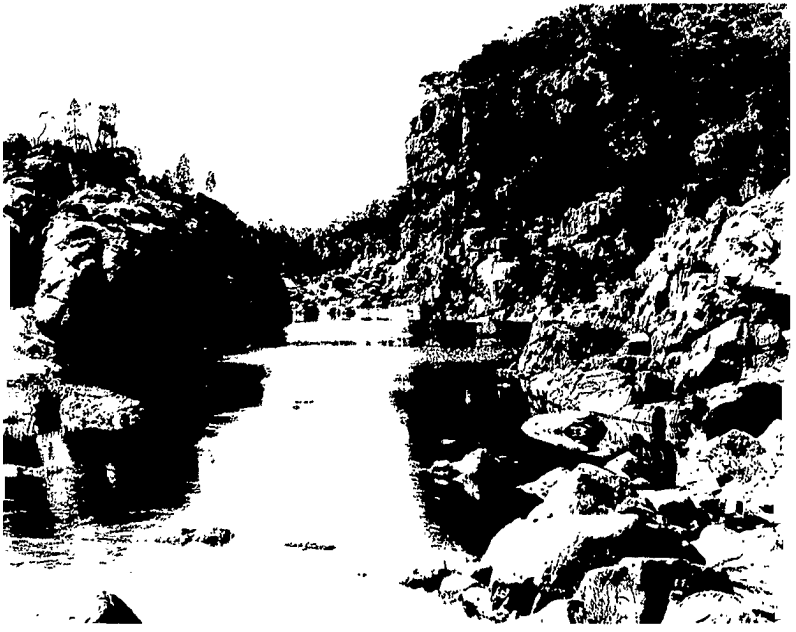
# Murrumbidgee River in the A.C.T. Region



REPORT OF THE JOINT COMMITTEE ON THE AUSTRALIAN CAPITAL TERRITORY
JULY 1984

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

# MURRUMBIDGEE RIVER IN THE A.C.T. REGION

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JULY 1984

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## JOINT COMMITTEE ON THE AUSTRALIAN CAPITAL TERRITORY

The Joint Committee on the Australian Capital Territory was first appointed by resolution of both Houses of Parliament in 1957 and has been re-appointed in succeeding Parliaments. Both Houses resolved to appoint a Joint on the last sitting day in 1956 but time did not permit the appointment of members. The present Committee was appointed for the life of the 33rd Parliament by resolutions of the Senate and the House of Representatives in May 1983.

The duties of the Committee as specified in its Resolution of Appointment are to inquire into and report on:

(a) all proposals for modification or variations of the plan of lay-out of the City of Canberra and its environs published in the Commonwealth of Australia Gazette on 19 November 1925, as previously modified or varied, which are referred to the committee by the Minister for Territories and Local Government, and

(b) such matters relating to the Australian Capital Territory as may be referred to it by:

(i) the Minister for Territories and Local Government, or

(ii) resolution of either Hous of the Parliament.



## TERMS OF REFERENCE FOR THE INQUIRY INTO THE MURRUMBIDGEE RIVER

1. To inquire into the physical, chemical and biological condition of the Murrumbidgee River in the Canberra region upstream from the Burrinjuck Dam with particular reference to the impact of past development on the river.

2. To examine the impact of future developments in the ACT region and of Canberra's future urban development on the Murrumbidgee River.

3. To consider the possible impact of future uses on the river, for example, water supply, irrigation, mineral extraction and recreation.

4. To consider the range of current and future uses of the river and standards of water quality appropriate to the reasonable protection of those uses.

5. To examine whether present policies and legislation are adequate to manage and protect the river and its immediate environs.

6. To suggest apt measures to safeguard the quality of the Murrumbidgee River and its environs.

7. To consider the economic cost involved in the attainment of the desired standards as referred to in Term 6.

8. To examine such other matters as the Committee may consider relevant to these issues and the future of the Murrumbidgee River within the ACT.

## MEMBERSHIP OF THE COMMITTEE

### 32nd Parliament

| | |
|---|---|
| Chairman: | Senator M.E. Reid |
| Deputy Chairman: | Mr K.L. Fry, M.P. |
| Members: | Senator G. Georges |
| | Senator D.J. Hamer, DSC |
| | Senator M.A. Colston |
| | Mr J.M. Bradfield, M.P. |
| | Mr W.P. Coleman, M.P. |
| | Hon. J.D.M. Dobie, M.P. |
| | Mr N.J. Hicks, M.P. |
| | Mrs R.J. Kelly, M.P. |
| Secretary: | Mr A.J. Kelly* |

### 33rd Parliament

| | |
|---|---|
| Chairman: | Mr K.L. Fry, M.P. |
| Deputy Chairman: | Senator M.E. Reid |
| Members: | Senator P.J. Giles |
| | Senator M.E. Lajovic |
| | Senator M. Reynolds |
| | Mr C. Hollis, M.P. |
| | Mrs R.J. Kelly, M.P. |
| | Mr P.J. McGauran, M.P. |
| | Mr P.M. Ruddock, M.P. |
| | Mr J.H. Snow, M.P. |
| Secretary: | Mr D.R. Elder** |

* Mr M. Adamson replaced Mr P.F. Bergin as Secretary to the Committee on 18/5/1981.
Mr A.J. Kelly replaced Mr M. Adamson as Secretary to the Committee on 5/7/1982.

** Mr Elder replaced Mr Kelly as Secretary to the Committee on 2/3/1984.



## ABBREVIATIONS AND TECHNICAL TERMS

| | |
|---|---|
| AWRC | Australian Water Resources Council |
| CCC | Canberra Canoe Club |
| CTHC | Capital Territory Health Commission |
| Cusecs | Flow of one cubic foot of water per second |
| DHC | Department of Housing and Construction |
| DTLG | Department of Territories and Local Government |
| Ephermeral | Short lived, lasting only a few days |
| Eutrophic | is a term used to describe bodies of water, rich in dissolved nutrients. This causes a high production of organic matter by aquatic weeds and algae. These plants flourish and they die, with their decay resulting in a depletion of dissolved oxygen in the bottom waters. Eutrophic waters are usually shallow. The process of eutrophication may occur naturally or from man made causes. |
| Gigalitres | a billion litres |
| LMWQCC | Lower Molonglo Water Quality Control Centre |
| MCC | Murrumbidgee Country Club |
| Megalitres | one million litres |
| MIA | Murrumbidgee Irrigation Areas |
| MMA | Murrumbidgee Monitor Association |
| Mesotrophic | describes intermediate stages between oligotrophic and eutrophic |
| NCDC | National Capital Development Commission |
| NCOSS | National Capital Open Space System |

| | |
|---|---|
| Oligotrophic | refers to bodies of water containing relatively low amounts of nutrients such that the production of organic matter is low and the level of dissolved oxygen in the water is high. |
| SPCC | State Pollution Control Commission |
| WCR | Water of the Canberra Region, NCDC Technical Paper No. 30 |
| WRC | Water Resources Commission |



## RECOMMENDATIONS

### Murrumbidgee River Corridor

1. The Committee recommends that developments within the Murrumbidgee River Corridor should be limited to those compatible with the primary purposes of the Corridor which are the preservation of the natural environment and heritage elements together with the provision of compatible recreation facilities. (Para. 3.69)

2. The Committee recommends development proposals should be the subject of an Environmental Impact Statement which is then available for public comment and input. Stringent environmental and human management guidelines should be a condition of development approval. (Para. 3.69)

3. As a first step in the preservation of the rural landscape setting of the Lanyon and Lambrigg homesteads, the Committee recommends that the River Corridor in the Lanyon-Riverview- Lambrigg area be widened to include those additional areas designated by NCDC in its draft Murrumbidgee River Corridor Policy and Development Plan as being for inclusion in the River Corridor subject to the Tuggeranong and West Murrumbidgee Reviews. These additional areas are:

- the area west of Tharwa Road near Williamson's Hill;
- the area immediately to the north of Lanyon Hill; and
- the area on the west bank of the Murrumbidgee opposite Lanyon stretching to the Tidbinbilla Road. (Para. 3.75)

4. The Committee recommends that nature conservation areas identified in the NCDC Draft Corridor Plan be declared under the Nature Conservation Ordinance 1980. (Para. 3.59)

5. The Committee recommends that the entire Murrumbidgee Corridor in the Australian Capital Territory be placed in the Register of the National Estate without further delay. (Para. 4.81)

### Environmental Protection of the Murrumbidgee River

6. The Committee recommends that the Water Pollution Ordinance and amendments to the Canberra Sewerage and Water Supply Regulations are completed and enacted within 3 months of tabling of this Report and that they be binding on the Crown in right of the Commonwealth. (Para. 4.52)

7. The Committee recommends that the Air Pollution (Stationary Sources) Ordinance be completed and enacted within three months and be binding on the Crown in right of the Commonwealth. (Para. 4.53)

8. The Committee recommends that the Minister for Territories and Local Government ensure that legislation to provide for the licensing of the sale, use, handling, storage and disposal of hazardous chemicals be implemented forwith. Legislation should also cover pesticides and other agricutural and veterinary chemicals. (Para. 4.56)

9. The Committee recommends that the Minister for Territories and Local Government ensure that adequate secure storage is provided in the ACT to cope with intractable wastes generated or held in the ACT. (Para. 4.58)

10. The Committee recommends that the Dangerous Goods Ordinance be redrafted and that the revised Ordinance be implemented as soon as possible. (Para. 4.64)

11. As the recommendation of the Report of the House of Representatives Standing Committee on Environment and Conservation - Hazardous Chemical Wastes, concerning discharges of chemical waste to the sewerage system does not appear to have been acted upon the Committee recommends that: discharges of chemical waste to the sewerage system be required to register the nature and volumes of the waste with the relevant authority. (Para. 4.51)

12. The Committee recommends that the Minister for Territories and Local Government discuss with the Canberra Abbatoir the impediments preventing the connection to the sewer line being made, and how these impediments can be overcome. (Para. 2.19)

13. The Committee recommends that a heritage ordinance for the ACT be completed and implemented ensuring that the Territory's heritage is conserved, made known and accessible. That ordinance should protect Aboriginal sites. In the meantime while this delegated legislation proceeds, the Committee recommends that DTLG act to preserve historic sites on leasehold land. (Para. 4.81)

14. The Committee recommends that the Minister for Territories and Local Government continue to seek the cooperation of the New South Wales Government to have remedial works at the Cowarra Mine dam completed. The Committee further recommends that should remedial works not be completed satisfactorily, water resources funding for New South Wales be reduced. (Para. 2.32)



15. The Committee recommends that the use of sediment and oil traps prior to stormwater entering lakes and streams be maximised. The Committee further recommends that the use of biological filters be further investigated and, if suitable for use in urban environments, their use be maximised in conjunction with sediment and oil traps. (Para. 2.39)

16. The Committee recommends that a breeding program of Macquarie Perch and Trout Cod be undertaken by the Department of Territories and Local Government to enable the River to be re-stocked with these species. (Para. 3.65)

17. The Committee recommends that the international Convention aimed at conserving wetlands of international significance be taken into consideration before a decision on the Lake Mejum Storage Proposals is made. (Para. 3.112)

**Coordination of Administrative Arrangements**

18. The Committee recommends that the Water Use Plan for the whole of the ACT should be completed without delay. (Para. 3.124)

19. The Committee recommends that the Minister for Territories and Local Government negotiate with the New South Wales Government to ensure that water released from Tantangara Reservoir to maintain minimum flows at Cotter Crossing does reach the ACT. (Para. 3.97)

20. The Committee recommends that DTLG monitor water extraction to ensure that all pumping from the River is authorised. (Para. 3.100)

21. The Committee recommends that the Minister for Territories and Local Government seeks from the New South Wales Government cooperation to ensure that in keeping with the Seat of Government Acceptance Act 1909, New South Wales water management plans for the Queanbeyan and Molonglo Rivers be drawn up in close consultation with the Water Quality sub-committee of the Commonwealth Inter Departmental Committee on Environmental Quality in the ACT. (Para. 4.9)

22. The Committee recommends that the Minister for Territories and Local Government becomes a member of the Australian Water Resources Council until self-government when the position should be reviewed. (Para. 4.94)

**Effects of Urban Development on the Murrumbidgee River**

23. The Committee recommends that all proposals for further development in Tuggeranong, including urban development south of the presently gazetted suburbs and the Town Centre development, be referred to this for examination and report, at an early stage in planning. (Para. 5.8)

24. The Committee recommends that the Minister for Territories and Local Government formalise his decision that there will be no urban development on the western side of the Murrumbidgee River to ensure that this decision can not be arbitrarily changed at a later date. (Para. 5.9)

25. The Committee recommends that:

(a) there be no urban development south of the Lanyon Hill ridgeline on either side of Tharwa Drive;

(b) Tharwa Drive be retained and the proposed Wright's Drive not be proceeded with; and

(c) the existing entrance drive to Lanyon homestead be retained. (Para. 5.21)

26. The Committee recommends that construction work on the Tuggeranong Town Centre not commence until special measures are in place to protect the River from runoff until Lake Tuggeranong is completed, and further that NCDC report on the special measures when the Town Centre development briefing is provided to the Committee for examination and report as recommended in paragraph 5.8. (Para. 5.14)

27. The Committee recommends that the Minister for Territories and Local Government seek assurances from the New South Wales Government that the impact of urban runoff on Jerrabomberra Creek is minimised. (Para. 5.27)

**Murrumbidgee Country Club**

28. The Committee recommends that the Murrumbidgee Country Club proposal proceed but that the granting of a lease to the Club be conditional on adequate guarantees being made that each stage can be completed. (Para. 5.63)

29. The Committee also recommends that any housing constructed in the Country Club Estate, that would be visible from the Red Rocks area be restricted by siting and design controls to single storey level. (Para. 5.63)



## CONDUCT OF THE INQUIRY

On 23 January 1981 the Minister for the Capital Territory, the Hon. Michael Hodgman, M.P., forwarded to the Committee suggested Terms of Reference for an inquiry into the Murrumbidgee River. The suggested Terms of Reference were accepted by the Committee and are set out on page 5 of this report.

The inquiry was advertised in major metropolitan newspapers and in newspapers in the surrounding region. The Committee received 49 formal submissions from a wide range of organisations and individuals concerned with the Murrumbidgee River in the ACT. In addition to organisations and individuals in the ACT there were submissions from local government individuals and producer organisations within the surrounding region as well as Federal Government Departments and Authorities.

The Committee held seven public hearings at which 67 witnesses appeared before the Committee. These included representatives from 25 organisations. The transcript of evidence taken at those hearings is available for inspection at the Committee Office of the House of Representatives and the National Library. Public hearings were held in Canberra, Sydney and Yass and 1379 pages of evidence was taken. Appendix I lists the witnesses who appeared before the Committee, while Appendix II lists those persons and organisations who made submissions but were not called to provide evidence in public.

In addition the Committee held informal discussions with members of Shire Councils in Leeton and Griffith, the Murrumbidgee Valley Water Users' Association, representatives of the NSW Rice Marketing Board, officials of the CSIRO Centre for Irrigation Research at Griffith and officers of the New South Wales Water Resources Commission, as well as conducting eight inspections. Appendix III lists dates and places inspected.

The co-operation and assistance given to the Committee during the course of the inquiry is acknowledged. The Committee expresses its thanks to all who made submissions or appeared as witnesses.

## CHAPTER 1

## DESCRIPTION

### The Murrumbidgee River Inquiry

1.1 The purpose of this Inquiry is to examine the Murrumbidgee River in the Canberra region from its headwaters in the Snowy Mountains down to the Burrinjuck Dam. The scope of the inquiry is quite broad as the Committee's reference is not confined to merely examining the physical or chemical condition of the River. The Committee is to consider the impact of past and future developments and uses upon the River (for example, urban development, recreation, heritage aspects, water consumption and sewage treatment), as well as to assess the adequacy of present policies and legislation in safeguarding the quality of the River and its environs including the fauna and flora.

1.2 As all waterways in the ACT flow into the Murrumbidgee River, the Inquiry covers the entire water system in the ACT.

1.3 A matter which already fell within the Terms of Reference of the Inquiry but which the Minister for Territories and Local Government specifically asked the Committee to consider was the environmental impact on the Murrumbidgee River Corridor of the proposed Murrumbidgee Country Club.[1]

### The Significance of the Murrumbidgee River

1.4 The Murrumbidgee River is a major tributary of the Murray-Darling River system of South-eastern Australia. The Murray-Darling system is the largest river system in Australia. It drains 1 062 000 sq km of country in Queensland, Victoria, South Australia, New South Wales and ACT, which is nearly one-seventh of the total area of Australia. There are numerous water storage dams within the system for irrigation storage, hydro-electricity generation and to a lesser extent flood mitigation. Early this century a series of locks and weirs were built on the Murray to enhance river navigability. A map of the Murray-Darling system is at Figure 1.

1.5 The Murrumbidgee is almost 1600 km in length from its source in the Snowy Mountains, in New South Wales, to its junction with the Murray near the town of Balranald. The Murrumbidgee Basin drains approximately 87 000 sq kilometres in the State's southern inland area. It is bounded on the east by the Great Dividing Range, and lies between the Lachlan River valley to the north and the Murray River valley to the south. It is one of the most important inland waterways in NSW.



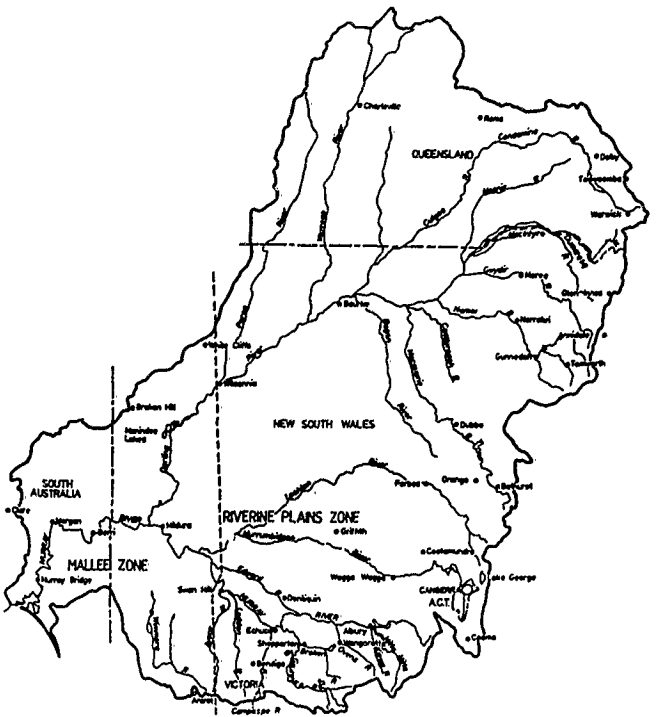



Figure 1: MURRAY-DARLING DRAINAGE AREA

1.6 The Murrumbidgee rises in the Fiery Range of the Snowy Mountains about 30 km north of the town of Kiandra in South-east NSW. After flowing a short distance it enters the Tantangara Reservoir. On leaving the Reservoir, the River proceeds in a south-easterly direction towards Cooma, then veers in a northerly direction to the Australian Capital Territory. Two secondary streams, the Umaralla and the Bredbo Rivers, which rise in the Great Dividing Range to the east, join the Murrumbidgee upstream of the ACT border.

1.7 The River enters the ACT at Angle Crossing flowing through 60 km of varying terrain before leaving the ACT and flowing another 30 km to Burrinjuck Reservoir. While the Murrumbidgee is over 230 km in length from its source in the Snowy Mountains to the Burrinjuck Dam, only 60 km of the River is within the ACT. Figure 2 is a map of the Upper Murrumbidgee Basin.

1.8 The Murrumbidgee downstream of Burrinjuck Dam passes through several major country centres, such as Gundagai, Wagga Wagga, Narrandera and Hay, as well as the agriculturally important Murrumbidgee and Coleambally Irrigation Areas. Many cities, towns and agricultural areas downstream of Canberra depend heavily on the water of the Murrumbidgee River for irrigation, town water supplies, watering of stock and sewage effluent disposal.

1.9 A distinctive feature of the Murrumbidgee in the ACT region is that the streamflow of the River is subject to great fluctuations, both seasonal and annual. In 50 years of recordings at Cotter Crossing in the ACT, the annual discharge has varied within the range of 173-3800 million cubic metres. In the major flood of 1974, the maximum flow, averaged over a day, was 2 300 cubic metres per day. Between 1927 and 1984 there were approximately 60 days on which there was no flow in the Murrumbidgee River at Cotter Crossing. The River stopped flowing for eight days and was at a very low rate of flow for about three months in late 1982 and early 1983.[2]

## Physical Aspects

1.10 Before commencing with a physical description of the components of the ACT water system, including the Murrumbidgee, it is worthwhile to note the operation of the Tantangara Dam located at the headwaters of the River.

### Tantangara Dam and the Murrumbidgee River

1.11 The Tantangara Dam was built by the Snowy Mountains Hydro-Electricity Authority on the upper reaches of the Murrumbidgee as part of the Snowy Mountains Scheme and completed in 1960. Its purpose is to divert water from the headwaters of the Murrumbidgee to Lake Eucumbene for hydro-electric generation and irrigation in the lower Murray and Murrumbidgee basin.



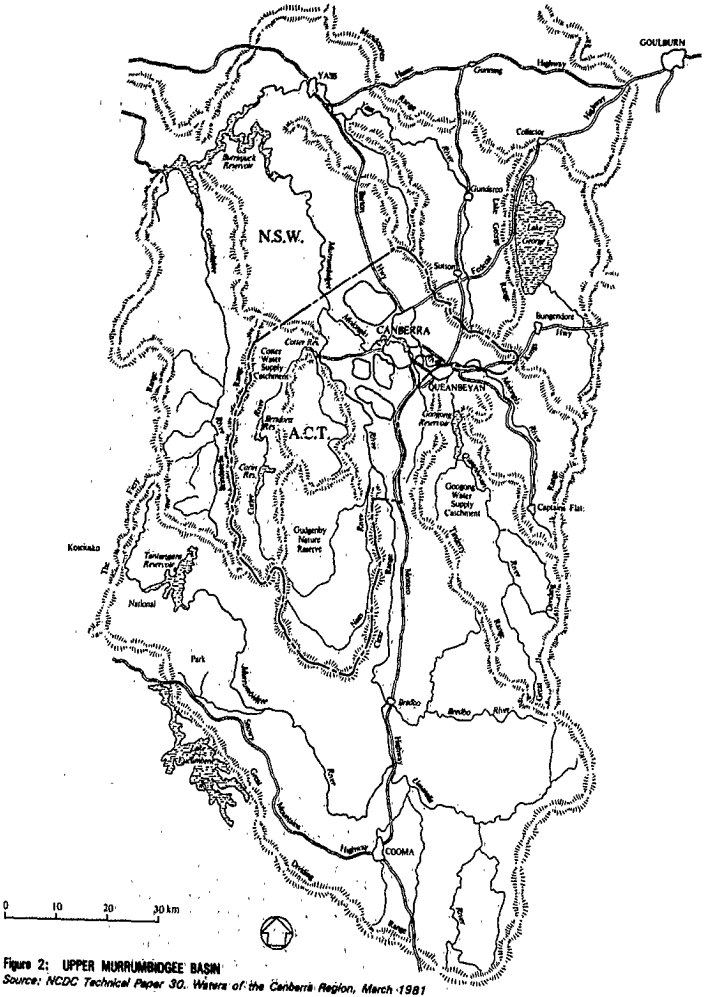



Figure 2: UPPER MURRUMBIDGEE BASIN
*Source: NCDC Technical Paper 30, Waters of the Canberra Region, March 1981*

1.12 The National Capital Development Commission (NCDC) has estimated that a significant component of the Murrumbidgee flow, approximately 27 per cent of the mean annual flow as measured at Cotter Crossing, has been diverted by the Dam.[3]

1.13 Discussions were held between the responsible Commonwealth and NSW State Government authorities and the Snowy Mountains Council prior to the commencement of operation of Tantangara. It was determined that the water release from the Reservoir to maintain River flow in dry periods would be up to a maximum flow of 83 megalitres (34 cusecs) a day, or the total inflow to the storage, whichever is the lesser.[4]

1.14 This release formula is designed to meet user entitlements downstream and maintain specific minimum flow levels of 31.8 megalitres per day (13 cusecs) at Mittagong Crossing, just downstream of Cooma, and 17.1 megalitres per day (7 cusecs) at Cotter Crossing in the ACT. However, the Department of Territories and Local Government (DTLG) noted in its supplementary submission to the Inquiry that 'in drought conditions, when no flow is entering Tantangara Dam, minimum flow levels cannot be maintained down-stream in the Murrumbidgee'.[5] There is also the possibility that not all released water would reach the ACT due to withdrawal by irrigation users upstream of the ACT. The Committee does not believe that this is a problem at present. However there is a need for close coordination between Commonwealth and State authorities to regulate water allocation and withdrawal within the Murrumbidgee Basin so as to permit the optimum use of the water and ensure adequate flows to downstream users.

**Bredbo River and Cowara Mine**

1.15 Tailings from a disused gold mine, the Cowarra Mine, are polluting a tributary of the Bredbo River close to its junction with the Murrumbidgee River. A tailings dam at the Mine is slowly collapsing and further corrective works are required to protect the otherwise high quality waters of the area. This matter is dealt with further in Chapter 2.

**The Murrumbidgee in the ACT**

1.16 Figure 3 shows an outline of the ACT river system. The Murrumbidgee in the ACT is described below.

(a) Angle Crossing to Gudgenby River - 9 km

The Murrumbidgee enters the ACT at Angle Crossing, where it is characterised by sand and rock terraces and beaches. Sheep and cattle grazing dominate land-use on both sides of the River. Downstream on the upper eastern valley slopes are areas of open forest, regenerating forest and savannah woodland, while on the western slopes,



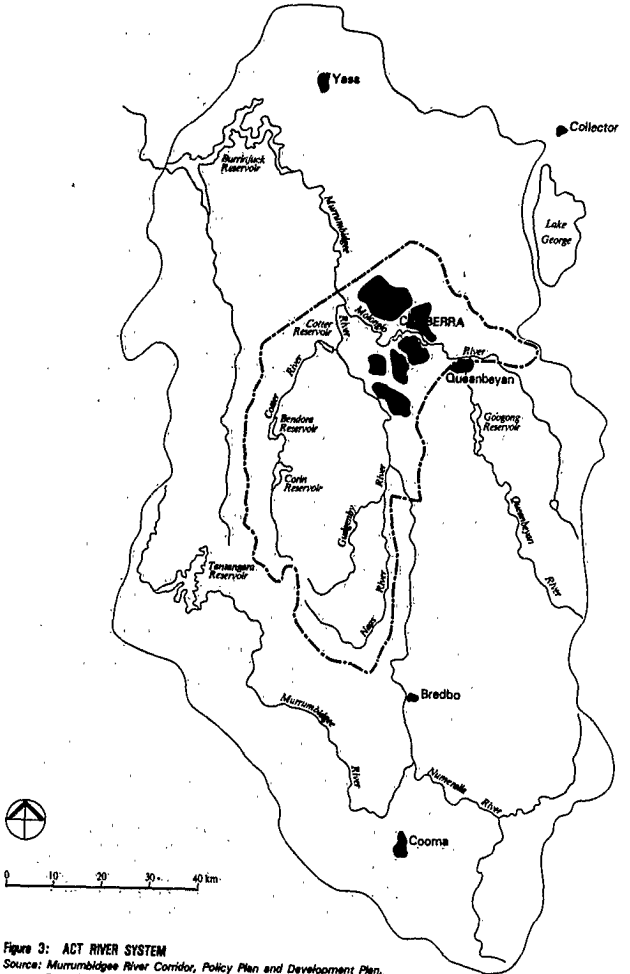



**Figure 3: ACT RIVER SYSTEM**
*Source: Murrumbidgee River Corridor, Policy Plan and Development Plan, Draft for Discussion NCDC, October 1983*

commercial pine plantations have been established well back from the immediate River environs in the Ingledene area.

