



**AUSTRALIAN CAPITAL TERRITORY**

**DEPARTMENT OF URBAN SERVICES**

**APPROVAL OF PLAN OF MANAGEMENT**

**INSTRUMENT NO. 173 OF 2001**

As the Plan of Management for Canberra's Urban Lakes and Ponds (the Plan) attached to this Instrument has been considered and endorsed by the Legislative Assembly Standing Committee on Planning and Urban Services, pursuant to paragraph 204(a) of the Land (Planning and Environment) Act 1991, I approve the Plan.

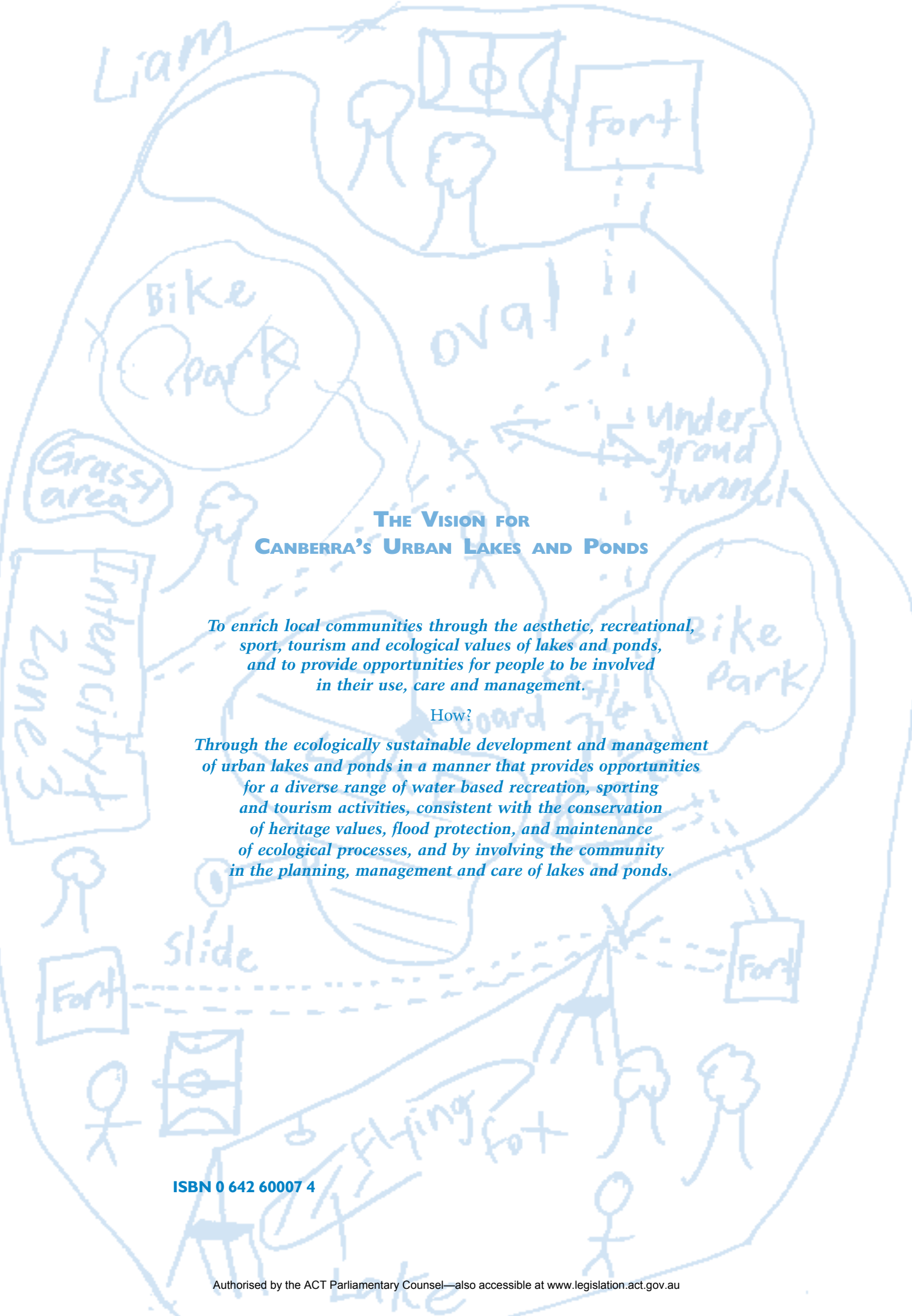
Dated this 25 day of June 2001

***Brendan Smyth MLA***  
Minister for Urban Services



# Canberra's Urban Lakes and Ponds

Liam



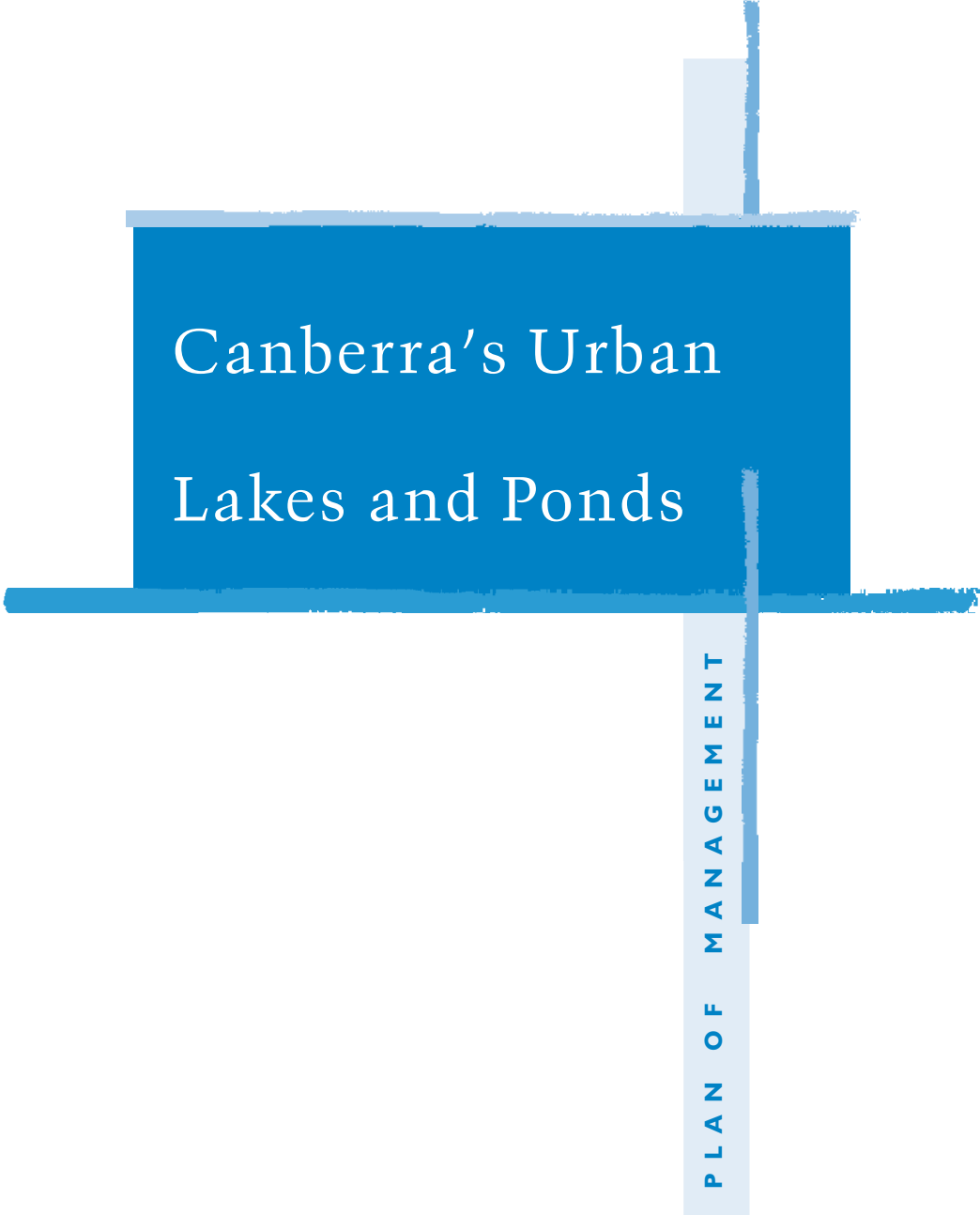
## THE VISION FOR CANBERRA'S URBAN LAKES AND PONDS

*To enrich local communities through the aesthetic, recreational, sport, tourism and ecological values of lakes and ponds, and to provide opportunities for people to be involved in their use, care and management.*

How?

*Through the ecologically sustainable development and management of urban lakes and ponds in a manner that provides opportunities for a diverse range of water based recreation, sporting and tourism activities, consistent with the conservation of heritage values, flood protection, and maintenance of ecological processes, and by involving the community in the planning, management and care of lakes and ponds.*

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# Canberra's Urban Lakes and Ponds

PLAN OF MANAGEMENT

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## *Community Groups and Businesses*

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Australian Battle Group Inc.

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The Valley View

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Conservation Council of South-East Region\*

ACT Waterski Association Incorporated

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Canberra Jet Sports Boating Association

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Sailability ACT, and

Canberra residents who participated in community and focus group meetings

## *Government Agencies*

Urban Services - Environment ACT – Water Unit\*, Wildlife Research and Monitoring\*,  
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ACT Health Protection Service\*

CityScape Services

Urban Ranger Services – Lake Rangers\*

Urban Services - Canberra Urban Parks and Places\*

Education and Community Services - Sport and Recreation

Gungahlin Development Authority

National Capital Authority

Urban Services - Planning and Land Management\*

Urban Services - Roads and Stormwater\*

Totalcare Industries

\* Agencies represented on the Project Steering Committee

This Plan was prepared by EDAW (Aust.) Pty Ltd in conjunction with the  
Cooperative Research Centre for Freshwater Ecology.

The project management team comprised: Ian Baird, Chris Nazer,  
Joelle Bakker and Joanne Maree Mitchell.

The planning team comprised: John Wood, Ian Lawrence, Natalie Fisher,  
Suzanne Rawlinson and Kimberly Everett.

## PREFACE

This Plan of Management has been prepared by Canberra Urban Parks and Places in accordance with the provisions in Part V of the *Land (Planning and Environment) Act 1991*, which require the Conservator of Flora and Fauna to prepare Plans of Management for public land. The land covered by this Plan of Management are water bodies defined as Public Land (Lake) and Water Features in the Territory Plan. The Plan describes the way in which Canberra's Urban Lakes and Ponds are to be managed to provide for public and community use and environmental values and protection.

Canberra's urban lakes and ponds provide opportunity for active and passive recreation, enable protection of natural features, and provide for stormwater drainage and pollution control.

The intent of the Land Act's management planning provisions is to ensure that management of public land, including urban lakes and ponds, is consistent with the relevant land use policy set out under the Territory Plan and that, through a formal consultation process, the community has a say in the way these areas are to be managed.

A draft version of the plan was issued for public comment in May 2000 and we are pleased to now release this final version, which will guide the management of Canberra's urban lakes and ponds for the period 2000-2005.

Further information about management of Canberra's urban lakes and ponds may be obtained at Canberra Urban Parks and Places website:

[www.parksandplaces.act.gov.au](http://www.parksandplaces.act.gov.au)



Brendan Smyth MLA  
Minister for Urban Services

February 2001





# part a.

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## ABOUT THIS PLAN

## How to Use This Plan

Readers of this Plan will have very different information needs, ranging from a general appreciation of the Plan as a whole, to specific detail about a particular lake or pond. To enable readers to find relevant information speedily, this Plan has been designed in the following way.

### part a

#### ABOUT THIS PLAN

Part a summarises:

- how to use this Plan;
- what the Plan is for;
- the water bodies covered by the Plan;
- how the Plan was prepared;
- the policy framework, statutory requirements; and
- who the managers of Canberra's urban lakes and ponds are.

### part b

#### PLANNING FRAMEWORK

Part b describes:

- the vision for Canberra's urban lakes and ponds;
- the consultation process followed;
- the issues which arose;
- lake and pond values; and
- lake and pond ecology and water quality.

### part c

#### MANAGEMENT OF LAKES AND PONDS

Part c sets out:

- how Canberra's urban lakes and ponds will be managed;
- the level of development and facility provision that can be expected; and
- how performance will be measured.

### appendices

The appendices provide essential information in support of the Plan and enable readers to identify key legislation, policies or references that they may wish to consult for additional detail.

## WHAT THE PLAN IS FOR

This Plan aims to:

- present the framework guiding the management of Canberra's urban lakes and ponds in a manner responsive to a range of environmental and community values;
- communicate management intent associated with managing Canberra's urban lakes and ponds;
- document the management vision, objectives, and services that will be aimed for; and
- provide performance indicators to monitor the achievement of the Plan's objectives.

## WATERBODIES COVERED BY THE PLAN

The Plan covers waterbodies defined as Public Land (Lake) and Water Features in the Territory Plan (refer Figure 1), including:

### *Belconnen*

- Dunlop Pond 1
- Dunlop Pond 2
- Lake Ginninderra
- West Belconnen Pond

### *Gungahlin*

- Yerrabi Pond
- Gungahlin Pond

### *Tuggeranong*

- Point Hut Pond
- Gordon Pond
- Isabella Pond
- Upper Stranger Pond
- Lower Stranger Pond
- Tuggeranong Weir
- Lake Tuggeranong

### *Inner Canberra*

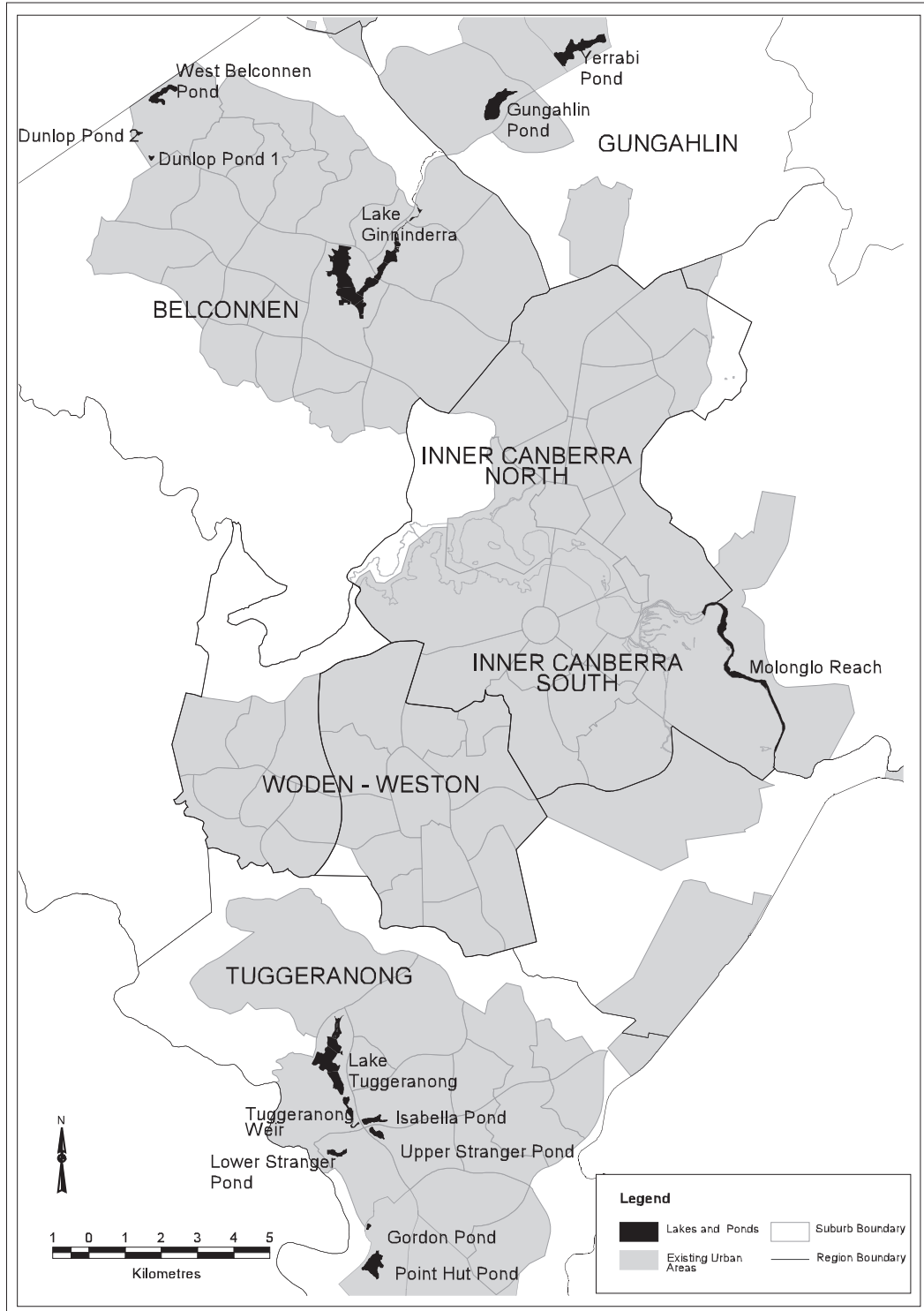
- Molonglo Reach

This Plan does not include:

- Ponds on private property or the small wetlands which have replaced sediment interception ponds; and
- Lake Burley Griffin which is managed by the National Capital Authority (*Lake Burley Griffin Management Plan 1995*).
- Jerrabomberra Wetlands which is managed by Environment ACT under its own Plan of Management (ACT Parks and Conservation Service 1994).



