MOOCHALABRA DAM CATCHMENT AREA
WATER SOURCE PROTECTION PLAN

Wyndham Town Water Supply

WATER AND RIVERS COMMISSION REPORT
WRP 45
2002
WATER RESOURCE PROTECTION SERIES

Water and Rivers Commission

WATER AND RIVERS COMMISSION
HYATT CENTRE
3 PLAIN STREET
EAST PERTH
WESTERN AUSTRALIA 6004

TELEPHONE (08) 9278 0300
FACSIMILE (08) 9278 0301
WEBSITE: http://www.wrc.wa.gov.au

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Cover Photograph: Moochalabra Dam and Spillway after the 1999 upgrade

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Resource Management Division

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Acknowledgments

Contribution	Personnel	Title	Organisation
Program Direction	Tony Laws	Manager, Resource Quality	Water and Rivers Commission
Supervision	Ross Sheridan	Program Manager, Protection Planning	Water and Rivers Commission
Report Preparation	Mark Warner	Environmental Engineer	Water and Rivers Commission
Report Preparation	Adrian Tomlinson	Senior Water Resources Planner	Water and Rivers Commission
Report Preparation	Sandra Franz	Environmental Scientist	Water and Rivers Commission
Report Preparation	Nick Edwards	Environmental Scientist	Water and Rivers Commission
Drafting	Nigel Atkinson	Mapping Consultant	McErry Digital Mapping Pty Ltd

For more information contact:

Program Manager, Protection Planning
Resource Quality Branch
Water and Rivers Commission
3 Plain Street
EAST PERTH WA 6004

Telephone: (08) 9278 0300
Facsimile: (08) 9278 0585

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Foreword

Water source protection plans

Water Source Protection Plans establish the level of protection required in Water Reserves. Catchment protection of water sources is considered a fundamental part of ensuring the provision of a safe drinking water supply.

Water Source Protection Plans identify sources of contamination that should be investigated and set out programs for management of the resource. Water Source Protection Plans are developed in consultation with affected landowners and industry groups and relevant government agencies.

Proclaiming Water Reserves under the *Country Areas Water Supply Act 1947* protects the quality of water sources in country Western Australia. The Act's by-laws enable the Water and Rivers Commission to control potentially polluting activities, regulate land use, inspect premises and take steps to prevent or clean up pollution.

The Water and Rivers Commission aims to work pro-actively with planning agencies to incorporate water protection in the land planning process. Decisions on land use zoning and subdivision applications have a significant impact on the protection of water sources. The Commission supports the amendment of Town Planning Schemes and Development Strategies that reflect land use compatible with Water Source Protection Plans.

This Water Source Protection Plan provides a basis for establishing compatible land uses in the Moochalabra Catchment Area and is a mechanism for practical implementation of the Commission's protection strategies. Local government decision-makers, State planning authorities and operational staff are encouraged to recognise this document as a basis for ensuring the long-term protection of this groundwater resource for generations to come.

Water quality protection framework

The Water and Rivers Commission is responsible for managing and protecting Western Australia's water resources. The Commission has developed policies for the protection of public drinking water source areas that include three levels of priority classification.

Priority 1 (P1) source protection areas are defined to ensure that there is no degradation of the water source. P1 areas are declared over land where the provision of the highest quality public drinking water is the prime beneficial land use. P1 areas would typically include land under Crown ownership. P1 areas are managed in accordance with the principle of risk avoidance and so land development is generally not permitted.

Priority 2 (P2) source protection areas are defined to ensure that there is no increased risk of pollution to the water source. P2 areas are declared over land where low intensity development (such as rural) already exists. Protection of public water supply sources is a high priority in these areas. P2 areas are managed in accordance with the principle of risk minimisation and so some development is allowed under specific guidelines.

Priority 3 (P3) source protection areas are defined to minimise the risk of pollution to the water source. P3 areas are declared over land where water supply sources need to co-exist with other land uses such as residential, commercial and light industrial developments. Protection of P3 areas is achieved through management guidelines rather than restrictions on land use. If the water source does become contaminated, then water may need to be treated or an alternative water source found.