(b) Gudgenby River to Point Hut Crossing - 10.5 km

Downstream of the Gudgenby confluence, the River valley opens to extensive river flats. Located approximately one kilometre down from the confluence is the village of Tharwa. The long history of grazing and agriculture in the area has led to a considerable change from the natural environment. The River, which is generally deep and placid in this section, is deeply entrenched below the surrounding plain where the natural woodland or natural grassland has been largely replaced by improved pasture or crops. The historic properties of Lambrigg, Lanyon and Cuppacumbalong are located on this section of the River. The Gudgenby-Naas catchments are dealt with further later in the chapter.

(c) Point Hut Crossing to Tuggeranong Creek - 6 km

From Point Hut Crossing the character of the River changes with a diverse range of scenery characterised by sandy beaches, rocky shrub-covered banks, pools and rapids. The slopes adjacent to the River on the east are generally treeless and moderately steep. Recreation areas have been established at Point Hut and Pine Island, where there is good access to the River. Further back from the River the terrain is open and undulating and used for sheep grazing. The historic property of Tuggeranong is situated on the east side of this part of the River.

(d) Tuggeranong Creek to Kambah Pool - 5 km

The River flows through the rugged Red Rocks Gorge and from the cliff tops surrounding the Gorge, the land rises steeply and is covered with regenerating native forest. Access into the Gorge is difficult, however urban development in Kambah is only 2 km away. Downstream of the Gorge lies the major recreation area of Kambah Pool. The Pool lies in a deep sided part of the River with slopes rising steeply on the west through native forest to the top of the Bullen Range.



(e) Kambah Pool to Cotter River - 12.4 km

For 5 km the River moves away from the Bullen Range to enclose an area of undulating land within a loop in the River. It then flows to the west through the steep escarpment of the forested Bullen Range. At the downstream end, the Cottermouth Scout Camp and Greenhills Conference Centre overlook the River on the eastern bank at its junction with the Cotter River. A short distance upstream on the Cotter River is the Cotter Recreation Reserve, which together with Casuarina Sands on the Murrumbidgee forms an important recreation area. The significance of the Cotter catchment will be dealt with later in the chapter.

(f) Cotter River to NSW Border - 16.8 km

The Murrumbidgee provides considerable and well used public recreation facilities at the Cotter Camping Ground and at Casuarina Sands picnic area. At Casuarina Sands two weirs have been built on the River to improve its value for swimming. These weirs now include fish ladders. From Casuarina Sands the River passes through gorges, with no easy access until the valley broadens at Uriarra Crossing. The Murrumbidgee then passes the YMCA Camp at Sturt Island before being joined by the Molonglo River.

The Lower Molonglo Water Quality Control Centre (LMWQCC) is located near the confluence, and discharges highly treated sewage effluent into the River. Cliffs and steep slopes overlook the River downstream of the confluence. The River remains deeply entrenched until it flows out of the ACT a short distance downstream.

The vegetation is quite variable in this section, with river oaks and various shrubs dominating the margins of the River, and areas of native forest, pine plantation on the west bank and grazing land overlooking it on the upper slopes.

1.17 Downstream of the ACT, the Murrumbidgee traverses 30 km of precipitous terrain to Taemas Bridge at the head of the Burrinjuck Reservoir. Three rivers flow into the Burrinjuck Reservoir; the Murrumbidgee, the Goodradigbee and the Yass Rivers.

1.18 The Upper Murrumbidgee basin above Burrinjuck Dam drains an area of approximately 13 000 sq km. With its main tributary streams being the Cotter, Molonglo and Gudgenby Rivers, the catchment in the ACT accounts for only 2356 sq km or less than 18 per cent of the Upper Murrumbidgee Basin.[6] Figure 4 shows the relative contributions of various rivers to the Burrinjuck Reservoir.

## The Tributaries of the Murrumbidgee River in the ACT

### Cotter River

1.19 The Cotter River rises in the Brindabella Ranges in the South-west of the ACT. The Cotter is of great importance to the ACT because approximately half of the River flow (on a long term average) is utilised for Canberra's water supply. Until 1978, when Googong Dam was completed, the Cotter provided all of Canberra's drinking water. Water quality is quite high and requires little treatment. Human habitation and other activities deleterious to the protection of water quality are prohibited. An extensive part of the Cotter catchment area is native forest with some commercial pine plantations. Three storage dams are located on the River, they are the Cotter, Bendora and Corin Dams. The Cotter system has the capacity to serve a population of 215 000 people. Canberra's water supply system is dealt with further at the end of Chapter 3.

### Queanbeyan and Molonglo Rivers

1.20 Under the provisions of the Seat of Government Acceptance Act 1909, the use and control by the Commonwealth of the water resources of the Queanbeyan and Molonglo Rivers located in NSW, is paramount.[7]

1.21 The Googong Reservoir is located in NSW on the Queanbeyan River which has its source in the Great Dividing Range to the east of the ACT. As the catchment of the Reservoir includes inhabited rural land and the River can have relatively high turbidities, full water-treatment facilities have been provided. The Googong treatment plant, completed in 1978, currently has a capacity to serve a population of 115 000 and will ultimately have a capacity to serve 150 000 (124 410 Megalitres).

1.22 As well as providing town water supplies, these storage dams do provide some capacity for maintaining river flow downstream during dry periods.

1.23 The Molonglo River has its source to the east of Canberra near the NSW town of Captains Flat, at the base of the Great Dividing Range. It is joined near the ACT border by the Queanbeyan River and flows through Lake Burley Griffin. After leaving the Lake, it flows approximately 12 kms before entering



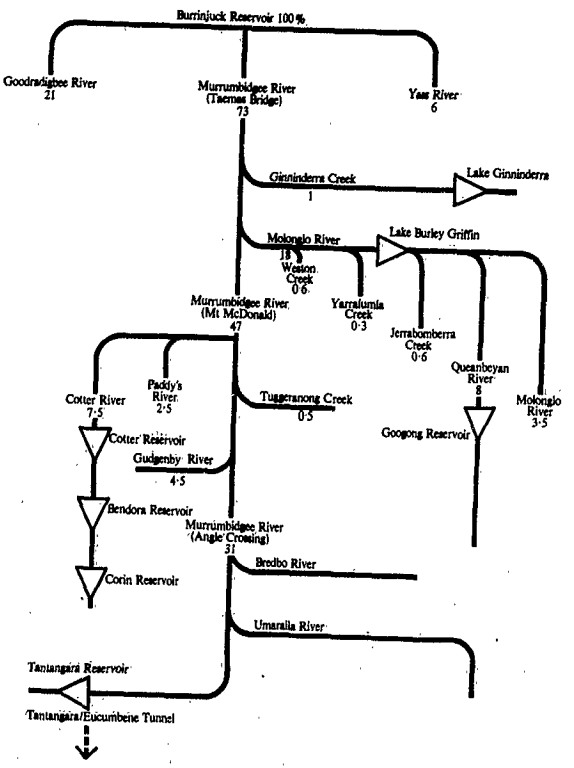



**Figure 4: SUB-CATCHMENT RUNOFF AS A PROPORTION OF INFLOW TO BURRINJUCK RESERVOIR 1980-1978**
*Source: NCDC Technical Paper 30, Waters of the Canberra Region, March 1981*

the Murrumbidgee upstream of the LMWQCC. The upper Molonglo River was in the past heavily polluted by chemicals leaching from tailings from past zinc mining operations at Captains Flat. These included zinc, lead, copper and sulphur. Remedial works were conducted in the 1970s and have significantly removed the source of the problems, although elevated levels of the pollutant metals are still found downstream.

### Naas/Gudgenby Rivers

1.24 The Naas and Gudgenby Rivers rise in the Boboyan Divide and Scabby and Clear Ranges in the South-west of the Territory. The Naas flows into the Gudgenby near Mt Tennant several kilometres upstream of its junction with the Murrumbidgee. For most of their courses the Rivers are surrounded by extensive native forest which constitutes the Gudgenby Nature Reserve. The Reserve was gazetted in June 1982 under the Public Parks Ordinance and in late 1983 was regazetted under the Nature Conservation Ordinance. The rivers provide approximately 4.5 per cent of the inflow to Burrinjuck Reservoir.[8] These rivers contribute water of high quality and forward planning indicates that the next storage dam for the ACT will be constructed on the Gudgenby River near Mt Tennant.

## The Urban Lakes

### Lake Burley Griffin

1.25 Lake Burley Griffin was established in 1964 with the construction of Scrivener Dam across the Molonglo River. It is an essential element of Burley Griffin's Plan of Canberra. It consists of six basins along its 9.1 km length. The dominant inflow is from the Molonglo River. The Lake is primarily a landscape feature, and hence is maintained at a constant level, with release volume at the Dam reflecting inflows at the eastern end of the Lake. The Lake also serves as an important ecological system and enables some pre-treatment of polluted waters before draining to the Murrumbidgee River.

1.26 The Lake is a major recreational area, particularly for swimming, boating and fishing. Water quality problems resulting from sewage overflows and algae formation have led on occasions to health warnings not to swim in the Lake. The Lake is generally shallow with significant areas of weed growth, which is particularly evident during dry summers. Generous numbers of trees and shrubs are planted around the shoreline in formal and less formal parkland settings. Clumps of tall aquatic weeds occur at intervals along the shoreline. The soft edges of the western area of the lake and the Molonglo River form a contrast with the more formal and less biologically diverse stone walls and hard edges in the more intensively developed parts of the Lake such as Central Basin.



### Jerrabomberra Wetlands

1.27 At the northern end of Lake Burley Griffin is an area known as the Jerrabomberra Wetlands which is inhabited by a variety of waterbirds. Approximately 150 species of birds have been recorded on or adjancent to the Lake.

1.28 The Jerrabomberra Wetlands and the adjacent Molonglo Reach comprise the most significant wetland habitat in the ACT which interacts closely with other regional aquatic ecosystems such as Lake George, Lake Bathurst and Lake Ginninderra.

1.29 The wetlands, which are watered by Jerrabomberra Creek, extend throughout a large area lying between Lake Burley Griffin and Dairy Flat Road and between Jerrabomberra Creek and the Molonglo River. They provide important feeding, refuge and breeding resources for large numbers of resident and migrant waterfowl, as well as for fish and aquatic mammals such as platypus and water rat. As part of the overall ecological system of the Lake, the Jerrabomberra Wetlands represent the principal nesting and breeding site for a large proportion of the waterfowl that frequent the main body of the Lake.

1.30 NCDC, in cooperation with DTLG, is currently developing the Jerrabomberra Wetlands as a refuge for waterbirds but providing special public viewing and interpretation areas to allow the birds to be observed with minimal disturbance. The public viewing and interpretation areas are being developed in the southern area of the Wetlands around Jerrabomberra Pool and Kelly's Swamp. Walkways, viewing mounds, blinds for the viewing of waterbirds, pedestrian access, footbridges and car parks are being developed or will be developed to enable public viewing and interpretation in these areas.

1.31 Another developmental proposal in the area referred to the Committee in the 82nd Series of Variations in March 1984, was for the construction of a cycleway through the western section of the Wetlands. This cycleway would complete the cycle route around the Lake. To protect the refuge area in the western section of the Wetlands, NCDC proposed constructing a moat between the cycleway and the refuge area to act as a buffer system. In NCDC's view, the use of the proposed cycleway with the moat in place would not disturb the waterbirds to such an extent that the refuge nature of the area for the birds would be destroyed. However, the Committee received evidence from the Canberra Ornithologists Group that the use of the cycleway would seriously disturb some of the shyer water birds and that the net effect of the disturbance would be to reduce the diversity of bird life in the Wetlands.[9] The Committee will report to Parliament in detail on the cycleway proposal in a further report on the 82nd Series of Variations.

1.32 There has been increasing concern in recent years that waterbird breeding areas are being threatened by urban development and the drainage of rural land. The Committee believes that the Jerrabomberra Wetlands, as a very significant waterbird habitat in a local and regional context, should be adequately protected. However, its location in urban environment means that it also provides the opportunity for use as an attractive recreation resource for residents and tourists. By developing the Wetlands to permit public access and interpretation to selected parts under controlled conditions, the area could become a significant tourist attraction, without seriously impairing its ecological value as a waterbird refuge.

1.33 To ensure that an appropriate balance is struck it is essential that, while selected areas are developed for controlled public access, other areas of the Wetlands should remain largely undisturbed to provide refuge areas for the birds. As the southern areas around Jerrabomberra Pool and Kelly's Swamp are being developed for public viewing and interpretation, there are strong arguments for confining development to this area and severely restricting access to other areas of the Wetlands, particularly the western 'fingers' areas.

### Lake Ginninderra

1.34 Lake Ginninderra was formed in 1974 by the construction of an embankment across Ginninderra Creek. It is also a landscape feature and consequently is maintained at a constant level. The Lake comprises a broad basin on the western side with a narrow reach on the eastern side. Ginninderra Creek enters the Lake at the top end of the eastern arm. Shallows at the top end of the Lake are attractive to water birds and some work has been done to enhance this habitat. This work cannot be completed until the Naval Radio Station is moved. Lake Ginninderra is also used for swimming and boating.

1.35 It is smaller than Lake Burley Griffin and serves the town of Belconnen. As well as providing some pollution control, it provides water recreation facilities in an area not well endowed with natural recreation areas. Apart from Lake Ginninderra, all of the natural sites for water-based recreation are on, or south of, the Molonglo, as are most of the popular picnic and barbecue sites.[10]

1.36 There is also some concern about the current and future water quality in this Lake. Water quality control will become more critical with the beginning of construction of the new town of Gungahlin upstream of the Lake.



### Lake Tuggeranong

1.37 It is proposed to incorporate a lake adjacent to the Town Centre site at Tuggeranong. The Lake will be formed by a dam below the junction of Tuggeranong and Village Creeks. It will be smaller than Lake Ginninderra and is quite small relative to the urban area draining into it. Apart from its function in stormwater management and as a landscape feature, the Lake may provide some recreational facilities. However, investigations undertaken by the NCDC over several years indicate that the level of nutrient loading on the proposed lake may be such that at times the water quality of the Lake may well fall short of community expectations of recreational and visual amenity. The NCDC is considering possible solutions to solve this problem.

## The Murrumbidgee River downstream of the ACT

### Burrinjuck Reservoir

1.38 As mentioned earlier, upon leaving the ACT the Murrumbidgee traverses 30 km of precipitous terrain before reaching Taemas Bridge at the head of the Burrinjuck Reservoir. The Reservoir was initially formed in 1912, and has been augmented several times since. It extends about 55 km from the dam wall to Taemas Bridge. It has a capacity of 1 026 000 megalitres when filled to the maximum conservation level.[11] On average river flows into the Reservoir, the Murrumbidgee River contributes about 70 per cent, the Goodradigbee River 23 per cent and the Yass River 7 per cent.[12]

1.39 It is an important headwork storage for irrigation and urban water supplies for the Murrumbidgee and Coleambally Irrigation Areas and the remainder of the lower river basin. It is also used extensively for recreation. The water quality of the Reservoir is an important consideration. The Murrumbidgee arm of the Reservoir had been under great ecological stress from sewage effluent from Canberra, particularly during the 1970s. While there has been a very marked improvement in the Murrumbidgee following the commissioning of the LMWQCC, Burrinjuck Reservoir has been slow in showing improvement. This has generally been attributed to the build up of nutrient rich sediments in the Reservoir and the drought which extended for several years before breaking in 1983.

1.40 The amount of water stored in the Burrinjuck Reservoir is subject to considerable fluctuations, particularly during the November-March irrigation period when the Reservoir may be substantially reduced. The Reservoir was almost emptied in 1967-68, while in other years, 1970-74, it has remained almost full. In early 1983 storage levels were the lowest since 1968, but in early 1984 the Reservoir was full.

1.41 To ensure continuity of supply of water to the Murrumbidgee and Coleambally Irrigation Areas, the flow of water in the Murrumbidgee River is regulated by the storing and discharging of water from the Blowering and Burrinjuck Dams.

1.42 Blowering Dam which has a capacity of 1 628 000 megalitres is situated 13 kilometres south of Tumut on the Tumut River. Water released from Blowering Dam flows down the Tumut River to its junction with the Murrumbidgee River. The combined flow continues down to Berembed Weir, 386 km from Burrinjuck Dam where it is diverted to the Murrumbidgee Irrigation Area main canal.

The Murray-Darling River System

1.43 The water resources of the Murray-Darling are the most fully committed of any river in Australia. According to the 1975 Review of Australian Water Resources, 15 941 Gigalitres (Gl) were committed annually out of a possible average annual exploitable yield of 18 372 Gl, with a further 793 Gl as planned or authorised commitments. That is, 91 per cent of Murray water is now committed.[13] Commitments include evaporative losses from storages and rivers.

1.44 The present high demands placed on the waters of the Murray-Darling system and the fact that the Murray has stopped flowing at its mouth several times emphasise the need for careful management of water resources within the system including those of the Murrumbidgee. As rivers within the system cross several State and Territory boundaries coordination and cooperation of the water management authorities is essential.



ENDNOTES

1. Evidence, p. 1027.
2. Evidence, pp. 1291-2.
3. NCDC Technical Paper No. 30, p. 3/10.
4. Evidence, p. 1111.
5. ibid.
6. NCDC Development and Policy Plan, p. 9.
7. Paragraph 2, First Schedule.
8. Evidence, p. 1252.
9. Evidence to 82nd Series of Variations, p. 360.
10. Professor G. Seddon, 'An Open Space System for Canberra', NCDC, Technical Paper No. 23, Canberra, October 1977, pp. 47-48, and ACT Committee Report Ginninderra Creek-Lake Ginninderra, Canberra, February 1979, pp. 5, 10.
11. NCDC Technical Paper No. 30, p. 3/10.
12. Australian Water Resources Report 1976.
13. Evidence, p. 1274.

## CHAPTER 2

### ENVIRONMENTAL CONSIDERATIONS

2.1 The Murrumbidgee River system in the region of the ACT, like most other inland river systems in Australia is characterised by wide fluctuations between extended dry periods and major floods. The NCDC observed:

> The extreme variability in flow is the principal determinant of water quality, in terms of controlling the level of pollutants transported to streams, the ambient levels of pollutants in streams, and the ecological processes prevailing in lakes and streams. A large number of streams in the basin are ephemeral.

The Murrumbidgee itself has stopped flowing on a number of occasions when prolonged droughts have occurred. It ceased flowing for more than a week early in 1983. This occurred during a three month period of very low flows. Figure 5 shows the nature of these fluctuations. There are marked fluctuations between years as well as seasonal variations within years.[1]

2.2 Urban areas affect adjacent waterways by taking their water supplies from them and by discharging stormwater and sewage effluents into them. Runoff waters from urban areas discharged through the stormwater system generally contain higher nutrient levels, bacteria and chemical contamination than runoff from rural land. The impact of sewage effluent is very much dependent on the level to which it is treated and the degree of dilution that occurs in the receiving waters.

2.3 A major determinant of water quality of waterways passing through urban areas is the size of the urban area. While careful controls of urban wastes entering waterways can considerably reduce their impact, the limitations of economic, engineering and enforcement measures mean that some reduction of water quality is inevitable. Consequently as a city grows its environmental impact is also likely to grow.

2.4 Canberra's growth was slow from the 1910s to the mid-1950s by which time the population had reached around 35 000. By 1962 the population had leapt to 65 000 and in the mid-1970s was over 200 000. Growth since the mid-1970s has been much slower. This rapid growth from the later 1950s to the mid 1970s radically altered the environment including waterways. The lack of capacity of sewage treatment plants to cope with the population growth had the worst impact on the waters of the region. The Lower Molonglo Water Quality Control Centre was designed and built to overcome these problems.



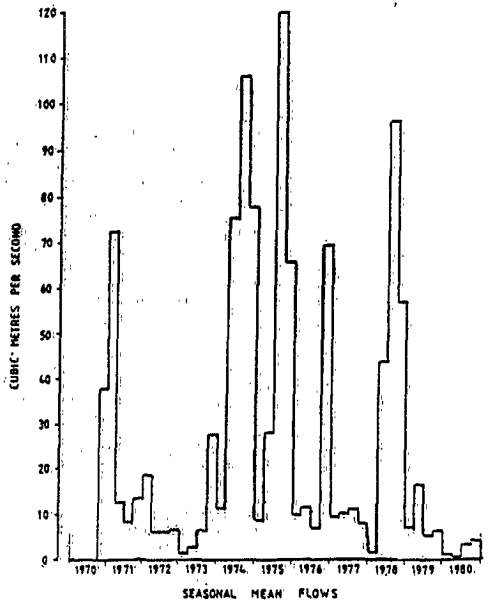



Figure 5: MURRUMBIDGEE RIVER UPSTREAM OF THE MOLONGLO RIVER CONFLUENCE

## Current Water Quality in the ACT Region

2.5 The waters of the Murrumbidgee system upstream of the ACT are relatively free from the major impacts of urban areas. On the basis of three major studies, by NCDC it described waters upstream of Canberra as:

> generally of high quality, low in total soluble salts, bacteria and nutrients, and except for periods of flood, low in turbidity and suspended solids, and free of heavy metals and pesticides. These waters were found to support a diverse flora and fauna, generally typical of oligotrophic* waters.[2] (*See next paragraph)

In contrast the waters downstream of Canberra during the period of the studies (1976-78) were found to be heavily polluted with nitrogen, phosphorus and bacteria.

2.6 Oligotrophic, eutrophic and mesotrophic are terms used to describe water quality conditions. Oligotrophic refers to bodies of water containing relatively low amounts of nutrients such that the production of organic matter is low and the level of dissolved oxygen in the water is high. Eutrophic refers to bodies of water, rich in dissolved nutrients. This causes a high production of organic matter by aquatic weeds and algae. These plants flourish and they die, with their decay resulting in a depletion of dissolved oxygen in the bottom waters. Eutrophic waters are usually shallow. The process of eutrophication may occur naturally or from man made causes. Mesotrophic describes intermediate stages between oligotrophic and eutrophic.

## Sources of Pollution

2.7 The water pollution problems identified by the three studies during 1976-1978 were grouped into five principal categories:

- nuisance plant growth (eutrophication) as a result of the discharge of nutrient-rich sewage effluents;
- oxygen depletion and high levels of ammonia as a result of sewage effluent discharges, or indirectly due to decomposition of plant material when growth has been stimulated by nutrient-rich sewage effluents;
- turbidity of recreational waters, principally from urban runoff under certain flow regimes;
- bacteriological pollution of recreational waters, due to discharges of sewage effluent and urban runoff;



- debris, oil and organic matter conveyed by urban stormwater drains.

2.8 The marked fluctuations in river flows that occur within the system have a significant effect on pollution. Storms result in increased turbidity from rural and urban runoff and debris swept into urban stormwater drains.

### Sewage Effluent

2.9 With a few exceptions, all land in the ACT leased for industrial, commercial and residential use is connected to the sewerage system as part of the land development process. The LMWQCC located at the confluence of the Molonglo and Murrumbidgee Rivers treats most of the sewage wastes of Canberra. There are several smaller treatment works in the ACT. The Fyshwick works built in 1967 provide primary and secondary treatment processes to serve a population-equivalent of 20 000 persons. Its continued operation is reviewed annually. Two minor plants are located at Casuarina Sands and at the Hume Industrial Estate.

2.10 A major source of pollution affecting waterways in the region have been sewage treatment works, primarily through their effluent but occasionally through spills of untreated sewage. Before the commissioning in 1978, of the Lower Molonglo Water Quality Control Centre, effluent from the Weston Creek and Belconnen sewage treatment works polluted the Molonglo River, below Weston Creek and consequently the Murrumbidgee, and Ginninderra Creek just prior to it entering the Murrumbidgee.

2.11 These waters exhibited high levels of bacteria, nutrients and suspended solids. During summer these waters also exhibited extensive growths of attached algae, often with the formation of surface scums and malodorous smells characteristic of highly eutrophic waters. Seventy five per cent of the phosphorus and nitrogen nutrients in the River came from sewage effluent as the previous treatment works did not remove these elements. E. Coli counts in the lower Molonglo River frequently exceeded 10 000/100ml compared to the desirable level for swimming of 200/100ml.[3]

2.12 This pollutant load eventually entered Burrinjuck Reservoir, which is a deep stratified water body draining the Yass, Goodradigbee and Murrumbidgee Rivers. The reservoir was also regarded as eutrophic in view of the extensive algal blooms that had been observed in 1968, 1972 and 1975 with consequent odour complaints and fish and stock deaths. Bloom concentrations have occurred each summer from 1977-1983, mainly in the Murrumbidgee Arm. The years 1976-83 had quite low rainfalls and are generally regarded as having been drought years.

2.13 The Weston Creek Sewage Treatment Works was originally constructed in 1926 and was progressively augmented until its closure in 1978. It had a capacity to serve approximately 140 000. However, its facilities for treatment were deficient. The Belconnen Centre was fully commissioned in 1970 to serve the newly developed area. It was capable of serving a population of 70 000 before its closure in 1979.

2.14 Planning for the LMWQCC commenced in 1969 and it came into operation in 1978. The existing plant is the first of four possible stages. This first stage has a design capacity to treat an average dry weather flow of 109 megalitres/day and is capable of serving a population of 350 000. The site has the capacity for plant expansion to cater for a population of 1 000 000. The present load on the plant is provided by a population of approximately 230 000 persons. The average dry weather flow is 75 megalitres/day. The plant uses a combination of treatment processes including physical screening and sedimentation, the removal of phosphorus and suspended matter, the removal of nitrogen, effluent filtration and chlorination and dechlorination.

2.15 Design criteria set for the LMWQCC are as follows:

| | | |
|---|---|---|
| Biochemical Oxygen Demand (BOD) | 5 | mg/l |
| Suspended Solids | 5 | mg/l |
| Nitrogen (N) | 2 | mg/l |
| Phosphorus (P) | 0.15 | mg/l |
| E. Coli | 200 per | 100 ml |
| MBAS (Detergent) | 0.5 | mg/l |

The effluent is to be substantially free of floatable solids, turbidity, colour and odour. Ammonia and chlorine is to be removed or reduced to levels not toxic to aquatic life downstream.[4]

2.16 Since the commissioning of LMWQCC in late 1978 and the resolution of some teething problems, water quality in the receiving waters has improved significantly. In addition to having processes for reducing suspended solids and biochemica oxygen demand (BOD) to low levels the plant provides facilities for reducing phosphorus and nitrogen concentration and bacteria levels in the effluent.[5]

2.17 Water quality in the Murrumbidgee below the LMWQCC is now quite satisfactory, particularly when it is considered that effluent from the plant can constitute up to 80 per cent of the river flow immediately downstream. Burrinjuck Reservoir has been much slower to show improvement and has remained in poor condition during the many low rainfall years since 1978 in which water levels were extremely low. This allowed nutrient rich sediments to release nutrients causing the Reservoir to become eutrophic. The drought breaking rains of 1983/84 have refilled



the Reservoir, however the nutrient rich sediments will continue to create problems when the level is low in summer. The operation of LMWQCC will continue to reduce summer algal growth in the Murrumbidgee River and Burrinjuck Reservoir as well as reducing the total nutrient load accumulating in the Reservoir. However, rural runoff during high flows will still constitute a significant nutrient source. The existing nutrient rich sediments could, under certain conditions, become available to promote algal growth.[6]

2.18 Raw sewage has spilled into the Molonglo on several occasions in recent years through overflows at the Queanbeyan City Council's sewage pumping station and once from the Canberra sewage system through a malfunction of pumps at Regatta Point on the edge of Lake Burley Griffin in Canberra.