Figure 1: The urban lakes and ponds covered by this Plan



## HOW THE PLAN WAS PREPARED

This Plan was prepared over a six month period, commencing in February 1999. The format complements the four previous Plans of Management prepared for Canberra Urban Parks and Places for public open space in Belconnen, Woden - Weston, Tuggeranong and Inner Canberra, and a fifth, Gungahlin, which is currently in preparation. These Plans make up a family of Plans which will eventually cover all public open space and sportsgrounds in urban Canberra area.

The content of this Plan reflects feedback on values and issues raised by the ACT community and directions from a Canberra Urban Parks and Places chaired Project Steering Committee. Monthly meetings were held with the Project Steering Committee during the Plan preparation process.

## STATUTORY REQUIREMENTS

This Plan of Management has been prepared in accordance with Part V of the *Land (Planning and Environment) Act 1991* (*Land Act*). Management objectives stated in Schedule 1 of the Act are:

- i. to prevent and control floods by providing a reservoir to receive flows from rivers, creeks and urban run-offs,
- ii. to prevent and control pollution of waterways,
- iii. to provide for public use of the lake for recreation,
- iv. to provide habitat for fauna and flora.

*Appendix b* details the requirements of the Land Act and how this Plan of Management satisfies those requirements.

## THE POLICY FRAMEWORK

Land planning and management in the ACT is the responsibility of both the Commonwealth and the ACT Governments. The division of responsibilities is determined by the *Australian Capital Territory (Planning and Land Management) Act 1988*, which provides for two categories of land in the ACT:

- **National Land**, used by or on behalf of the Commonwealth and managed by the Commonwealth includes some centrally located parkland. In particular the 'symbolic' open spaces associated with the Parliamentary Zone/War Memorial are National Land and as such are outside the scope of this Plan of Management; and
- **Territory Land** – all the remaining land of the ACT (ie land that is not declared National Land), which is managed by the ACT Government.

A feature of planning in the ACT is the existence of two planning bodies - the Commonwealth's **National Capital Authority** and the ACT Government's **Planning and Land Management (PALM)**.

The **National Capital Plan** is prepared and administered by the National Capital Authority and has the object of ensuring 'that Canberra and the Territory are planned and developed in accordance with their national significance'. It sets out general land use and other planning policies for the Territory as a whole. It also specifies areas having 'the special characteristics of the National Capital' to be **Designated Areas**. The National Capital Authority has the planning responsibility for Designated Areas, which may be either National Land or Territory Land. In Designated Areas, all proposed works (building works, landscaping, tree-felling, excavations) managed by the Territory Government are subject to approval by the National Capital Authority.

Planning for areas which are *not* Designated Area is the responsibility of ACT Government's PALM, which prepares and administers the **Territory Plan**. The Territory Plan must be 'not inconsistent' with the National Capital Plan.

The overall object of the Territory Plan is 'to ensure, in a manner not inconsistent with the National Capital Plan, that the planning and development of the Territory provides the people of the Territory with an ecologically sustainable, healthy, attractive, safe and efficient environment in which to live, work and have their recreation'.

The Territory Plan assigns all land outside Designated Areas to one of 16 major Land Use Policies. The Territory Plan Map identifies the land coverage for each land use policy. Planning and development of land within each land use zone is guided by the detailed objectives and policies set out in the Territory Plan Written Statement.

The land covered by this Plan of Management are water bodies mapped as Water Features in the Territory Plan. The Water Feature Land Use Policies are Part B6 in the Territory Plan. Major water bodies (eg. Lakes Ginninderra and Tuggeranong) also appear on the Public Land Overlay as Lakes (Pg) consistent with Schedule 1 of the *Land Act* (see Part C1 Overlay Provisions in the Territory Plan).

All waters in the ACT and their catchments have been divided into three Water Use Catchments either Conservation; Water Supply; or Drainage and Open Space (see Fig. 1 page 13 of Part C2 in the Territory Plan). The Drainage and Open Space Water Use and Catchment Policies affecting urban lakes and water bodies are Section 2.3 of the Water Use and Catchment Policies (Part C2 in the Territory Plan). Schedule 6 of Part C2 defines Water Uses permitted and Environment Values consistent with mapped sub-catchments covering urban Canberra.

For the purposes of the *Environment Protection Act 1997* Part VI Water of the *Environment Protection Regulations 1997* is known as the 'Water Quality Guidelines'. Schedules 3 and 4 of these regulations define environmental values or water uses consistent with Part C2 Water Use and Catchment Policies of the Territory Plan (see above). Ambient environmental standards in relation to water quality for waterways are defined in Schedule 4 taking account of the environmental values present or water uses permitted.

Prior to preparation of this Plan of Management all fourteen waterbodies not previously so declared were gazetted as 'lakes' for the purposes of the *Lakes Act 1976* (s.5).

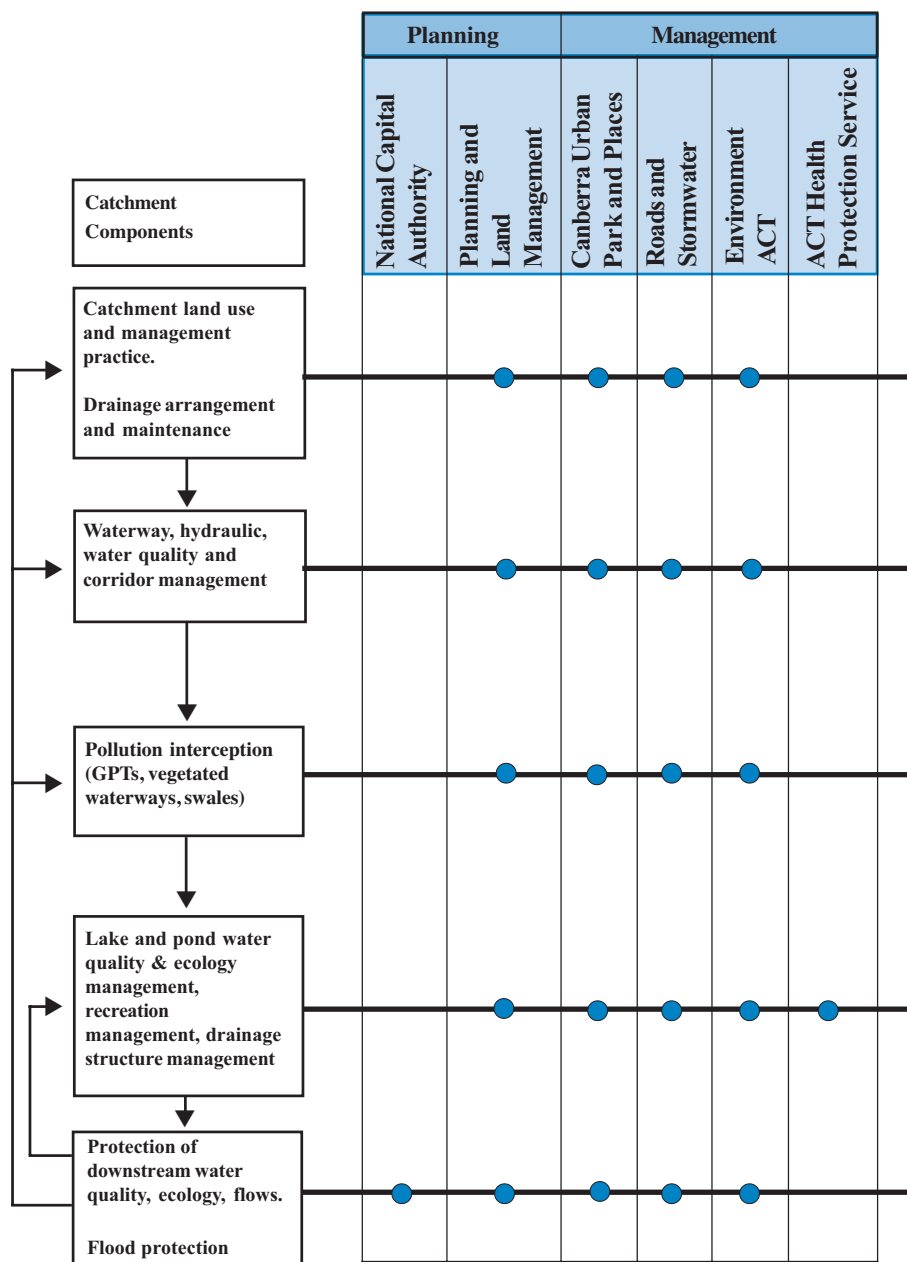




## THE MANAGERS OF CANBERRA'S URBAN LAKES AND PONDS

Responsibility for different aspects relating to Canberra's Urban Lakes and Ponds currently rests with six major agencies as indicated below. Agency responsibilities and administrative arrangements are summarised in Appendix c.

Figure 2: Agency responsibilities for Canberra's urban lakes and ponds



Source: CRC for Freshwater Ecology

Note: The above agency responsibilities are current as at May 2000. However changing functions and restructuring within the ACT Government may result in subsequent changes.

# part b.

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## PLANNING FRAMEWORK

## one. THE VISION

A vision draws on people's imagination, insight and wisdom to identify a future of great inspiration and foresight. A vision statement positions an organisation to look beyond day to day services, initiatives and issues, in order to spearhead what could be or should be in the future. It guides decision making by providing a framework in which objectives, strategies and service can be set.

The emerging vision for Canberra's urban lakes and ponds is:

***To enrich local communities through the aesthetic, recreational, sport, tourism and ecological values of lakes and ponds, and to provide opportunities for people to be involved in their use, care and management.***

How?

***Through the ecologically sustainable development and management of urban lakes and ponds in a manner that provides opportunities for a diverse range of water based recreation, sporting and tourism activities, consistent with the conservation of heritage values, flood protection, and maintenance of ecological processes, and by involving the community in the planning, management and care of lakes and ponds.***

## two. CONSULTATION PROCESS

This draft Plan incorporates many suggested changes received in response to the call for public comment on previous draft Plans released by Canberra Urban Parks and Places over the last two years.

The specific consultation process developed in support of this draft Plan involved the following components:

- 6th March 1999      Placement of advertisements in the *Canberra Times* and local papers advising of the commencement of the planning process and the calling for submissions.
- 18th March 1999      Search workshop involving representations of Government Agencies involved in lake and pond management.
- 17-24th March 1999      Focus group meetings with 5 groups of 10 people selected at random from the Canberra population representing:
  - Boys 9-11 years of age
  - Girls 9-11 years of age
  - Teenagers 13-15 years of age
  - Adults 20-45 years of age
  - Adults 60 years of age or over.



- 14th April 1999                      Mailout of a Canberra urban lakes and ponds information pack.
- 24th & 27th April 1999              Placement of advertisements in the *Canberra Times* (24/4/99) and the six local editions of the *Canberra Chronicle* (27/4/99) inviting people to register their interest in attending search workshops regarding Canberra's urban lakes and ponds.
- 3rd and 4th May 1999                Search workshop held in Tuggeranong and Belconnen.
- 3rd June 1999                        Follow up search workshop held in Tuggeranong.
- July to December 1999              Revision of draft Plan of Management incorporating comment by individuals and agencies represented on the Project Steering Committee.
- May to June 2000                    Release of draft Plan of Management for public comment.

### three. ISSUES

Pooling the inputs available, including those which emerged from the consultation process described in Chapter 2, the main issues regarding Canberra's urban lakes and ponds are summarised in Table 3.1:

*Table 3.1: Issues, values and management objectives*

Issues	Related values	Management objectives
Maintenance of the amenity of the lakes and ponds and their surrounds.	Lake and pond values are key urban amenity / quality of life components.	<ul style="list-style-type: none"> <li>■ Provision of a range of quality lake and pond settings and landscapes.</li> <li>■ Enhancement of lake and pond values.</li> </ul>
Competing demands for lake and pond use, exclusive water use during special events, inappropriate use in conservation areas.	Transparent, open and participatory process of allocation, equitable allocation of scarce resources, market based allocation, efficiency in use, agreed conflict resolution processes, formal basis for identifying agreed uses and values, involvement of local communities.	<ul style="list-style-type: none"> <li>■ Lake and Pond Management Plan development and adoption as a process and framework for community partnership in resolution of equitable and sustainable use demands.</li> <li>■ Accommodation of a range of uses and values by way of location and time zoning.</li> <li>■ Flexibility to respond to emerging needs and issues by way of permit based uses.</li> </ul>
Concerns regarding environmental degradation i.e. loss of waterways and wetlands.	Ecologically sustainable land and water uses, restoration of urban waterway values.	<ul style="list-style-type: none"> <li>■ To capture opportunities for conservation of aquatic ecology associated with lakes and ponds.</li> </ul>
Integrated catchment management i.e. water quality is dependent on catchment runoff and landuses.	Integrated catchment based uses and management, clear administrative responsibilities and coordination processes.	<ul style="list-style-type: none"> <li>■ Lake and pond management plans are integrated and catchment management based.</li> <li>■ Agreed agency functions, programs and boundary resolution processes in respect to management of lakes and ponds and their catchments.</li> </ul>
Equity i.e. all sectors of the community treated equally and fairly.	Transparent, open and participatory process of allocation, equitable allocation of scarce resources.	<ul style="list-style-type: none"> <li>■ Open and equitable process of allocation of lake and ponds uses and values.</li> <li>■ Provision of access for all groups.</li> </ul>
Affordability i.e. the cost of access should not impose a barrier to use for those who are less well off.	Level of service provision financially viable, nexus between level of demand and user pays, efficiency in service delivery, multi-purpose use based.	<ul style="list-style-type: none"> <li>■ Adoption of multi-purpose use based facilities, guided by economic and social benefits.</li> <li>■ Balance of adopted uses and level of service and cost. Adoption of market based approaches where feasible. Efficient service provision.</li> </ul>
Public security and health risks.	Reasonable level of protection from hazards and health risks.	<ul style="list-style-type: none"> <li>■ Adoption of designs minimising potential risks to life, health, property.</li> <li>■ Establish and maintain exclusion barriers and warning signs adjacent to hazard areas.</li> </ul>
Exclusion of the community from decisions affecting its well being, and from participation in management and caring roles	Right of community for voice in decisions affecting its well being and future. Community as stakeholder in natural resource management	<ul style="list-style-type: none"> <li>■ Adoption of a process of determining lake and pond uses and service levels facilitating full participation of community.</li> <li>■ Establishment of information service.</li> <li>■ Seek joint projects with community recreation, lake, pond, wetland, land care, waterway groups and clubs.</li> </ul>

## four. VALUES

A value is a measure of quality and significance. For most people, values are a corner stone of worth from which to begin assembling their aspirations. In a plan of management, values serve as the absolute foundation on which other things depend.

### COMMUNITY VALUES

In response to press advertisements and invitations, members of the community and interest groups attended workshops to discuss their views regarding Canberra's urban lakes and ponds. The style of discussion was predominantly a values search which highlighted how people perceive urban lakes and ponds in Canberra and explored ideas for their future management.

The community is generally satisfied with the urban lakes and ponds and value them for the following reasons:











- aesthetic qualities, particularly when water bodies are visible;
- appreciation of the existing natural systems and aquatic life;
- the wide range of available recreational opportunities, including swimming and boating;
- facilities for family and group gatherings including barbeques; and
- opportunities to interact with the natural environment.



## CORE LAKE AND POND VALUES

Common core values associated with Canberra's urban lakes and ponds are identified below, while more specific values are listed for each lake in Chapter 8. The icons are used throughout Part C to indicate the presence of these values at each lake or pond.

Lake and pond values were identified from existing information sources and local knowledge. Thus, values will need updating as new information emerges.

Core value		Values associated with:
Ecological/ Environmental		<ul style="list-style-type: none"> <li>■ water quality</li> <li>■ natural heritage</li> <li>■ aquatic plants and animals</li> </ul>
Fish		<ul style="list-style-type: none"> <li>■ recreational fishing</li> </ul>
Visual/ Landscape Amenity		<ul style="list-style-type: none"> <li>■ those aspects which appeal to visual senses</li> <li>■ vistas and views</li> </ul>
Aboriginal		<ul style="list-style-type: none"> <li>■ evidence of past Aboriginal occupation or use *</li> <li>■ areas of significance to existing Aboriginal communities *</li> <li>■ cultural heritage *</li> </ul>
Historic		<ul style="list-style-type: none"> <li>■ evidence of past European occupation or use</li> <li>■ cultural heritage *</li> </ul>
Recreation		<ul style="list-style-type: none"> <li>■ a wide range of informal recreation activities which people associate with lakes and ponds</li> </ul>
Sporting		<ul style="list-style-type: none"> <li>■ a limited range of facilities which cater for competitive water sports</li> </ul>
Tourism		<ul style="list-style-type: none"> <li>■ features which attract a high proportion of interstate and international visitors</li> </ul>
Commercial		<ul style="list-style-type: none"> <li>■ services which may be made available to lake and pond visitors for a charge</li> </ul>
Flood Management		<ul style="list-style-type: none"> <li>■ lake and pond aspects that serve a flood management function</li> </ul>

\* For further information contact the Heritage Unit on 02 6207 7378



## FIVE. LAKE AND POND ECOLOGY AND WATER QUALITY

### Lakes and ponds as components of a highly integrated drainage system

The water quality and ecology of lakes and ponds is a reflection of their catchment and drainage context.