In addition to priority classifications, wellhead protection zones are defined to protect the water source from contamination in the immediate vicinity of production wells. Wellhead protection zones are usually circular, with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. These zones do not extend outside water reserves and special conditions apply.

Contents

Summary

Wyndham obtains its water supply from Moochalabra Dam, which was supplemented by water from the King River until 1999. The King River system was decommissioned following the upgrade to Moochalabra Dam.

The dam's catchment is undeveloped Crown land. It provides a secure, high-quality water source. It is proposed to amend the existing proclaimed area to reflect the physical catchment area for the dam.

The plan was developed in consultation with the Water Corporation, relevant State government agencies (including the Shire of Wyndham, Agriculture Western Australia, Conservation Council and the Department of Environmental Protection), landowners and other interested parties.

The draft plan was released in June, 2000 and all submissions have been considered in the preparation of this plan.

1. Introduction

Wyndham is located on the Cambridge Gulf in the Shire of Wyndham - East Kimberley and is the only major port in the East Kimberley. It services agricultural, tourism and extractive industries in surrounding areas (Figure 1).

Wyndham's town water supply is obtained from Moochalabra Dam, about 15 km to the south.

2. Physiography

Moochalabra Dam is located on Moochalabra Creek. The harnessed catchment has an area of 58 km^2 with an estimated mean annual flow of approximately 9 GL.

The Moochalabra Dam catchment is characterised by dissected sloping plateaux of the Kimberley Group sediments. The catchment rises in the east to the Mt Erskine Range, which forms the catchment boundary.

The Pentecost Sandstone outcrops throughout the catchment, with erosion processes forming structural benches on resistant sandstone beds.

Bedrock outcrops exist throughout the catchment, causing little soil cover and only sparse vegetation. There is therefore potential for rapid runoff response to intense rainfall events.

3. Scheme description

Moochalabra Dam is a reinforced rockfill dam with a clay core. It was constructed as a temporary water supply in 1971 with a storage capacity of 0.57 GL. Construction to increase the storage capacity and to repair the face of the dam was completed in late 1999. The new reservoir has a capacity of 2.35 GL.

Until the end of 1999, the water supply scheme for Wyndham relied on two sources: Moochalabra Dam and the King River. Moochalabra Dam is on Moochalabra Creek, which joins the King River downstream of the King River Pools.

The main source for Wyndham was the old Moochalabra Dam. The King River Pools were used to augment storage at Moochalabra Dam when storage was low and during peak seasonal demand periods.

The combined supply from the old Moochalabra Dam and the King River Pools were adequate to meet Wyndham's current demand of 0.45 GL/year.

Completion of the dam's upgrade rendered the King River Pools redundant as a water supply system. By the end of 1999, pumping facilities at the pools had been decommissioned and removed.

The new reservoir will have enough capacity to ensure high-level security of supply for Wyndham for the foreseeable future.

The water source is currently protected by the King River Pools Water Reserve (Figure 2). The Reserve contains most of the catchment of Moochalabra Dam as well as the entire King River Pools catchment.