2.19 Effluent from the Canberra Abbatoir is discharged into the Molonglo after only low levels of treatment. Facilities to provide a higher degree of treatment of abbatoir wastes prior to discharge to the sewer have taken a considerable time to finalise. A sewer line to service the abbatoir has been completed for some time but not connected. The DTLG advised in November 1983 that a connection was expected within the next few months. This connection has still not been made and is awaiting the provision of adequate pre-treatment facilities before discharging of effluent to the sewer. Connection will be required with the Water Pollution Ordinance coming into effect. **The Committee recommends that the Minister for Territories and Local Government discuss with the Canberra Abbatoir the impediments preventing the connection to the sewer line being made, and how these impediments can be overcome.**

2.20 Elevated nutrient levels, notably phosphorus and nitrogen, have resulted in nuisance weed growth and algal blooms in Lake Burley Griffin. On several occasions the formation of toxic, blue-green surface algae has posed health problems. The removal of excess nutrients from abbatoir and sewage treatment works effluent is essential to minimising nuisance plant growth and maintaining recreational water quality in the Lake.

2.21 The Queanbeyan Sewage Treatment Works is located in the ACT. It has a capacity to serve approximately 28 000 persons. It has been identified as a major source of pollution in the Molonglo River and Lake Burley Griffin. A recent report by the NSW Department of Public Works recommends its immediate upgrading. Raw sewage spills while serious have been only occasional. Effluent discharged from the Queanbeyan sewage treatment works during winter continuously contributes substantial nutrient material to the Molonglo just above Lake Burley Griffin. During summer months, effluent is spray - irrigated onto paddocks which has reduced phosphorus levels in Lake Burley Griffin. However, it has also diverted nitrogen.[7]

2.22 Evidence was given that the removal of phosphorus alone would minimise eutrophication. Phosphorus can be removed relatively inexpensively. The resulting elevated nitrogen levels would not produce nuisance plant growth, as these need both phosphorus and nitrogen. Elevated nitrogen levels could prevent the growth of blue-green algae which are favoured by a deficiency of nitrogen in the water. At present both phosphorus and nitrogen from Queanbeyan sewage effluent are lowered by spray-irrigation in summer.[8] Nitrogen levels at present in Lake Burley Griffin are low relative to phosphorus levels and encourage the less-desirable blue-green algae.

Waste Disposal

2.23 As well as the diffuse inputs of pollutants that typically contribute to urban runoff, there are significant point sources of pollution. Water can be contaminated by the accidental spillage of a wide range of chemical products. The ACT does not have adequate legislation to control the use, storage, transport and disposal of all hazardous chemicals. Wastes of various kinds can, if improperly disposed of, be major pollutants.

2.24 Within the ACT at present, sewage treatment (with the exception of Queanbeyan effluent), domestic and most industrial refuse disposal facilities are of a high standard and contribution to water pollution from these sources is minimal.

2.25 Two recent reports from the House of Representatives Standing Committee on Environment and Conservation on Hazardous Chemicals pointed to the lack of legislation and administrative arrangements to control hazardous chemicals and hazardous chemical wastes in the ACT. That Committee reported in its second report:

> The Committee inspected the chemical waste facility at the West Belconnen tip. Lists provided to the Committee, of chemicals disposed of at the tip, showed that chemicals which require high-temperature incineration for proper disposal are being buried in drums at the site. This site drains into, and is not far from the Murrumbidgee River. While the quantities of waste involved are small, this is no excuse for improper disposal.[9]

2.26 The Department told this Committee recently that 3000 to 5000 litres of solvent was disposed of annually to landfill at the West Belconnen tip. The Department acknowledged that this was unsatisfactory and is seeking better alternatives.[10] The legislative requirements for the disposal of environmentally hazardous waste is dealt with in Chapter 4.



Mine Tailings

2.27 Mine tailings have caused problems in the upper Murrumbidgee system with hazardous leachate entering waterways. Erosion and leaching of tailings from an abandoned copper-lead-zinc mine at Captains Flat, together with water flowing through the old mine and sediments built up on the river bed, caused serious pollution of the Molonglo River below the mine site. The mine ceased operation in 1962 with over 2 million tonnes of mine waste being stockpiled in dumps. The material in the waste contains significant quantities of zinc, lead, copper, cobalt, chromium, arsenic, mercury, cadmium, nickel, manganese and iron. Leachate also includes sulphur and has a low PH (i.e. it is acidic). This pollution decreased the abundance and diversity of aquatic life in the River and reduced its aesthetic appeal. It also rendered parts of the River unsuitable for drinking water, irrigation, watering stock, swimming and fishing. The Molonglo was reputedly a good trout habitat up until 1938.[11]

2.28 Abatement works were undertaken in 1973-76 to contain the tailing heaps and prevent water flowing through the mine. The capital works and maintenance have cost the Commonwealth and State Governments in the order of $2.5m and have markedly reduced further pollution. Aquatic life in the River below the mine site is still lower in numbers and in the diversity of species than either upstream or much lower downstream near Lake Burley Griffin. Zinc levels in the Molonglo where it enters Lake Burley Griffin have fallen to less critical levels. However, the cleansing of the Molonglo, including Lake Burley Griffin, will take many years due to the deposition of contaminated sediments in the River and Lake. The NSW Department of Mineral Resources considers that there are unlikely to be any significant future metalliferous mineral mining developments in the area.[12]

2.29 In June 1983, it was announced that waste from two tailings dams from an abandoned gold mine near Bredbo, the Cowarra Mine, was seeping into a tributory of the Bredbo River. The processing plant at the mine used the cyanide process for extracting the gold. While the pollution at the moment is local, the lower dam retaining wall is unstable and slowly collapsing. A further small collapse occurred during heavy rain in December 1983. It is estimated that there is about 50 000 tonnes of waste from the processing operations in the lower dam, the top dam having already collapsed. Should the dam collapse, there could be a devastating effect on the ecosystems of the Bredbo. These are high quality waterways and support a number of fish and other aquatic life forms. The waters are classified Protected Waters (Class P) by the State Pollution Control Commission. Discharges of effluents into these waters are limited to those with a quality similar to that required as a raw source of potable water.[13] The effluent the Committee observed was clearly not of that nature. Analysis of the waters has shown excess levels of manganese, chrome, cadmium, iron and sulphate. The water has a PH of 2.5 (i.e. it is highly acidic).

2.30 Two species of fish, Trout Cod and Macquarie Perch which are classified as endangered species, use this area for breeding. In addition to toxic effects, siltation of the breeding ground would harm eggs and otherwise discourage breeding. The seepage was discovered by an officer of the Water Resources Commission making a general survey of past and present mining and extractive industries in the upper Murrumbidgee River Basin.[14] There is a large number of old mine sites in the Basin and it is possible that others still have tailing dams containing toxic wastes.

2.31 The Committee has written several times to the Minister for Territories and Local Government, the Hon. T. Uren, who has written to the responsible minister in New South Wales. Early in 1984 a drain was bulldozed around the tailings dam by the New South Wales authorities as a permanent diversion capable of handling at least 100 year floods. This will considerably reduce the risk posed by the tailings dam which is still collapsing under gravity. Further remedial work is still required in the form of another dam below the collapsing one.[15]

2.32 **The Committee recommends that the Minister for Territories and Local Government continue to seek the cooperation of the New South Wales Government to have remedial works at the dam completed. The Committee further recommends that should remedial works not be completed satisfactorily, water resources funding for New South Wales be reduced.**

Urban Runoff

2.33 Urban runoff contributes significantly to the pollution of waterways. Sealed surfaces and stormwater systems in urban areas result generally in a much higher percentage of rainfall entering waterways than from natural or farm lands. Urban runoff, particularly during storms, increases turbidity, biochemical oxygen demand and bacterial contamination of waterways while washing nutrients, heavy metals, oil, pesticides and other chemicals and debris into waterways. Lead from vehicle emission fallout and hydrocarbons including oil, petrol and bitumen are present in urban runoff. Faecal contamination of urban runoff comes from domestic animals as well as from leakage, particularly in wet weather, from the sewerage system to the stormwater system.

2.34 The concentration of suspended matter in urban runoff is generally higher than for rural runoff. The impact of urban runoff during storms is difficult to determine as the events are intermittent and often accompanied by greatly increased river flows. The levels of concentration of nutrients in urban drainage water in dry periods are substantially higher than for rural runoff water.[16]



2.35 The overall impact of urban runoff on the Murrumbidgee system in the region is small compared with the contributions of other pollutants such as sewage effluent from Queanbeyan. However, the impact of urban runoff is heaviest at its point of entry into waterways. Care needs to be taken in the siting of stormwater outlets to waterways as, in addition to general ecological damage, areas can be rendered unsafe for water contact recreation. In several instances in Canberra, stormwater system retention ponds and debris collection screens have been installed to reduce the impact of stormwater on the receiving waters, e.g. Sullivans Creek and Telopea Park stormwater channels before they enter Lake Burley Griffin.

2.36 The urban lakes, Lake Burley Griffin and Lake Ginninderra, act as large retention ponds, providing for the settling out of some suspended matter from urban and rural runoff and to that extent, have a cleansing effect. In the Tuggeranong area, runoff during land servicing and construction work has been identified as a major cause of turbidity in the Murrumbidgee.[17] There is a need for more careful management of construction work near sensitive areas and water control structures may need to be built. A possible lake in Tuggeranong is discussed in Chapter 5.

2.37 NCDC stated that:

> Urban lakes in particular provide extremely effective 'sinks' for the retention of phosphorus, turbidity, heavy metals, silt and bacterial contaminants.
>
> However, lakes as still bodies of water are more vulnerable to the impact of pollution than flowing streams. Hence there is a conflict between the concept of using water features as runoff sinks and for other uses, such as recreation.[18]

While urban lakes acting as settling ponds result in cleaner water downstream, the deposition of nutrient rich sediments in the lakes creates its own problems. It is desirable that wherever economically possible, urban lakes are not used as the primary settling pond for urban runoff but that bed-load sediment and surface oil traps are installed in major drainage channels before their entry to the Lake.

2.38 Evidence was given that pollution from urban runoff would be reduced by developing drainage channels as biological filters. Utilising shallow, sloping grassed areas for drainage channels with frequent shallow pools and marshy areas would allow diverse biological communities to develop so as to trap as much of the pollutants as possible.[19]

**2.39 The Committee recommends that the use of sediment and oil traps prior to stormwater entering lakes and streams be maximised. The Committee further recommends that the use of biological filters be further investigated and, if suitable for use in urban environments, their use be maximised in conjunction with sediment and oil traps.**

2.40 Lake Burley Griffin and Lake Ginninderra are highly turbid, particularly after storms. Lake Ginninderra becomes a closed system under drought conditions receiving only low flows from urban runoff through the stormwater system. Consequently algal and plant growth is considerably less than in Lake Burley Griffin. Both Lakes are on the borderline between the status of mesotrophic and eutrophic. However, it should be noted that for most of the time high tubidity represents a significant restraint on potential levels of plant growth.[20]

2.41 One expert witness said that Lake Ginninderra, while mesotrophic at present could be expected to become eutrophic as the catchment is further urbanised.[21] At present 17 per cent of the catchment is urbanised but the development of the new town of Gungahlin could be expected to place much greater loads on the Lake.

2.42 Many of the major service, industrial and fuel storage areas in the ACT and Queanbeyan drain into Lake Burley Griffin and represent potentially significant sources of industrial pollutants. Pollutant problems to date have mostly involved discharge of petroleum products into creeks and stormwater drains leading to the Lake and firm careful planning, legislative, and enforcement action, is required to minimise such discharges, both deliberate and accidental.

2.43 Heavy metals, particularly zinc, are of concern to management authorities because of their toxic effect on fish and other aquatic organisms. In the past the main source of these pollutants has been the former mine workings at Captain's Flat. Following the stabilisation of spoil dumps at Captain's Flat, the zinc levels in the Molonglo River and the Lake have declined significantly and there is now cautious optimism that the problem has, to a large extent, been overcome.[22]

2.44 Substantial amounts of zinc and other heavy metals deposited in the bed and flood plain of the Molonglo River and in the bed of the Lake which could be brought back into solution in the event of a massive depression of dissolved oxygen and pH in the Lake or as the result of disturbance associated with dredging, construction activities, major floods or, possibly, the feeding action of European carp.[23]



2.45 Turbidity influences the extent of light penetration in water which, in turn, influences such diverse matters as plant growth, aesthetic quality and the attractiveness and safety of the water for recreation. While the most common source of turbidity is suspended clay colloidal material, it may also be caused by suspended biological material, for example, phytoplankton.

2.46 Suspended sediments may have a directly lethal effect on fish as a result of abrasion, thickening and fusion of gills or adhesion of silt particles to the eggs of some species, particularly trout. In addition, suspended sediment decreases light penetration and thereby limits production of phytoplankton and other aquatic plants used by fish for food and cover. It may also cause alterations in stream temperature change rates and precipitation of organic particles which produce high stream biochemical oxygen demands.[24]

2.47 Nutrient materials enter the Lake in runoff from urban and rural areas and from significant point sources such as the Queanbeyan Sewage Treatment Works and the Canberra abattoir. While Lake Burley Griffin does not commonly exhibit signs of gross pollution, a number of early indicators of eutrophication, such as increasing levels of plant growth or dominance of a particular species of algae, are evident suggesting that increased attention should be given to ameliorating nutrient loadings on the Lake.[25]

2.48 The urban lakes usually have highly turbid water and this factor, by limiting available light, reduces the growth of submerged plants. Plant growth normally occurs in about three per cent of the area of Lake Burley Griffin, and about ten per cent of Lake Ginninderra. In some years, dry winter/spring periods have led to the lake waters clearing markedly throughout the following summer growing season. On such occasions the area covered by submerged plants increases up to ten times that of other years. The area of plants recorded range from 5 hectares in years when turbidity was high, to 52 hectares when it was at the lowest level recorded.[26]

2.49 Aquatic plants make several important contributions to the maintenance of environmental conditions suitable for other forms of aquatic life. These include oxygenation of the water, provision of food for aquatic organisms, shelter for animals and filtration.[27]

2.50 Each growing season the urban lakes are carefully surveyed on a regular basis to determine the plant species present and their extent. Aerial photography is used to assist in assessing the extent of plant growth. Physical conditions of the water such as turbidity and temperature provide data for estimates of plant growth or regrowth after cutting. The responses of aquatic plants to changes in water quality regimes have been researched to a point where predictions can be made on plant growth patterns related to such changes.[28]

2.51 Recent research has revealed that nutrient enrichment has greatly increased algal productivity in Lake Burley Griffin since a previous study in 1975-77. The presence of the potentially toxic blue-green algae Anacystis cyanea (also known under its synonym Microcystis aeruginosa) has been noted in the urban lakes in past years, occasionally reaching 'bloom' proportions. Another blue-green species Anabaena circinalis has also been recorded. Both of these species have occurred as blooms, which are concentrated along shorelines by wind action.[29]

2.52 Certain blue-green blooms are toxic. Stock, including cattle, sheep and horses, as well as experimental mice and some wildlife fauna, have been killed by Anacystis cyanea. Acute toxicity has also been demonstrated with Anabaena circinalis. Toxins produced by these algae could be dangerous to humans and research in the USA strongly suggests that this is so.[30]

2.53 Because of its distinctive appearance 'like dull green curdled milk' and its unpleasant odour in the bloom stage, it seems most unlikely that adults would swallow or swim in affected water. However, beaches with high algal populations in the vicinity are closed to protect the public, particularly children. Water in the vicinity of all lake swimming areas is inspected up to three times per week during the summer vacation period and at least once per week during non-vacation periods from December to April when algal blooms may occur.[31]

Salinity

2.54 Salinity is not a problem for the Murrumbidgee River system as a whole, other than near its confluence with the Murray. Salinity is a major problem in the Murray River. A NSW State Pollution Control Commission Report in 1978 stated that surveys revealed increases in electrical conductivity, sodium and potassium salts and water hardness were insignificant along the Murrumbidgee above Burrinjuck Dam.[32] At its junction with the Murray River the Murrumbidgee River is seen as having a diluting effect on the salinity of the Murray River.[33]



ENDNOTES

1. See Figure 5.
2. Water of the Canberra Region, NCDC Technical Paper No. 30, (WCR) p. 1/4, 1/5.
3. Evidence, p. 316.
4. Evidence, p. 319.
5. Evidence, p. 319.
6. WCR 5/18.
7. Evidence, p. 1014.
8. Evidence, pp. 1014-15.
9. 2nd Report of House of Representatives Standing Committee on Environment and Conservation - Hazardous Chemicals, p. 97.
10. Evidence, p. 1241.
11. WCR 4/44.
12. Evidence, p. 862.
13. Canberra Times, 18 February 1984, p. 1.
14. Canberra Times, 9 June 1983.
15. Evidence, p. 1258.
16. Evidence, p. 335.
17. Evidence, p. 365.
18. WCR 1/8.
19. Evidence, p. 1003.
20. WCR 4/18 and 5/13.
21. Evidence, p. 966.
22. Lake Burley Griffin: a situation report Department of the Capital Territory, Canberra, October 1981, p. 7.
23. ibid.
24. ibid, p. 5.

25. ibid, p. 15.

26. Management of Aquatic Plants, including algae, in Urban Lakes, City Parks Administration, Department of the Capital Territory, May 1982, p. 1.

27. ibid.

28. ibid, p. 3.

29. ibid, p. 2.

30. *ibid.*

31. ibid, p. 3.

32. NSW Pollution Control Commission Report 1978, p. 2.

33. Water 2000, A perspective on Australia's water resources to the year 2000. Department of Resources and Energy 1983, p. 39.



CHAPTER 3

## LAND USE CONSIDERATIONS IN THE MURRUMBIDGEE RIVER CORRIDOR

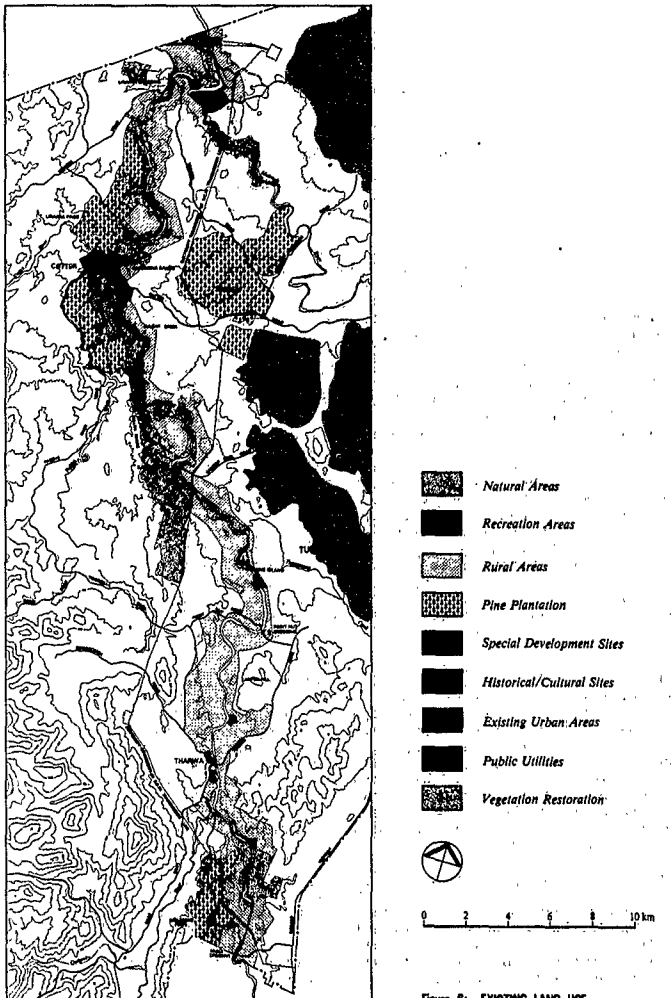
### Introduction

3.1 A number of submissions have sought the delineation of an environmental corridor along the Murrumbidgee to ensure its conservation and protection from development pressures. The Murrumbidgee River Corridor is subject to a great range of land-use demands and pressures. For example, the River Corridor is a major focus for recreation and water activities in the ACT, and is at present almost exclusively used for rural purposes such as sheep and cattle grazing. Parts of the Corridor have remained in their original natural state. These areas are primarily confined to the River gorges. Existing land use in the vicinity of the River is shown in Figure 6.

3.2 Other land-use pressures on the Corridor include sand and gravel mining, forestry, urban runoff and the need to provide special development sites, such as the LMWQCC. There are a number of European and Aboriginal historic sites which require preservation. Another factor which indirectly affects the Corridor itself is water supply, since several of the Murrumbidgee's tributaries in the ACT are used, or intended to be used, for town water supply, diverting a significant water flow from the River. Community organisations and groups have made suggestions to the Committee in the course of the Inquiry as to the future of the Corridor and its ability to accommodate these demands.

3.3 The NCDC suggests in its supplementary submission, that the Murrumbidgee River Corridor be developed as a 'multi-use area', with different parts of the Corridor having different land uses, which reflect the characteristics of the land (for example, recreation areas, special rural landscapes and nature conservation areas). In late 1983, NCDC published a Draft Policy and Development Plan for the Murrumbidgee River Corridor. The boundaries of some sections of the proposed Corridor were uncertain, since they were dependent upon the outcome of the Commission's review of its planning intentions for Tuggeranong and West Murrumbidgee.

3.4 A variety of community groups, such as the Murrumbidgee Monitor Association (MMA) argue that the River and its Corridor are a unique resource to be preserved and improved. These groups are opposed to the NCDC's original plans for Tuggeranong, which provided for urban development close to the River's foreshores with development on both sides of the River. They advocate a buffer zone around the River to protect its natural features.




Source: Murrumbidgee River Corridor, Policy Plan and Development Plan, Draft for Discussion NCDC, October 1983

Figure 8: EXISTING LAND USE



3.5 The National Trust of Australia (ACT), in response to NCDC's 1977 Structure Plan for West Murrumbidgee undertook a study of the River Corridor from its junction with the Gudgenby River to Kambah Pool. The National Trust recommended that 'the Murrumbidgee Valley in the study area be submitted to the National Heritage Commission for classification as a landscape to be conserved as part of the National Estate by its inclusion in the National Estate Register'.[1] The Australian Heritage Commission was awaiting a final delineation of the Corridor boundaries before listing the Corridor as part of the National Estate. It expected that listing would take place by the end of 1984.

3.6 The House of Assembly Standing Committee on Planning and Development conducted an inquiry into the Murrumbidgee River Corridor reporting to the Assembly in March 1983. That Committee recommended:

1. that the Assembly strongly support the nomination by the National Trust of Australia (ACT), of the entire Murrumbidgee River Corridor for inclusion on the Register of the National Estate;

2. that the entire Murrumbidgee River Corridor be Gazetted as a 'Reserved Area' (Nature Reserve) under the provisions of the ACT Nature Conservation Ordinance 1980; and

3. that the Report and recommendations be forwarded to -

   - the National Trust of Australia (ACT) and the Australian Heritage Commission for consideration during the nomination/Registration hearings; and

   - the Joint Parliamentary Committee on the ACT for consideration in the context of that Committee's Inquiry into the Murrumbidgee River.[2]

3.7 This chapter will consider in some detail the land-use pressures upon the Corridor and their likely future impacts. It is, however, worthwhile to briefly review the development of the Commonwealth's approach to the River Corridor.

## The Development of the Commonwealth's Approach to the River Corridor

3.8 The original Burley Griffin plan for Canberra recognised the surrounding hills, mountains and the river corridors as essential parts of the National Capital's distinctive landscape character.

3.9 The NCDC maintains that since its establishment in 1957 it 'has recognised the special position of the Murrumbidgee River in its planning and development functions and has been concerned to preserve the water quality, landscape, ecology and recreational qualities of the river system in the ACT'.[3]

3.10 To this end, in 1964, particular areas of the ACT were designated by Government decision as 'Areas of Special National Concern'. These were the Parliamentary Zone, the main approach roads, the hill areas of Canberra and sections of the Molonglo and Murrumbidgee River Corridors. These areas constitute part of the National Capital Open Space System (NCOSS), which provides for open space areas predominantly on the periphery of Canberra's urban development and often left in their natural condition. The NCDC believes the open space system provides a 'pleasing and unifying visual background to the city, and is also a diverse recreational, cultural, and ecological resource for residents and visitors'.[4]

3.11 The River Corridors are a major part of the NCOSS and account for 40 per cent of the total open space area in the system.

The ACT Land Use Plan

3.12 In the late 1960s the Parliamentary Joint Committee on the ACT conducted an inquiry into freehold lands in the Territory. Among other things, the Committee recommended that a general land-use plan for the whole of the ACT be prepared.[5] The NCDC prepared a long-term land-use plan at the request of and in collaboration with DTLG. The report 'A Land Use Plan for the ACT', was released in 1975.

3.13 The Land Use Plan Report stressed that it was a statement of principles and guidelines and not a definitive declaration of precise boundaries and alignments.[6] However, the Land Use Plan emphasised, among other things, two particular features, these were that:

- urban development is planned largely for the area east of the Murrumbidgee River, and
- a metropolitan river corridor system is shown along the Molonglo River and the Murrumbidgee River for recreational purposes and environmental protection.[7]

3.14 It was noted in the land use report that 57.5 per cent of the total ACT land area is topographically unsuitable for normal urban development at acceptable cost. Most of the Murrumbidgee River Corridor and its immediate environs were shown to be unsuitable for urban development, particularly the area north of Red Rocks Gorge and south of Tharwa. The remaining



part of the Corridor, that is, from Pine Island to Tharwa was indicated as suitable for such development.[8] At that stage 40 sq km within the Molonglo and Murrumbidgee Corridors had been set aside for environmental protection and a broad range of leisure pursuits.

National Capital Open Space System

3.15 In 1976 and 1977, two reports dealing with the Open Space System were released. The first was an Interim Report on the NCOSS prepared by the NCDC and the second was prepared by Professor Seddon for the NCDC, entitled 'An Open Space System for Canberra'.[9]

3.16 The former paid particular attention to the River and River Corridors and their part in the Open Space System. It discussed future recreation demand and likely developments as well as management issues. The two reports highlighted the changing recreational patterns and attitudes towards landscape conservation.

3.17 Professor Seddon's report was a critical examination of the open space system and provided an impetus to alteration in ideas and policies. He emphasised that protection of the natural River Corridor environment of the Molonglo and Murrumbidgee should take priority over their use for recreational purpose or other development,[10] stating that, 'it is important to develop recreational areas away from the rivers'.[11]

3.18 Professor Seddon made the following recommendations:

- the gorge areas of the Murrumbidgee and Molonglo Rivers should be set aside and managed as secluded natural areas;
- the resources of the Murrumbidgee River Corridor in Tuggeranong should be developed and managed for riverside recreation to the full extent of their environmental carrying capacity;
- recreation parks should be developed to divert demand away from the fragile river and natural areas;
- a variety of landscapes in the ACT could be maintained and extended and river lands could be rehabilitated.

3.19 The above report provided the direction for future work of the joint NCDC/DTLG NCOSS study group, and for the strategy and planning policy for the NCOSS.

3.20 The NCDC also released in 1977 its 'Structure Plan for West Murrumbidgee, Tuggeranong', which outlined the planning proposals for this part of Tuggeranong. It proposed urban development within 200 metres of the river foreshores and the location of the Town Centre at Pine Island. The Commission is currently reviewing its plans for Tuggeranong. A more detailed examination of the Commission's proposals and the current review are to be found in Chapter 5.

3.21 In 1979 the Committee's Report, 'Planning in the ACT', recommended that the role of the NCDC, with respect to the planning and development of the City of Canberra be extended to include the whole of the ACT.[12] The NCDC in its supplementary submission to the present inquiry indicates that it has assumed full planning authority for the remainder of the river system in the ACT.[13] However, section 11 of the Commission's Act has not yet been amended to authorise this desirable change. The delay in amending the Act is inexcusable, resulting as it does in a statutory authority going outside the provisions of its enabling legislation. Further to assuming this expanded role the Commission is currently preparing a new ACT Land Use Plan and draft Metropolitan Policy Plan, and has produced a draft Murrumbidgee River Corridor Policy and Development Plan in October 1983.