Changes in catchment land use or management practice, in the drainage type, or in flow retardation or pollutant interception measures, will impact on the pattern and form of water and pollutant loading on the lakes or ponds, modifying their water quality and ecology. The shape and size of the lake or pond will further modify the dominant water quality and ecological processes.

The identification of water quality goals or ecological objectives for lakes or ponds has implications for sustainable catchment land uses and management practices, or flow retardation or pollutant interception measures upstream.

Over and above their local provision of open space and landscape amenity and recreation values, lakes and ponds are key management components in respect to securing wider metropolitan flood and environmental protection objectives. They incorporate significant storage capacity for the retardation (detention) of major stormwater discharges, enabling flood protection to properties downstream. In addition, they enable the interception of urban stormwater pollutants, thereby protecting downstream waters.

The catchment land use and management practice, the drainage type, the flow retardation and pollutant interception practices, and lake or pond water quality and ecology are all interlinked, and must be considered as an integrated whole.

Clearly, the ability to deliver services to particular standards in respect to the environmental and use values of lakes and ponds is subject to the coordinated activities of a range of agencies having responsibilities for:

- catchment land use development, management and regulation, and
- the provision and maintenance of drainage and pollutant interception devices.

The services and agencies responsible are summarised in Table 8.1.

Water quality and ecological processes in urban lakes and ponds are affected by periodic storm event discharges which are high in litter, suspended solids, organic matter, nutrients and bacteria (refer Figure 5.1).

During stormwater discharges, there is rapid adsorption of nutrients, organic material, bacteria and toxicants onto surfaces of suspended solids, and their sedimentation under the flow detention conditions in ponds and lakes. Litter discharged in storm events may be trapped in lake or pond vegetation, detracting from aesthetic values, while litter trapped in sediments may impact on micro-fauna.

Following the storm event, there is a period of decomposition of sedimented organic material, depleting oxygen in bottom waters and sediments, and reducing some nutrients and toxicants to soluble forms, with their release back into the water column.

In the case of deep waters ( $> 2$  m), thermal stratification of waters during summer limit the rate of oxygen transfer through the water column to the sediments, exacerbating the sediment reducing conditions in the periods following storm events.

Nutrients released from the sediments are taken-up by algae.

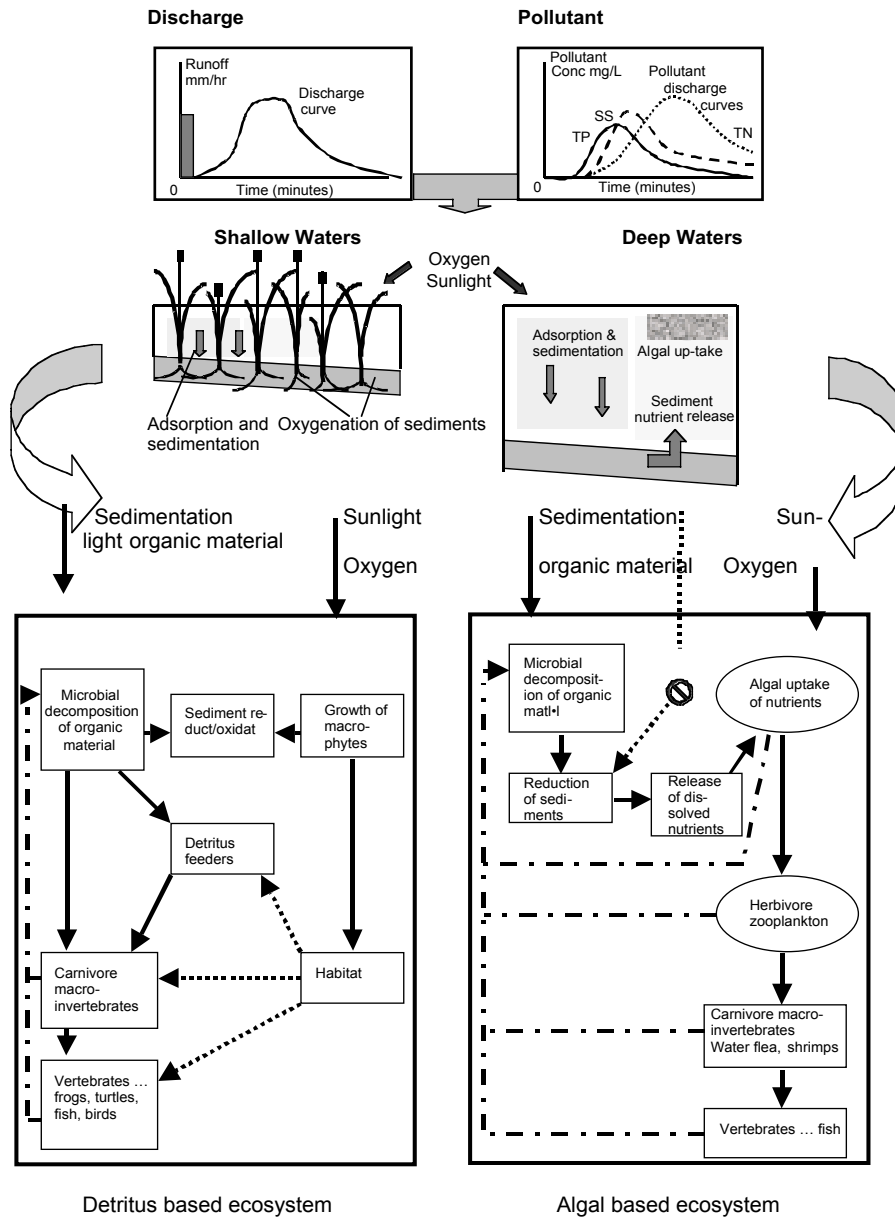
The period of growth following storm events may be followed by growth in the numbers of micro-animals (zooplankton) grazing the algae. In turn, the zooplankton provide the food source for the crustacea (water fleas and shrimps) and higher vertebrates (fish). Under conditions of reduced light (elevated suspended solids or turbidity) and poor mixing, the blue-green alga, with their flotation capability, are likely to be the dominant algal group.

In the case of ponds, subsequent storm event discharges may wash-out a significant proportion of algae and other remobilised pollutants, while elevated suspended solids in lakes will temporarily reduce the bio-availability of nutrients and limit light required for algal photosynthesis (temporary reduction in algal levels).

In the case of shallow waters ( $< 1.5$  m) with extensive emergent aquatic plants (macrophytes), the macrophytes enhance the sedimentation process, and by transferring oxygen through their stems to their root (rhizome) zones, offset the sediment reducing conditions and phosphorus remobilisation. The high rates of detritus accumulation in the sediments of these zones supports a range of organic decomposers and detritus feeders (protozoa, midges). In turn, crustacea (copepods, shrimps) and insect larvae graze on the decomposers and detritus feeders, and provide the food source for the higher vertebrates (frogs, turtles, aquatic birds and fish).

Biofilm may develop on the surfaces of macrophytes (epiphytes) and on the pond or wetland sediments (diatoms). Biofilm based systems occur in situations of low inflow velocities, low in suspended solids, with nutrients and organics in predominantly dissolved and colloidal forms.

Figure 5.1: Lake and pond water quality and ecological processes  
(Source: CRC for Freshwater Ecology)



The biofilm biologically takes up nutrients and fine organic colloids, transforms the organic material by enzyme processes, and transfers the nutrients to the sediments. Given the event nature of stormwater discharges, and the elevated level of suspended solids, this type of system is a minor component in the case of urban lakes and ponds. They may be observed in the higher water quality intermediate and downstream zones of the larger lakes during dry (few storm discharges) periods.

In view of the storm event driven nature of lake and pond water quality and ecology processes, the water quality and ecology of lakes and ponds is highly variable, and will reflect the long term climatic conditions, activities in the catchment, and in-lake ecological succession processes.

### Lake and pond water management zones

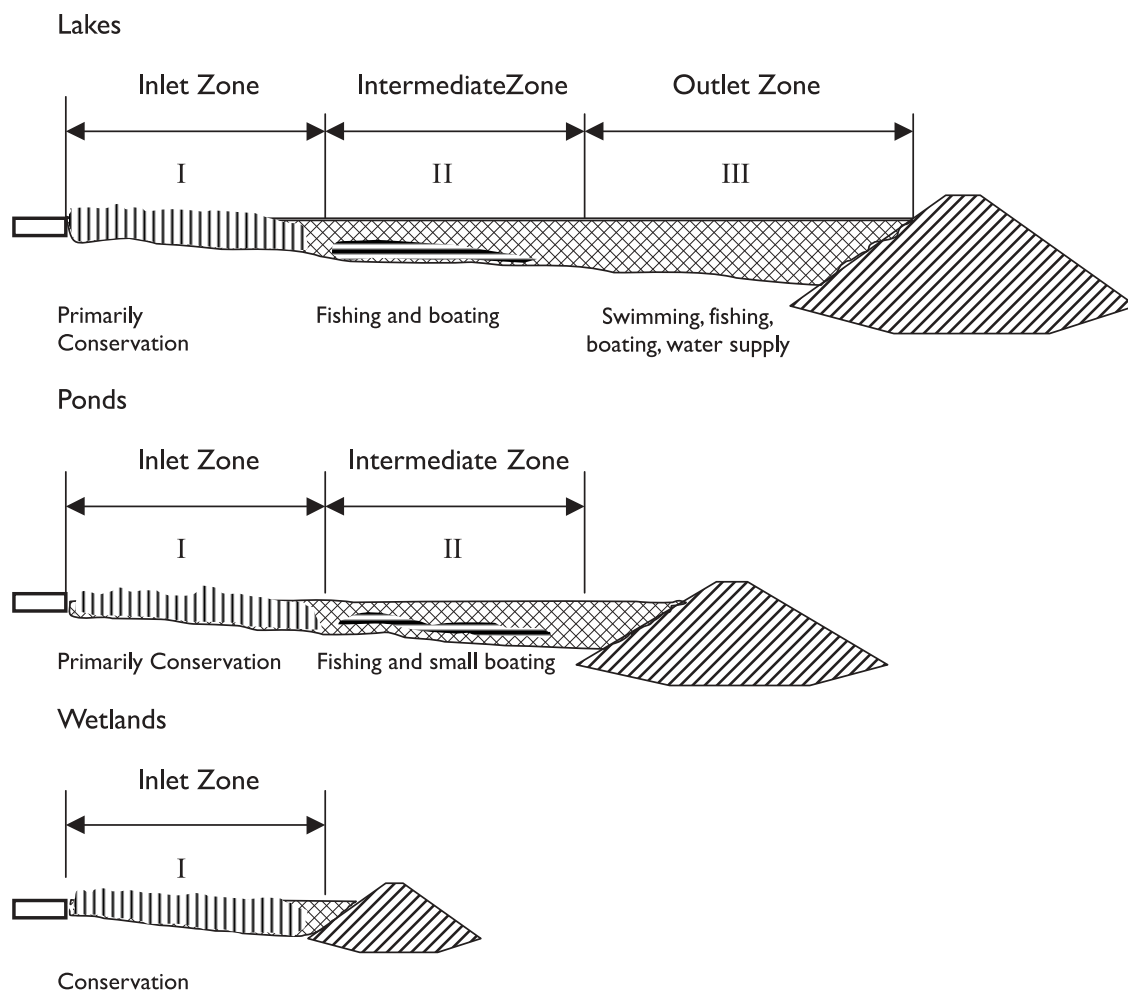
Monitoring of water quality and ecology through the ponds and lakes has identified a pattern of progressive water quality improvement longitudinally downstream as a result of these processes (refer to Figure 5.2), resulting in three distinct water management zones:

- **Water Management Zone I** (Inlet zone) is high in suspended solids, nutrients, organic material and bacteria. Typically, this zone comprises the shallow water – emergent aquatic plant ecosystems described above. It is a highly productive zone, sustaining high biomass of plants, macroinvertebrates, fish and birds. This zone is primarily managed for conservation purposes, and the water quality conditions encountered limit all body contact recreational activities. Intensive management of aquatic plants in this zone is critical to sustaining the water quality and ecology of downstream zones.
- **Water Management Zone II** (Intermediate zone) includes the edge of the macrophytes and clear water, with reduced (fine) levels of suspended material, nutrients and bacteria. It typically comprises extensive submerged macrophytes and epiphytic and planktonic algae. This submerged vegetation may limit boating activities, and prevailing water quality conditions may periodically exclude body contact recreational activities.
- **Water Management Zone III** (Outlet zone) is low in suspended solids, nutrients and bacteria, and low in planktonic algae. Typically, this zone comprises the deep water – planktonic algal ecosystems described above. This zone will accommodate a wide range of water-based recreational activities.

At times, under provisions of the *Lakes Act 1976*, water conditions such as algal blooms, faecal pollution, toxic spills etc will require an entire water body to be closed temporarily excluding body contact recreational activities. Within the intermediate and inlet zones described above, most edge (littoral) areas have emergent macrophytes, with a width of the order of 2 to 4 m. The littoral area exhibits many of the characteristics of the shallow extensive emergent macrophyte ecosystem described above. In this case, suspended solids and organic material (algae) is washed into the

macrophyte beds from the open waters by wave action, while runoff from the adjacent foreshore area discharges suspended solids, nutrients and organic material.

*Figure 5.2: Water management zones  
(Source: CRC for Freshwater Ecology)*



# part c.

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## MANAGEMENT OF LAKES AND PONDS

## six. OBJECTIVES AND STRATEGIES

The Territory Plan sets out the following broad objectives for the management of Canberra's urban lakes and ponds:

- a to protect and conserve the water quality and aquatic habitats of highly valued lakes, rivers and streams;
- b to make provision for a range of water uses and environment values which are compatible with the conservation values of the catchments;
- c to ensure that water and catchment land use are consistent with maintaining ecological sustainability and the conservation values of the catchments;
- d to ensure that the stream-flow and quality of discharges from the catchments are consistent with protection of environment values of downstream waters; and
- e to protect and conserve the water quality of ground-water resources of the ACT.

Within this policy framework, Table 6.1 sets out the specific management objectives for Canberra's urban lakes and ponds, together with suggested strategies for achieving them and related service delivery programs. These management objectives and strategies derive from the issues, values and objectives in Table 3.1.

*Table 6.1: Management objectives and strategies*

Management objectives	Strategies for meeting objectives
Provision of a range of quality recreation opportunities.	<ul style="list-style-type: none"> <li>■ Water quality and ecology based determination of sustainable uses and levels of use</li> <li>■ Provision of clear information on permissible, conditional and non-permissible uses, location, quantum, water quality and service standards.</li> <li>■ Establish a system of zoning (location, time) to separate potentially conflicting uses (accommodate a range of uses) and assess ecologically sustainable uses.</li> <li>■ Provision of access and other facilities enabling full enjoyment of scheduled uses. Augmentation or upgrade of facilities to accommodate recreation demands and use levels.</li> <li>■ Stocking of lakes with fish to maintain the recreational fishery.</li> </ul>
Provision and enhancement of landscape values.	<ul style="list-style-type: none"> <li>■ Assessment of existing qualities and enhancement opportunities.</li> <li>■ Consideration as part of development and maintenance programs</li> </ul>
Transparent, open and participatory processes	<ul style="list-style-type: none"> <li>■ Use of Management Plan development as a vehicle for community partnership in the development of programs and agreed uses and conditions of use.</li> <li>■ Provision of clear information on permissible, conditional and non-permissible uses.</li> </ul>
Flexibility to respond to emerging needs and issues	<ul style="list-style-type: none"> <li>■ Establishment of administrative procedures, supervision and monitoring programs to ensure compliance with agreed uses and conditions of use.</li> </ul>