## The NCDC's Planning Proposals for the River Corridor

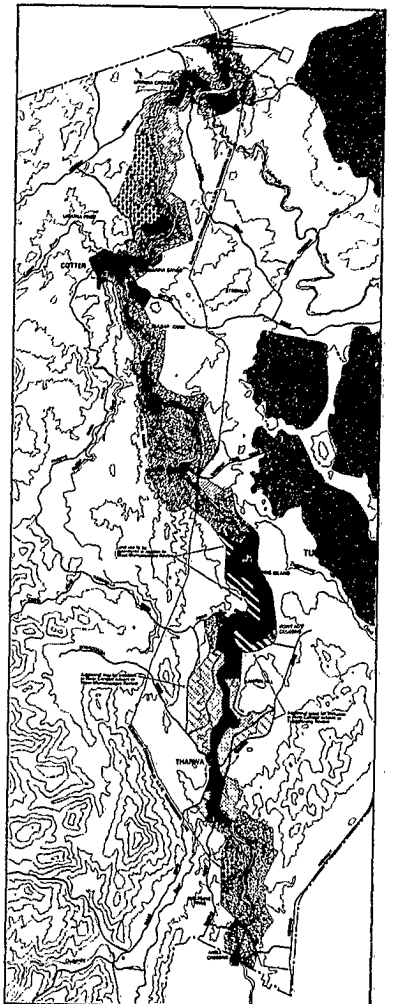
3.22 The Commission proposes in the draft Policy and Development Plan of October 1983 that the River Corridor should not be developed as traditional public open space or parkland. Instead it is proposed that the Corridor be a multiple-use area with different parts of the Corridor having different planning and management policies which reflect the characteristics of the land but which retain the integrity of the River Corridor as a whole.[14] The NCDC Draft Policy Plan for Land Use in the Corridor is shown in Figure 7.

3.23 The draft Development Plan indicates how the Policy Plan might be implemented wholly, or in part. It shows the location of development projects currently envisaged which would provide the basis for detailed discussions with client departments and authorities. The NCDC draft Development Plan for the Corridor is shown in Figure 7A. The Committee has had made available to it NCDC's final Policy and Development Plan in map form yet to be submitted to the Minister for Territories and Local Government for noting. The final plan is largely consistent with the draft plan although changes have been made in some areas. At the request of NCDC the Committee has not published the final plan as part of this report to ensure that the Minister is able to freely exercise his discretion to suggest further changes.

3.24 The NCDC identifies specific areas along the River Corridor for particular uses. These are:

- nature conservation areas;






Source: Murrumbidgee River Corridor, Policy Plan and Development Plan, Draft for Discussion NCDC, October 1983

Figure 7: DRAFT POLICY PLAN (Land Use)

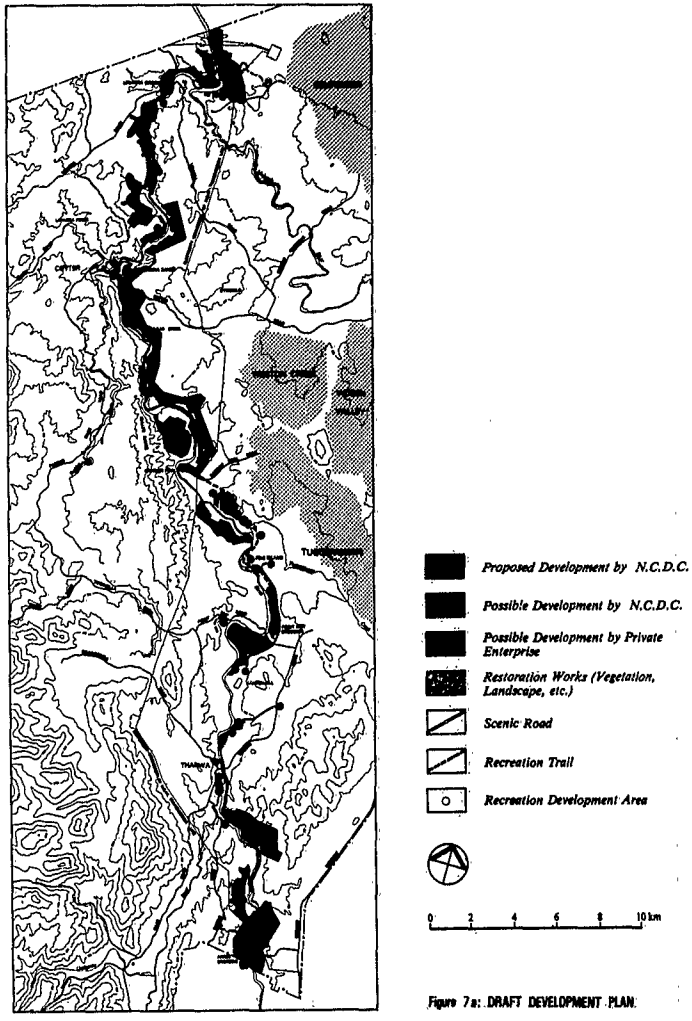



Figure 7a: DRAFT DEVELOPMENT PLAN



- recreation development areas;
- grazing; special rural landscapes;
- pine plantations;
- special development sites, e.g. LMWQCC;
- areas for vegetation restoration; and
- historical/cultural sites.[15]

3.25 With respect to land-use the proposed policy of the Commission is:

> To preserve the landscape/environmental character and ecological continuity of the River Corridor and provide a balanced range of riverside recreation and other uses, in a manner that reinforces the River Corridor as a diverse ecological, cultural, scenic and recreation resource.[16]

3.26 The criteria used by NCDC for determining the extent of the Corridor are:

- the relative sensitivity of the River to increased usage and development;
- the nature of the adjoining land uses and their likely impact on the River; and
- the ability of the Commonwealth to manage and maintain the River Corridor and the practical aspects of this.

The proposed Corridor boundaries have been selected on the basis of visual, topographic, ecological, water quality, recreation and access criteria, as well as considerations of adjacent lease boundaries and the suitability of the boundary for fencing.[17]

3.27 The Commission believes that the consideration of these factors provides a suitable basis for determining the River Corridor boundary rather than of an arbitrarily fixed Corridor width as suggested in some submissions to the Committee. The DTLG agrees with this basis of determining the Corridor boundaries. The Committee concludes that the basis adopted by NCDC and DTLG for establishing Corridor boundaries is preferable to a Corridor of fixed width. The NCDC claims that the proposed boundary 'is such as to ensure that the Murrumbidgee can be protected from the impact of urban development'.[18]

3.28 The NCDC proposes that the boundaries of the River Corridor define the extent of the 'Areas of Special National Concern' along the River, which have never been precisely defined since their inception in 1964.

3.29 The NCDC in the Draft Development Plan identifies 31 development projects for the Corridor. These include:

- restoration of natural vegetation at various sites in the Corridor;
- the development of new recreational areas, near Smiths Road, at Cuppacumbalong, Winslade and at Shepherd's Reserve;
- a tourist and picnic facility with access trail to Farrer's Grave;
- a recreation trail along a major part of the eastern side of the Corridor; and
- improvements to facilities at Cotter and Casuarina Sands.[19]

3.30 The Commission also mentions as a 'possible development' the construction of a Murrumbidgee scenic drive from Pine Island to Lanyon. This road as shown on the Corridor Development Plan appears incomplete and part of a larger scenic drive system not shown. The Committee is most concerned that these scenic drives should not proceed without appropriate consultation with interested groups, and further without proper environmental impact inquiries being undertaken. These roads will in any case need to come to the Committee as variations to the City Plan.

Community Proposals for the River Corridor

3.31 Community groups have expressed concern about the future of the Murrumbidgee River and its Corridor and have made some suggestions to the Committee as to how these aspects can be dealt with.

3.32 The theme common to all of these groups is the necessity to conserve the Murrumbidgee River in its present condition and possibly to improve it. All regard it as a valuable environmental and recreational resource to be conserved and protected, particularly from urban development.

3.33 The Murrumbidgee Monitor Association (MMA) and the Canberra Canoe Club (CCC) both suggest that the entire River Corridor in the ACT be proclaimed or gazetted as a nature reserve.[20] The purpose of this suggestion is to conserve the Corridor by creating a buffer zone to protect the Murrumbidgee from the adverse effects of development, particlarly urban development.



3.34 All the groups acknowledge the importance of the River and its Corridor for recreational purposes. None are opposed to the further development of recreational facilities in the Corridor. Indeed, another common theme in their submissions is the need for a management plan for the Corridor incorporating recreational facilities. However, several groups stressed that the development of recreational facilities should only take place after a thorough environmental assessment of the likely effects.[21] The MMA maintains that any development that could have a serious impact upon the River should be the subject of an environmental impact statement which would be available for public comment.[22] The Association also states that off-river recreation areas should be developed as a means of protecting the River.

3.35 Both the MMA and CCC are opposed to urban development near the Corridor and are critical of NCDC's original proposals for south Tuggeranong/West Murrumbidgee mentioned above. Hence their advocacy of a buffer zone intended to protect the River. Only the MMA suggested a minimum distance of 2 km either side of the River.[23]

3.36 Several clubs concerned with the protection of fish and recreational fishing in the ACT have expressed concern about the decline in the number of fish in the Murrumbidgee River over recent years. The clubs suggest that the management of the Murrumbidgee River Corridor ensure propogation and survival of local fish in the River. Support has been expressed for the establishment of an Australian Institute of Fresh Water Studies, which could conduct research and co-ordinate the plannning and management of Australian fresh water research on a national scale.

3.37 The ACT Equestrian Association proposes the establishment of a multi-purpose recreational trail system on both sides of the River Corridor. Bush walkers, hikers, joggers, cyclists could also make use of this facility. Such a facility could contribute to tourist development and would be extensively used by equestrians especially for training and endurance events.[24].

3.38 The Association believes that a trail system in the River Corridor would provide an opportunity to use an off-road system which could link recreation sites and encourage people to walk to secluded parts of the River. In a report prepared for the NCDC in 1975 entitled 'Outdoor Recreation demand Study - Murrumbidgee River Corridor, Tuggeranong, ACT' it was estimated that such a riverside trail would be used by up to 2300 people during a weekend.[25] A trail system could remove the necessity for riders and cyclists to use highways around the River.

3.39 An equestrian trail system for Canberra is in existence now, covering 41 km. It has been developed by the NCDC and further extensions are being planned. The trails are located generally on the periphery of residential areas, are kept away from shops, schools, playgrounds and sportsgrounds. The Association believes the the existing trails provide a good basis for bringing the National Horse Trail which runs from Cooktown to Melbourne through the National Capital. Furthermore, it would like to have access from the existing trails to the proposed Murrumbidgee multi-purpose trail and thence ultimately to the established trails in the Kosciusko National Park.

3.40 The National Trust of Australia's (ACT Division) submission to the Committee is based on its 1980 report, 'The Murrumbidgee River Valley Study'. This report only examined that section of the Murrumbidgee from its confluence with the Gudgenby to Kambah Pool. It is also strongly opposed to urban development in the areas of South Tuggeranong and West Murrumbidge which it believes to be 'unacceptable' since it 'would do irreparable damage to an outstanding section of the Murrumbidgee Valley'.[26] Further, it recommends that the study area be maintained as an area of 'landscape conservation'.[27] NCDC has recently announced the the development of West Murrumbidgee will not now go ahead.

## Land Use and Future Development Needs

### Recreation

3.41 Water based recreation is a popular activity throughout Australia, including the ACT. Since Canberra is situated approximately 200 km from the coastal beaches, there is a heavy reliance upon the Murrumbidgee River system, including the man-made lakes, for local water oriented recreation.

3.42 The existing riverside recreation areas along the Murrumbidgee at Cotter, Casuarina Sands, Kambah Pool, Pine Island, Uriarra and Point Hut Crossing, occupy 15.5 per cent of the length of the River in the ACT.[28] There are also two undeveloped riverside recreation areas in use at Angle Crossing and at Smiths Road.

3.43 However, the capacity of most of these sites, except for Pine Island, is limited by the length of accessible river available. There is also little scope for any increase in their size because of the constraints of the surrounding terrain.

3.44 These sites are popular for several types of recreational activities including swimming, barbeques and picnics, canoeing, boating, fishing, walking and a variety of passive pursuits.



3.45 The popularity of these sites as recreational areas for the local population is shown in figures obtained by the NCDC. Surveys undertaken by the Commission in 1980 show that on a fine summer Sunday, 40 000 people used the River and lakeside recreation areas.[29] The recreation areas on the Murrumbidgee attracted 41 per cent of the total, the urban lakes attracted 40 per cent, the remaining 19 per cent were distributed around the developed parts of the Molonglo, Cotter and Paddy's Rivers.[30] Lakeside areas such as Black Mountain Peninsula are heavily used and do relieve some of the pressures on riverside areas.

3.46 The Commission's figures also show that between 1970-1980 use of the lake and riverside areas on a fine summer Sunday increased by almost 50 per cent. However, the proportion of the Canberra/Queanbeyan population using the areas remained constant at 16.5 per cent. Tourists account for 10 per cent of the total number of users of these facilities on a summer Sunday. This percentage could be as high as 40 per cent on a weekday.[31]

3.47 Whilst there is currently some crowding at popular ACT recreation areas on the majority of fine, summer Sundays, the total capacity of recreation areas is usually not exceeded. Residents of the ACT also make use of inland water recreation facilities in nearby parts of New South Wales such as Googong Dam, Ginninderra Falls, Burrinjuck Dam and the Murrumbidgee River outside of the ACT.

### Projected Demand

3.48 The Commission estimates that, based upon population and daily use data, in 1990 the lake and riverside recreation areas will receive a daily total of 50 000 person visits, an increase of 25 per cent over 10 years. To meet this demand in 1990 the NCDC observes that an additional recreational area equivalent to three times the capacity of Weston Park would be required.[32]

### NCDC Recreation Planning Proposals

3.49 The NCDC draft policy and development plan proposes that certain areas be developed as recreation sites to accommodate the projected increase in recreation use.

3.50 Existing and possible recreation sites in the ACT have been investigated by the Commission to determine their development potential and design guidelines have been prepared for their future development within the physical conditions and environmental constraints of the site. These sites are proposed in areas where sandy beaches form safe swimming areas and river margins are wide enough for picnicking areas and other recreation uses.[33] Areas of high ecological sensitivity have been excluded, particularly natural areas in the river gorge

country. The Commission proposes that a recreational trail system be established along the length of the River with access trails from hill areas and urban areas. Vehicular access will be limited to new and existing recreation/picnicking areas.

3.51 The Commission has identified a number of sites as future recreation areas along the Murrumbidgee, with the majority being located in the Tuggeranong area. Only one site has been identified in the northern section of the River accessible from Belconnen and this is at Shepherd's Reserve.[34]

3.52 The NCDC proposes to provide both high and low intensity recreation areas located to reduce recreational growth pressure on natural and ecologically sensitive areas. The intensity of development is to be as best suited to the physical and ecological capacity of the site.

**Impact of Future Recreation Use**

3.53 The NCDC is aware that the ability of the Murrumbidgee River to meet increased future recreational demands is limited because of its physical character. It has evaluated the total physical daily capacity of the Corridor as 60 000 persons on a fine, summer Sunday, and 60 per cent of this capacity lies in the southern part of the Territory. This is expected to be reached within an ACT population of 400 000.[35]

3.54 The development of riverside recreation areas also places significant constraints on upstream development since body contact water recreation demands a very high level of water quality. So significant water quality protection requirements are needed in the catchment area.

3.55 The Commission's proposed policy attempts to minimise the impact of the development of recreation areas on the River Corridor in keeping with Professor Seddon's report. He suggests building recreation areas away from the River Corridor.[36] The urban lakes have deflected some of this water recreation demand but other high capacity, multi-activity recreation areas need to be developed away from the River so as to ease the pressure on river and natural areas. Lake recreation areas such as Black Mountain Peninsula are already heavily used.

3.56 While careful planning proposals are an important first step to ensure the protection of the River, sound and effective management practices are required to maintain the quality of the River and its Corridor. The DTLG is responsible for land and water management in the Corridor.

3.57 The Murrumbidgee River in the ACT is a very important recreational resource for the Canberra population. Its importance in satisfying both resident and tourist recreational demands is only likely to increase in the future. The limited recreation capacity of the Murrumbidgee River is a good reason for minimising the proximity of urban development to the River.



**Natural Areas**

3.58 Some areas of the Corridor have not been used for agriculture or grazing and have remained in their natural state. These natural areas comprise approximately 37 per cent of the length of the Murrumbidgee River in the Territory. These include Red Rocks Gorge, Bullen Gorge, Guises Creek to Gudgenby River Junction and the gorge downstream of Casuarina Sands. These natural areas are mainly in river gorges where the land is too steep and rugged to have been used for rural purposes.[37]

3.59 As the river gorge areas have remained in a relatively undisturbed state, NCDC and DTLG have agreed that they be defined and preserved as secluded nature conservation areas. It is intended that such areas are used only for low-intensity recreation compatible with their environmental protection.

3.60 Access roads may be provided to the entrance of the gorges, but the intention is to retain the gorge areas as secluded natural areas by restricting access to those people prepared to walk. Any future scenic roads are to be located far away from these areas to preserve their remoteness and limited accessibility. Buffer zones or areas of low intensity use alongside the gorges could further protect them.[38]

3.61 The draft policy plan for the River Corridor provides for the preservation of these nature conservation areas as they are an important ecological, visual and landscape resource. The Committee agrees that they should be preserved because of their unique character and no development should occur near them. **The Committee recommends that nature conservation areas identified in the NCDC Draft Corridor Plan be declared under the Nature Conservation Ordinance 1980.**

3.62 The River Corridor provides an important wildlife migration route for fish, water birds and other migratory birds and animals. Some species, particularly fish, use the Corridor as a re-establishment area following drought. To the southwest, bushland adjoining the River extends into the Kosciusko National Park. With the exception of the gorge areas, much of the River has long been used for grazing and very much altered from its natural state. Consequently the number and diversity of native fauna and flora species is much smaller than in comparatively undisturbed areas.

3.63 Special care is required in the Corridor to minimise further impacts on its wildlife to ensure that habitats are maintained for less numerous species such as platypus, Painted Honeyeaters, White-Back Swallows and Casuarinsas (River Oaks). Of greater concern are the three species from the Corridor areas which are officially listed as endangered species. These are the Macquarie Perch, Trout Cod and a legless lizard (Aprasia parapuchella). The latter is known only from Coppins Crossing on the Molonglo but is suspected of existing in the Corridor.

3.64 The Painted Honeyeaters utilises the Corridor as part of its migratory route. It appears to travel no more than 100-200 metres between landings and the continuity of trees is important. Care needs to be taken to avoid nature conservation areas being just isolated pockets. NCDC has undertaken to revegetate substantial areas of the Corridor previously cleared for grazing.

3.65 With regard to the endangered fish species in the Corridor, the Macquarie Perch and the Trout Cod, the Committee believes efforts should be made to increase their stocks in the River. **The Committee therefore recommends that a breeding program of Macquarie Perch and Trout Cod be undertaken by the Department of Territories and Local Government to enable the River to be re-stocked with these species.** It may be that fishing for these species in the Corridor will need to be temporarily restricted until the re-stocking program takes effect.

*Special Development Areas*

3.66 Several special development sites are to be found at various spots along the River Corridor, these include LMWQCC, YMCA Sturt Island, Greenhills Conference Centre, and the Crafts Centre and Outward Bound Camp at Cuppacumbalong. All of these facilities are on leasehold land and are not available for free access by the public.

3.67 The Commission proposes that these sites be retained for these purposes and measures be taken to minimise their impact on both the quality of the river water and the landscape of the Corridor.

3.68 The NCDC notes that it is likely that there will be some demand in the future for special areas for commercial, community, recreation and tourist activities and for National Capital purposes. Such structures and areas are to be subject to careful design, siting, landscaping and management to ensure that the development does not detract from the primary role of the River Corridor or adversely impact on adjoining areas.[39]

3.69 The Committee acknowledges that there may in the future be a need for such developments or facilities in close proximity to the River, but such developments must be limited. For example, NCDC had planned to construct a number of bridges across the Murrumbidgee between Tuggeranong and West Murrumbidgee. These would have been an intolerable intrusion into aesthetically important parts of the Corridor. **The Committee recommends that developments within the Corridor should be limited to those compatible with the primary purposes of the Corridor which are the preservation of the natural environment and heritage elements together with the provision of compatible recreation facilities. The Committee further**



**recommends development proposals should be the subject of an Environmental Impact Statement which is then available for public comment and input. Stringent environmental and human management guidelines should be a condition of development approval.**

*Historic Sites*

3.70 A recent archeological survey conducted for the Commission revealed 127 sites of prehistoric Aboriginal occupation in the Murrumbidgee Corridor within the ACT.[40] Also located in this zone are 46 historic sites of European occupation, including major ones such as Lanyon and Lambrigg homesteads, Farrer's grave, Farrer's laboratory and experimental wheatfield and Cuppacumbalong cemetery. These five places are on the Register of the National Estate.

3.71 The NCDC proposes that special sites be established to protect and preserve historic features in appropriate settings. Sites are to be planned and managed so that nearby development, ease of public access or high visitor numbers do not conflict with the main purpose of the site.[41]

3.72 The Committee agrees with these policies. It notes that special attention must be given to protecting the prehistoric sites from vandalism and pilfering. These have been the major problems with such sites. On an inspection the Committee saw evidence of remains of early European buildings being scavenged for firewood as well as being knocked over by grazing cattle.

3.73 The Committee is concerned that of the many prehistoric and historic sites within and near the NCDC proposed Corridor, only Lambrigg and Lanyon complexes, are identified as special sites on the Draft Policy Plan for the Corridor.

3.74 With respect to the major homesteads on the floodplain at Tharwa, Lanyon and Lambrigg, NCDC's original planning proposals for south and west Tuggeranong would have provided for urban development close to the boundaries of the two homesteads. Concern about the effect of these planning proposals on Lanyon and Lambrigg was expressed to the Committee by the National Trust, the Australian Heritage Commission and the Lanyon Restoration and Acquisition Committee. The three organisations believed it was essential that an appropriate rural setting be provided for Lanyon and Lambrigg and that the location of urban development within site of the homesteads would destroy the landscape setting of the homesteads. They recommended that the additional areas in south Tuggeranong and West Murrumbidgee to be included in the Corridor subject to NCDC's Tuggeranong and West Murrumbidgee reviews, be included in the River Corridor or be retained as rural areas. Apart from these proposals for the River Corridor boundaries, the three organisations also were

concerned that no urban development be visible from Lanyon or its rural approaches. This would necessitate that there be no urban development, not only in the areas of the River Corridor, but also south of Lanyon Hill ridgeline and on the north and west slopes of Williamson's Hill.

3.75 The Committee believes that the rural landscape along the River in the Lanyon-Riverview-Lambrigg area should be retained to ensure the preservation of the total rural environment around the homesteads. To achieve this objective urban development in the area will need to be designed carefully so that a rural environment can be preserved around Lanyon and Lambrigg. As a first step in this preservation, the Committee recommends that the River Corridor in the Lanyon-Riverview-Lambrigg area be widened to include those additional areas designated by NCDC in its draft Murrumbidgee River Corridor Policy and Development Plan as being for inclusion in the River Corridor subject to the Tuggeranong and West Murrumbidgee Reviews. These additional areas are:

- the area west of Tharwa Road near Williamson's Hill;
- the area immediately to the north of Lanyon Hill; and
- the area on the west bank of the Murrumbidgee opposite Lanyon stretching to the Tidbinbilla Road.

3.76 The inclusion of these three areas largely protects the visual setting of the Lanyon-Lambrigg historical precinct. However, there is also concern about urban developoment on the southern slopes of Lanyon Hill and east of Tharwa Drive around Williamson's Hill. The Committee considers those developments in Chapter 5 in the context of the impact of urban development generally in Tuggeranong.

3.77 The Corridor as a whole is of special national concern and is part of the National Capital Open Space System. Sections have been so changed by past human activity as to be regarded as an artefact. The Committee recommends that the Corridor as delineated in the NCDC Draft Policy Plan, including those additional areas recommended for inclusion, be entered on the Register of the National Estate without further delay.

Extractive Industries

3.78 Sand and gravel mining were carried out in the Murrumbidgee River within the ACT prior to 1974, by which time the bulk of the winnable sand had been removed, and freehold land along the River in the Territory had been acquired by the Commonwealth and rural leases terminated.



3.79 Most of the winnable sand previously existing in the Murrumbidgee River was located between Angle Crossing and Point Hut Crossing. Operations in the area were supervised, on behalf of DTLG, by the Department of Housing and Construction to ensure protection of water quality and the river banks. The winning operations caused minimal increase in river water turbidity because the sand was reasonably clean.

3.80 At present, the only place where sand is being extracted from the Murrumbidgee system is at Sturt Island, near the confluence of the Murrumbidgee and the Molonglo.

3.81 Both the DHC and NCDC believe that with the cessation of sand extraction natural erosion and sand transport along the River would cause the river pools to gradually refill with sand, initially at the upstream end of the River and gradually extending downstream. The River's potential for recreation swimming and canoing could then be considerably reduced.[42]

3.82 The DHC estimates that natural sand transport along the River is between 35 000 to 45 000 cubic metres per year which is equal to the mining capacity of a single moderate sized operator.[43]

3.83 The NCDC and DHC both argue that it would be desirable to have one sand operator working the River to maintain the potential of the River for recreation provided the local impacts can be contained. It must be recognised that as recreational development on the River reaches its maximum capacity, adverse mining effects will be less easily contained. The designation of water uses in the Draft Corridor Plan does not permit sand extraction.[44] The Committee believes that limited sand and gravel mining may have to be considered at suitable places on the River provided that impacts are contained. This should only be undertaken on a needs basis and after the effects on downstream recreation areas and freshwater environment carefully considered. It may become necessary to temporarily close a recreation area to remove sand and restore its full recreational amenity.

Domestic Water Supply

3.84 Canberra depends upon two of the Murrumbidgee's tributaries in the ACT for its water supply, the Cotter and Queanbeyan Rivers. No water for Canberra's use is taken directly from the Murrumbidgee River.

The Cotter Supply System

3.85 Three dams are located on the Cotter River. The Cotter Dam and pumping station were completed in 1915. Its capacity was increased in 1951 when the level of the dam wall was raised. Water from the Cotter Dam now is not normally used but is kept as a reserve. Bendora Dam was built upstream of the Cotter Dam

in 1961 to augment the water supply. Both of these dams have relatively small storages and the reduction in the Murrumbidgee flow was not significant at the time. Corin Dam was constructed on the Cotter River further upstream in the Brindabella Range in 1967 and is the main storage dam in the Cotter Supply System. Bendora Dam is maintained by the flow from Corin Dam. The capacities of the dams are set out below.

Capacity of ACT Townwater Storages (Megalitres)[45]

| | | |
|---|---|---|
| Corin Reservoir | 75 455 | |
| Bendora Reservoir | 10 720 | |
| Cotter Reservoir | 4 697 | |
| TOTAL | | 90 872 |
| Googong Dam | 124 510 | |
| TOTAL | | 215 382 |

3.86 Treatment facilities for the Cotter Supply System are located at Mount Stromlo. The treatment facilities for water at Mount Stromlo include flocculation, sedimentation, chlorination and fluoridation.

3.87 The Corin and Bendora reservoirs on the upper reaches of the River have virtually uninhabited natural bushland catchments. The water in the storages has very low turbidities all year round and treatment at Mount Stromlo for this water is mainly for pH correction, chlorination and fluoridation.

3.88 The catchment of the Cotter Reservoir includes commercial pine forestry operation. The stored water can have turbidities of 20 units or more and requires substantial treatment.

3.89 There is no continuous water release downstream from the Cotter River then for Canberra water supply purposes. Canberra's town water from the Cotter system is fed by a gravity main from Bendora Dam. No releases occur in the dry season. The Cotter Reservoir is quite small and as water has to be pumped up to the Mt Stromlo Water Treatment Works it is therefore more expensive than gravity fed water from Bendora Dam.

**The Googong Water System**

3.90 The Seat of Government Acceptance Act 1909 gives the Commonwealth paramount rights to the use of the waters of the Queanbeyan and Molonglo Rivers. To meet the growing water demands of the Canberra and Queanbeyan population, the Commonwealth constructed the Googong Dam on the Queanbeyan River in NSW. A treatment plant and pumping station are located adjacent to the dam, which was commissioned in 1978.



3.91 The catchment of Googong includes inhabited rural land, so the treatment of water, stored in the reservoir, is necessary because the physical, chemical and bacteriological quality of the raw water is variable. The water treatment plant provides for flocculation, chlorination, pH correction and removal of colour.

**Canberra's Water Supply System**

3.92 The Cotter water supply system can serve approximately 215 000 persons. Googong with its current treatment plan facility can serve approximately 115 000. The Cotter River facilities and Googong operating as an integrated system are capable of serving approximately 350 000 persons.[46]

3.93 The Googong facility will ultimately have a capacity to serve 150 000 persons if operated as a separate system. However with an extended Googong and the Cotter operating as a single integrated system, the combined capacity will be sufficient for 450 000.

3.94 The Committee was advised that when the population, served by Canberra's water supply (i.e. Canberra and Queanbeyan), reaches 450 000 a further water storage dam will be required. NCDC stated that the most likely site is on the Gudgenby River near Mount Tennant.[47]

3.95 It has been estimated on a long term basis that 70 per cent of the Cotter River streamflow and 30 per cent of the Queanbeyan River is used for town water and that 50 per cent of the water is returned to the river system, mainly as effluent from sewage treatment works.[48] Another 20 per cent of water loss is offset by increased runoff from impermeable surfaces in urban areas.[49] The current average annual loss of water as a result of metropolitan use is 2-3 per cent of the mean annual flow at Burrinjuck Dam.

**Irrigation**

3.96 The terms of the agreement between the Snowy Mountains Council and the responsible State and Commonwealth authorities for the release of waters from the Tantangara Reservoir provides for a guaranteed minimum flow of 17.2 megalitres/day at the Cotter Crossing in the ACT, under the conditions outlined earlier in paras 1.13-1.14. However, releases made in accordance with this agreement may be utilized for irrigation before the water reaches the ACT. It is an established practice along some parts of the Murrumbidgee River to pump water directly from the River to irrigate crops and pastures. This does occur on some of the NSW properties located on the Murrumbidgee upstream of the ACT.

3.97 **The Committee recommends that the Minister for Territories and Local Government negotiate with the New South Wales Government to ensure that water released from Tantangara Reservoir to maintain minimum flows at Cotter Crossing does reach the ACT.** While this particular problem may be more easily solved in isolation the Committee sees a need for greater national co-ordination of the conservation and use of water resources particularly where they cross state and territory boundaries.

3.98 The practice of taking water from the River and its tributaries within the ACT for irrigation and other purposes remains subject to the provisions of the NSW Water Rights Act, 1902.[50] The DTLG notes that many of its provisions are outdated and need amendment.

3.99 The Department in its evidence on water extraction stated that 'only a limited number of applications ever came in',[51] and that 'traditionally permission was always granted when people applied for permission to pump'.[52] The Department is not sure that all of the pumping undertaken in the ACT is authorised. Only recently have the impacts of requests to pump river water for irrigation been examined.

3.100 The Department now examines all applications to pump water for irrigation and other purposes from ACT rivers and streams. Applicants are asked to supply details about what amount of water is required and for what period, the area and type of crops to be irrigated. The DTLG then circulates this information to the CTHC, NCDC and DHC for their comments. Approval is granted only after this information has been considered. Conditions may be attached to the approval, including the Commonwealth's right to review the conditions of approval or terminate approval at any time. **The Committee recommends that DTLG monitor water extraction to ensure that all pumping from the River is authorised.**

3.101 Irrigation water can be extracted from the river system as an alternative to using town water supply for the watering of urban parks. This practice is already used in Canberra for the Lake Ginninderra foreshores, Commonwealth Park and at Royal Canberra and Yowani Golf Clubs. The NCDC noted that 50 per cent of reticulated water used within the ACT is used for the irrigation of parks and domestic gardens.[53,54]

**Murrumbidgee Irrigation Areas**

3.102 The Committee received three submissions from the Murrumbidgee River Irrigation areas, one from the Ricegrowers' Association of Australia, one from the Murrumbidgee Valley Water Users' Association and one from the Murrumbidgee River Irrigators' Association.



3.103 The Committee also paid a visit to the Murrumbidgee Irrigation Areas and held informal discussions with members of the Association's mentioned above and members of Shire Councils in Leeton and Griffith, the local manager of the Water Resources Commission of NSW and members of the CSIRO Centre for Irrigation Research at Griffith.

3.104 In terms of the impact of the ACT on the Murrumbidgee Irrigation Areas, the main concerns expressed during the Committee's visit and in the submissions are the quantity and the quality of the water reaching the area. The people in the areas depend largely upon the quantity of water for their livelihood through irrigation. The quality of water is important as it is used for domestic and stock use.

3.105 Sewage effluent pollution of the Murrumbidgee, and consequently Burrinjuck Reservoir, leading to algal blooms and offensive odours and taste, have been major concerns. Studies have shown that the ACT makes no contribution to salinity in the River. Since the commissioning of the LMWQCC in 1978, the water quality in the Murrumbidgee downstream of the centre has improved considerably and is now considered to be quite satisfactory.

3.106 There is some concern in the MIA about current water usage by the ACT and the impact of future water storage dams to cater for urban growth.[55] Recent consumption figures for the ACT are:

| Financial Year | Megalitres Used | |
|---|---|---|
| | Canberra | Queanbeyan |
| 1979/80 | 62 201 | 3 999 |
| 1980/81 | 55 945 | 3 825 |
| 1981/82 | 55 472 | 3 850 |
| 1982/83* | 69 432 | 4 199 |

* drought year - high consumption

It is believed that 60-70% of the water used in Canberra is returned to the River.

3.107 By way of comparison, the Manager of the Water Resources Commission at Leeton, has advised that an average irrigation farm uses approximately 1400Ml of water/year. This means that Canberra uses approximately the equivalent of 43 irrigation farms. Future increases in Canberra's consumption are expected to be in direct proportion to population increases. The current average annual loss of water as a result of metropolitan use is 2-3 per cent of the mean annual flow at Burrinjuck Dam.

3.108 When the Canberra-Queanbeyan population reaches 450 000 an additional water storage dam will be required and will probably be built on the Gudgenby River near Mr Tennant.

3.109 The Committee was informed that during the period June to October in the MIA surplus flows in the Murrumbidgee River arise from overflows from storages, contributions from downstream tributaries and irrigation cut-backs. It is claimed that a significant amount of water during this period flows down the River to the ocean. This water is referred to as 'surplus flow'. To capture some of this surplus flow, which according to the submissions, otherwise goes to waste, it is proposed to use Lake Mejum, which consists of three natural swamps near Narrandera, as a storage to be filled during peak flow periods.

3.110 Two alternative schemes have been proposed to use the water subsequently stored by Lake Mejum namely gravity and pumping. It is not within the scope of this Committee's terms of reference to comment on which scheme is the more suitable. The Committee is concerned that any surplus flow might be wasted. Submissions from the MIA sought additional storage capacity to offset future increases in water usage by the ACT. The Committee believes that there needs to be a national approach to the management of scarce water resources, and that the feasibility of the Lake Mejum proposal be considered in conjunction with the proposed Mount Tennant Reservoir. The minimum flows required to sustain the river ecology and provide regular flushing also need to be considered.

3.111 A report of the Water Resources Commission of NSW, concerning Lake Mejum Storage Proposals, states in part that 'recent fauna surveys have recognised that Mejum Swamp is a valuable water bird habitat in the Riverina Region. Any decision to flood the swamp would destroy this habitat causing wildlife to vacate the area'.[56] The report went on to say that suitable options not to flood the swamp can be developed under the pumping scheme.

3.112 It should be noted that Australia and Japan are signatories to and have ratified a Convention aimed at conserving wetlands of international importance within their territories. A number of species of birds that migrate internationally are covered by this Convention. **The Committee therefore recommends that the international Convention aimed at conserving wetlands of international significance be taken into consideration before a decision on the Lake Mejum Storage Proposals is made.**

3.113 Furthermore, when considering the establishment of additional reservoirs due weight should be given to the fact that by the diversion of water and reducing the volume and flow of water, the quality of the water downstream of such a diversion can be adversely affected.

**Conservation of Water**

3.114 The Report 'Water 2000 - A perspective on Australia's water resources to the year 2000' states:



> There is potential for the more efficient use of water in irrigation, in the domestic sector and in industry.
>
> The largest scope for increased efficiency in water use occurs in the irrigation sector. Potential benefits include increased crop yields, reduced waterlogging and salting, the release of regulated supplies for meeting new rural or urban demands from existing storages, and increased security for existing users.
>
> Scope for increased efficiency also exists in urban water use. Although the percentage of total use (10%) is small compared with irrigation (74%), quality requirements are much higher and suitable sources of new supplies are increasingly remote from centres of demand, so they are more costly to develop. Furthermore, treatment costs are high and, as a general rule, are expected to rise in the future as raw water from unrestricted catchments is brought into supply systems.
>
> Up to 50% of domestic supplies is used for garden watering in some areas. Much of this is wasted through over-watering and excessive use of fixed sprinklers. The nature of many gardens, with their emphasis on large areas of lawn and annual plants, is conducive to high water use compared with gardens incorporating plants and shrubs better adapted to local climatic conditions.
>
> Household appliances such as garbage grinders, dishwashers and washing machines also use large amounts of water unless carefully managed.[57]

The Report goes on to indicate the need for a conservation campaign similar to those conducted for liquid fuels and electricity to make more efficient use of what is a limited resource.

3.115 As the lead time for the planning and development of major water resource developments tends to be at least ten years most major projects to the year 2000 have already been identified and planned for. It is stated in Water 2000 that:

> Water authorities should be planning now for the period beyond the year 2000 in order to develop options for meeting future water needs, to estimate funding and other resource requirements and to identify potential problems. This planning will become increasingly complex as the limits to economic development of water resources are approached in some regions.[58]

The same Report warns:

> It is not economically feasible to ensure water supplies without restrictions for urban and agricultural uses under all seasonal conditions. Restrictions in periods of severe rainfall deficiencies must be expected in Australia, with its high rainfall variability, and the resulting inconvenience and losses must be expected by all groups of users. The acceptable degree of restriction is a matter for political decision in the light of economic and social factors, including competing demands for public funds.[59]

3.116 Canberra is the largest inland urban area in Australia. Lower rainfall than the coastal areas where the majority of our urban population lives means that per capita water consumption in Canberra is higher than the Australian average but similar to that of other inland centres in Australia.

3.117 The volume of water in our river system is ultimately limited. While it appears adequate to supply our short to medium-term needs, there must come a point where quantity and/or quality will be inadequate. This problem is not confined to the ACT or to Australia. In the United States per capita water consumption is increasing at a much greater rate than the increase in supplies. Some US observers have likened the water supply problems expected there in the 1980s to the Energy Crisis of the 70s. It is clear that we have to start looking at our own water usage patterns now, with a view to conservation if we are to avert or even delay future supply problems.

**Water Use, Draft Policy Subject Plan**

3.118 In conjunction with the Department, NCDC has drawn up a Draft Policy Plan (Water Use) for the ACT. The Draft Policy Plan (Water Use) is intended to cover all uses of lakes and streams within the ACT, together with specification of streamflow and water quality objectives to be met by waters flowing into the ACT and waters flowing out into NSW. The plan sets ACT waters in their broader catchment context, and aims to ensure that action taken within the ACT is consistent with water and related land activities, both upstream and downstream of the ACT. The ACT Policy Plan (Water Use) has been divided into a number of segments which are generally based on sub-catchments within the ACT region. These are shown in Figure 8.

3.119 The river system comprises a complex system of land use, streamflow and water quality inter-relationships. The ability of the stream to sustain a flow of water quality appropriate to a particular water use is dependent on the land and water uses upstream. Consequently, any change in land or water use will have implications for water use, and, thereby, land use downstream. Conversely, any change in water use will have implications for all water and land uses upstream.



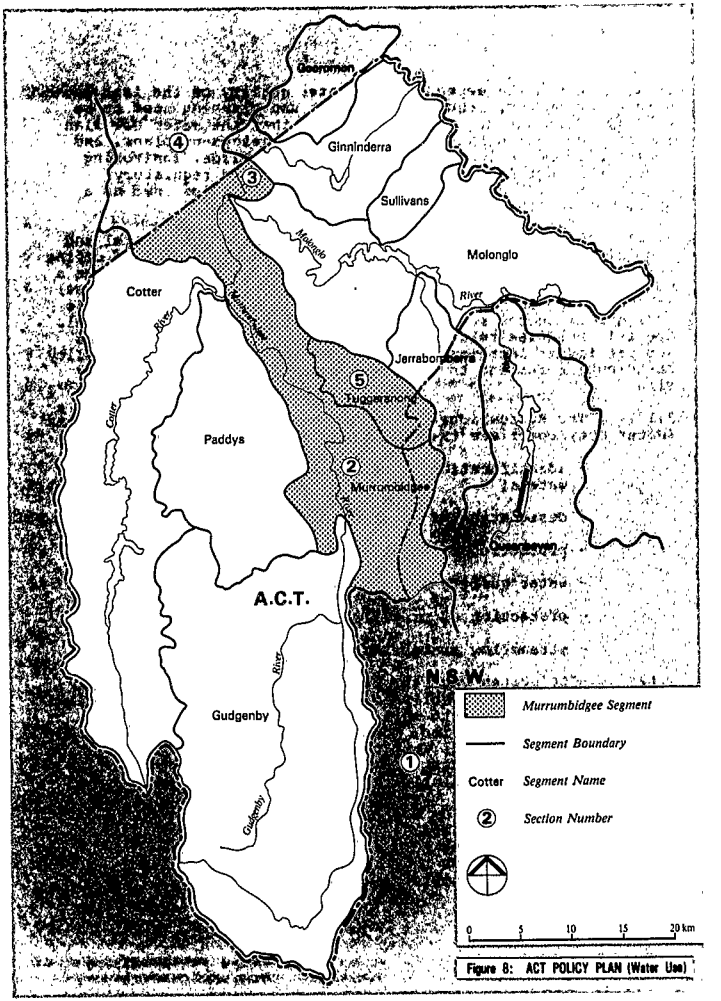



Figure 8: ACT POLICY PLAN (Water Use)

*Source: Murrumbidgee River Corridor, Policy Plan and Development Plan, Draft for Discussion NCDC, October 1983*

3.120 Given the dependence of water quality on the land use within catchments, land use and water use planning need to be closely coordinated. NCDC have advised that the Water Use Plan is integrated with land-use policy and development plans, and includes common objectives in terms of standards, monitoring procedures, definition of responsibilities and regulatory mechanisms. Such an agreed plan is similar to ones used as a basis for water resource planning and management.

3.121 The Water Use Policy Plan is comprised of General and Specific Policies. General Policies are broadly based and define the Commission's basic planning objectives within the area as a whole. The factors underlying the Draft Policy Plan (Water Use) are reflected in general policies covering water uses, aquatic ecology, discharge zones and the extraction of sand and gravel. Specific Policies relate to particular water use designations and particular locations and are presented as a series of policy statements referring to the areas defined on the Draft Policy Plan.

3.122 The Murrumbidgee River segment of the Draft Policy Plan (Water Use) comprises the following four major components:

- identification of beneficial uses made of the waters;
- designation of water uses for specific sections;
- protection of aquatic ecology;
- water quality objectives;
- protection of prevailing water quality; and
- streamflow protection objectives.[60]

3.123 NCDC states that through the ACT Region Water Quality Study (1976) it has established the water quality and streamflow objectives appropriate to the protection of the range of beneficial uses identified. These objectives have been endorsed by the Interdepartmental Committee on Environmental Quality and have also formed the bases of water quality management and pollution control legislation.

3.124 The Draft Policy Plan (Water Use) provided to the Committee, covers only the Murrumbidgee Corridor. As indicated earlier the whole of the ACT is part of the Murrumbidgee Basin. The Committee recommends that the Water Use Plan for the whole of the ACT should be completed without delay.



ENDNOTES

1. Evidence, p. 572.
2. Evidence, p. 1033.
3. Evidence, p. 10.
4. Evidence, p. 11.
5. Parliamentary Paper No. 2 of 1968.
6. NCDC, ACT Land Use Plan 1975, p. 8.
7. ibid, p. 6.
8. ibid, p. 12.
9. Professor Seddon was at the time Head of the Centre for Environmental Studies, University of Melbourne.
10. Seddon, G., An Open Space System for Canberra; A Policy Review, NCDC, Canberra, 1977, p. 66.
11. ibid.
12. Para. 171.
13. Evidence, p. 1083.
14. NCDC, Murrumbidgee River Corridor draft Policy and Development Plan, October 1983, p. 17.
15. ibid, pp. 58-65.
16. ibid, p. 57.
17. ibid, pp. 18-19.
18. ibid. p. 19.
19. ibid, pp. 75-76.
20. Evidence, pp. 445, 636.
21. Evidence, p. 446.
22. ibid.
23. Evidence, p. 445.
24. Evidence, pp. 676-679.
25. Evidence, p. 682.

26. Evidence, pp. 575-576.

27. Evidence, pp. 578-580.

28. Murrumbidgee River Corridor, draft Policy and Development Plan, 1982, p. 26.

29. ibid, p. 36.

30. ibid.

31. ibid.

32. NCDC, Technical Paper No. 32, Monitoring River Recreation Demand in the ACT, 1981, p. 19.

33. Murrumbidgee River Corridor, draft Policy and Development Plan, p. 76.

34. ibid, p. 43.

35. ibid, p. 43.

36. NCDC, Technical Paper 23, An open space system for Canberra, 1977, by Professor George Seddon, p. 50.

37. Murrumbidgee River Corridor Draft Policy and Development Plan 1983, p. 30.

38. ibid, p. 69.

39. ibid, p. 62.

40. ibid, p. 32.

41. ibid, p. 38.

42. ibid, p. 49.

43. Evidence, p. 313.

44. Murrumbidgee River Corridor Draft Policy and Development Plan 1983, p. 64.

45. Evidence, p. 179.

46. NSW Department of Public Works, 'Community Water Supplies Investigation Report No. 8'.

47. Evidence, p. 60.

48. Evidence, p. 180.

49. Evidence, p. 60.



50. Evidence, p. 1209.

51. Evidence, p. 219.

52. ibid.

53. Evidence, p. 145.

54. Water 2000 - A perspective on Australia's water resources to the year 2000. Report of the Steering Committee in conjunction with the Department of Resources and Energy, AGPS, Canberra, 1983.

55.

56.

57. Water 2000, pp. 67-68.

58. ibid, p. 36.

59. ibid, p. 33.

60. Draft Plan, p. 66

## CHAPTER 4

## LEGISLATIVE AND ADMINISTRATIVE ARRANGEMENTS

### New South Wales Government Responsibilities

4.1 In New South Wales a number of authorities have responsibilities for administering legislation relating to freshwater resource management. These include the Water Resources Commission (WRC), State Pollution Control Commission (SPCC), Soil Conservation Service, Departments of Environment and Planning, Mineral Resources and Agriculture, National Parks and Wildlife Service, State Fisheries and the Forestry Commission.

4.2 The State Pollution Control Commission's main duty is to carry out functions under the Clean Waters Act, the Clean Air Act and the Noise Control Act.[1] The SPCC is the principal environmental control body for NSW. It is charged with controlling pollution, regulation and control of waste disposal including discharges into or affecting waterways, and coordinating the activities of all public authorities in respect of pollution, waste disposal and environment protection.[2] The SPCC's Act enables the Commission, if necessary, to direct any public authority in NSW to do anything within the powers of that authority to control pollution, regulate waste disposal and protect the environment. The SPCC has been effective in controlling point source pollution in NSW but the problem of diffuse source pollution is more difficult and a lot more work is still required to resolve diffuse source problems.[3]

4.3 The Water Resources Commission gains powers under the Irrigation Act, Water Act and Water Resources Commission Act to protect water quality. While the Clean Waters Act administered by the SPCC is the primary legislation for controlling point source pollution of waterways, the Irrigation and Water Acts provide for water resource management in qualitative as well as quantitative terms.[4]

4.4 The Water Resources Commission is currently preparing a State Water Plan to assist in the overall management and coordination of the development and use of the State's water resources. A preliminary plan is now being prepared by the Water Resources Commission for the management and development of the water resources of the Murrumbidgee River Basin.[5]



4.5 The State Water Plan:

> will consist of individual river basin plans which will broadly consider both surface and underground water resources, present and future water requirements for all purposes, possible alternative resource developments and options for the better management of existing supplies. Major water quality, environmental and social factors will be identified but not considered in any detail.[6]

The Committee believes it important that ACT management of the Murrumbidgee and its tributaries be closely coordinated with NSW management of the Rivers above and below the ACT.

4.6 The Water Resources Commission is concerned that increasing nutrient loads from urban development in Canberra, from both sewage effluent and urban runoff, could pose long term problems for water quality in Burrinjuck Dam.[7] With the exception of Queanbeyan sewage effluent and that from Canberra Abbatoir the Committee believes nutrient from sewage effluent is now minimal. Continuing care is required to minimise that from urban runoff.

4.7 The Water Resources Commission has appointed a Catchment Officer whose duties include local administration of the Commission's catchment management responsibilities in the Murrumbidgee above Burrinjuck Dam and in the catchment of Googong Dam. This Catchment Officer, along with a representative of the SPCC are members of the Sub-committee on Water Quality of the Commonwealth Inter Departmental Committee on Environmental Quality in the ACT.[8]

4.8 There is generally good cooperation between Commonwealth and State authorities responsible for water quality matters. The implementation of measures for the construction of, and subsequent management of the catchment of Googong Dam is a good example. The Seat of Government Acceptance Act 1909 gives the Commonwealth prior rights to the use and control of the Queanbeyan and Molonglo Rivers in NSW. The Googong Dam was built in NSW to provide water supplies to the ACT but water is also provided to Queanbeyan. A Googong Dam catchment Management Working Party has been established with membership from relevant State and Commonwealth authorities.

4.8a As part of the State Water Plan, the Water Resources Commission is preparing preliminary plans for the Queanbeyan and Molonglo River catchments.[9] This is part of a Water Plan for the whole Murrumbidgee Basin. The ACT Water Use Policy Plan will ensure that developments within the ACT are consistent with the protection of uses made of the water downstream in NSW. NSW authorities are represented on the Water Quality Sub-committee

which participated in the preparation of this Plan. In terms of ensuring the quality of incoming water into the ACT, the NSW Water Resources Commission Act provides for the representation of NSW authorities and water user groups on the Water Utilisation Council, which advises on the development of NSW Water Use Plans.[10] However, other than the Googong Catchment Management Working Party, the ACT has no official participation in the preparation of Water Use Plans for waters upstream of the ACT. The Committee believes that such plans should be drawn up in close cooperation with the Commonwealth.

4.9 **The Committee recommends that the Minister for Territories and Local Government seeks from the New South Wales Government cooperation to ensure that in keeping with the Seat of Government Acceptance Act 1909, New South Wales water management plans for the Queanbeyan and Molonglo Rivers be drawn up in close consultation with the Water Quality sub-committee of the Commonwealth Inter Departmental Committee on Environmental Quality in the ACT.**

4.10 It should be noted that this sub-committee has State Government representatives as members and there should be a *reciprocal arrangement.*

## Responsibility for Water Matters in the ACT

4.11 Responsibility for water management in and around the ACT is divided between several government authorities. A schematic outline of these responsibilities is shown in Figure 9.

4.12 *The NCDC is responsible for the planning, development* and construction of the City of Canberra. As mentioned in Chapter 3 following a recommendation of the Joint Committee on the ACT in its Planning in the ACT report, a government decision was made in 1979 to make the Commission responsible for planning throughout the ACT. The specific responsibilities of the Commission related to the Murrumbidgee River system in the ACT include:

- land-use planning and development of the Murrumbidgee catchment within the ACT;
- planning, design and construction of services for water supply, sewage and stormwater disposal including the creation of urban lakes and other water features;
- planning of recreational use of the river corridors and urban lakes and design and construction of parks and recreational facilities, roads and services;



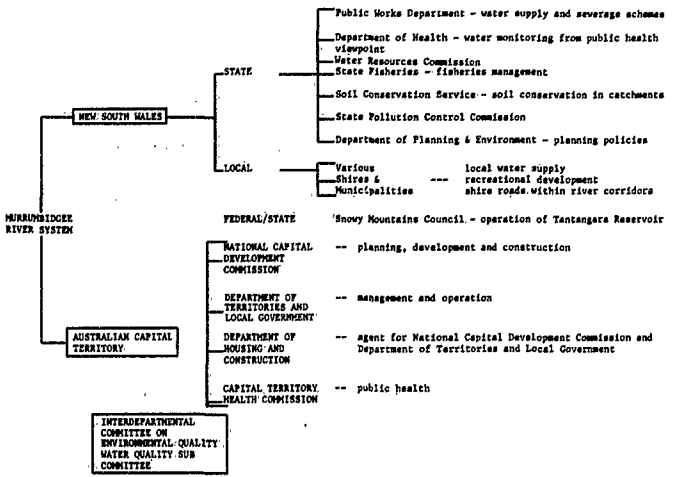



**Figure 9: ADMINISTRATIVE RESPONSIBILITIES FOR THE MURRUMBIDGEE RIVER SYSTEM**
*Source: NCDC Technical Paper 34, Utilisation and Protection of the Murrumbidgee River System in the A C T, July 1981*

- water quality studies required as an input to the planning and development of the above works or to monitor the performance of completed works;

- other studies (e.g. recreation demand) undertaken as an input to the planning and development of recreation areas; and

- design and siting approval for industrial development which can include provisions for the control of the quality of waste water.

4.13 The Department of Territories and Local Government (formerly the Department of the Capital Territory) is responsible for the administration and management of the ACT including the City of Canberra. Its specific responsibilities related to the Murrumbidgee river system include the following:

- management of land within the ACT including the Murrumbidgee catchment;

- management of the urban lakes, streams, rivers and their corridors, including surrounding parkland;

- management of the Cotter water supply catchment and the acquired area surrounding Googong Reservoir;

- management of services for water supply, sewage and stormwater disposal, in conjunction with the Department of Housing and Construction;

- water quality and ecological studies required as an input to management work;

- policy and monitoring of the quality of water from industrial developments;

- approval of leases for extraction of sand, gravel and topsoil;

- approval of applications for extraction of irrigation water within the ACT; and

- arranging soil conservation works to protect water quality.

4.14 The Department of Housing and Construction undertakes the design and construction of hydraulic work on behalf of NCDC and the maintenance of this work on behalf of the DTLG. This includes:



- design and supervision of construction of hydraulic services;

- operation and maintenance of Canberra's water supply and sewerage systems;

- maintenance of the stormwater system;

- water quality monitoring related to the Department's operational responsibilities or as an agent of NCDC;

- operation of the water quality data archive;

- supervision of the operation of sand, gravel and topsoil extraction leases; and

- operation and maintenance of flood control works (dams) and river flow monitoring equipment.

4.15 The Capital Territory Health Commission is responsible for aspects of water quality related to public health including:

- monitoring of bacterial levels in lakes and rivers used for recreation;

- monitoring drinking water quality;

- approval of industries with liquid wastes that cause the industry to be classified as 'noxious'; and

- other water quality monitoring in support of the Interdepartmental Water Quality Sub-committee.

4.16 The Department of Home Affairs and Environment reviews environmental issues relating to Canberra's development in accordance with the Environmental Protection (Impact of Proposals) Act 1974.

*Coordination*

4.17 The responsibilities for water planning and management are fragmented, being shared among a number of government authorities. The coordination of planning and management is therefore essential. Major responsibilities are shared between NCDC and DTLG, such that fragmentation is minimal. Coordination of these agencies should be much more easily achieved then in the States where agencies sharing responsibilities are much more numerous.