*Table 6.1 continued*

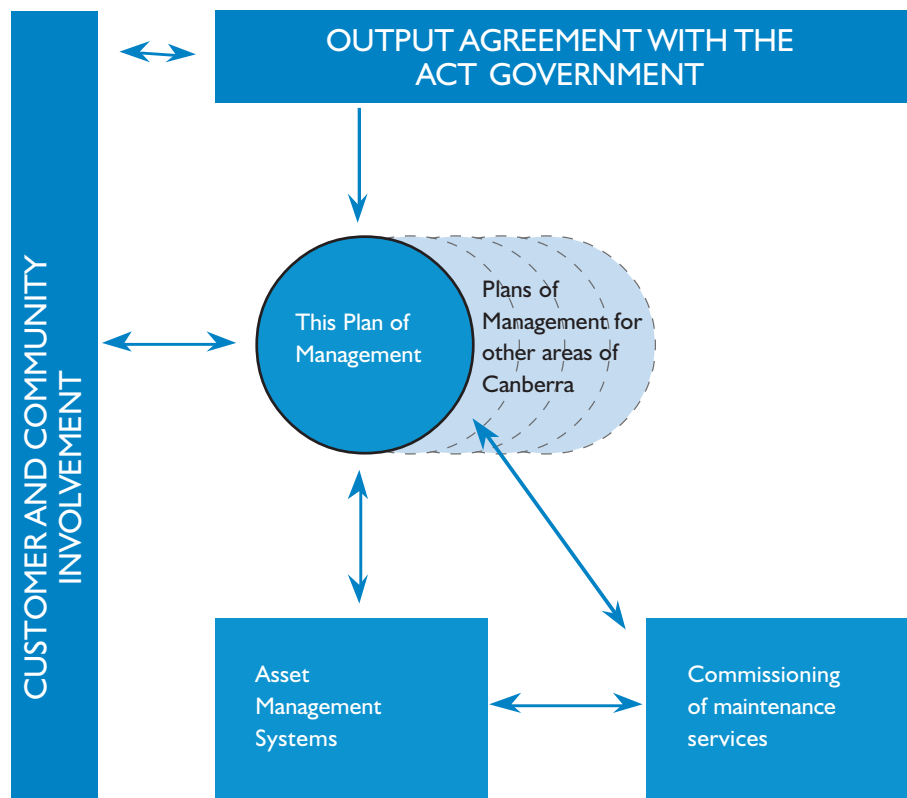
Management objectives (cont)	Strategies for meeting objectives (cont)
Safe and convenient access for all permissible users.	<ul style="list-style-type: none"> <li>Established processes for new use applications and review of allocation of resource across competing groups.</li> <li>Assessment of access in relation to a comprehensive range of community groups.</li> </ul>
Ecologically sustainable use and management.	<ul style="list-style-type: none"> <li>Ecological based zoning and consideration of sustainable uses.</li> <li>Use of conservation plans for select areas and/or species.</li> </ul>
Urban waterway restoration.	<ul style="list-style-type: none"> <li>Capture opportunities for conservation of aquatic ecology associated with lakes and ponds.</li> </ul>
Protection / restoration of water quality.	<ul style="list-style-type: none"> <li>Catchment land use and development controls, pollution control.</li> <li>Infrastructure provision and maintenance.</li> <li>Maintenance of water quality zones through lakes and ponds.</li> </ul>
Limit potential risks to acceptable levels.	<ul style="list-style-type: none"> <li>Risk/hazard inspections and assessments.</li> <li>Adoption of designs minimising risk.</li> <li>Exclusion from hazard areas, provision of information regarding hazards, use of legal deterrents, education programs.</li> <li>Contingency plans for major hazards.</li> </ul>
Partnership with the community.	<ul style="list-style-type: none"> <li>Seek joint projects with community recreation, lake, pond, wetland, land care, waterway groups and clubs.</li> <li>Encourage and support 'Adopt-a-Wetland' groups.</li> </ul>
Ready availability of information	<ul style="list-style-type: none"> <li>Maintain reference material on each facility.</li> <li>Development of school curriculum material, provision of guidelines and kits for participating community groups, eg Ginninderra Catchment Group Education Project.</li> </ul>
Affordability of facilities and services	<ul style="list-style-type: none"> <li>Provision of facilities and level of services guided by economic and social benefit/cost analysis. Analysis of service provision costs by use sector.</li> </ul>
Effective coordination	<ul style="list-style-type: none"> <li>Integration of lake and pond development and management with the wider catchment land use and management.</li> <li>Coordination of community and agency programs.</li> <li>Agreed joint budget processes.</li> <li>Need for agreed budget directions in relation to interdependent areas of activity.</li> </ul>
Effective management	<ul style="list-style-type: none"> <li>Description of the nature, value, condition and maintenance requirements of the assets.</li> <li>Ongoing maintenance program to maintain assets in serviceable condition.</li> <li>Augment or upgrade of facilities to accommodate growth in demand or level of use.</li> </ul>
Efficient service provision.	<ul style="list-style-type: none"> <li>Adoption of market based approaches where feasible.</li> <li>Identification of potential commercial based use sectors.</li> <li>Tender based service contracts wherever feasible. Monitor cost of service delivery against benchmarks.</li> </ul>
Accountability	<ul style="list-style-type: none"> <li>Establish performance monitoring programs and annual reporting against performance criteria.</li> </ul>



## seven. MANAGEMENT GUIDELINES

This Plan of Management is one of a number of regional Plans of Management which, when taken together, will cover the whole of urban Canberra (refer Figure 7.1). The Plans of Management are the key documents that guide all planning and management activities in all urban open space, lakes and ponds.

*Figure 7.1: How this Plan relates to other planning and management systems.*



To implement the objectives of the Territory Plan, ACT Government has developed a number of management guidelines. These guidelines detail the position taken by ACT Government in relation to particular issues; they guide management processes and are reflected in the contract specifications prepared for service providers.

In order to manage Canberra's urban lakes and ponds in a consistent way, management guidelines are being developed to indicate clearly how particular matters will be managed. The matters covered by the current management guidelines are listed in Table 7.2 and are presented in summary form in Appendix d.

As the management guidelines will be updated from time to time, it is advisable to contact Canberra Urban Parks and Places (phone 02 6207 2500) if more detailed information is required.

*Table 7.2: A list of existing management guidelines which apply to Canberra's urban lakes and ponds.*

Management Guideline	Refer page...
Aquatic Macrophyte Management	78
Commercial Activities on Lakes and Ponds	78
Dogs	78
Feral Species Control	79
Fisheries Management	79
Litter and Rubbish Management	79
Major Events on Lakes	79
Public Safety (People and Property)	79
Sports and Recreation Management	80
Water Quality Monitoring	80

### eight. SERVICE DELIVERY

To achieve the management objectives identified in Chapter 6, services will be provided in four key areas: aquatic plant management; litter removal and cleaning; asset management; and recreation and sporting use. The aim being to provide a cost effective delivery of these services while ensuring achievement of the overall vision and objectives.

Figure 8.1 summarises the services to be provided.

*Table 8.1: Services to be provided regarding Canberra's urban lakes and ponds*

Service	Service Responsibility
<b>Activities and Uses</b>	
Regulation of recreation and sporting use	Environment ACT
Lakeshore restoration (Urban Landcare)	CUPP
Lakes information services (website, brochures)	CUPP
Monitoring visitor numbers and visitor satisfaction	CUPP
Management policies and community involvement	CUPP, Environment ACT, PALM
Asset management and provision	CUPP
Wildlife management, feral animal control	Environment ACT, CUPP
Dams/weirs safety inspections	Roads and Stormwater
Emergency contingency plans	ACT Emergency Services
<b>Aquatic Plant Management</b>	
Aquatic plant/habitat management	CUPP
Aquatic plant control at beaches etc, feral plant removal	CUPP
<b>Water Quality</b>	
Litter removal, cleaning	CUPP
Blue-green algae monitoring	CUPP and Environment ACT
Bacteria monitoring	CUPP, HPS
Water quality monitoring	Environment ACT
Water quality compliance	Environment ACT
Water pollution monitoring	Environment ACT
Pollution control from non-point sources	PALM, Environment ACT
Pollution control from point sources	Environment ACT
Gross pollutant trap maintenance and cleaning	Roads and Stormwater
Water quantity level monitoring	Roads and Stormwater
<b>Fishery</b>	
Fish stocking of lakes	Environment ACT

**Note:** CUPP = Canberra Urban Parks and Places  
HPS = Health Protection Service  
PALM = Planning and Land Management

*nine.* **OVERALL LAKE AND POND MANAGEMENT**

Canberra's urban lakes and ponds will be developed to cater for an appropriate range of the waterbased recreation and sporting needs of existing and future communities. To ensure as wide a range of quality recreational and sporting opportunities as possible, as envisaged by the vision statement, it will be necessary for parts of the lake and pond system to be developed and managed differently. Ideally, management should reflect the inherent values and functions of each individual lake and pond, and respond to the needs of surrounding and regional communities.

### Facility Provision

Initiatives are improvements or modifications that may be proposed to enhance the quality or use of Canberra's urban lakes and ponds. Various initiatives are proposed as a part of this Management Plan, but will be subject to funding. These initiatives have been categorised into a number of broad headings, as identified in Table 9.1, and would normally apply within, or adjacent to, the indicated water management zone.

Table 9.1: Key to facility icons

Initiative	Description	Water Management Zone		
		I	II	III
	Sandy Beaches			✓
	Water Access Points / Ramps			✓
	Swimming Areas and Pontoons			✓
	Jetty		✓	✓
LAKESHORE		Associated Lakeshore Area		
		I	II	III
	Car Parking Facilities			✓
	Pedestrian/Cycle Path System	✓	✓	✓
	Disabled Facilities			✓
	Landscaping	✓	✓	✓
	Toilets			✓
	Barbecue Facilities (eg barbecues, drinking fountains)		✓	✓
	Picnic Facilities (eg shelters, tables, seats)		✓	✓
	Play Facilities (mainly 2-9 years)		✓	✓
	Adventure Play Facilities (teenagers)			✓
	Club House			✓
Key		✓ indicates facility would normally be provided, subject to funding.		

### Urban Lake and Pond Use

Under provisions of the *Land (Planning and Environment Act (1991))*, use of Canberra's urban lakes and ponds is determined by two Acts. Section C2.3 of the Territory Plan provides the policy framework for managing the use of Canberra's urban lakes and ponds. The *Lakes Act 1976* provides the administrative mechanisms by which the above policies can be applied.

Table 9.2 summarises the proposed situation regarding use of each of the lakes and ponds, according to the water management zones present.

Table 9.2: Proposed use of Canberra's urban lakes and ponds

Locality		Belconnen						Gungahlin			
Lake or Pond		Dunlop Pond I	Dunlop Pond 2	Lake Ginninderra			West Belconnen Pond	Yerrabi Pond		Gungahlin Pond	
Water Management Zones		I	I	I	II	III	I	I	II	I	II
Informal Recreation Activities											
Fishing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windsurfing		-	-	✗	✓	✓	✗	✗	✓	✗	✓
Sailing		-	-	✗	✓	✓	-	-	-	-	-
Jet skiing		✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Model boating		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Recreational boating (non-motorised)		-	-	✓	✓	✓	✓	✓	✓	✓	✓
Recreational boating (steam and electric)		✗	✗	⊠	⊠	⊠	✗	-	-	-	-
Recreational boating (petroleum driven)		✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Swimming at designated beaches		-	-	-	-	✓	-	-	-	-	-
Water skiing (social)		✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Scuba diving (training)		-	-	-	-	✓	-	-	-	-	-
Sport (Competitive) Activities											
Wind surfing regattas		-	-	⊠	⊠	⊠	-	⊠	⊠	⊠	⊠
Sailing regattas		-	-	⊠	⊠	⊠	-	-	-	-	-
Rowing regattas		-	-	⊠	⊠	⊠	-	-	-	-	-
Triathlon swim course		-	-	⊠	⊠	⊠	-	-	-	-	-
Water skiing (competitive)		✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Support, Management and Emergency Activities											
Motorised sport support or training craft		-	-	⊠	⊠	⊠	-	-	-	-	-
Motorised research craft		⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
Motorised emergency and patrol craft		-	-	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
Special Events and Commercial Activities											
Special Events		-	-	⊠	⊠	⊠	-	⊠	⊠	⊠	⊠
Commercial activities		-	-	⊠	⊠	⊠	-	⊠	⊠	⊠	⊠
Model boat regattas		⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
Key to symbols	Activities		Water Management Zones								
	✓	Permitted	I			Inlet Zone					
	⊠	Subject to permit	II			Intermediate Zone					
	✗	Not permitted	III			Outlet Zone					
	-	Not relevant/appropriate									

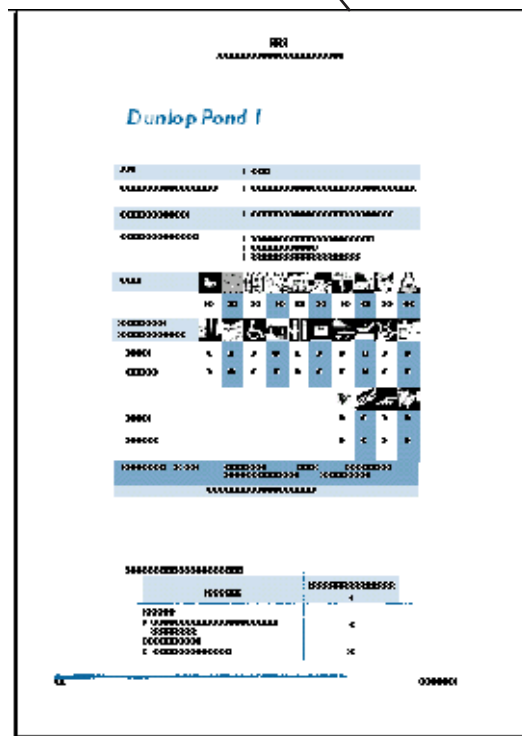
Table 9.2 continued

Locality			Tuggeranong									Inner Canberra	
Lake or Pond			Point Hut Pond		Gordon Pond	Isabella Pond	Lower Stranger Pond	Upper Stranger Pond	Tuggeranong Weir	Lake Tuggeranong		Molonglo Reach	
Water Management Zones			I	II	I	I	I	I	I	I	II	III	N/A
Informal Recreation Activities													
Fishing			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windsurfing			✗	✓	-	✗	✗	✗	✗	✗	✓	✓	✗
Sailing			✗	✓	-	✗	✗	✗	✗	✗	✓	✓	✗
Jet skiing			✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	☒
Model boating			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Recreational boating (non-motorised)			✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
Recreational boating (steam and electric)			✗	✗	✗	✗	✗	✗	✗	☒	☒	☒	☒
Recreational boating (petroleum driven)			✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	☒
Swimming at designated beaches			-	-	-	-	-	-	-	-	-	✓	-
Water skiing (social)			✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	☒
Scuba diving (training)			-	-	-	-	-	-	-	-	-	✓	-
Sport (Competitive) Activities													
Wind surfing regattas			-	-	-	-	-	-	-	☒	☒	☒	-
Sailing regattas			-	-	-	-	-	-	-	☒	☒	☒	-
Rowing regattas			-	-	-	-	-	-	-	☒	☒	☒	-
Triathlon swim course			-	-	-	-	-	-	-	☒	☒	☒	-
Water skiing (competitive)			✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	☒
Support, Management and Emergency Activities													
Motorised sport support or training craft			-	-	-	-	-	-	-	☒	☒	☒	☒
Motorised and research craft			☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Motorised emergency and patrol craft			☒	-	☒	☒	☒	☒	☒	☒	☒	☒	☒
Special Events and Commercial Activities													
Special Events			☒	☒	-	☒	☒	☒	☒	☒	☒	☒	☒
Commercial activities			☒	☒	-	☒	☒	☒	☒	☒	☒	☒	☒
Model boat regattas			☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	-
Key to symbols	Activities							Water Management Zones					
	✓	Permitted						I	Inlet Zone				
	☒	Subject to permit						II	Intermediate Zone				
	✗	Not permitted						III	Outlet Zone				
	-	Not relevant/appropriate											

## ten. MANAGEMENT OF SPECIFIC LAKES AND PONDS

The information regarding each urban lake and pond covered by this Plan is presented in the following format:

























- Lake or pond title
- Lake or pond area
- Prime management purposes
- Legal status
- General characteristics
- Lake or pond values
- Proposed initiatives
- Water uses



A plan of each lake or pond



## Dunlop Pond I

<b>Area</b>	• 0.7 ha									
<b>Prime Management Purposes</b>	• Water quality and flood management, informal recreation									
<b>Tenure / Legal Status</b>	• Public Land (Water Feature) in the Territory Plan									
<b>General Characteristics</b>	• Attracts visitors from adjacent urban areas • Informal recreation use • Managed and maintained infrequently									
<b>Values</b>										
	●	◐	◑	○	○	◐	○	○	○	◐
<b>Improvements (Lakeshore)</b>										
Existing	X	X	X	✓	X	X	X	X	X	X
Proposed	X	✓	X	✓	X	X	X	X	X	X
<b>Improvements (Water)</b>										
Existing							X	X	X	X
Proposed							X	X	X	X
<b>Symbols Key</b>	● High	◐ Moderate	◑ Low	○ Not Known	✓ Likely to be provided	X Not provided				
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone
	I
<b>Permitted</b> <ul style="list-style-type: none"> <li>• Fishing, model boating.</li> </ul>	✓



### Canberra Urban Parks and Places

Draft Plan of Management  
Urban Lakes and Ponds

Dunlop Pond 1  
Dunlop

### Legend

Water Management Zone I (Inlet)  
 Water Management Zone II (Intermediate)  
 Water Management Zone III (Outlet)

20 0 20 40 60 80 Metres

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 ACT Department of Urban Services  
 Canberra Urban Parks and Places  
 GIS Unit



































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 change.

Date: June 1999



## Dunlop Pond 2

Area	• 0.7 ha									
Prime Management Purposes	• Water quality and flood management, informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	• Attracts visitors from adjacent urban areas • Informal recreation use • Managed and maintained infrequently									
Values										
										
Improvements (Lakeshore)										
Existing	X	X	X	✓	X	X	X	X	X	X
Proposed	X	✓	X	✓	X	X	X	X	X	X
Improvements (Water)										
Existing							X	X	X	X
Proposed							X	X	X	X
Symbols Key	● High      ○ Moderate      ○ Low      ○ Not Known ✓ Likely to be provided      X Not provided									
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone
	I
<b>Permitted</b> <ul style="list-style-type: none"> <li>• Fishing, model boating</li> </ul>	✓



**Canberra Urban Parks  
and Places**

Draft Plan of Management  
Urban Lakes and Ponds

Dunlop Pond 2  
Dunlop

**Legend**

Water Management Zone I (Inlet)  
 Water Management Zone II (Intermediate)  
 Water Management Zone III (Outlet)

20 0 20 40 60 80 Metres

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 Canberra Urban Parks and Places  
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 this map is subject to  
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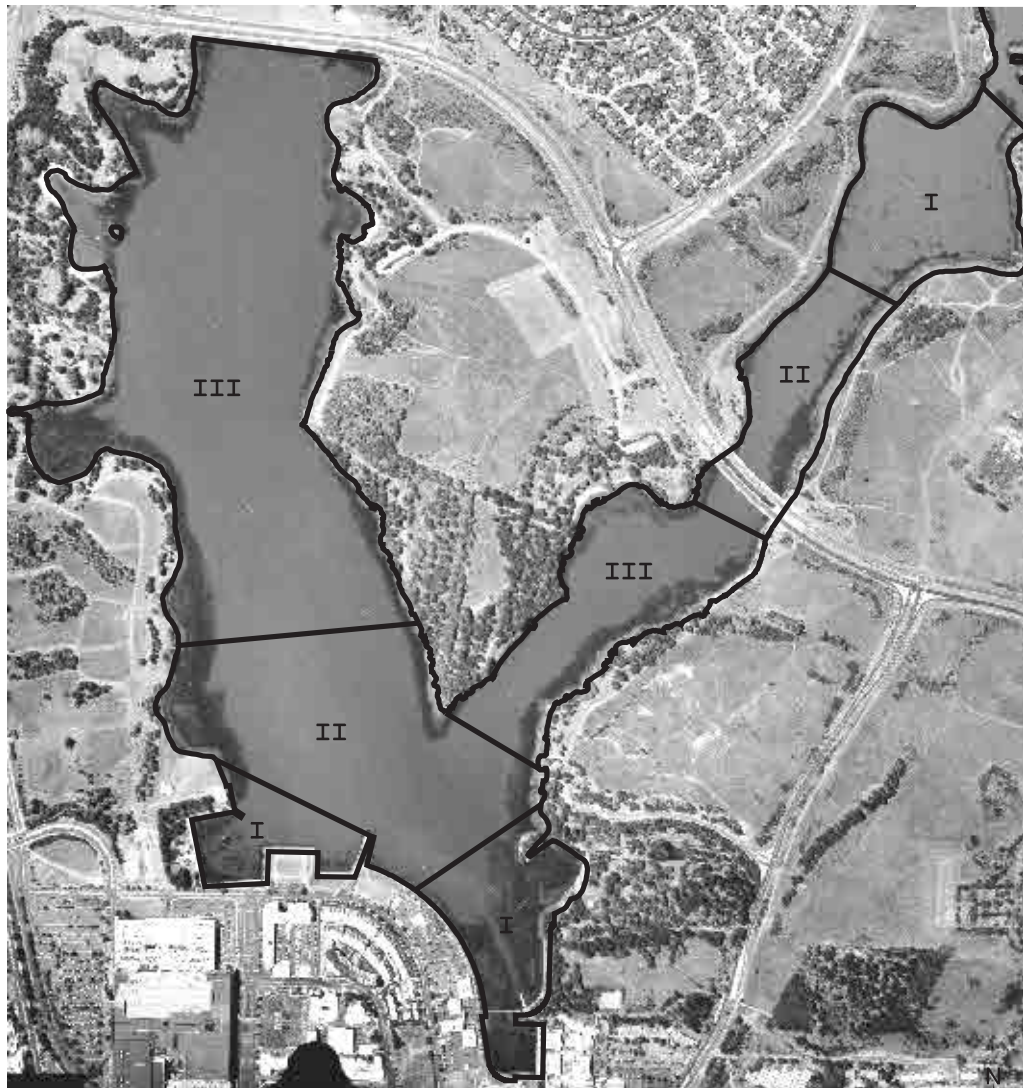
## Lake Ginninderra

<b>Area</b>	• 105 ha
<b>Prime Management Purposes</b>	• Recreation / conservation / sport
<b>Tenure / Legal Status</b>	• Public Land (Lake) in the Territory Plan
<b>General Characteristics</b>	<ul style="list-style-type: none"> <li>• Attracts visitors from Belconnen and beyond, because of the outstanding features, high quality facilities and good accessibility</li> <li>• Receives intensive levels of use</li> <li>• To be managed and maintained to a high standard</li> <li>• Stocked with fish under the Fish Stocking Plan</li> </ul>
<b>Values</b>	
<b>Improvements (Lakeshore)</b>	
Existing	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Proposed	✓ ✓ X ✓ X X X X X X
<b>Improvements (Water)</b>	
Existing	✓ ✓ ✓ ✓
Proposed	X X X X
Note: There may be additional improvements as a result of the Lake Ginninderra Masterplan.	
<b>Symbols Key</b>	● High      ◐ Moderate      ◑ Low      ○ Not Known ✓ Likely to be provided      X Not provided
For Key to Icons, refer pages 15 and 28	

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Lake Uses	Water Management Zone		
	I	II	III
<b>Permitted</b>			
• Fishing, recreational boating (non-motorised)	✓	✓	✓
• Windsurfing, sailing		✓	✓
• Swimming, scuba diving (training)			✓
<b>Subject to Permit</b>			
• Special events, commercial activities, model boat regattas, recreational boating (steam and electric), motorised sport support or training craft.	✓	✓	✓
• Motorised research craft.	✓	✓	✓





## Canberra Urban Parks and Places

Draft Plan of Management  
Urban Lakes and Ponds

Lake Ginninderra  
Belconnen

### Legend

Water Management Zone I (Inlet)  
Water Management Zone II (Intermediate)  
Water Management Zone III (Outlet)

100 0 100 200 Metres

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Canberra Urban Parks and Places  
GIS Unit









































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change.

Date: June 1999

**URBAN**  
SERVICES

## West Belconnen Pond

<b>Area</b>	• 9.9 ha									
<b>Prime Management Purposes</b>	• Water quality management, informal recreation									
<b>Tenure / Legal Status</b>	• Public Land (Water Feature) in the Territory Plan									
<b>General Characteristics</b>	• Attracts visitors from adjacent urban areas • Informal recreation use • Managed and maintained infrequently									
<b>Values</b>										
										
<b>Improvements (Lakeshore)</b>										
Existing	X	X	X	X	X	X	X	X	X	X
Proposed	X	✓	X	✓	X	X	X	X	X	X
<b>Improvements (Water)</b>										
Existing							X	X	X	X
Proposed							X	X	X	X
<b>Symbols Key</b>	 High	 Moderate	 Low	 Not Known	 Likely to be provided	 Not provided				
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone
	I
<b>Permitted</b>	
• Fishing, model boating	✓
<b>Subject to Permit</b>	
• Motorised research craft	✓



**Canberra Urban Parks  
and Places**

Draft Plan of Management  
Urban Lakes and Ponds

West Belconnen Pond  
Dunlop

**Legend**

Water Management Zone I (Inlet)  
 Water Management Zone II (Intermediate)  
 Water Management Zone III (Outlet)

50 0 50 100 Metres

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 Canberra Urban Parks and Places  
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## Yerrabi Pond

<b>Area</b>	• 26.4 ha									
<b>Prime Management Purposes</b>	• Water quality management / informal recreation / sport / conservation									
<b>Tenure / Legal Status</b>	• Public Land (Water Feature) in the Territory Plan									
<b>General Characteristics</b>	<ul style="list-style-type: none"> <li>• Attracts visitors from adjacent suburbs and Gungahlin because of quality facilities and good accessibility</li> <li>• Receives moderate levels of use which will increase over time</li> <li>• To be managed and maintained to a high standard</li> <li>• Stocked with fish under the Fish Stocking Plan</li> </ul>									
<b>Values</b>										
	●	●	●	●	●	○	○	○	○	○
<b>Improvements (Lakeshore)</b>										
Existing	X	X	X	✓	✓	✓	✓	✓	✓	X
Proposed	X	✓	X	✓	X	X	X	X	X	X
<b>Improvements (Water)</b>										
Existing							X	X	X	X
Proposed							X	X	X	X
<b>Symbols Key</b> ● High   ● Moderate   ● Low   ○ Not Known ✓ Likely to be provided   X Not provided										
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone	
	I	II
<b>Permitted</b>		
• Fishing, model boating, recreational boating (non-motorised),	✓	✓
• Windsurfing		✓
<b>Subject to Permit</b>		
• Motorised research craft	✓	✓



**Canberra Urban Parks  
and Places**

Draft Plan of Management  
Urban Lakes and Ponds

Yerrabi Pond  
Amaroo

**Legend**

Water Management Zone I (Inlet)  
 Water Management Zone II (Intermediate)  
 Water Management Zone III (Outlet)

100 0 100 200 Metres

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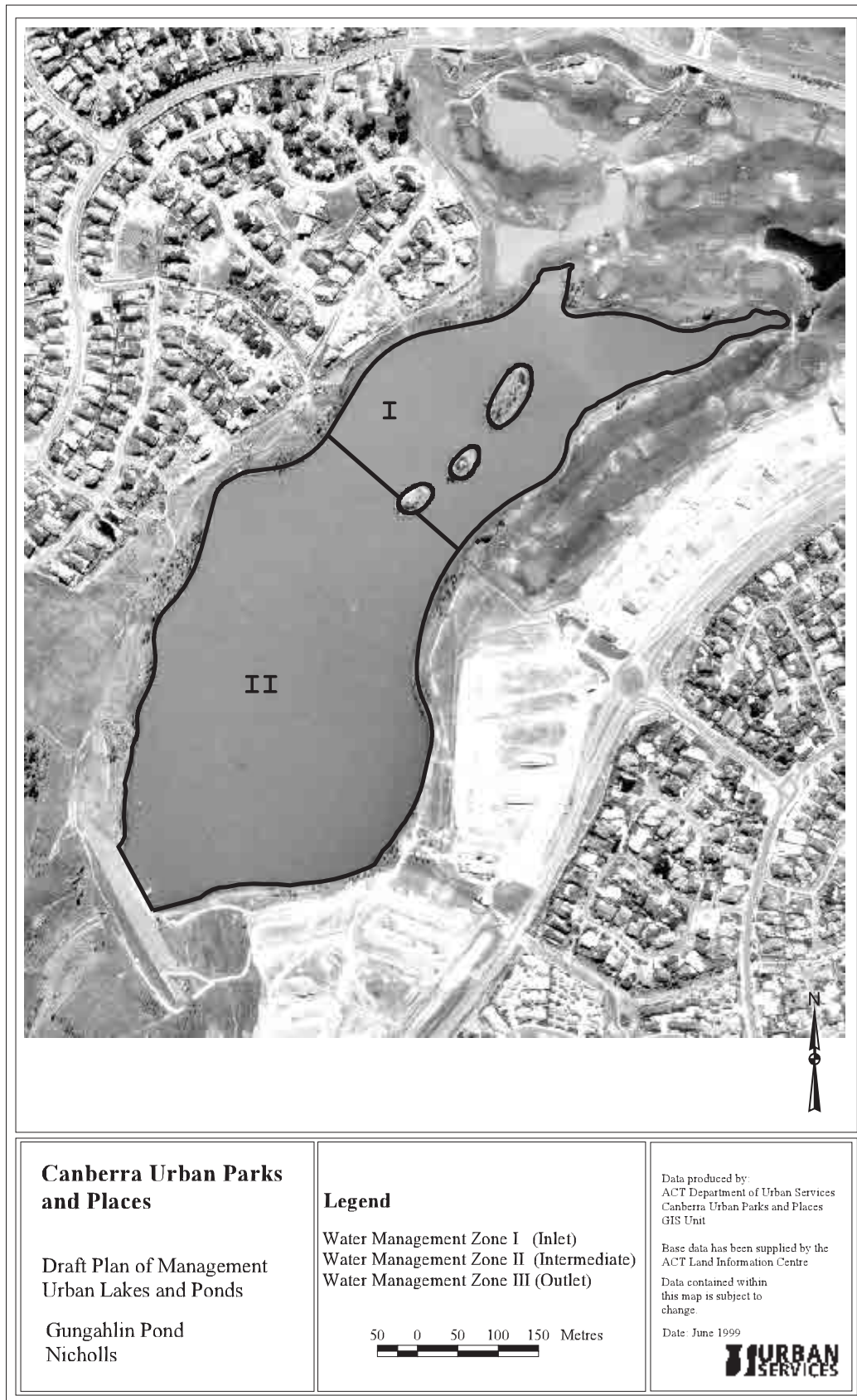


## Gungahlin Pond



































Area	• 23.8 ha									
Prime Management Purposes	• Water quality management / informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	<ul style="list-style-type: none"><li>• Attracts visitors from adjacent suburbs because of quality facilities and good accessibility</li><li>• Receives moderate levels of use</li><li>• To be managed and maintained to a appropriate standard</li><li>• Stocked with fish under the Fish Stocking Plan</li></ul>									
Values										
										
Improvements (Lakeshore)										
Existing	X	✓	X	✓	X	X	X	X	X	X
Proposed	X	✓	X	✓	X	X	X	X	X	X
Improvements (Water)										
Existing							X	X	X	X
Proposed							X	X	X	X
Symbols Key	● High	◐ Moderate	◑ Low	○ Not Known						
	✓ Likely to be provided			X Not provided						
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone	
	I	II
<b>Permitted</b>		
• Fishing, model boating, recreational boating (non-motorised).	✓	✓
• Wind surfing.		✓
<b>Subject to Permit</b>		
• Motorised research craft	✓	✓



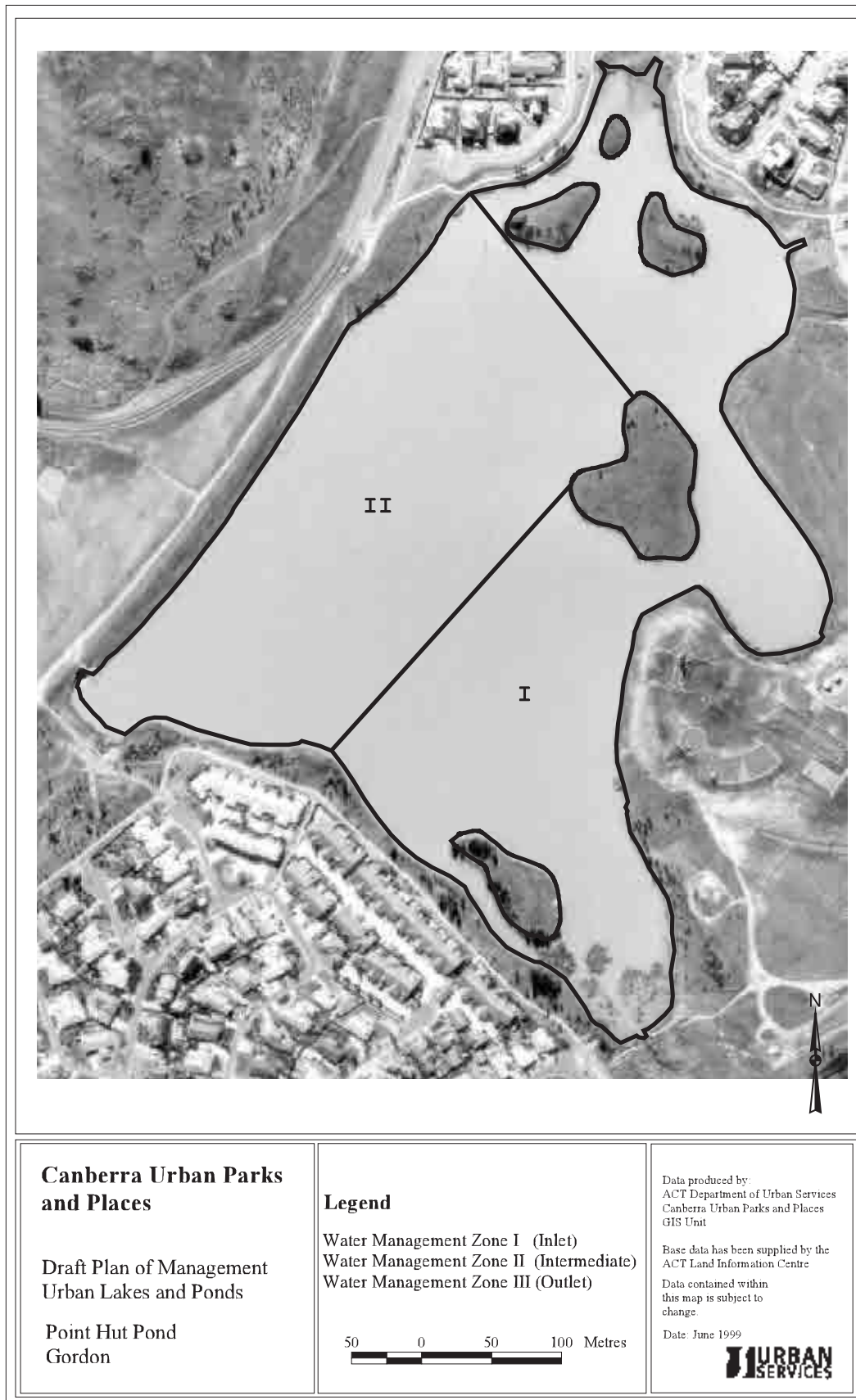
## Point Hut Pond

Area	• 16.7 ha									
Prime Management Purposes	• Water quality management / informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	<ul style="list-style-type: none"><li>• Attracts majority of visitors from adjacent suburbs and Tuggeranong because of quality facilities and good accessibility</li><li>• Receives low levels of water use, but expected to increase in time</li><li>• To be managed and maintained to a high standard</li></ul>									
Values										
										