4.18 Two significant administrative mechanisms exist to facilitate the coordination of the activities of authorities on aspects of the Murrumbidgee river system in the ACT. The Interdepartmental sub-committee on Water Quality, and the National Capital Open Space System Study Working Group.

4.19 The Water Quality Sub-committee is responsible to the Interdepartmental Committee on Environmental Quality in the ACT, which advises the Minister for Territories and Local Government on environmental matters affecting the ACT. It consists of representatives from the NCDC, DTLG, DHC, CTHC, Department of National Development and Energy, the Bureau of Mineral Resources, and two NSW authorities; the State Pollution Control Commission and the Water Resources Commission.[11] The Sub-committee meets approximately once a month and the parent committee, three to four times a year.

4.20 The Sub-committee is an important forum for the exchange of information on current issues and ongoing studies. Specific tasks of the sub-committee include:

- advise on the drafting of water pollution legislation for the ACT;
- standardisation of water quality monitoring sites and procedures;
- coordination of water quality monitoring programs undertaken by various authorities;
- determination of agreed designated beneficial uses of river systems and related water quality criteria; and
- liaison on specific water pollution problems.[12]

The committee and sub-committee have no statutory powers nor do they have full-time staff.

4.21 The other avenue for coordination is through the NCOSS Study Working Group. As mentioned in the last chapter, this group consists of representatives of DTLG and NCDC. Its purpose is to achieve a coordinated approach towards the planning and management of the National Capital Open Space areas. The groups meets only when there are policy considerations to be dealt with rather than for regular meetings and averages about one meeting a month. The NCDC states that this group has given a high priority to evaluation and planning of the Murrumbidgee River Corridor.



4.22 These two bodies do not cover the complete range of planning and management matters requiring coodination. There is a noticeable divergence of opinion amongst the government authorities involved as to the success of existing arrangements for coordination.

4.23 The DTLG in its original submission to the Committee argued that the fragmentation of planning and management responsibilities does not facilitate the development of policies and management strategies.

4.24 In its supplementary submission, it states:

> the department recognises and supports the view that there is a clear need for more positive coordination and monitoring of water quality issues in the ACT and that options for achieving this (e.g. department, committee, statutory body) should be thoroughly explored.[13]

It further maintains that 'various agencies involved in planning and management have each tended to develop policies "often in isolation", adequate for their own particular responsibilities'.[14]

4.25 The Department argues that the lack of an authority with general executive powers in water quality matters (the water quality sub-committee has no power to determine and enforce water policy priorities) can result in different agencies following priorities other than those established by the sub-committee.

4.26 This is in sharp contrast to the views of the NCDC. It maintains that coordination has been satisfactory in the past. Mr M. Latham, Associate Commissioner, told the Committee:

> There are few formal administrative arrangements to integrate development and management activities and yet a high level of informal coordination has been achieved and served us well. The practical results have been generally satisfactory.[15]

The Commission does note in its supplementary submission that there 'is a need to give greater focus to the mechanism of coordination'.[16]

4.27 In its 1979 Report on Planning in the ACT, the Joint Committee on the ACT recommended that:

> Action be taken to improve liaison and cooperation between the National Capital Development Commission and the Department of the Capital Territory to overcome problems of coordinating land planning and management.

The Government response in November 1979 was:

> Supported. This has always been an objective. Positive steps have been taken, including establishing regular liaison meetings between the Secretary of the Department, the Commissioner of the N.C.D.C., and senior officers. The Canberra Development Board has been established on the basis of cooperative arrangements to coordinate development promotion in the Australian Capital Territory.

The Committee notes from the evidence that liaison and cooperation still need to be improved.

4.28 DTLG is the main water management department even though it delegates some management responsibilities to the Department of Housing and Construction. NCDC is the main water planning authority although it also delegates some responsibility to DHC. The IDC on Environmental Quality advises the Minister for Territories and Local Government.

4.29 There are fewer agencies involved in water planning and management in the ACT than there are in NSW. Coordination should therefore be more easily attained in the ACT even with self-government.

Suggestions for Improvement and Coordination of Administration

4.30 While the NCDC saw no need to change the status quo, it did see a need to improve coordination. It suggests that the most viable proposition is a system of management plans as currently being developed by the NCDC and DTLG. This plan package consists of three elements:

- ACT Land Use Policy Plan
- River Corridor and Lake Policy and Management Plans
- ACT Water Use Policy Plan.

4.31 The NCDC believes 'such plans provide a basis to facilitate coordination and to achieve desired objectives by extension of actions already being undertaken'.[17] These Plans would be prepared by NCDC in close consultation with DTLG.

4.32 On departmental responsibilities the NCDC's position and more recently that of DTLG support the status quo. This contrasts with the DHC and CTHC which believe that the existing system needs improvement and that it would be appropriate for one authority to be responsible for water matters. In a letter



dated 23 January 1984 DTLG advised that the Department considers that one authority should have formal management responsibility for the waterways of the ACT and that the Department of Territories and Local Government should be that authority. In such a structure the National Capital Development Commission would still have responsibility for planning. The Department of Housing and Construction would continue to operate the Territory's water and sewerage system and the oversight of all matters impacting on public health would be maintained by the Capital Territory Health Commission.

4.33 Of the water management plans, DTLG goes on to say:

> Essentially, the Department supports the NCDC viewpoint that proper control of water quality in the ACT can be maintained by this system of management within agreed policy and development plans. This is a far less complex arrangement than applies in the States and ensures that water quality is a prime element of any development and management strategy. In summary, the Department regards the Draft Corridor Plans as a valuable contribution to the overall mangement of open space in the ACT. Considerable detailed consultation will be required, however, between the Department and the Commission to formulate workable development and management plans for the Corridor.
>
> The Corridor proposed by the Commission was determined in conjunction with the Department and is generally considered a logical line for planning, development and management purposes, having regard to natural features and the varying degrees of protection required in particular areas.[18]

4.34 The DHC believes that a single body, either a branch or a section of a Commonwealth department, should be responsible for the protection and management of the water resources of the ACT and for ensuring that appropriate monitoring and investigatory work is carried out.[19] This was echoed by DTLG which stated:

> The Department believes there should be one authority with statutory responsibility to at least coordinate, not necessarily conduct, all water quality monitoring and management.[20]

4.35 Two other proposals to improve coordination and administration are provided by Dr R. Rosich of the CCAE and the Native Fish Australia group.

4.36 Dr Rosich argues that only very limited studies have been made of rivers and creeks in the ACT and that further development of the ACT will lead to a deterioration in the quality of ACT waters, unless remedial action is taken. He suggests a 'Task Force on ACT Waters' which would be a short-term authority, approximately 5 years, whose function would be to undertake research on water matters in the ACT, e.g. fish problems, recreation need, drinking water supply, and propose management and planning solutions. He further suggested the establishment of a National Water Research Institute.[21]

4.37 The Native Fish Australia Group also advocate a single authority in the ACT that would be responsible for all forms of water quality management, including fishing and recreation. Dr P. Greenham, a representative of this group, notes that:

> We have a lot of groups in the ACT which do very specialised jobs quite well. What we lack .... is a higher degree of integration between all these activities.[22]

4.38 The NFA envisage such an authority as a policy and management body which is a part of a larger authority responsible for management and research of freshwater on an Australia-wide basis, an Australian Institute for Freshwater Studies.[23] The Committee is aware of the lack of data on freshwater resources generally within Australia, however the volume of evidence received by the Committee suggests that the ACT must have the most studied waters in Australia. A freshwater research institute will be further dealt with later in the chapter.

4.39 The Committee believes that to be effective, water planning and management must be integrated with land planning and management in the catchment area. Therefore the establishment of a single water management body would lack the necessary coordination with land planning and management. The Committee concludes that the system of plans proposed by NCDC and generally accepted by DTLG provides a sound basis for the co-ordination of water and land use planning and co-ordination between the major agencies within the ACT. The sub-committee of the IDC on Environmental Quality in the ACT provides substantial co-ordination with NSW authorities. However it is clear that coordination between NCDC and DTLG still needs to be improved. This will be increasingly necessary with self-government.



Legislation on Water Matters in the ACT

4.40 There is a considerable body of legislation currently in force which relate to the waters of the ACT and the Murrumbidgee River and its Corridor. They include:

- Seat of Government Acceptance Act 1909
  This Act gives the Commonwealth paramount rights to the use of the waters of the Molonglo and Queanbeyan Rivers for Canberra's water supply; it requires the State of NSW to protect the Rivers from pollution.

- Environmental Protection (Impact of Proposals) Act 1974
  This Act requires that matters affecting the environment to a significant extent are to be taken into account and examined in relation to the actions or decisions of the Commonwealth Government and/or its agencies. This Act has been applied in the ACT several times.

- Lakes Ordinance 1976
  This Ordinance provides for the administration of Lake Burley Griffin and Lake Ginninderra.

- Public Parks Ordinance 1928
  The Molonglo Gorge Reserve, Cotter Reserve, Pine Island Reserve, Kambah Pool Reserve and Uriarra Reserve are administered under this Ordinance.

- Cotter River Ordinance 1914
  Limits activities in the catchment upstream of Cotter Dam to protect water quality.

4.41 Various sections of the following Ordinances relate to water pollution in the ACT although several are antiquated and not suited to modern water pollution control:

- Police Offences Ordinance 1930

- Public Health Ordinance 1928

- Building and Services Ordinance 1924
  This Ordinance provides for the Canberra Sewerage and Water Supply Regulations.

- Fishing Ordinance 1967

4.42 The existing legislation dealing with water pollution is uncoordinated, inadequate and outdated.[24] It has been repeatedly stressed to the Committee, during the Inquiry, that there is an urgent need for the speedy enactment of a water pollution ordinance. For example, Queanbeyan sewage effluent is

discharged into the Molonglo within the ACT. Were this discharge to have been into NSW waters the SPCC would have intervened under its legislation to reduce the pollution several years ago.

4.43 The NCDC states:

> In legislative terms, the outstanding inadequacy at present is the lack of a water resource planning piece of legislation in the ACT which will both control discharge from point sources and organise the way water is used ... We understand that this legislation is in the pipeline. We certainly hope that this Inquiry can assist in bringing this legislation into force.[25]

The DHC also urges the enactment of the draft water pollution ordinance as soon as possible,[26] together with complementary amendments to the sewerage regulations.

Draft Water Pollution Ordinance

4.44 The draft Ordinance has been in preparation since 1975 with responsibility lying with the DTLG. Various authorities concerned with water matters in the ACT have had an input to the legislation via the Water Quality Sub-committee.

4.45 The proposed Ordinance will provide a means for the control of discharge of wastes into ACT waters. It provides that a Pollution Control Authority will be established under the proposed Air Pollution Ordinance and it will also administer the Water Pollution Ordinance.

4.46 The proposed Ordinance will provide the Authority with power to grant licences either unconditionally or subject to particular conditions to discharge wastes into ACT waters. It will be an offence to discharge waste from premises otherwise than in accordance with the provisions of the licence.

4.47 All waters in the Territory will be classified by the Ordinance and standards will be prescribed by Regulation for each water classification. These standards will be required to be met before waste will be allowed to be discharged into waters of that classification.[27] As pollution has the effect it does regardless of who causes it, environmental protection legislation should therefore bind the Crown. The draft ordinances bind the Crown but care will be needed with self-government that the legislation continues to bind the Commonwealth as it is the biggest 'industry' in the ACT. For example, the Mint is one of the largest manufacturing plants in the Territory.



4.48 When asked as to the reasons for the delay in introducing the Water Pollution Ordinance, the Department at its first hearing before the Committee on 11 August 1981 indicated that the draft Ordinance is modelled on the 'leading legislation' of NSW (the Clean Waters Act 1970) and time has been spent overcoming some of the inadequacies in that legislation. However the Department stated:

> We are now in the process of finalising that piece of legislation.[28]

At the time of finalising this Report the ordinances were still with the Assembly. The Draft Water Pollution and the Air Pollution (Stationary Sources) Ordinances went to the House of Assembly for consideration in December 1983. Drafting of the Noise Pollution Ordinance is still not complete. The Committee believes that the long delays are inexcusable.

4.49 The DHC indicates another area of legislative inadequacy concerning water pollution. It urges that 'codes of practice and legislation should be formulated and enacted to control the discharge of trade waste to the sewerage system and to permit adequate maintenance of the sewerage and stormwater drainage systems'.[29]

4.50 The Water Pollution Ordinance will require that if a sewer is provided and it is legal to discharge a particular trade waste to the sewer then that waste must be discharged to the sewer.[30] It will not be permissable to discharge such waste to stormwater or to the ground or to a watercourse. Adequate provisions are required in the Canberra Sewerage and Water Supply Regulations to define what trade wastes, and in what volumes, may be discharged to the sewer. The Sewerage Regulations will be complementary to the Water Pollution Ordinance and should be updated at the time the Ordinance becomes effective.

4.51 In its Report on Hazardous Chemical Wastes, the House of Representatives Standing Committee on Environment and Conservation recommended in March 1982 that:

- standards for chemical effluent discharge to the sewer in the Australian Capital Territory be developed and incorporated in the Sewerage Regulations; and
- discharges of chemical waste to the sewerage system be required to register the nature and volumes of the waste with the relevant authority.

DHC advised that a set of standards has been drawn up and passed to DTLG for incorporation in the Regulations. As the second recommendation does not appear to have been acted upon the Committee recommends that: discharges of chemical waste to the sewerage system be required to register the nature and volumes of the waste with the relevant authority.

4.52 The Committee believes it is unsatisfactory that after nine years the Pollution legislation has still not been implemented nor has it been coordinated with the updating of the Sewerage Regulations. It believes that the Department has been inefficient in not ensuring that such an important piece of legislation is completed and implemented quickly and coordinated with other requirements. The Committee recommends that the Water Pollution Ordinance and amendments to the Canberra Sewerage and Water Supply Regulations are completed and enacted within 3 months of tabling of this Report and that they be binding on the Crown in right of the Commonwealth.

4.53 The draft Air Pollution (Stationary Sources) Ordinance has also been taking many years to finalise. Fallout from such pollution together with lead from motor vehicle emissions can be washed from urban areas into waterways. Similarly a Noise Control Ordinance has been many years in preparation. This ordinance is not as directly relevant to the protection of the Murrumbidgee as the other two, however quiet enjoyment of the River and the general requirements of good government make such an ordinance necessary. The Committee recommends that the Air Pollution (Stationary Sources) Ordinance be completed and enacted within three months and be binding on the Crown in right of the Commonwealth. It should be noted that the House of Representatives Committee on Environment and Conservation in its Report on Hazardous Chemicals recommended that the Air Pollution Ordinance be introduced within six months of the tabling of that Report (November 1982) and that such legislation be binding on the Crown.[31]

4.54 The House of Representatives Committee concluded that it was necessary to license the use, storage and disposal of hazardous chemicals and most particularly the disposal of intractable wastes. The Committee recommended that the ACT establish such a system and provide storage areas and maintain a register.

4.55 In evidence in November 1983, DTLG advised that it has developed a strategy for hazardous waste disposal and completed a survey of chemical use in the ACT. However there are a number of important areas where controls over hazardous chemicals are lacking. Pesticides and other agricultural chemicals are not subject to specific legislation as they are in the States and the Northern Territory. The Environment and Conservation Committee pointed out that specific legislation was needed for the ACT. The Department said in evidence that it would adopt model licence conditions for the use, storage, handling and



disposal of individual chemicals being prepared for all States at a national level. However legislation will be needed to give effect to these conditions. The very slow rate at which environmental protection legislation has been prepared and adopted in the ACT, including that for which model codes have been available, concerns the Committee. It could be a decade or more before this legislation comes into effect. Recent events involving hazardous chemicals in the ACT underline the need for controls to be implemented quickly.

4.56 The Committee recommends that the Minister for Territories and Local Government ensure that legislation to provide for the licensing of the sale, use, handling, storage and disposal of hazardous chemicals be implemented forwith. Legislation should also cover pesticides and other agricutural and veterinary chemicals. The Committee regards this matter as of such a high priority that any further delay would constitute negligence on the part of those involved.

4.57 When asked what secure storages were planned for intractable wastes, NCDC advised the Committee that the most practical basis of management of intractable wastes is to require that such wastes be returned to the manufacturer of the chemicals.[32] While this may be possible with waste having some commercial value, the Committee is unaware of any legal requirement that manufacturers accept such returned waste, particularly when these manufacturers are interstate or overseas. Contamination of other materials by intractable waste, as occurred at the Mint when water was contaminated by Polychlorinated Biphenyls, would not be covered by such a requirement.

4.58 A single secure storage area operated by government may be difficult to justify on the volume of such waste generated in the ACT but individual operators generating or holding such intractable materials or wastes must have secure storages and must be licensed. The Committee recommends that the Minister for Territories and Local Government ensure that adequate secure storage is provided in the ACT to cope with intractable wastes generated or held in the ACT.

4.59 Hazardous chemicals can enter the environment through spillage from transport accidents. These can include chemicals not normally used in the ACT. To cope with transport emergencies involving chemical spills the Australian Transport Advisory Committee finalised a Model Code in July 1980. This was published in a Commonwealth Gazette in December 1980 and became the Australian Code for the Transport of Dangerous Goods by Road and Rail. It is intended that the Code be uniformly taken up in legislation by all States and Territories.

4.60 The House of Representatives Committee on Environment and Conservation said in its Second Report on Hazardous Chemicals:

> In the Committee's First Report on Hazardous Chemical Wastes it was critical of the tardiness of the Department of the Capital Territory in incorporating the Australian Code for the Transport of Dangerous Goods by Road and Rail into ACT legislation. Since that Report, there has been a major transport accident in the ACT involving hazardous chemicals. The hazard was unnecessarily increased as the vehicle was not placarded in accordance with the Code. Firemen, not knowing the nature of the load, sprayed water on the burning truck and its cargo, unwittingly exacerbating the situation by releasing toxic fumes. Around 80 peole were treated in hospital following the incident. As the Committee said in its First Report, it is irresponsible for authorities to await some tragedy before considering legislation, and its consequent enforcement to be urgent. Authorities have a clear responsibility to anticipate hazards and implement preventive controls. Legislation should prevent disasters rather than constitute a ritual response to them.[33]

The Committee also said:

> To be effective, regulations under the legislation have to be free from legalisms so as to be readily understood by individuals. Similarly, consolidated amendments should be made at regular, not too frequent, pre-determined intervals so that those subject to the regulations have up-to-date information. Irregular amendments notified in Gazettes tend not to be noticed or understood. This would not preclude unscheduled gazettals in emergency situations. The implementation of the Australian Code for the Transport of Dangerous Goods by Road and Rail, which is discussed further in Chapter 6, has been designed to overcome these barriers to uniformity and operator awareness.[34]

4.61 A Dangerous Good Ordinance was gazetted in February 1984 however this Ordinance says that the NSW Dangerous Goods Act and Dangerous Goods Regulations apply in the ACT subject to 17 pages of amendments in small type.[35] This patchwork solution is quite unsatisfactory and does not implement the code in the manner intended.

4.62 The Dangerous Goods Ordinance covers the transport, storage and labelling of bulk chemicals. It is based on older liquid fuel and explosive controls. Smaller quantities of hazardous chemicals are not adequately covered and more comprehensive chemical control legislation is required.



4.63 The House of Representatives Environment and Conservation Committee was critical of DTLG for the low priority it gave to this legislation and recommended legislation be adopted within six months of the Report (December 1982). Despite the time taken the legislation does not call up the Australian Code in a straightforward way so that it is easily understood by those drivers and operators to whom it applies.[36]

4.64 **The Committee recommends that the Dangerous Goods Ordinance be redrafted and that the revised Ordinance be implemented as soon as possible.**

## The Murrumbidgee River Corridor and Legislation

4.65 There have been several suggestions that the Murrumbidgee River Corridor be declared a national park or that major parts of it be gazetted as a means of protection against undesirable development.

4.66 The NCDC however in early evidence stated that its land use planning policies provide 'adequate protection in the planning and development of the river corridors without the need for additional legislation'.[37] The Commission maintains there is no need for legislation to protect the Corridor. For instance, the Commission states, in relation to sections of the Corridor designated for particular uses in the draft Policy Plan, there is no need to declare the River Corridor a national park:

> because the land use plan powers that the Commonwealth have in the ACT are such that we can simply keep that as a rural area. As long as we identified it for rural use, and not urban use, the existing land use power would permit that to be protected.[38]

4.67 The Committee believes that this leaves too much discretion to the NCDC. The Committee cannot accept such an argument, otherwise there would be no need for any parks or reserves to be gazetted. There is clearly a need for parkland, nature conservation areas and heritage sites to be declared under appropriate legislation.

## Heritage Legislation

4.68 The Murrumbidgee Corridor contains important heritage sites. The ACT lacks Heritage legislation which would ensure that its heritage is conserved, while at the same time is known and accessible. The first Heritage Act in Australia, the Victorian Historical Buildings Act, was enacted in 1974. Since then Heritage Acts have been introduced in New South Wales and

South Australia. The ACT Heritage Legislation has been in the process of drafting for a number of years and is still not completed. South Australia was the first State to introduce legislation to protect Aboriginal sites in 1965 and the last state to legislate was Tasmania in 1976. Particular problems exist in revealing the location of some Aboriginal sites and it may be necessary to list such sites on a confidential register with the public register listing the general area. Limited protection of Aboriginal sites is provided through the ACT Nature Conservation Ordinance 1980. The Ordinance came into force in 1982 and provides in Section 56(3) that:

(3) A person shall not, in a reserved area, without the consent in writing of the Conservator -

(a) damage or destroy a natural or man-made structure or feature; or

(b) damage or destroy a site, or remove an object, of historical, archaeological, palaeontological or geological interest.

Penalty: $500.

To date Gudgenby Nature Reserve is the only area to have been declared. The Ordinance provides no protection for sites that are not within nature conservation areas. In comparison, the Western Australian Aboriginal Heritage Act 1972 vests ownership of all known, as well as unrecorded, Aboriginal and archeological sites in the Crown. Protection is thus extended to all sites without needing a declaration of each site. The Committee believes the latter approach is more desirable.

4.69 The Australian Heritage Commission Act 1975 established an independent statutory authority to act as the administrative body responsible for the National Estate and to offer policy advice to the Commonwealth Government. Relevant functions of the Commission set out in Section 7 of the Act include:

- to furnish advice to the Minister either of its own motion or upon request made to it by the Minister, on matters relating to the National Estate, including advice relating to action to conserve, improve and present the National Estate;
- to encourage public interest in, and understanding of issues relevant to the National Estate;
- to identify places included in the National Estate and to prepare a Register of those places; and



- to furnish advice and reports concerning the protection of the National Estate.

4.70 The primary role of the Commission at present is the compilation of the Register of the National Estate. The Commission has a purely advisory role and is not intended to have a policing role. However, each Commonwealth Minister is required under section 30 of the Act to ensure that Departments and Authorities for which he or she is responsible do not take any action that adversely affects a place on the Register, unless the Minister is satisfied that there is no feasible or prudent alternative, and that all measures that can reasonably be taken to minimise the adverse affect, will be taken. Ministers are similarly bound in relation to their own actions.

4.71 Evidence was given by archaeologists, Mrs R.K. Barz and Mr J.H. Winston-Gregson, that the Murrumbidgee River margins in southern ACT have been:

> modified to the point where the riverine landscape is a cultural artefact, most clearly expressing the needs of its human occupants, formed in the creation of many prehistoric and historic sites ... The Murrumbidgee therefore has a particular value to the regional heritage.[39]

> ... The Murrumbidgee and its environs, incorporating ninety individual sites in a remarkable unity, constitute a significant part of the regional cultural heritage yet there is nothing but initiative to prompt the planner, the manager, and the user, to the formal recognition of that heritage.[40]

It should be noted that the figure of ninety sites is from the first part of the survey of the Corridor in the ACT. The completed survey identified 173 sites of which 127 were Aboriginal sites.

4.72 The same witnesses stressed that while not everything can be nor should be preserved intact, there is no reason for heritage to vanish. They stated that:

> It is obviously impractical to constrain society to live in a museum; people will continue to influence their surroundings. Even so, a future without roots would be bleak.[41]

4.73 The Committee agrees with these witnesses that a heritage ordinance should not be merely a series of prohibitions as is the Nature Conservation Ordinance[42] but should enable public access and appreciation of our heritage, e.g. Farrer's grave is only accessible on foot half a kilometre uphill from the road.

4.74 It is of concern that the Nature Conservation Service created under the Ordinance, has no duties under the Ordinance other than to police its prohibitions. It should have more positive provisions similar to those in the Australian Heritage Commission Act.

4.75 The banks of the Murrumbidgee in southern ACT contain a number of valuable remnants of early European settlement and development. These include the homesteads and associated buildings at Lanyon, Lambrigg and Cuppacumbalong. On a sandy flat by the Murrumbidgee at Lambrigg, the work of one man sparked the most significant agrarian revolution in Australia's history:[43]

> William James Farrer, the surveyor, resigned from the Lands Department in 1886 and began his wheat breeding work. Within the 20 years between 1886 and his death in 1906, Farrer transformed a precarious and often profitless activity into a major industry. He did this, not as is often incorrectly claimed, by breeding a rust resistant wheat, but by breeding a great variety of wheats to suit a great diversity of conditions. His drought resistant and early maturing wheats led to the transformation of wheat production in Australia. The homestead of Lambrigg built by Farrer still stands on the west side of the River. It is an attractive two storeyed house with a deep verandah, the bottom storey built of stone and mortar whilst the top is of brick.[44]

Farrer's grave is on a hilltop overlooking the homestead and the River.

4.76 The ACT Committee's 1980 Report on Tourism in the ACT dealt with the importance of Lambrigg and Farrer's Grave. The Committee's recommendations and the then Government's responses were:

> Recommendation 3(a)
>
> Funds be made available for the development of better vehicle access to the (William Farrer) memorial and that the way to it be clearly signposted and referred to in appropriate literature.
>
> Response: It is considered that the vehicular access is adequate but that improvements to the walking access are desirable. These improvements are being investigated but it is important to ensure that any increase in visitor usage does not create undue problems for the landholder.



> Recommendation 3(b)
>
> The historic importance of Lambrigg Homestead and the property where Farrer conducted his experiments be recognised and that it and the Farrer memorial eventually be developed as an historic site.
>
> Response: Supported. The historical importance of Lambrigg Homestead and of the Farrer experiments is recognised. Development of an adequate Farrer memorial is accepted as a long term objective.

The Draft Corridor Plan proposes improvements to the parking area including picnic facilities together with a walking track to Farrer's Grave.[45] The Grave and the Homestead and experimental area are designated as Historical/Cultural Sites on *the Draft Policy Plan for the Corridor. The Committee does not* agree that vehicular access to Farrer's Grave and higher visitor numbers to the Grave are incompatible with the nature of the site and its heritage significance.

4.77 *The Lambrigg sites are of national, even world,* heritage significance. Groups of visitors from North America come specifically to visit the sites. The Committee in its 1980 report on Tourism in the ACT noted that the exposure of tourists to elements of their national and cultural heritage will *heighten their awareness and feelings towards that heritage.* It was also noted that experience elsewhere in Australia, as well as in North America, have shown that historical attractions and other items of national heritage are becoming increasingly popular with tourists as places to visit. Professor Seddon said of tourists:

> To confound the cynics, look for education - visitor numbers at the Botanic Gardens, Tidbinbilla and Lanyon Homestead show this very clearly.[46]

4.78 The National Trust has recommended the establishment of a National Farm and Agricultural Memorial in the Lanyon-Lambrigg area.

> The National Farm concept stems from the fact that nowhere in eastern Australia is there a national 'monument' to the pioneers and people on the land who have built-up and sustained the economy of Australia. Even today our economy is substantially dependent on the rural sector. We have such tributes as the War Memorial in Canberra, the Pioneer Village at Forbes, NSW, or private undertakings like Old Sydney Town. It seems

fitting, therefore, that the concept of a tribute to the rural pioneers of Australia is appropriate and that the Study Area on the edge of the National Capital would be an ideal location.