Improvements (Lakeshore)										
Existing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Proposed	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
Improvements (Water)										
Existing							✗	✗	✗	✗
Proposed							✗	✗	✗	✗
Symbols Key	<div>● High</div> <div>○ Moderate</div> <div>○ Low</div> <div>○ Not Known</div> <div>✓ Likely to be provided</div> <div>✗ Not provided</div>									
For Key to Icons, refer pages 15 and 28										



































**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone	
	I	II
<b>Permitted</b>		
• Fishing, model boating, recreational boating (non-motorised).	✓	✓
• Wind surfing.		✓
<b>Subject to Permit</b>		
• Motorised research craft	✓	✓





## Gordon Pond

Area	• 0.1 ha									
Prime Management Purposes	• Water quality management, informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	• Attracts visitors from adjacent suburbs • Receives low levels of use • Managed and maintained infrequently									
Values										
										
Improvements (Lakeshore)										
Existing	X	✓	X	✓	X	X	X	X	X	X
Proposed	X	X	X	✓	X	X	X	X	X	X
Improvements (Water)										
Existing							X	X	X	X
Proposed							X	X	X	X
Symbols Key	● High	◐ Moderate	◑ Low	○ Not Known	✓ Likely to be provided	X Not provided				
For Key to Icons, refer pages 15 and 28										



































**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone
	I
<b>Permitted</b> <ul style="list-style-type: none"> <li>• Fishing, model boating.</li> </ul>	✓





## Isabella Pond

<b>Area</b>	• 5.7 ha									
<b>Prime Management Purposes</b>	• Water quality management/ informal recreation									
<b>Tenure / Legal Status</b>	• Public Land (Water Feature) in the Territory Plan									
<b>General Characteristics</b>	• Attracts visitors from adjacent suburbs • Receives low levels of use • To be managed and maintained infrequently									
<b>Values</b>										
										
<b>Improvements (Lakeshore)</b>										
Existing	X	✓	X	✓	X	X	X	X	X	X
Proposed	X	X	X	X	X	X	X	X	X	X
<b>Improvements (Water)</b>										
Existing							X	X	X	X
Proposed							X	X	X	X
<b>Symbols Key</b>	● High	○ Moderate	○ Low	○ Not Known	✓ Likely to be provided	X Not provided				
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone
	I
<b>Permitted</b>	
• Fishing, model boating, recreational boating (non-motorised)	✓
<b>Subject to Permit</b>	
• Motorised research craft	✓



**Canberra Urban Parks  
and Places**

Draft Plan of Management  
Urban Lakes and Ponds

Isabella Pond  
Monash

**Legend**

Water Management Zone I (Inlet)  
 Water Management Zone II (Intermediate)  
 Water Management Zone III (Outlet)

40 0 40 80 120 Metres

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













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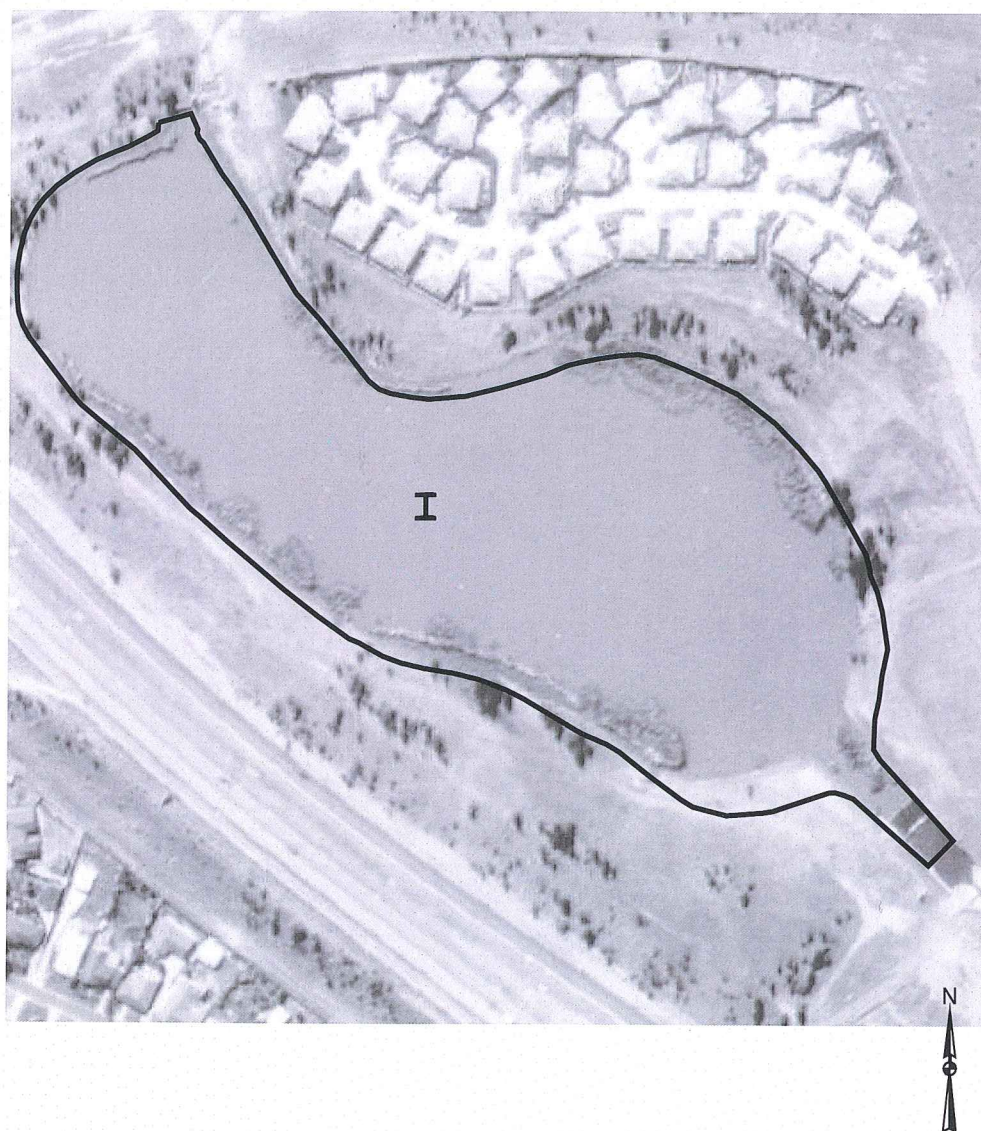
## Upper Stranger Pond

Area	• 4.4 ha									
Prime Management Purposes	• Water quality management, informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	<ul style="list-style-type: none"><li>• Attracts visitors from adjacent suburbs</li><li>• Receives low levels of use</li><li>• To be managed and maintained infrequently</li></ul>									
Values										
	◐	◑	○	◑	◐	◑	○	◑	●	◐
Improvements (Lakeshore)										
Existing	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
Proposed	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
Improvements (Water)										
Existing							✗	✗	✗	✗
Proposed							✗	✗	✗	✗
Symbols Key	● High	◐ Moderate	◑ Low	○ Not Known	✓ Likely to be provided	✗ Not provided				
For Key to Icons, refer pages 15 and 28										

Permitted activities (refer Table 9.2 for activities which are not permitted)

Pond Uses	Water Management Zone
	I
<b>Permitted</b>	
• Fishing, model boating, recreational boating (non-motorised)	✓
<b>Subject to Permit</b>	
• Motorised research craft	✓





**Canberra Urban Parks  
and Places**

Draft Plan of Management  
Urban Lakes and Ponds

Upper Stranger Pond  
Isabella Plains

**Legend**

Water Management Zone I (Inlet)  
Water Management Zone II (Intermediate)  
Water Management Zone III (Outlet)

25 0 25 50 Metres

























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## Lower Stranger Pond

Area	• 4.1 ha									
Prime Management Purposes	• Water quality management / informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	• Attracts visitors from adjacent suburbs • Receives low levels of use • To be managed and maintained infrequently									
Values										
	◐	◑	●	○	○	◐	○	○	○	◐
Improvements (Lakeshore)										
Existing	X	X	X	✓	X	X	X	X	X	X
Proposed	X	X	X	✓	X	X	X	X	X	X
Improvements (Water)										
Existing							X	X	X	X
Proposed							X	X	X	X
Symbols Key	● High	◐ Moderate	◑ Low	○ Not Known						
	✓ Likely to be provided			X Not provided						
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Pond Uses	Water Management Zone
	<b>I</b>
<b>Permitted</b>	
• Fishing, model boating, recreational boating (non-motorised)	✓
<b>Subject to Permit</b>	
• Motorised research craft	✓



**Canberra Urban Parks  
and Places**

Draft Plan of Management  
Urban Lakes and Ponds

Lower Stranger Pond  
Bonython

**Legend**

Water Management Zone I (Inlet)  
 Water Management Zone II (Intermediate)  
 Water Management Zone III (Outlet)

50 0 50 100 Metres

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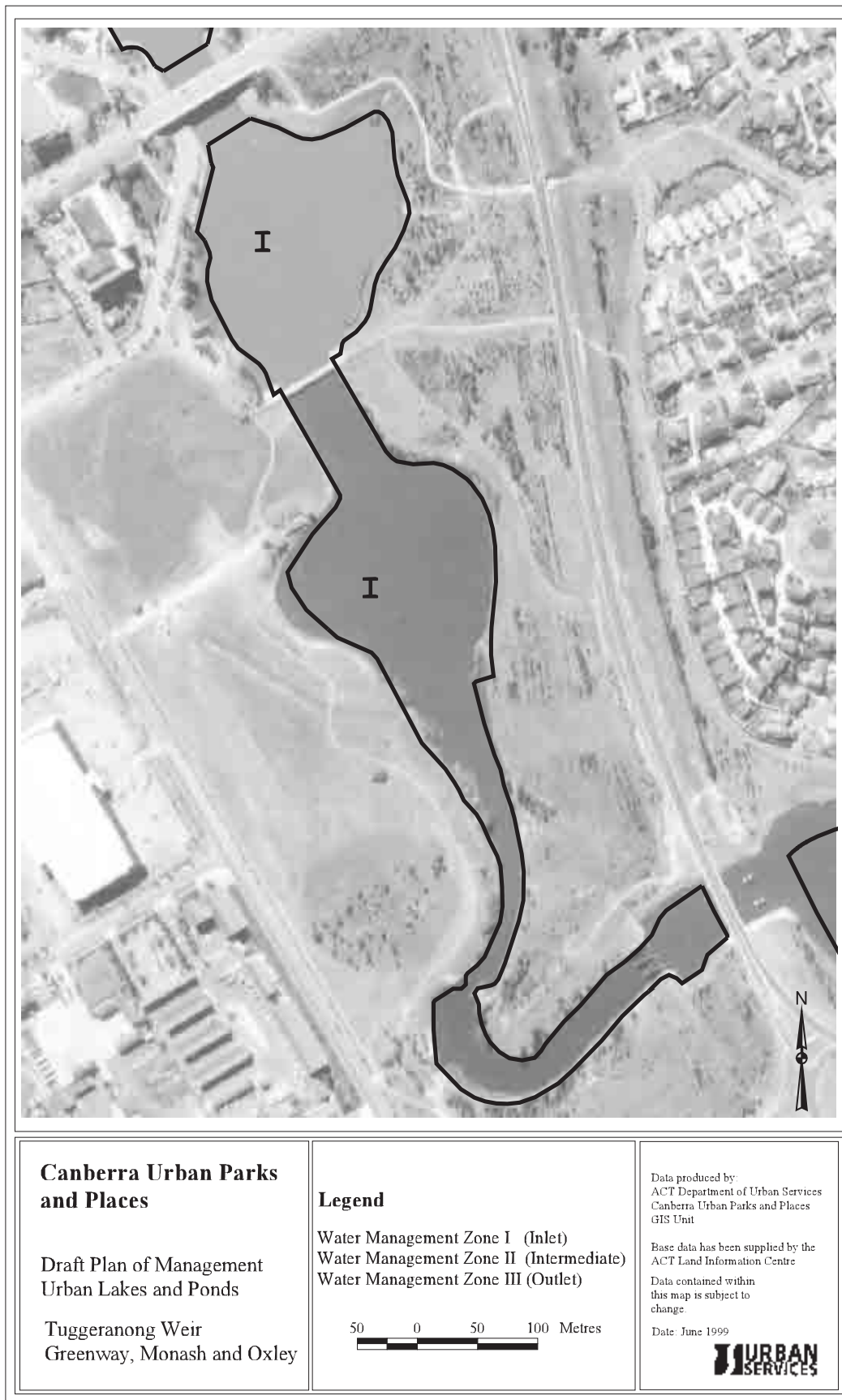
## Tuggeranong Weir

Area	• 7.5 ha									
Prime Management Purposes	• Water quality management, informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	<ul style="list-style-type: none"><li>• Attracts visitors from Tuggeranong because of its location and accessibility</li><li>• Receives low to moderate levels of water use</li><li>• To be managed and maintained to a moderate standard</li></ul>									
Values										
	●	◐	○	◐	●	○	○	◐	●	◐
Improvements (Lakeshore)										
Existing	X	✓	X	✓	X	X	X	X	X	X
Proposed	X	✓	X	✓	X	X	X	X	X	X
Improvements (Water)										
Existing							X	X	X	X
Proposed							X	X	X	X
Symbols Key	● High	◐ Moderate	◑ Low	○ Not Known	✓ Likely to be provided	X Not provided				
For Key to Icons, refer pages 15 and 28										

**Permitted activities (refer Table 9.2 for activities which are not permitted)**




Pond Uses	Water Management Zone
	<b>I</b>
<b>Permitted</b>	
• Fishing, model boating, recreational boating (non-motorised)	✓
<b>Subject to Permit</b>	
• Motorised research craft	✓





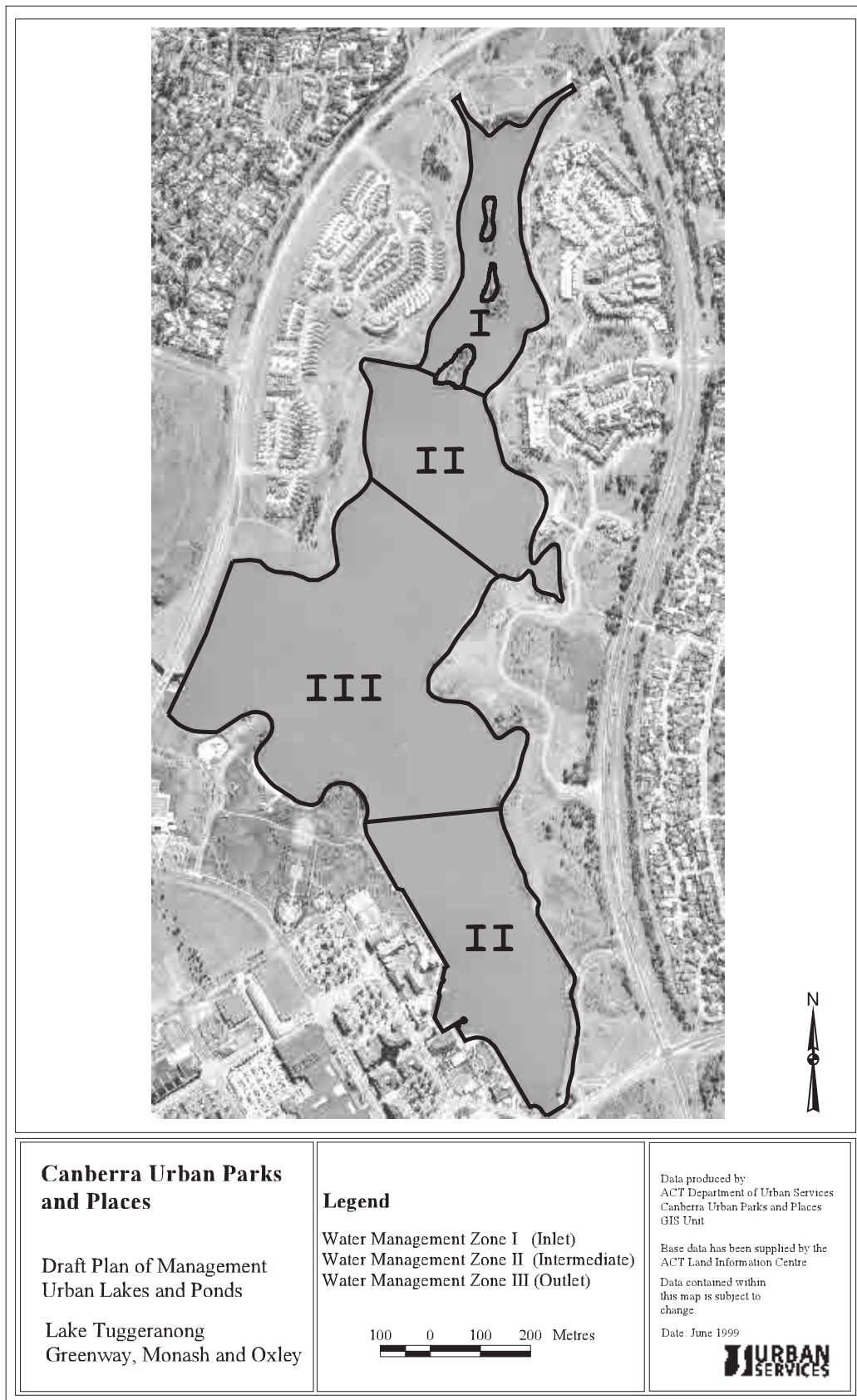


## Lake Tuggeranong

<b>Area</b>	• 57.1 ha
<b>Prime Management Purposes</b>	• Recreation / conservation / sport
<b>Tenure / Legal Status</b>	• Public Land (Lake) in the Territory Plan
<b>General Characteristics</b>	<ul style="list-style-type: none"> <li>• Attracts visitors from Tuggeranong and beyond, because of high quality facilities and good accessibility</li> <li>• Receives high levels of use</li> <li>• To be managed and maintained to a high standard</li> <li>• stocked with fish under the Fish Stocking Plan</li> </ul>
<b>Values</b>	
<b>Improvements (Lakeshore)</b>	
Existing	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ X ✓
Proposed	X X ✓ ✓ ✓ X X X X X
<b>Improvements (Water)</b>	
Existing	✓ ✓ ✓ ✓
Proposed	X X X X
Note: There may be additional improvements as a result of the Lake Tuggeranong Masterplan.	
<b>Symbols Key</b>	● High      ○ Moderate      ○ Low      ○ Not Known ✓ Likely to be provided      X Not provided
For Key to Icons, refer pages 15 and 28	

**Permitted activities (refer Table 9.2 for activities which are not permitted)**

Lake Uses	Water Management Zone		
	I	II	III
<b>Permitted</b>			
• Fishing, recreational boating (non-motorised)	✓	✓	✓
• Windsurfing, sailing		✓	✓
• Swimming, scuba diving (training)			✓
<b>Subject to Permit</b>			
• Special events, commercial activities, model boat regattas, recreational boating (steam and electric), motorised sport support or training craft.	✓	✓	✓
• Motorised research craft.	✓	✓	✓



## Molonglo Reach

Area	• 83.5 ha									
Prime Management Purposes	• Sport / conservation / informal recreation									
Tenure / Legal Status	• Public Land (Water Feature) in the Territory Plan									
General Characteristics	<ul style="list-style-type: none"><li>• Attracts visitors from the entire city and beyond, because of the water skiing, quality facilities and boat launching facilities</li><li>• Receives intensive levels of use</li><li>• To be managed and maintained to an appropriate standard</li></ul>									
Values										
	◐	◑	◐	○	○	●	◐	○	◐	
Improvements (Lakeshore)										
Existing	✓	✓	✗	✓	✓	✓	✓	✓	✗	✓
Proposed	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗
Improvements (Water)										
Existing							✓	✓	✓	✗
Proposed							✗	✗	✗	✗
Symbols Key	● High	◐ Moderate	◑ Low	○ Not Known	✓ Likely to be provided	✗ Not provided				
For Key to Icons, refer pages 15 and 28										

### **Molonglo Reach Uses** (refer Table 9.2 for activities which are not permitted)

#### **Permitted**

- Fishing, sport and recreational boating (non-motorised) in some areas.

#### **Subject to permit**

- Recreational boating (petroleum), jet skiing, water skiing, special events, motorised research craft.



## *eleven.* MEASURING PERFORMANCE

We believe that our management actions must be open and accountable. In this way we will measure our performance and publicise the results. We will measure our performance in 4 areas relating to our major stakeholders, namely:

- performance in satisfying community needs;
- performance in meeting agreements with the ACT Government;
- performance in commissioning maintenance services; and
- lake and pond values and performance (quality) indicators.

Each of these areas will be measured and reported separately.



### **Satisfying Community Needs**



The community is our most important stakeholder. Therefore, community satisfaction with our level of service is an important indicator. We monitor our performance based on two surveys.

The first is an annual survey of the community's expectations, satisfaction and levels of usage of Canberra's urban parks and open space including lakeshore areas conducted by Canberra Urban Parks and Places (MARS 1997, 1998, 1999). This survey has two components: a random telephone survey of Canberra households and an "in-park" survey of major Town and District Parks. This survey provides year to year trends in the mowing, cleanliness of facilities (e.g. toilets, barbecues, paved areas). It also provides reliable estimates of the number of people visiting Town and District Parks (MARS 1998), and for Neighbourhood Parks in (MARS 1999).

Canberra Urban Parks and Places has also used a survey which has been conducted by the Department of Urban Services known as the Customer Satisfaction and Performance Indices Study (Artcraft Research 1998). This survey measures the community's relative degree of satisfaction with the full range of services provided by the Department. For each of over fifty services both an "importance" and "performance" measure are derived with relative satisfaction expressed on common rating scale in each case. In the 1998 survey eight of the fifty-six services evaluated were concerned with managing open space and facilities, two of the questions were concerned with the cleanliness and water quality of Canberra's lakes and ponds. Both surveys show the Canberra community places a high importance on



maintaining both the “quality of water in Canberra’s lakes and rivers” and the “cleanliness of lakes and ponds” relative to other services.

### Delivering on Our Commitments

The Department of Urban Services has an agreement with the ACT Government with respect to the management of Canberra’s urban lakes and ponds. Our annual performance in honouring that agreement is a good measure of our overall performance (ACT Government 1998).

Canberra Urban Parks and Places has a contract for cleaning and maintenance services for the lakes. Performance against this agreement is audited monthly.

### Commissioning Maintenance Services

Canberra Urban Parks and Places are purchasers of maintenance services from contractors and other government organisations. It is important to measure our performance in purchasing these services. We have chosen to measure our performance by measuring the actual standard of maintenance against the actual standard detailed in contracts. For open space, this is achieved through a monthly contractor performance audit. More than 100 items are measured every month and collated for an overall performance rating.

### Values and Performance Indicators

#### Conservation: Aquatic Ecology

- Shallow water - emergent macrophyte/detritus ecosystems, water quality, avifauna, fish (abundance/biomass, levels of genera, appropriate diversity of species).
- Moderate depth - submergent macrophyte/detritus ecosystems, water quality, avifauna, fish (abundance/biomass, levels of genera, appropriate diversity of species).
- Deep water - algal/grazing ecosystems, water quality, avifauna, fish (Biomass, % BG, levels of genera, diversity of species).

Refer Tables 11.1 and 11.2 for specific water quality indicators.

#### *Landscape*

- Wetland – water quality, emergent aquatic plants/riparian plants, open water areas, diversity/contrast, balance/harmony, visible animals (fish, mammals, reptiles, avifauna).
- Natural shoreline – water quality, emergent aquatic plants/riparian plants, diversity/contrast, balance/harmony, visible animals (fish, mammals, reptiles, avifauna), features (rock outcrops, jetties, beaches).
- Formal edge – water quality, form, texture, proximity to water.
- Waterscape - water quality, scale relative to shoreline vegetation and skyline.

#### *Managed Fishery*

- Water quality, appropriate diversity, stocked species growth, fish biomass, catching effort (surveys, community satisfaction).

#### *Boating*

- Clear of floating or submerged debris, free of nuisance plants across course and launching areas, water quality, width, course length, boats/ha, management of other potential boating/recreational use conflicts.

#### *Swimming*

- Water quality, substrate (sand, silt, nuisance plants), safety (free of submerged rocks, logs, glass, deep holes, safe diving depth, elevated currents, boating activities), provision of barriers (children swimming areas), provision of diving platforms.

#### *Water supply*

- Water quality, provision of inlet and pump facilities, facilities flood and vandal proof.

#### *Pollution Control*

- Percentage of discharge controlled by GPTs, percentage capture (volume) of catchment stormwater discharges, percentage area macrophytes, BOD load/m<sup>2</sup> of surface area, monitored interception (SS, TP, faecal coliform).

#### *Drainage function*

- Backwater for 1 in 100 ARI event clear of properties, maintenance of stormwater detention volume required for downstream flow amelioration (flood protection), stability of banks/shoreline and bed from erosion, maintenance of spillway and outlet hydraulic and energy dissipation functions.

*Table 11.1: Water quality indicators: lake and pond environmental and use values*

Indicators	Environmental and Use Values						
	Swimming	Boating	Managed Fishing	Landscape	Water Supply (irrigation)	Drainage flood protection	Pollution control
SS mg/L					<500		
Turbidity Units				<30			
Secchi depth m	> 1.2						
Odour	Not objectionable	not objectionable		not objectionable			
Scums	None	None		None			
pH Units	6.5 – 8.5		6.5 – 9.5		4.5 – 9.0		
Total Dissolved Solids mg/L					<3500		
Diss Oxyg mg/L			>4				
Tot Phosph mg/L	<0.1	<0.1		<0.1			
N/P ratio	> 12	> 12		> 12			
Ammonia mg/L			<1.0				
Chlorophyll 'a' ug/L	< 10	< 10		< 10			
BG algae Cells No	<5000	<5000		<5000			
Z <sub>mix</sub> /Z <sub>euph</sub> ratio							
Faecal colif /100 ml	< 150	<1000			< 1000		
SS retention %							>80
TP retention %							> 70
Detention capacity MI						Specific to facility	
Emergent macrophytes:							
• Cover % area				10-30%			
• Species diversity				>3 *			
Macrofauna							
• Visible							
• Relative abundance (Perch, Murray Cod)			> 10% of catch	Birds, fish			
Texture shoreline – Range of edge and vegetation composition (Outlet zone)				>4 **			
Proximity walkway to water (length within 3m of water's edge)				>50%			

Notes:

- \* species occupying greater than 10% of the total macrophyte area
- \*\* edge and vegetation composition categories comprise
  - Outcropping boulders, sand or gravel beaches
  - Edge macrophyte – grassed foreshore or shrub and tree foreshore
  - Hard edge – grass, shrubs and tree foreshore or buildings foreshore



*Table 11.2: Water quality indicators: lake and pond conservation values*

Indicators	Ecosystem categories		
	Shallow water – emergent macrophyte zone	Moderate water depth – submerged macrophyte zone	Deep water – algal & grazing zone
SS mg/L	< 60	< 40	< 20
Turbidity NTU		< 30	< 30
Secchi depth m		> 0.5	> 1.0
pH Units	6.5 – 8.5	6.5 – 9.0	6.5 – 9.0
Diss Oxyg mg/L	> 4	> 4	> 4
Ammonia mg/L	< 1.0	< 1.0	< 1.0
Tot Phosph mg/L	< 0.2	< 0.1	< 0.1
N/P ratio	> 10	> 8	> 8
Z <sub>mix</sub> /Z <sub>euph</sub> ratio	1	> 2	> 3
Emergent macrophyte cover %	> 30	> 10	> 5
Submergent macrophyte cover %		> 30	
Algal biomass Chlorophyll 'a' ug/L		< 10	< 10
Emergent macrophyte - diversity - appropriate species	Dominant species < 70% Free of exotics	Dominant species < 60% Free of exotics	Dominant species < 50% Free of exotics
Submergent macrophyte diversity		Dominant species < 80%	
Numbers of waterfowl, fish and mammals	Extensive	Numerous	Few
Diversity of waterfowl, fish and mammals	eg. > 10 species birds	eg. > 5 species birds > 4 species fish*	eg. > 5 species birds > 4 species fish*

Notes:

\* Managed fisheries only

# Appendices.

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## Appendix a.

### GLOSSARY OF TERMS AND ABBREVIATIONS

Source: Design Guidelines: Stormwater Pollution Control Ponds and Wetlands (1998)

Abiotic climate	Environmental features, such as those of soils or that do not derive directly from the presence of organisms.
ACT	Australian Capital Territory
Adsorption	The taking up of one substance on the surface of another.
Aerobic, oxic	An environment in which there is free oxygen.
Anaerobic, anoxic	An environment devoid of oxygen.
ARI	Average recurrence interval of storm events.
Attenuation	The temporary storage (detention or retardation) of stormwater to reduce the peak discharge rate of the storm runoff. Commonly used to alleviate flooding of downstream areas.
Base flow	Regular flow of water when there has not been rain, which is usually due to seepage from the groundwater.
Benthic	Pertaining to the bed or substratum of a lake or pond.
BG call numbers	Number of algae of order Cyanophyceae.
Biofilm	A gelatinous sheath of algae and polysaccharides which absorbs colloids and nutrients.
Biological uptake	Take-up of gas or fluid through cell membrane.

Biomass	The weight of live plant or animal organisms.
Bioturbation	The physical disturbance of sediments by burrowing animals.
BMP	Best Management Practices or treatment measures most appropriate and practical for reducing the target pollutants.
BOD	Biochemical oxygen demand of bacterial breakdown of organic matter.
Chlorophyll	The green pigments in plants. Used as a measure of algal biomass.
Coagulation	The aggregation of dispersed colloids into larger particles.
Colloids	Fine particles of typically 0.1 µm to 1 nm in diameter.
Constructed ponds	Small water bodies having an average depth generally >2m and containing zones of open water and zones of macrophytes.
Constructed wetlands	Small water bodies having an average depth of <2m and characterised by extensive macrophyte growth.
Critical pollutants	Pollutants of primary concern because of their impacts on water quality and biota.
CUPP	Canberra Urban Parks and Places.
Detention basin	A basin designed to temporarily detain storm or flood waters, to attenuate peak discharge to acceptable levels.
Detritus	Fine organic material suspended in water or sinking to sediment.
DO	The concentration of dissolved oxygen in water.
Dry weather flow	Base or low flow between storm discharge events.
EMC	Equivalent mean concentration: the mass of pollutant discharged in a storm event divided by the volume of water discharged in the event.
Ephemeral	Systems which exhibit flow or presence of water only periodically.
Epiphytes	Algae attached to the surfaces of other plants.
Euphotic depth	Depth (m) at which light is reduced to 10% of incident intensity.

Eutrophication	Enrichment of water with nutrients, causing abundant plant growth.
Event	A rainfall or discharge condition which is significantly different (> 10 times) from the day to day background levels.
Faecal coliform	Gram negative bacteria, an intestinal bacterium in warm-blooded animals. Used as an indicator of possible faecal contamination.
Flow attenuation	(see Attenuation).
Gross pollutant trap (GPT)	A trap designed to reduce flow sufficiently to enable sedimentation of the medium silt and larger suspended solids fraction, and to intercept (by screening) trash and debris entrained by stormwater.
Groundwater	Water found beneath the ground surface, in the soil and in rock aquifers.
HPS	Health Protection Service.
Lake	An impounded body of water having a surface area greater than 30 ha, or as declared under the <i>Lakes Act 1976</i> .
Lakeshore	Land adjacent to a lake or pond.
Macrophytes	Large aquatic plants, either emergent or submerged.
N/P ratio	Ratio of Nitrogen/Total Phosphorus.
Off-line	Not in the direct flow path of the stormwater drainage system.
On-line	In the direct flow path of the stormwater drainage system.
Overtopping	High discharge rates which exceed outlet pipe or primary spillway capacity, and flow over the top of the embankment or weir bounding the pond or wetland.
PALM	Planning and Land Management.
Particulate	Particle.
Perennial	Systems which maintain continuous flow or presence of water.
pH	Measure of acidity or alkalinity of water.
Planktonic algae	Algae suspended in water.

Pond	An impounded body of water having a surface area generally 4 - 30 ha, and an average depth less than 2m.
Reduction	Chemical removal of oxygen, addition of hydrogen ions, or addition of electrons, by a reducing agent.
Retention time	The time that inflowing water is retained in a pond or wetland before discharge.
Secchi disk depth	The depth beyond which a standard Secchi disk is no longer visible.
Sedimentation	Process of particles settling out of the water column onto the sediment below.
Short circuiting	A situation where a discharge to a pond or wetland follows a direct route to the outlet, without fully mixing across the pond or wetland water storage.
SPM	Suspended particulate material.
SS	Suspended solids.
Stratification	The density separation of layers of water vertically as a result of differences in temperature or salinity.
Substrate	Surfaces (sediments, rock, plants) upon which epiphytes (attached algae) are able to establish in water.
Swales	Shallow grassed drains.
TDS	Total dissolved solids.
TN	Total nitrogen.
TOC	Total organic carbon.
TP	Total phosphorus.
Treatment train	A series of treatment processes designed to collectively meet a prescribed water quality objective.
Turbidity	A measure of light absorption by suspended particles in water.
Vegetated waterways	A natural or constructed channel, in which surfaces comprise natural grass, shrubs and aquatic plants rather than concrete lining.
Wetland	A shallow (generally less than 1m) body of water having an average depth <2m, and extensive emergent aquatic plants.