A National Farm centre could be based around Lanyon with its large woolshed and outbuildings ... Related to the National Farm could be an Agricultural Memorial possibly based on Lambrigg. Here the work of Farrer and his experiments with early wheat strains, so valuable in cereal production, would be commemorated ... Added to such a site could be a national collection of earth and crop handling equipment developed in Australia from early settlement times onwards.[47]

4.79 The Committee inspected the remains of the original Uriarra Homestead and associated buildings built by William Webb. This like many valuable links with the past has been allowed to deteriorate. Grazing cattle, people indiscriminately taking firewood and other acts of vandalism have hastened the demise of such remains. The land on which these buildings are located has been leasehold for many years yet the Department of Territories and Local Government has not fulfilled its responsibilities in protecting these sites, even by fencing them off. The original Uriarra Homestead should be fenced off to protect it from vandalism and grazing cattle. The China Wall, an important historic site in Tuggeranong, also is deteriorating and needs to be protected to ensure that further deterioration is minimised.

4.80 The Murrumbidgee River Corridor in the ACT, particularly the southern section, has a rich collection of historical sites and landscapes that require special care if their attraction is to be maintained and even enhanced. Both Lanyon and Lambrigg and their immediate surrounds are designated as special historical sites in the Draft Corridor Plan.

4.81 **The Committee recommends that a heritage ordinance for the ACT be completed and implemented ensuring that the Territory's heritage is conserved, made known and accessible. That ordinance should protect Aboriginal sites. In the meantime while this delegated legislation proceeds, the Committee recommends that DTLG act to preserve historic sites on leasehold land. The Committee further recommends that the entire Murrumbidgee Corridor in the Australian Capital Territory be placed in the Register of the National Estate without further delay.**



Other Legislation Applying to the Murrumbidgee River Corridor

4.82 The following pieces of legislation are other examples of the large body of legislation which applies to the River Corridor:

Careless Use of Fire Ordinance 1936
Motor Traffic Ordinance 1936
Litter Ordinance 1977
Noxious Weeds Ordinance 1921
Roads and Public Places Ordinances 1937
Protection of Lands Ordinance 1937
Trespass on Commonwealth Lands Ordinance 1932
Enclosed Lands Protection Ordinance 1943
Soil Conservation Ordinance 1960
Pounds Ordinance 1928
Stock Ordinance 1934
Rabbit Destruction Ordinance 1919
Gun Licence Ordinance 1937
Public Gates Act (NSW) 1901
Dog Control Ordinance 1975

4.83 It is understood that consideration will be given to drafting and implementing an Open Lands Protection and Use Ordinance. Such an ordinance would ensure a more effective and coordinated protection of Open Space areas in the ACT, including areas of the Corridor, than the large amount of existing legislation.

Freshwater Resource Management

4.84 Effective freshwater resource management is dependent on an adequate understanding of the multiplicity of factors that determine water quality and quantity and their interrelationships. Before looking at freshwater management in the ACT region, a brief look at the general availability of research data in Australia is warranted.

4.85 A recent report for the Australian Water Resources Council emphasised the importance of nurturing Australia's water resources saying 'Australia's water resources are in short supply, variable in quantity and quality and unpredictable in occurrence'.[48] Utilisation of water resources has lead to some environmental degradation and deterioration of water quality. While research from other countries is often adapted to resolve resource development problems in Autralia, the above Report claimed that this is generally not possible with regard to water resources. The 'flat topography, aridity, spatial and temporal climatic variability and biological distinctiveness have produced an aquatic environment to which much overseas research is inapplicable'.[49] The Report concluded that 'Australia's current water research effort is inadequate, fragmented and poorly balanced and has substantial gaps. Immediate national needs are sound management, leadership and substantially increased funding'.[50]

4.86 The Report pointed out that Australia is unique amongst developed nations in lacking a national water research centre. It pointed to the environmental diversity of Australia and its waterways and claimed that the development of a single research centre would be inappropriate. Rather it argued for the expansion and increased funding of existing research centres in tertiary education institutions and CSIRO. It recommended that annual expenditure on water research be increased from the present level of $12m to a minimum of $30m. The Report claims 'the failure to assess water research needs on a national basis is perhaps the key deficiency of the research management process'.[51]

4.87 Dr R. Rosich, in evidence, said that within government departments, CSIRO and tertiary institutions in Canberra there is a considerable body of expertise and physical resources with easy access to arid and alpine water systems[52] such that Canberra could be one regional research centre for a water research institute. The Australian Institute of Marine Science, based in Townsville, is a federally funded marine science institute. A similar body to provide expertise, facilities and direction for freshwater research is desperately needed.

4.88 In June 1981 a private members Bill was introduced by Mr R. Jacobi, the Member for Hawker, to establish an Institute of Freshwater Studies. While this Bill failed to pass the House of Representatives, it was passed by the Senate. The Committee believes that such an institute is long overdue to conduct or commission research which would enable sound river management practices to be developed. Given the diversity of Australian water systems the Institute might comprise a number of existing research centres.

4.89 In November 1983 the Minister for Resources and Energy announced the establishment of an Interim Council of an Institute of Freshwater Studies which will advise the Government on the need for and possible role of such an institute. The Interim Council will also provide advice on the need for:

- information and research necessary to provide for the efficient management of interstate river systems, with particular reference to the River Murray and its tributaries;
- information and research in relation to the biological, environmental, economic, social and physical aspects of freshwater science; and
- development of appropriate technology for the efficient use of water resources.

The Report of the Interim Council is expected by the end of May 1984. The Committee welcomes the Governments initiative in this essential area of resource management information.



4.90 Many problems face those responsible for water management. For example, fish are sensitive to temperature and function best within an optimum temperature range. Above and below this range they exhibit physiological stress. The thermal tolerance limits and median lethal levels for Australian fish have not been assessed. Certain temperature ranges are required for spawning. When cold water is released from the lower levels of storage dams it is depleted in oxygen and dramatically alters the aquatic environment downstream. The full environmental effects of this cold water is not fully understood. As native aquatic communities are poorly understood and the taxonomy of many community members is unclear, few studies have been made on the effects of introduced species or the changes in river flows resulting from storage dam construction. The known toxicological effects of chemical contaminants in the environment are based on tests conducted overeas. Little or nothing is known about the specific effects on Australian native species.

4.91 Storage dams and weirs create barriers to fish migration, often essential for reproduction, and create water bodies with radically different environments to the rivers on which they are situated. In the ACT region, rivers and streams tend to be shallow and ephemeral. Water storages create large bodies of water with different temperature layers and levels of oxygenation.

4.92 Water management of rivers has until comparatively recently concentrated on quantitative aspects but it is increasingly obvious that an understanding of qualitative aspects is essential to the proper management of our freshwater resources.

4.93 The political boundaries across which rivers flow, pose serious problems to river system management in Australia. Where States have joined together to resolve interstate river problems they have primarily reached agreements on matters of quantity rather than those of quality. Water quality and the control of land usage affecting river quality are jealously guarded by each State as internal affairs. The Committee believes that to be effective, river management must be devised and implemented for the whole of a river system not merely that part falling within particular political boundaries. Management of the Murrumbidgee within the ACT, or even the ACT region, must be consistent with the management of the whole Murrumbidgee system which itself is part of the Murray-Darling system.

4.94 The Australian Water Resources Council has as its members the State, Northern Territory and Commonwealth Ministers responsible for water resources. The ACT is not represented on the AWRC. This is reflected in AWRC reports which tend to treat the ACT as part of NSW and ignore the management difficulties and land coordination neccesary for river management across that political boundary. The Department of Energy and National Resources as a national department cannot represent the ACT.

This is borne out by its inability to make a submission to this Inquiry.[53] The functions of the Council are to promote cooperation and collaboration on water matters of mutual concern to members; to provide a forum for exchange of views relating to the development of policies, guidelines and programs which may be considered appropriate to assist the most beneficial development and orderly assessment, and management of Australia's water resources. The AWRC is involved essentially in administration and policy areas and does not undertake research. **The Committee recommends that the Minister for Territories and Local Government becomes a member of the Australian Water Resources Council until self-government when the position should be reviewed.**

Economic Costs

4.95 The Terms of Reference for the Inquiry provided by the Minister ask the Committee to consider the economic cost of measures required to safeguard the quality of the Murrumbidgee River and its environment. Unfortunately very little evidence was provided to the Committee on this aspect including the submissions from the Minister's own Department.[54]

4.96 Cost benefit assessments of environmental protection measures are notoriously difficult to make. It is usually only when major environmental damage occurs that the costs to the community become universally acknowledged. The results of inadequately treated sewage effluent from the Canberra region in the past is a good example. NCDC stated:

> The level of expenditure on water quality protection reflects the community's expectation of environmental quality and recreational amenity. The higher this expectation, the greater the cost to the community of the provision and operation of infrastructure, and the greater the potential constraints on ongoing development.[55]

4.97 The LMWQCC and associated trunk mains cost $112 m, including interest charges.[56] This is a major capital expenditure on water quality protection.

4.98 However, not all of this cost should be considered as being for pollution control or water quality protection measures. Sewerage systems are part of the infrastructure of urban areas and as such are part of the cost of normal urban development. They are a public health measure and the benefit to public health is major.



4.99 The high level of treatment at LMWQCC has the following benefits:

- reduction of health and water treatment costs of those drinking the water downstream;
- avoids the cost of further pollution and possible ruining of Burrinjuck Reservoir;
- reduction of stock losses from polluted water;
- restoration of recreational amenity; and
- minimises impact on aquatic wildlife.

Measuring all of these benefits accurately is not always possible. It is difficult to quantify the cost of the destruction of wildlife, particularly endangered species.

4.100 NCDC provided some order of magnitude costings for different stormwater control measures:[57]

| | |
|---|---|
| . Oil filter (e.g. Coranderrk Street pool) | $ 20 000 |
| . Debris trap with provision for screening of floatable material (e.g. Sullivan's Creek at Barry Drive) | $ 100 000 |
| . Wetland filter - depends on size and terrain characteristics but of the order of | $ 600 000 |
| . Lake Tuggeranong | $ 5 000 000 |

As urban lakes serve a number of functions only part of their cost should be attributed to water quality protection. Urban lakes provide water quality control ponds, recreation facilities, landscape features, stormwater control, a cooling pond for town centre air-conditioning and additional wildlife habitats. To take recreation facilities as an example, additional benefits flow from their provision at urban lakes in reduced travelling costs for water based recreation and the reduced environmental pressure on riverside recreation areas.

4.101 It was claimed by NCDC that water quality protection measures during construction are accepted as a component of project costs. They also reduce the cost of post-construction remedial measures in many cases.[58]

4.102 On the opportunity cost of land, NCDC said:

> While the measures for protecting the water quality of the river system during and after construction are considered feasible and economic, there may be circumstances in which it is necessary to forego land development in orer to implement these measures. If so, the opportunity cost of that land can be regarded as a charge against the protection of the river system.[59]

Care needs to be taken not to attribute opportunity costs where large tracts of land are not used due to environmental problems. These are more properly regarded as uneconomic and not feasible. NCDC clarified the kinds of costs involved:

> The implications of this can be seen in the design of trunk stormwater systems. In areas where land values are high, so are the opportunity costs associated with the construction of wide grassed floodways. Consequently the creek channel through the Woden Town Centre has adopted a design which is relatively narrow and concrete-lined with minimal benefits for water quality control. On the other hand, in outer suburban areas (e.g. Kambah, Giralang/Kaleen) where land is less valuable, broad grassed floodways have been constructed, in some cases with a concrete invert to carry low flows. In rural areas, where land values are still lower, no floodway is provided and water courses are left in their natural state.[60]

4.103 The Committee considers that the measures in operation at present such as the Lower Molonglo Water Quality Control Centre and measures proposed for the future such as Lake Tuggeranong are economically justifiable, in that without this level of protection intolerable environmental degredation would occur.

4.104 The cost of maintaining recreation areas on the Murrumbidgee was estimated by DTLG at around $330 000 per annum. This includes providing services such as garbage collection, barbecue maintenance and cleaning, weekend ranger patrols and turf maintenance. Much of these costs are in the nature of municipal services rather than specifically water quality protection measures.[61]

4.105 Careful planning in the Corridor itself including the provision of buffer zones which have an economic use, such as grazing, minimise the pressures on a relatively small and fragile river environment. The Committee considers that overall the Corridor proposals provide environmental protection at a moderate economic cost.



4.106 On the question of who pays for environmental protection, the principle of 'polluter pays' is now widely accepted as the most appropriate. Until adequate environmental protection legislation is in place this principle will not be effective in the Territory.

FOOTNOTES

1. Evidence, p. 874.
2. Evidence, p. 895.
3. Evidence, pp. 896-7.
4. Evidence, p. 868.
5. Evidence, p. 854.
6. ibid.
7. Evidence, p. 851.
8. Evidence, p. 855.
9. Evidence, p. 854.
10. Evidence, p. 1095.
11. Evidence, pp. 83 and 867.
12. Evidence, p. 83.
13. Evidence, p. 1208.
14. ibid.
15. Evidence, p. 128.
16. Evidence, p. 1080.
17. ibid.
18. Committee Secretariat. Murrumbidgee River Inquiry File, M5.
19. Evidence, p. 308.
20. Evidence, p. 217.
21. Evidence, p. 637.
22. Evidence, p. 627.
23. Evidence, p. 628.
24. Evidence, p. 278.
25. Evidence, p. 128.
26. Evidence, p. 396.



27. Evidence, pp. 193-4.
28. Evidence, p. 216.
29. Evidence, pp. 396, 1304-6.
30. Evidence, p. 1306.
31. Report of the House of Representatives Standing Committee on Environment and Conservation - Hazardous Chemicals, Second Report, December 1982, Para. 427.
32. Letter from NCDC dated 8 February 1984.
33. Report of the House of Representatives Standing Committee on Environment and Conservation - Hazardous Chemicals, Second Report, December 1982, Para. 428.
34. ibid, Para. 151.
35. Letter from NCDC dated 8 February 1984.
36. Report of the House of Representatives Standing Committee on Environment and Conservation - Hazardous Chemicals, First Report, March 1982, Paras 204-210, Second Report, December 1982, Paras 428-429.
37. Evidence, p. 97.
38. Evidence, p. 135.
39. Evidence, p. 977.
40. Evidence, p. 979.
41. Evidence, p. 977.
42. Evidence, p. 986.
43. National Trust Study, pp. 30-31.
44. National Trust Study, p. 31.
45. Draft Murrumbidgee River Corridor Plan, p. 76.
46. An open space system for Canberra. NCDC Technical Paper 23, October 1977 by Professor George Seddon, p. 26.
47. National Trust Study, pp. 78-80.
48. Working Group on Water Research Policy, Water Research in Australia: New Directions, Report to Australian Water Resources Council, Department of National Development and Energy, Canberra, 1981, p. 1.

49. ibid, p. 2.

50. ibid, p. 4.

51. ibid, p. 71.

52. Evidence, p. 1000.

53. Letters from the Minister dated 20 March 1981 and 26 August 1981.

54. Evidence, pp. 181-2.

55. Evidence, p. 111.

56. Evidence, p. 181.

57. Evidence, p. 113.

58. Evidence, p. 114.

59. ibid.

60. ibid.

61. Evidence, p. 182.



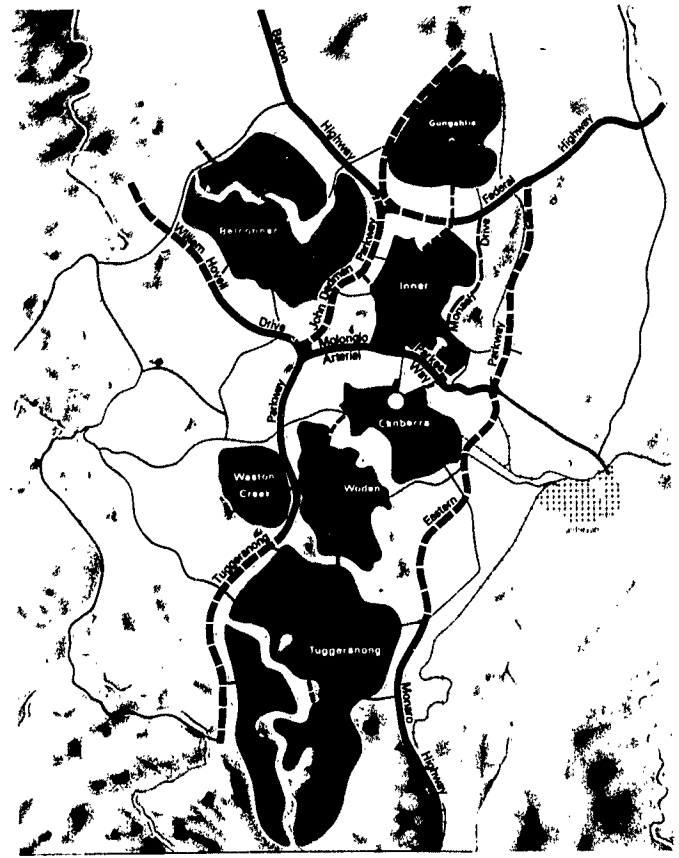



Figure 10: LONG TERM STRUCTURE FOR METROPOLITAN GROWTH

**TUGGERANONG**

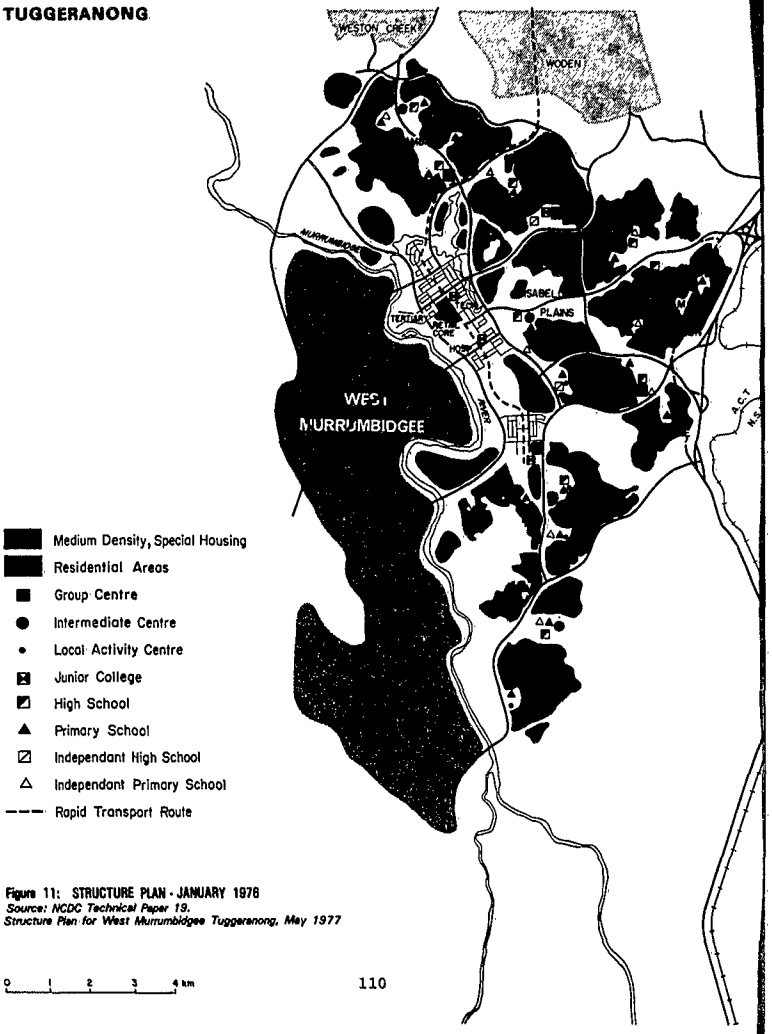



**Figure 11: STRUCTURE PLAN - JANUARY 1978**
*Source: NCDC Technical Paper 19.*
*Structure Plan for West Murrumbidgee Tuggeranong, May 1977*



## CHAPTER 5

## IMPACT OF FUTURE URBAN DEVELOPMENT

### Tuggeranong and West Bank Development

5.1 The planning of Tuggeranong commenced in 1969 with development commencing in 1973. With the virtual completion of broadacre development in Woden and Weston Creek and the development of Belconnen well advanced, NCDC had to choose whether to make Tuggeranong or Gungahlin the next major development.[1] Tuggeranong was identified for development as the next new town within the Y-plan structure for Canberra. The Y-plan structure for Canberra's future development is shown in Figure 10.

5.2 Tuggeranong if built as shown in this 1970 map, which includes the Lanyon and West Tuggeranong developments, would have a population of 170 000 making it by far the biggest town in Canberra. The next biggest town would be Belconnen with a design population of around 83 000. In March 1984, the population of Tuggeranong had reached 41 500. Within three years, the population is expected to be over 57 000 which is equal to the current population of Woden and Weston Creek combined.

5.3 A more detailed map of Tuggeranong in Figure 11 shows the Murrumbidgee River flowing through the length of this large urban development. NCDC claimed that initially the development of Tuggeranong was to be restricted to the east bank of the Murrumbidgee 'but it was subsequently realised that the River would be an ineffective boundary to contain urban development and there would be strong pressures to release the west bank once the east was settled'.[2] This was a questionable rationale for the development of the west bank given the strong planning powers of the Commission and the necessity for road additions to the Plan of Canberra to be scrutinised by the ACT Committee. NCDC itself contradicted this claim when it said that legislation was not needed to protect the Corridor:

> because the land use plan powers that the Commonwealth have in the ACT are such that we can simply keep that as a rural area. As long as we identified it for rural use, and not urban use, the existing land use power would permit that to be protected.[3]

Development of the west bank would involve much higher land development costs and would require a number of bridges across the Murrumbidgee.

5.4 In June 1980, the Metropolitan Issues Public Discussion Paper published by NCDC discussed the results of a review of the most appropriate sequence of land development and settlement in Tuggeranong and Gungahlin over the next fifteen years. This review was undertaken in expectation of a continuation of the low growth rates that characterised Canberra in the late 1970s.[4] The review identified three options for future settlement. These options were:

1. Continue existing policy which is to complete the development of Tuggeranong by the early settlement of Lanyon and West Murrumbidgee;

2. Develop northern Tuggeranong to a population of 70 000 with a town centre, and then commence the settlement of Gungahlin. The development of Lanyon and West Murrumbidgee would be postponed until after Gungahlin;

3. Develop north-eastern Tuggeranong to a population of 50 000 - with a small centre - and then settle Gungahlin.[5]

The Metropolitan Issues Paper supported option 3 which comprised the early development of Gungahlin and 'the restructuring of Tuggeranong into a settlement area with a population of 50-60 000 with local centres, but without a town centre in its initial phase of development'.[6] This strategy would not see the opening of a town centre before 1990 on the basis of predicted growth rates. Option 3 was subsequently adopted by the Commission.

5.5 NCDC believed that the adoption of Option 3 gave it time to gather additional information which would allow it to consider the environmental issues relating to development of the west bank of the Murrumbidgee and in the Lanyon area. The Committee was advised that the metropolitan strategy was under review and that this review could significantly affect decisions made about Tuggeranong's growth.

5.6 As a result of major changes to a number of factors affecting the metropolitan strategy, particularly the considerable growth in both employment and population in Canberra, the Commission has revised its strategy and will now continue land servicing in Tuggeranong by bringing forward north and south Lanyon while also developing Gungahlin as early as possible. Decisions have also been made in relation to the West Murrumbidgee review. The major changes to policy and planning intentions directly affecting the River Corridor which have been made as a result are:

- that a Town Centre containing a first stage of 24 000m$^2$ of retail and commercial space will be constructed on the site identified in the Tuggeranong Policy Plan;



- that Lake Tuggeronong will be constructed on a site adjacent to the Town Centre;

- that there will be no urban development of the area on the western side of the River previously identified for development. As a result the location of bridges across the River would now not be required;

- that, as indicated by the Minister for Territories and Local Government on 27 February 1984, there will be no urban development which would be visible from Lanyon homestead.[7]

5.7 While the Committee welcomes some of these intentions others of them raise significant concerns. The decisions to greatly expand the size of Tuggeranong and to construct the Town Centre on the proposed location will have a significant impact on the River and the environment surrounding it. The Committee has noted that it has only received advice as to the Commission's broad 'intentions', and is concerned that it have a role in considering all the implications of these proposals. The Committee's normal role is to examine these sorts of proposals at the point at which a variation to the Canberra City Plan is required. This is at a later stage in planning when it is difficult for the Committee to have a significant input other than recommending that a proposal not be proceeded with. It would be unfortunate if the Committee were to find that its only opportunity to examine these developments was in relation to variations to the City Plan.

5.8 **The Committee therefore recommends that all proposals for further development in Tuggeranong, including urban development south of the presently gazetted suburbs and the Town Centre development, be referred to this for examination and report, at an early stage in planning.** The subsequent necessary variation changes will provide a further and later opportunity for the Committee to scrutinize developments.

5.9 The Committee believes that the preservation of the western side of the Murrumbidgee River from urban and other development which would have a detrimental effect on the River and the surrounding environment is essential. The Committee therefore welcomes the decision that there will be no urban development on the west bank. However, the Committee is concerned that this decision could be changed arbitrarily at a time that there was great pressure for more land for urban development. **The Committee therefore recommends that the Minister for Territories and Local Government formalise his decision that there will be no urban development on the western side of the Murrumbidgee River to ensure that this decision can not be arbitrarily changed at a later date.** The Committee expects to be consulted about any proposed development on the west bank of the Murrumbidgee River.

*Impact of Urban Development in Tuggeranong*

5.10 Urban runoff from Tuggeranong already has caused considerable pollution of the Murrumbidgee at stormwater discharge points. This pollution has been worst when heavy rains have washed fine earth material from construction sites, greatly increasing turbidity in the River.

5.11 Existing and planned stormwater drains in Tuggeranong discharge, or will discharge, into the Murrumbidgee River above traditional recreation areas such as Kambah Pool. These drains carry silt from soil erosion, nutrients from fertilizers and soil erosion, bacteria from faecal material, toxic chemicals from insecticides and herbicides and lead, oil and bitumen from motor vehicle emissions and road construction.[8]

5.12 The present urban development has been within the catchments of Tuggeranong Creek and its major tributary, Village Creek. A proposed dam below the confluence of these two creeks would form Lake Tuggeranong. It is claimed that such a lake would reduce turbidity, remove most of the phosphorus and virtually eliminate excessive bacterial levels from water entering the lake. This would effectively minimise the impact on the Murrumbidgee of urban runoff from this particular catchment. Nutrient levels would be low enough to keep algal growth at Kambah Pool 'to an acceptable level'.[9] Lake Tuggeranong would be quite small in relation to the size of its urban catchment and, despite measures to reduce the level of pollutants in runoff before it enters the lake, it is unlikely that water quality in the lake would generally be adequate for body contact recreation. One witness, Dr Rosich, has recommended that in addition to the lake, drainage channels in Tuggeranong should 'take the form of shallow pools and marshy areas which allow diverse biological communities to develop so as to trap as much of the pollutants as possible'. The design of these biological filters should maximise their aesthetic and recreational values.[10]

5.13 The Committee recommended in Chapter 2 that maximum use be made of biolgical filters and oil and sendiment gaps in stormwater channels. These are particularly necessary for stormwater from Tuggeranong that will directly discharge into the River rather than through the Lake.

5.14 It is clear that a Lake, or equivalent pollution control structures, together with additional controls such as biological filters, pools or treatment works will be necessary to protect the Murrumbidgee from the impact of runoff from the proposed Tuggeranong Town Centre including during the construction phase. The Town Centre itself will at some points be only half a kilometre from the River and particular care will be required during its construction. The Committee was informed that the Lake would not be constructed until 1987, after construction work begins on the Town Centre. NCDC claimed that



special measures would be taken before the Lake is constructed to protect the River from runoff from development of the Town Centre site. **The Committee recommends that construction work on the Town Centre not commence until special measures are in place to protect the River from runoff until the Lake is completed, and further that NCDC report on the special measures when the Town Centre development briefing is provided to the Committee for examination and report as recommended in paragraph 5.8.**

5.15 The Committee, as indicated in Chapter 3, is also concerned about the proximity of urban development in Tuggeranong to the Lanyon and Lambrigg properties. It was recommended in that chapter that the Murrumbidgee River Corridor be extended to provide a rural landscape setting for the Lanyon and Lambrigg homesteads. However, the National Trust, the Australian Heritage Commission and the Lanyon Restoration and Acquisition Committee also were concerned that urban development beyond this wider corridor could still destroy the rural setting of the homesteads. In particular they were concerned about urban development south of Lanyon Hill ridgeline and on the north and west slopes of Williamson's Hill.[11]

5.16 The Committee has noted NCDC's intention to give effect to the Minister for Territories and Local Government's commitment that 'in preparing detailed plans for the development of the south Lanyon area, no urban development will be visible from the Lanyon Homestead'.[12] As detailed plans for the area have not yet been drawn up it is difficult for the Committee to judge how that intention will be translated into proposed development. However, the Committee believes that the definition 'urban development as visible from the Lanyon Homestead' is too restrictive to give effect to an intention to protect the rural setting of Layon. This definition is subject to a range of interpretations and, as interpreted by NCDC, is too restrictive.

5.17 In using this definition, NCDC indicated during the Committee's inspection of the Lanyon area that to the south there would be no urban development west of Tharwa Road from about the line of the existing Layon entrance. However, there would be urban development to the north of Lanyon and east of Tharwa Road, although this development would be restricted to that which was not visible from the homestead itself. Despite these restrictions the area of south Lanyon (to the east of Tharwa Road and south of the Lanyon entrance) which NCDC proposes to develop, will have a population of approximately 4500 people and will extend almost to Tharwa.

5.18 The Committee believes that, to effectively protect the rural setting of Lanyon, there should be no urban development visible from wider sections of the Lanyon property than simply 'the homestead' including the entrance into Lanyon. The use of this wider definition to restrict urban development 'visible from Lanyon' would have the effect of eliminating the proposed urban area of south Lanyon. Although some areas of south Lanyon

may not be affected by the use of the wider definition, the Committee was informed by NCDC that the loss of any further sections of south Lanyon would make it unviable as an urban development. The Committee believes then that the proposed development of south Lanyon should not proceed. The preservation of this area as non-urban would be valuable not only in retaining the rural setting of Lanyon, it also would retain an appropriate rural setting for Tharwa Village.

5.19 To the north of Lanyon, the Committee believes that there should be no urban development south of the Lanyon Hill ridgeline as this development would be clearly visible from many parts of the Lanyon property.

5.20 To complete the measures to protect the rural setting of Lanyon the Committee believes that the historic Tharwa Drive should be retained, that the proposed Wright's Drive not be proceeded with and that the existing entrance drive to Lanyon homestead be retained.

5.21 **The Committee therefore recommends that:**

(a) **there be no urban development south of the Lanyon Hill ridgeline on either side of Tharwa Drive;**

(b) **Tharwa Drive be retained and the proposed Wright's Drive not be proceeded with; and**

(c) **the existing entrance drive to Lanyon homestead be retained.**

Tharwa

5.22 The Village of Tharwa on the Murrumbidgee, is, together with the village of Hall, one of the last surviving pre-Canberra settlements in the ACT. The village located alongside an historic bridge crossing the River consists of a dozen houses, a church, school, hall and general store with a petrol pump. The Cuppacumbalong Craft Centre in the old Cuppacumbalong Homestead and the Outward Bound Camp are located on the River on the outskirts of the Village.

5.23 The village is at the southern extremity of the maximum designed area of Tuggeranong, if south Lanyon had gone ahead. The Committee has recommended that urban development not proceed to the limit of Tharwa enabling the rural surrounds of the village to be retained. Tharwa itself is to be largely left intact as a small village although the existing Policy Plan for the village allows for additional residential development which would approximately double the existing population. The Minister for Territories and Local Government wrote to the Committee on 27 March 1984 indicating that it was no longer intended to



proceed at this stage with variation proposals to give effect to the Policy Plan, as the results of an examination had shown that the area was unsuitable for development because of water supply and sewage disposal problems. The Committee welcomes this decision as it believes such developments are inappropriate for the Village and would impose additional environmental pressures on the River.

Gungahlin

5.24 Gungahlin has been identified as Canberra's next new town development and will be developed in parallel with south Tuggeranong. Development in Gungahlin would increase stormwater flows carrying nutrients, faecal bacteria and turbidity in Ginninderra Creek and Lake Ginninderra. Urban runoff from Gungahlin is split between Sullivan's Creek, which flows into Lake Burley Griffin, and Ginninderra Creek, above Lake Ginninderra. Lake Ginninderra will gain an additional urban catchment twice the size of its present catchment.[13] This will require careful control of nutrient flow from these areas into Lake Ginninderra. The Department of Housing and Construction advised that:

> *Consideration should be given to provision of a water quality pondage between Gungahlin and Lake Ginninderra similar to that provided in Tuggeranong Creek and Sullivans Creek.*[14]

5.25 Dr Rosich stated that Lake Ginninderra is at present mesotrophic but can be expected to become eutrophic with the construction of Gungahlin.

Queanbeyan

5.26 With the reduction or elimination of pollution from sewage effluent from Queanbeyan, the impact of Queanbeyan's urban runoff on the Queanbeyan and Molonglo Rivers will become more obvious. Future growth of Queanbeyan without measures to minimise urban pollution will increase the nutrient input to these Rivers and possibly Jerrabomberra Creek. Jerrabomberra Creek as a small stream feeding the Jerrabomberra Wetlands will require particular care and attention as a substantial residential development is proposed in the New South Wales portion of its catchment.

5.27 **The Committee recommends that the Minister for Territories and Local Government seek assurances from the New South Wales Government that the impact of urban runoff on Jerrabomberra Creek is minimised.** The Committee refers to its recommendation in Chapter 2 that maximum use be made of

biological filters and oil and sediment traps in stormwater channels to minimise the effect of urban runoff. These methods should be used to protect Jerrabomberra Creek from the effects of urban runoff.

Rural Development - Subdivision

5.28 NCDC stated that it has no proposals for rural subdivisions in the ACT. If such problems did arise in NSW border areas they would be a matter for the NSW authorities to resolve with, where necessary, the cooperation of Commonwealth agencies.

5.29 NCDC advised that rural subdivision would not be likely to have any greater impact on waterways than does conventional rural use. They cited three situations which could create problems. These were:

- where the scale of subdivision is such as to cause a dense proliferation of holdings with septic tanks polluting the groundwater and hence the River;
- changes in land management which would increase pollution loads in groundwater or streams (e.g. intensive application of fertilisers or pesticides, or practices which lead to increased soil erosion); or
- where the extraction of irrigation water from streams or groundwater water bores coupled with evaporative losses during irrigation substantially reduces overall stream flow.

Intensive farming such as piggeries or poultry farms might also create water quality problems. The Committee believes that rural subdivision is likely to be an area of future concern and developments should be carefully monitored.

Murrumbidgee Country Club

5.30 The Murrumbidgee Country Club has lodged a proposal with the NCDC to develop an integrated housing and golf club estate at Kambah close to the River Corridor. The Minister for Territories and Local Government believes that the environmental issues that have been raised about this proposal should be addressed before the Club's proposal is considered. The Minister has therefore asked the Committee to report on the environmental impact of the proposal on the River Corridor.



5.31 The club believes the proposal to be viable and capable of approval. The Committee has received a number of submissions expressing concern about the proposed establishment of a golf club/housing estate and the impact it would have on the environmental quality of the Murrumbidgee Corridor.

5.32 The site of the proposed 135 hectare development is located to the west of Kambah in Tuggeranong, immediately south of Mt Neighbour, it is bounded to the north west by the Kambah Pool Road which runs parrallel to the proposed Tuggeranong Parkway, to the south by Learmouth Drive, to the west by the proposed Murrumbidgee Park Drive and to the east by residential development. The boundary lies within 1-2 km from the Red Rocks Gorge.

5.33 The original intention at Kambah was for the Commonwealth to develop the Golf Course. The Urambi Village project was developed separately for housing in 1974 and excised from the site. In 1975 some Tuggeranong residents established the Murrumbidgee Country Club, with the aim of developing a golf club and associated recreational facilities on the site in West Kambah, identified for this purpose by the NCDC. The Club was granted a reservation on the lease of the site by the Minister for the Capital Territory in 1978.

5.34 The MCC project involves a three stage development over 10 years which will provide an 18 hole course, a range of other recreational facilities and some 300 to 400 dwellings.

5.35 The layout has been designed with the possibility in mind of extending the course in the future to 27 holes. The extension is to be located to the west of the proposed site and would require an extension of the lease boundaries. Should Murrumbidgee Park Drive proceed, access to the additional nine holes would be via an underpass on the line of Allen's Creek.

5.36 The NCDC has indicated that the Murrumbidgee Park Drive may never be constructed, but NCDC was not prepared to say that the Murrumbidgee Park Drive was no longer required.[15]

5.37 The proposed Murrumbidgee Country Club is quite close to the Murrumbidgee Red Rocks Gorge and requires special sewerage arrangements. Natural drainage from the site (Allens Creek) enters the Murrumbidgee downstream of Red Rocks Gorge but upstream of Kambah Pool. Allens Creek also drains existing residential areas. This runoff is currently untreated.

5.38 With regard to engineering and environmental aspects of the proposal, the Club has made a number of observations:

- A sewerage pumping station, is necessary because the development is outside the sewered catchment area.

- Urban runoff from the whole of Canberra flows into the Murrumbidgee River system and the runoff from housing on the Club site would have minimal effect.

- There is not expected to be an effect on Red Rocks Gorge since (a) natural drainage patterns enter the Murrumbidgee downstream of the Gorge and (b) the site cannot be seen from the Gorge area because of intervening topography.

5.39 The House of Assembly believes that in view of the potential impact of the proposed development on the Murrumbidgee Gorge and River, an environmental impact study should be undertaken to assess and make public the ramifications of the proposed development on the river system and the West Kambah area. The DTLG considers that the current proposal by the MCC requires further examination as it may not necessarily ensure protection of the River, particularly sensitive areas such as Red Rocks.

5.40 A number of environmental issues have been raised concerning the proposed Country Club development. The main issues relate to: traffic; the visual impact of the development from the Murrumbidgee River, especially Red Rocks Gorge as the present proposal places houses within close proximity to the sensitive Red Rocks Gorge area; the protection of water quality from the effects of stormwater runoff into the River and the possibility of sewage entering the River in the unlikely event of a major failure in the proposed sewage pumping system.

5.41 The impact of traffic on adjacent residential streets is limited to that generated by part of the housing development and is within the capability of those roads. Recreation traffic for the golf course gains access to the site from Kambah Pool Road.

5.42 The boundary of the Country Club is within 1-2 km of the environmentally sensitive Red Rocks area. NCDC has proposals, although far from firm, to build the Murrumbidgee Park Drive.

5.43 Roads and bridges that were proposed close to and across the River would have had obvious visual impact on the environment in the area. Further the traffic noise in close proximity to the Gorge would cause some noise pollution and affect wildlife in the area.

5.44 The Murrumbidgee Gorge Society which has objected to the Country Club proposal has stated that the Murrumbidgee Country Club residential suburb will lie in the path of an east bank route location of the Tuggeranong Parkway. The Society claimed that the 'suburb' will necessitate a major parkway river-crossing to West Tuggeranong near Red Rocks and another major crossing back again to the town centre.



5.45 On the metropolitan plan, the proposal for the west bank road is outside the Country Club site.[16] A decision has now been made not to develop the West Murrumbidgee region, hence there is now no longer a requirement for additional bridges across the River and the west bank road.

5.46 With regard to the visual impact of the proposed housing component of the Country Club, viewed from the Red Rocks area the NCDC assured the Committee that only from the edge of the upper level of the Red Rocks area, not within the Gorge itself, would it be possible to identify the upper level of two storey houses on some of the ridges of the proposed Country Club estate.[17]

5.47 The stormwater runoff of the proposed golf course will have no impact on Red Rocks since the natural drainage pattern of the proposal flows south west and enters the Murrumbidgee River downstream from the Gorge but upstream of Kambah Pool.

5.48 It is understood that the proposed water pollution control ponds are to be constructed in such a way that if one overflows it overflows into the next and if due to an exceptional rainfall, there is an overflow beyond that, a properly formed land area is to be constructed on the south west boundary of the site to contain overflow from the ponds.

5.49 The NCDC believes that the volume of these ponds is adequate to contain the amount of runoff and that irrigation of the golf course will be an appropriate use of this water. In the event of overflows entering the River, it will not alter the quality of the Murrumbidgee to any degree. The Club has indicated that it will use the ponds for irrigation.[18]

5.50 The establishment of houses on the golf course will increase urban runoff, but the proposed lakes, which will act as sedimentation ponds, will result in an overall improvement, as there is currently significant urban runoff passing through the Country Club site, which enters the Murrumbidgee without treatment. The Committee believes that the stormwater controls proposed are quite adequate and are an improvement on the current arrangements. Irrespective of the decision to develop the golf course urban runoff should not enter the Murrumbdigee River without some treatment.

5.51 The proposed development is outside the sewerage drainage area. It is proposed that sewage will have to be pumped back to the gravity area. The Club considers this scheme the most economical and with minimal aesthetic or physical problems in site development.

5.52 A witness for NCDC told the Committee that a back up pump would be required in case of failure of the sewage pump. Within the pumping system an overflow retention with a capacity of 48 hours will also be required. While the establishment costs will be borne by the Club the additional operating costs will be borne by ratepayers generally. Some areas on Ginninderra Creek rely on pumping stations. The Committee believes the sewerage proposals are acceptable.[19]

5.53 The DTLG has raised no objection to including a housing component within a golf course development and agrees that this will assist in providing a viable operation. However the Department has expressed concern that the present proposal would place houses within close proximity of the sensitive Red Rocks Gorge area. The Department takes the view that land use immediately adjacent to the Corridor must be compatible with the protection of the Murrumbidgee Corridor.

5.54 The DTLG is of the opinion 'that if urban development is allowed to proceed in close proximity to the River it would be difficult to introduce effective control measures'.[20]

5.55 The Department believes that the delineated Corridor as published in the NCDC Draft Policy Plan alone will not necessarily ensure environmental protection of sensitive areas such as Red Rocks Gorge and other areas of the River. The Department considers that a relocation of the golf course to form a buffer between the housing and the River would be preferable and considers that a further examination of the Murrumbidgee Country Club proposal is required.

5.56 The Club in a submission to the House of Assembly stated that 'since the earliest discussions with the Commission it was made very clear to the NCDC that the site identified was to be developed for a golf course and housing ... and that if the club did not want to develop this housing then the Commission would retain the housing land for development by others'. The NCDC informed the Committee that its land use policy for this area is housing and if the integrated housing and golf course development were not to proceed, then the Commission would be looking at this piece of land in terms of its capacity to absorb additional housing, including medium density housing.[21]

5.57 The Murrumbidgee Gorge Society in its submission to the Committee stated that:

> The extent of resident consultation by the NCDC and public participation in the planning process consisted of negotiations with the Murrumbidgee Country Club in which the NCDC maintained that unless the residents are prepared to accept 350 or more houses on their country club golf course then the alternative is a commercial suburban development of the entire site. Why is the choice between unacceptable alternatives?[22]



The Committee believes that the NCDC alternative of developing the whole area for housing is completely inappropriate.

5.58 The Committee agrees with DTLG that the delineated Corridor will not on its own ensure protection of the Red Rocks Gorge area. The declaration and management of a nature conservation area is also necessary. While the housing will be relatively close to the River its on-course location provides some buffering. The Committee believes the environmental problems can be overcome by careful planning and management. There should be no access to Red Rocks Gorge from this development or from adjoining raods should they be built. Access to the Gorge area should be by walking tracks along the River from established picnic areas.

5.59 While the Committee believes that the Country Club proposal with careful planning and management is environmentally acceptable it is still subject to the Environmental Protection (Impact of Proposals) Act 1974. The Act requires that where a matter involves a Commonwealth decision and is considered environmentally significant then the provisions of the Act must be invoked. Under the Act the Minister responsible (in this case the Minister for Territories and Local Government) designates the proponent (the Murrumbidgee Country Club) who submits specified information to the Minister for Home Affairs and Environment as soon as possible after the proposed action has been formulated. NCDC informed the Committee that a Notice of Intention under the Act was to be forwarded late in 1983.

5.60 The Club's development plan devised by a consultant and endorsed by the club involves the staged selling of land for housing, the proceeds of which will progressively finance the construction of the golf course.

5.61 In a letter to the Minister the Club stated that its 'sole objective is the creation of a much needed golf course facility in the Tuggeranong Valley and that the only apparent means for achieving this is the development and sale of residential land surrounding the course to provide the necessary funds for its construction'.[23]

5.62 In its Report on the 75th Series of Variations, this Committee stated that it would not approve a variation involving the private development of residential land until:

it receives from the NCDC and DCT copies of the draft guidelines that are currently being prepared governing the release of land in new residential subdivisions and setting out the responsibilities of private developers regarding servicing standards and marketing procedures.

Such guidelines were never received and it would appear that they would be necessary prior to this development.

5.63 **The Committee recommends that the Murrumbidgee Country Club proposal proceed but that the granting of a lease to the Club be conditional on adequate guarantees being made that each stage can be completed. The Committee also recommends that any housing constructed in the Country Club Estate, that would be visible from the Red Rocks area be restricted by siting and design controls to single storey level.**

Government Offices

5.64 During the 79th Series of Variations (White Industries and Erindale Centre), the Committee was told that a town centre for Tuggeranong could not be justified for at least ten years. The Committee was also told that the Department of Administrative Services had no intention in the forseeable future of building government offices in Tuggeranong.

5.65 Tuggeranong is disadvantaged, in relation to other areas, in terms of local employment.

5.66 Recent evidence given to the Committee indicated that government offices would be built as part of the proposed Tuggeranong Town Centre. The Committee expects to be consulted on these proposals when the Town Centre development is referred to it for examination and report as recommended in paragraph 5.8.

Concluding Comments

5.67 While the concept of a river corridor is a useful one for some purposes, such as aesthetic considerations, planning recreational facilities and developing buffer areas, it can be a limitation in assessing the total environmental impacts made on the River. The Murrumbidgee drains the whole of the ACT and consequently activities throughout the Territory could potentially affect the River. The Murrumbidgee River catchment within the ACT should be seen as a single system such that its use and management should be considered as a whole. Options for the use of water and land resources should be determined in relation to the present and future needs within the community, including environmental considerations, so as to maintain their long-term capabilities. Water and land management therefore need to be closely coordinated.



5.68 Basic environmental protection legislation still does not exist in the ACT. Water, air and noise pollution ordinances are yet to come into effect. Hazardous chemical control in the Territory, including agricultural chemicals such as pesticides, remains minimal. The House of Representatives Environment and Conservation Committee regarded the situation in the ACT in December 1982 as deplorable and sought urgent action to rectify these legislative deficiencies. This legislation is taking a long time to finalise and implement.

5.69 Suggestions as to the extent of the River Corridor and the kind of protection necessary for the Corridor have varied. However it is clear that most people want some recognition of the River and its environs as being special, with its recreational, natural and aesthetic features being maintained or enhanced. The name Murrumbidgee is associated by most Australians with one of our largest rivers, yet in the ACT region the upper part of that River does not have the size, permanency or resiliance that it has further downstream. The River and its tributaries are subject to marked variations between and within seasons. The River has even stopped flowing on occassions as it did for a period early last year. It is within the context of a fragile river ecosystem that the Corridor must be viewed.

5.70 It is a comparatively small water system to which we look for increasing water recreation facilities. There are increasing, and sometimes conflicting, pressures for other uses such as passive recreation, undisturbed natural areas, fishing, canoing, horse riding, grazing, forestry, urban development, sand and gravel extraction and water supply. Careful planning of the River's resources is essential. The volume of water in our river system is ultimately limited. While it appears adequate to supply our short to medium-term needs, there must come a point where quantity and/or quality will be inadequate. We must start looking at our own water usage patterns now, with a view to conservation if we are to avert or even delay future supply problems.

5.71 There are a number of aspects of the Corridor we wish to conserve or improve. There are increasing and sometimes conflicting demands placed on the River and its Corridor. While the Corridor is a focus for our attention in addressing the problems of the River, it does not exist in isolation and must be considered in a wider environmental context for its proper management.

24 July 1984

(KEN FRY)
Chairman

**FOOTNOTES**

1. Metropolitan Issues Paper, NCDC, June 1980, p. 16.
2. Transcript, p. 46.
3. Evidence, p. 97.
4. Metropolitan Issues Paper, p. 66.
5. ibid, p. 81.
6. ibid, Forward.
7. Letter from Mr B.M. Browning, Secretary and Manager, National Capital Development Commission, to the Committee, dated 16 May 1984.
8. Evidence, p. 365.
9. Evidence, p. 49.
10. Evidence, p. 1003.
11. Submissions to the National Capital Development Commission's draft Murrumbidgee River Corridor Policy and Development Plan, October 1983, by the National Trust of Australia (ACT), the Australian Heritage Commission and the Lanyon Restoration and Acquisition Committee.
12. Press Release by the Hon. T. Uren, MP, Minister for Territories and Local Government, dated 29 February 1984.
13. Evidence, p. 50.
14. Evidence, p. 365
15. Evidence, p. 1371.
16. Evidence, p. 1197.
17. Evidence, p. 1172.
18. Evidence, p. 1176.
19. Evidence, p. 1171.
20. Memorandum to Chairman from Department of Territories and Local Government, dated 25 January 1984 (Committee File M5).
21. Evidence, p. 1194.



22. Evidence, p. 1315.
23. Evidence, p. 1366.

## APPENDIX I

## LIST OF WITNESSES

ACT Equestrian Association

Mr I.L. Greenshields, President
Mrs J.M. Taylor, Trails Co-ordinator

Canberra Anglers Association

Mr I.B. Keightley, Vice-President
Mr G.H. Winter, Vice-President

Canberra Canoe Club

Mr C.F. Gledhill, Secretary
Mr J.L. L'Epagniol, Member
Mr T.D. Whight, President

Capital Territory Health Commission

Mr B.F. Christiansen, Principal Chemist, Public Health Laboratory
Dr A.J. Crowe, Assistant to the Medical Officer of Health and Adviser in Occupational Health
Mr H.D. Kruger, Chief Health Inspector

Centre for Resource and Environmental Studies, Australian National University

Dr T. Beer, Research Fellow
Dr R.B. Humphries, Postdoctoral Fellow

Department of Home Affairs and Environment

Mr E.M. Anderson, Assistant Secretary
Dr J. Gordon-Smith, Clerk



Department of Housing and Construction

Mr C.T.J. Bubb, First Assistant Secretary (Engineering), Central Office
Mr E.M. Fraser, Assistant Director, Water Supply and Sewerage Division, ACT Region
Mr J.W. Harris, Principal Engineer Sewerage Planning, ACT Region
Mr A.R. McIntyre, Director, ACT Region
Mr D.M. Philip, Principal Engineer (Sewerage), ACT Region

Department of Territories and Local Government

Mr R.J. Dunn, Director, Environmental Protection Section, Technical Services Branch
Mr R.G. Gallagher, Acting First Assistant Secretary, Lands Division
Mr W.E. Lawrence, First Assistant Secretary, Legislation and Policy Co-ordination Division
Mr R.J. Murrary, Director, City Parks Administrator, City Manager's Office
Dr B.H. Pratt, Director, Conservation and Agriculture Branch, Lands Division
Ms S.E. Robinson, Aquatic Biologist, Conservation and Agriculture Branch, Lands Division
Mr J.A. Turner, First Assistant Secretary, Special Duties

Geological Sites and Sub-Committee of the Geological Society of Australia Inc. (NSW Division)

Mr R.A.L. Osborne, Convenor

Ginninderra Community Council

Mr B.R. Wells, Member

Liberal Party of Australia ACT Division

Mr P.M. Macartney, Member, Policy Committee
Mr T.R. McGhie, Chairman, Policy Committee

Murrumbidgee Country Club

Mr M.P. Fretwell, President
Mr J. Hindmarsh, Consultant, Project Manager

Murrumbidgee Gorge Society

Mr A. Bonham, Convenor

Murrumbidgee Monitor Association

Mr G. Bardsley, Co-Convenor
Dr R.K. Darroch, Co-Convenor
Mr T.M. Digwood, Member
Ms N.L. Pratt, Co-Convenor

National Capital Development Commission

Mr G.J. Campbell, Chief Planner
Mr M.M.B. Latham, Associate Commissioner
Mr A.I.L. Lawrence, Water Resources Engineer
Mr G.W.D. Pain, Chief Engineer
Dr G.H. Scott, Principal Environmental Officer

National Parks Association of the Australian Capital Territory Inc.

Mr N.W. Esau, President
Mrs D.E. Robin, Vice-President

National Trust of Australia

Major-General K. Mackay (Rtd), Vice-President

Native Fish Australia

Dr P.H. Greenham, Committee Member
Mr G.H. Winter, President (Canberra Branch)

New South Wales Department of Mineral Resources

Dr R.I. Wallace, Principal Geologist, Non-metallic Minerals, Geological Survey of New South Wales

New South Wales Department of Public Works

Mr F. King, Inspecting Engineer, Sewerage Branch
Mr D.A.H. Maysey, Supervising Engineer, Water Supply Branch



New South Wales State Pollution Control Commission

Mr J.D. Brown, Officer-in-Charge, Water Assessments Section
Mr T.M.H. Jones, Pollution Control Inspector, Wollongong Regional Office
Mr P.B. Yates, Principal Engineer, Water, Wastes and Chemicals

Private Individuals

Mrs R.K. Barz, 82 Carruthers Street, Curtin, ACT
Dr R.S. Rosich, 9 Millard Place, Flynn, ACT
Mr J.H. Winston-Gregson, 192 Kingsford Smith Drive, Spence, ACT

Ricegrowers Association of Australia

Mr B.E.R. Caldwell, General Secretary
Mr G.C. Graham, President

School of Environmental Design, Canberra College of Advanced Education

Mr K. Taylor, Senior Lecturer

Water Resources Commission of NSW

Mr J.F. Bate, Principal Engineer, Storages and National Works
Dr D.E.J. Garman, Research Officer
Mr T.A. Janaway, Deputy Chief Engineer

Yass Shire Council

Mr E. Butt, Shire President
Mr P.A. Doyle, Councillor
Mr I.H. Lumsden, Shire Clerk
Mr G.D. Willey, Chief Health and Building Surveyor

Yass Soldiers' Club - Fishing Club

Mr R.H. Bayley, President

## APPENDIX II

Persons and organisations who made submissions but did not appear at public hearings:

ACT Fly Fishers Inc.
Australian Heritage Commission
Australian Institute of Landscape Architects (ACT Group)
Betts, Mrs N.J.
Blandford, Mr W.N.
Canberra Fisherman's Club
Dawling, Mr A.L.
Fernandez, Mr R.
Lake, Dr P.
Lanyon Restoration and Acquisition Committee
Livestock and Grain Producers' Association of NSW
Miller, Mr John B.
Murrumbidgee River Irrigators' Association
Murrumbidgee Valley Water Users' Association
NSW Canoe Association
Schmidt, Mr G.C.
Svenson, Mr J.



## APPENDIX III

### INSPECTIONS

| | |
|---|---|
| 31/5/1981 | Inspection Lake Burley Griffin |
| 28/8/1981 | Inspection LMWQCC and visit Googong Dam |
| 14/9/1981 | Formal tour along Murrumbidgee River |
| 23/10/1983 | Visit Burrinjuck Dam |
| 5/7/1983 | Inspection of River Corridor |
| 6/7/1983 | Inspection Bredbo River, Cowarra Mind and Googong Dam |
| 28/9/83 | Visit Murrumbidgee Irrigation Areas - Griffith/Leeton |
| 2/7/1984 | Inspection proposed Tuggeranong Town Centre site and Lanyon area |