# Appendix b.

## RELEVANT LEGISLATION

### REQUIREMENTS OF THE LAND (PLANNING AND ENVIRONMENT ACT) 1991 (THE 'LAND ACT')

Requirements of the Land Act	Relevant parts of the Draft Plan of Management
<p><b>General requirements.</b></p> <p>Description of the land for which the Plan has been prepared, section 196 (a).</p>	<ul style="list-style-type: none"> <li>Part A briefly describes the land covered.</li> <li>Maps of each waterbody provided (Chap. 10)</li> <li>Canberra Urban Parks and Places' Asset Register and Geographic Information System contains details of land covered in this Plan of Management.</li> </ul>
<p><b>Management objectives applying to the area</b></p> <p>Objectives outlined in Schedule 1 of the Land Act, section 195(a); and Objectives specified by the Conservator, section 195(b).</p> <p><b>Lake</b></p> <ol style="list-style-type: none"> <li>To prevent and control floods by providing a reservoir to receive flows from rivers, creeks and urban run-offs.</li> <li>To prevent and control pollution of waterways.</li> <li>To provide for public use of the lake for recreation.</li> <li>To provide a habitat for flora and fauna.</li> </ol>	<p>Part C identifies:</p> <ul style="list-style-type: none"> <li>management objectives and guiding management principles for the urban lakes and ponds.</li> <li>the services and levels of service to be provided for urban lakes and ponds in general.</li> </ul>
<p><b>Heritage</b></p> <p>The Land Act recognises an interim Heritage Places Register, section 63. Places on the interim Heritage Places Register may become approved as part of a variation to, or become part of the Heritage Places Register recognised in the Territory Plan, section 17.</p>	<p>Part C identifies:</p> <ul style="list-style-type: none"> <li>management objectives and guiding management principles including heritage objectives and values.</li> <li>heritage values where present for each open space type.</li> </ul>

## REQUIREMENT OF THE LAKES ACT 1976

Requirements of the Lakes Act 1976	Relevant parts of the Plan of Management
<p><b>General Requirements</b></p> <p>The <i>Lakes Act 1976</i> provides for the administration, control and use of certain lakes in Canberra (other than Lake Burley Griffin).</p> <p>Section 15 defines areas in lakes where signs may be erected (eg. launching, mooring, beaching, embarkation, landing, swimming areas).</p> <p>Section 21 allows declaration of a prohibited use area (eg. for swimming, section 17).</p> <p>Section 22 allows closing of a lake for regattas, exhibitions and sporting events.</p> <p>Section 27 places a general restriction on use of a power boat subject to penalty unless authorised by the Minister for sports club training or aquatic sports competitions or, on payment of a fee, section 26.</p> <p>Section 33 authorises agreements by the Minister allowing commercial activities.</p> <p>Section 35 allows authorisation charging a fee for entry to a lake area.</p> <p>Part V, sections 37-47 provides comprehensive navigation rules.</p> <p>Section 54 grants a general power to make regulations, including with respect to equipment to be carried on boats and qualifications for persons navigating boats.</p>	<ul style="list-style-type: none"> <li>Part C of this Plan of Management outlines the management policies and guidelines for lakes and ponds including permitted, permitted with consent and prohibited activities; and the level of development and facility provision that can be expected.</li> </ul>
<p><b>Waterbodies covered</b></p> <p>Waterbodies not previously declared as lakes under the <i>Lakes Act 1976</i> were declared as lakes prior to preparation of this draft Plan of Management (section 5).</p> <p>The area of a lake includes its foreshore and islands. The foreshore is defined as 100 m from the high water level of all lakes except where it is defined precisely for Lake Ginninderra in Schedule 2.</p>	<ul style="list-style-type: none"> <li>Part C includes maps of the fourteen waterbodies declared as lakes for the purposes of the <i>Lakes Act 1976</i>.</li> </ul>



## REQUIREMENTS OF THE ENVIRONMENT PROTECTION ACT 1997

<b>Requirements of the Environment Protection Act 1997</b>	<b>Relevant parts of the Draft Plan of Management</b>
<p><b>General Requirements</b></p> <p>The <i>Environment Protection Act 1997</i> aims to prevent environmental degradation through promoting pollution prevention, clean technologies, reuse, recycling and waste minimisation.</p> <p>Part VIII of the Act identifies polluting activities. Activities defined in Schedule 1 include: 'stormwater', 'stormwater system', 'wastewater', 'water', 'waterway', 'river', 'channel', 'lake', 'pond', 'lagoon', or 'marsh'.</p> <p>Persons (including a body corporate) shall not conduct a Class A activity (Schedule 1) unless authorised. Class A activities include: 'commercial aquaculture', section 42(1).</p> <p>Persons shall not conduct a Class B activity (Schedule 1) without being a party to an environmental agreement or having authority (see above). Class B activities include: 'major land developments', 'public infrastructure', 'municipal maintenance of unleased land', 'public roads or places', 'footpaths', or the 'stormwater system', section 42(2).</p> <p>A pollutant shall have caused environmental harm if:</p> <p>(a) the pollutant entering the environment exceeds the prescribed measure; or</p> <p>(b) the pollutant is a prescribed pollutant (Environment Protection Regulations 1997).</p>	<ul style="list-style-type: none"> <li>Part C includes maps of the fourteen waterbodies which are subject to this Plan of Management. These lakes or ponds act as detention (retardation) basins for stormwater arising from the surrounding urbanised catchments.</li> <li>Purchasers or providers of certain prescribed services are covered by the Act.</li> <li>Part C outlines the infrastructure developments and the types and levels of municipal maintenance services to be provided for urban lakes and ponds. These services are equivalent to those which require an environmental protection agreement or authorisation under the relevant provisions of the Act.</li> </ul>
<p><b>Environment Protection Regulations 1997</b></p> <p>Part VI Water of the Regulations are known as the 'Water Quality Guidelines'. In Schedules 3 and 4 the environmental values or uses defined correspond with those in Part C2 Water Use and Catchment Policies of the Territory Plan.</p> <p>Schedule 3 prescribes the pollutants causing environmental harm if they enter a waterway.</p> <p>Schedule 4 specifies ambient standards of water quality for waterways.</p>	<ul style="list-style-type: none"> <li>Part C of this Plan of Management outlines the permitted, permitted with consent, or prohibited water uses in each urban lake or pond. These uses correspond with those defined in Part C2 Water Use and Catchment Policies of the Territory Plan.</li> </ul>

**REQUIREMENTS OF THE BUSHFIRE AND FIRE BRIGADE ACTS**

*Bushfire Act (1936), Section 5N*

For the purpose of extinguishing or preventing the spread of any fire in any part of the Territory, other than a fire which is in a built-up area or a building and at which a member of the Fire Brigade is in attendance, the Chief Fire Control Officer shall have the power to enter or give directions for entering any land or premises and take or cause to be taken water from that land or premises.

*Fire Brigade Act (1957), Section 7*

The Chief Officer may, at or immediately after a fire in the Territory, for the purpose of protecting life or property or controlling or extinguishing the fire use, without payment, any convenient supply of water and shut off water from a main or pipe to obtain greater pressure or supply of water.

# Appendix c:

## MANAGEMENT AGENCIES AND ADMINISTRATIVE ARRANGEMENTS

### Canberra Urban Parks and Places

Canberra Urban Parks and Places is responsible for asset management and recreation services on lakes and ponds including:-

- Monitoring recreational and other use;
- Cleaning, rubbish removal and maintenance;
- Inspection of asset condition and maintenance of an assets database;
- Maintenance and creation of new lakes assets;
- Collection of needles, syringes and related chemical wastes;
- Management of special or seasonal sporting events; and
- Public relations, media and promotional activities.

### Planning and Land Management

#### *Land (Planning and Environment) Act 1991*

Requirement to establish a Territory Plan setting out permissible land and water uses and conditions of use.

#### *Territory Plan 1993 - 98*

Part B6 of the Plan sets out the policies in respect to the use and management of water bodies and their catchments. Part C2 of the Plan sets out the water use and catchment policies, including a detailed listing of water features and their designated use values. Part A of the Plan provides for the establishment of Planning Guidelines. These include:

- ACT Water Quality Guidelines
- GPT Design Guidelines
- Pond Design Guidelines
- Waterway Design Guidelines

Part B13 of the Plan sets out the policies in respect to River Corridors, including the Dairy Flat areas of the Molonglo River.

PALM also administers the Environmental Impact Assessment Part IV of the *Land (Planning and Environment) Act 1991*.

## Environment ACT

### *Lakes Act 1976*

The *Lakes Act 1976* provides for the administration, control and use of urban lakes in Canberra (other than Lake Burley Griffin). A summary of the requirements of the Act is given in Appendix B.

### *Water Resources Act 1998*

The primary focus of the *Water Resources Act 1998* is the allocation of water (including groundwater) across abstractors, and control of water control structures.

Of particular importance to the *Lakes and Ponds Management Plan* is the provision under the Act for determining environmental flow guidelines.

The *Draft Environmental Flow Guidelines 1999* include extensive reference to urban lakes and ponds, in respect to protecting their environmental flows, and management of water abstraction.

Water abstraction from urban lakes and ponds will require licensing under the *Water Resources Act 1998* and a water allocation. The *Water Resources Management Plan 1999* provides details on water allocation for uses other than for environmental flows for each sub-catchment in accordance with the Environmental Flow Guidelines. An allocation from an urban lake or pond will take into account exiting uses and the maximum allocation in the sub-catchment as outlined in the *Water Resources Management Plan*. The draft Environmental Flow Guidelines also specify a maximum drawdown for urban lakes and ponds as a result of abstraction, of 0.20m below the spillway.

A *Groundwater Management Plan* is currently being developed, as part of the *Water Resources Management Plan* related instruments. In view of the conjunctive surface water-groundwater nature of a number of the lakes and ponds, this represents an important component of overall resource management.

### *Environment Protection Act 1997*

The Act establishes an Environment Protection Authority for the administration of the Act, and incorporates the instruments for achieving the objects of the Act.

### *Environmental Protection Regulations*

The *Environmental Protection Regulations* promulgated under the Act identify the environmental values set out in Part C2 of the *Territory Plan* as the object of pollution control in respect to lakes and ponds. Schedule 4 of the Regulations incorporate the water quality guidelines to be met, consistent with protecting the designated environmental and use values. These guidelines are those identified in the *ACT Water Quality Guidelines* under the Plan.

### *Fisheries Act 2000*

Recreational fishing in the ACT is governed by the provisions of the *Fisheries Act 2000*. This Act applies to all public waters in the ACT, including the lakes and ponds covered by this management plan. The *Fisheries Act 2000* better reflects community expectations for recreational fishing than the previous *Fishing Act 1967*. The *Fisheries Act 2000* aligns ACT legislation with current NSW legislation and provides for a more uniform approach to fisheries management in the Canberra region.

Some of the larger lakes and ponds are actively managed as recreational fisheries and are part of the ACT Government fish stocking program (ACT Government 1997). The smaller ponds are considered unsuitable to sustain managed fisheries for a number of reasons including size, depth, fluctuating water levels and high summer water temperatures. Fishing is still permitted in these water bodies but stocking is not considered appropriate.

### *ACT Integrated Catchment Management Framework 2000*

Environment ACT prepared the ACT Integrated Catchment Management framework as a means of providing a more transparent presentation of integrated approaches to land and water management in the ACT, and as a vehicle for improved community partnership in overall management.

### *ACT Water Quality Monitoring Program*

Environment ACT coordinates the ACT Government Regional Water Quality Monitoring Program. Agencies involved in the Program include Environment ACT, PALM, DUS Stormwater and ACTEW. The Program also includes coordination with ACTEW, the National Capital Authority (Lake Burley Griffin), and the NSW Department of Land and Water Conservation.

### *Wildlife Research and Monitoring Program*

The Wildlife Research Unit contributes important ecological research and data to agencies managing the ACT waterways, and to the Director Environment ACT in his Conservator role. The fish conservation and recreation monitoring and management is an important component of this Program related to the management of the lakes and ponds.

### *Lakes Rangers*

Regulatory activities under the *Lakes Act 1976* and *Fisheries Act 2000* are the responsibility of the Lakes Rangers located within the Regulation Unit, Environment ACT. Services provided by the Lakes Rangers include:

- Wildlife management;
- Collecting evidence for prosecution;
- Issuing boat permits and licences;

- Booking service for Molonglo Reach;
- Regulating recreational use; and
- Investigation of safety issues eg. chemical spills; boating incidents; overhanging foliage; obstructions to movement and line of sight; and monitoring significant environmental incidents (eg. blue-green algae) and impacts.

### Roads and Stormwater

The Roads and Stormwater has responsibility for the provision, operation and maintenance of stormwater infrastructure throughout the ACT. Its major focus is on the design and construction of infrastructure, the hydrological assessment of existing and future development, the establishment of design standards, and ongoing review (monitoring) of performance of the stormwater system.

The *Urban Stormwater: Standard Engineering Practices* incorporates the design standards in respect to the lakes and ponds. The Practices integrate the *Water Pollution Control Pond Design Guidelines*, *Gross Pollutant Trap Design Guidelines* and *Engineered Waterway Design Guidelines* identified under the Territory Plan.

### ACT Department of Health and Community Care

The Department administers the *Public Health Act 1977*, and undertakes water quality monitoring related to safety of swimming areas in Canberra's lakes and rivers. e.g. Lake Ginninderra and Lake Tuggeranong.

### Murray Darling Basin Commission

The *Murray Darling Basin Council*, of which the ACT is a member, has adopted a number of Basin wide policies, some of which bear on this management plan. These include:

- the *Algal Management Strategy 1994*; and
- the *Water CAP 1997*.

### Research and monitoring groups

Co-operative Research Centre for Freshwater Ecology

Applied Ecology, University of Canberra

Department of Geography, ANU

Centre for Resource and Environmental Studies, ANU

CSIRO Land and Water

CSIRO Sustainable Ecosystems

Ecowise

Waterwatch Groups

Catchment and Landcare Groups

# Appendix d.

## MANAGEMENT GUIDELINES

### Aquatic Macrophyte Management:

Aquatic plants including algae not only serve an important role in the ecological functioning of urban lakes, but that they can also produce conflict with recreational activities. CUPP has engaged a contractor to provide a scientific monitoring and management assistance program for the aquatic macrophytes in four ACT urban lakes: Lakes Tuggeranong and Ginninderra and Gungahlin and Yerrabi Ponds.

The primary objective in submerged aquatic plant management is that of nuisance removal. To meet this objective all of the upper shoot growth of the submerged macrophytes is removed from swimming areas, boat launching sites, sailing courses, etc., where it is interfering with aquatic recreational pursuits. The plant shoot removal is achieved principally by mechanical methods and the removed plant material is composted.

### Commercial Activities on Lakes and Ponds:

Permanent commercial leases are permitted where appropriate and are considered by Planning and Land Management in consultation with Canberra Urban Parks and Places.

### Dogs:

#### General

The control of dogs is managed by the Registrar of Dogs in accordance with the *Dog Control Act 1975*. From 1 July 2001 the *Domestic Animals Act 2000* will replace the *Dog Control Act 1975*. Dogs are part of our community and where possible every effort has been made to achieve a balance between the needs of dog owners and non-owners to enjoy Canberra's lakes and ponds.

Under the Act, dogs are permitted within most public places in the urban areas of the ACT whilst restrained by a leash and held by a competent person. Land most suited for dog exercise is usually the non-irrigated land within most suburbs, often found surrounding playing fields.

#### Prohibited areas

There are areas in which dogs are prohibited which are usually identified by sign. In particular, dogs are prohibited in:

- Point Hut District Park;
- Within 10 metres of children's play equipment;
- Within 10 metres of BBQ facilities; and
- Within 10 metres of designated swimming areas.

**Feral Species Control:**

The control of feral species, both plants and animals, on and around the lakes and ponds, is undertaken where necessary in accordance with various strategies developed by the ACT Government. These strategies include the ACT Nature Conservation Strategy, ACT Weeds Strategy and the Willow Management Strategy for the Upper Murrumbidgee Catchment. Feral animals include rabbits, and domestic ducks where they have the potential to cross breed with native species. Feral plants include most willow species, blackberries and some introduced aquatic plants.

**Fisheries Management:**

Canberra's urban lakes are stocked with recreational fish species which aids in the conservation of native species by relieving fishing pressure on the more fragile rivers and streams in the Canberra region. Recreational fish stocks are monitored by the ACT Government. Such species include Murray Cod and Golden Perch.

**Litter and Rubbish Management:**

CUPP endeavours to provide a lake surface and shoreline free of litter and floating debris. Litter and rubbish standards are specified and a contractor has been engaged to achieve these service standards. The litter removal service is categorised into areas where litter removal has been identified as very high, high and medium. These priority areas have a specified frequency of inspections and actions are taken if the area requires clean up.

**Major Events on Lakes:**

Approval for major events may be obtained by submitting an application to Canberra Urban Parks and Places by the agent for the group.

**Public Safety (People and Property):**

This policy sets out the manner in which Canberra Urban Parks and Places ensures the protection of people and property. It includes references to hazards, obstructions, machinery in public places, and liaison with public utilities.

All due care will be taken by the Canberra Urban Parks and Places and maintenance contractors to ensure the safety of the public and their property.



### **Sports and Recreation Management:**

#### *Fees and Charges:*

The lakes and adjacent parklands are available for general use by the community without charge. Fees for special events and commercial uses have not been determined but are being examined by CUPP.

#### *Aquatic Values:*

Our objective is to conserve and encourage biological diversity and maintain ecological processes and systems.

### **Water Quality Monitoring:**

Recreational activities that depend on water resources are subject to ACT Water Quality guidelines developed to provide assistance to public health administrators water authorities and the general public to assess the suitability of water for recreational use (Part VI of the Environment Protection Regulations 1997). Primary contact recreation where there is direct contact with the water such as swimming, requires the regular sampling during the swimming season of October through to April for faecal coliforms. Sampling and analysis of the water is conducted by the Health Protection Service at designated beach sites and other nominated sites at Lakes Tuggeranong and Ginninderra. The results are conveyed to CUPP and are assessed according to the Australian Guidelines for Recreational Use of Water developed by National Health and Medical Research Council. Where necessary, warning signs are posted at beach areas indicating to the public when high levels of faecal coliforms are present and swimming is not recommended.

## Appendix e.

### POINTS OF CONTACT

1	Canberra Urban Parks and Places Information / Public Hotline	02 6207 2500
2	Environment ACT Information / Public Hotline	02 6207 9777
3	ACT Roads and Stormwater Information / Public Hotline	02 6207 6888
4	Planning and Land Management Information / Public Hotline	02 6207 1926

# Appendix f.

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