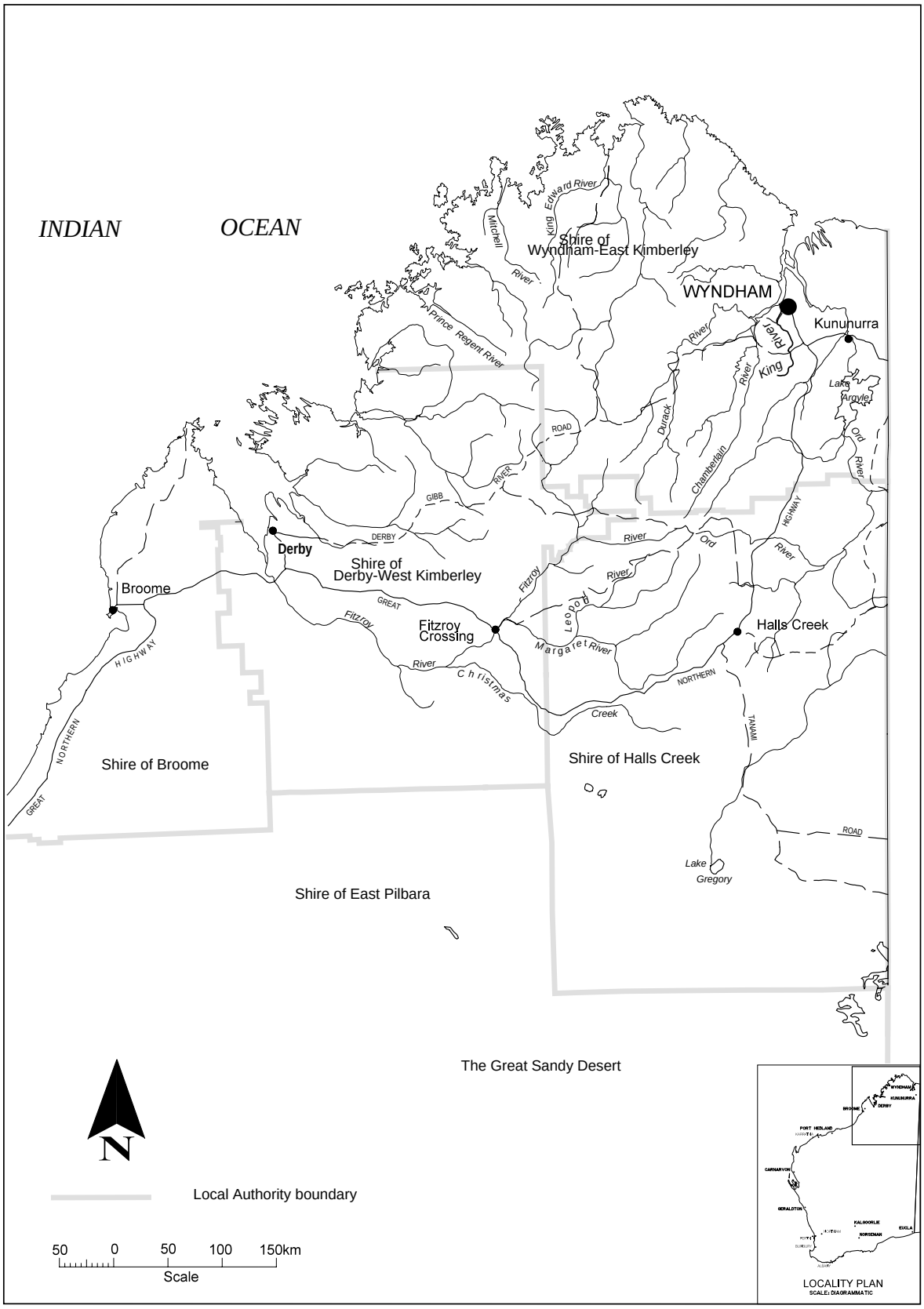
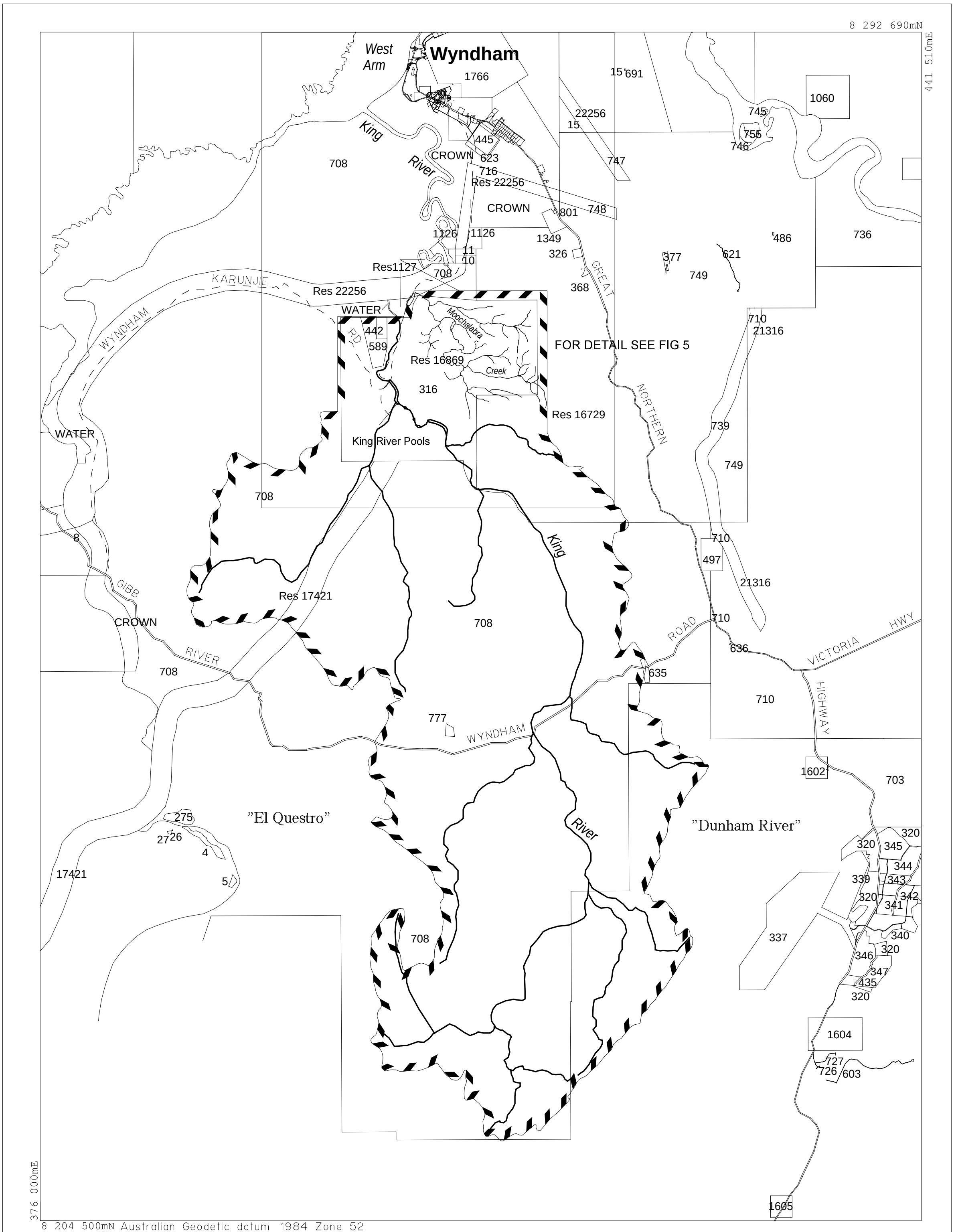


Figure 1. Wyndham locality map



WATERANDRIVERS COMMISSION

LEGEND:

Scale: 2 0 2 4 6 8km

Existing water reserve boundary

INDEX TO ADJOINING 1:100000 MAPS

4467	4567	4667
4466	4566	4666
4365	4465	4665

FIGURE 2.
KING RIVER POOLS WATER RESERVE

Drawn by N.J.A. Date 07/03/00

Policy and Planning Division
Water Quality Protection Branch

4. Existing and proposed land uses

The majority of the Moochalabra Dam catchment is within Reserve 16869. The reserve is for water supply purposes. The rest of the catchment is either within Reserve 1127, currently vested for Public Utility with the Department of Land Administration (DOLA), or Reserve 16729, which is vested with DOLA for the Use and Requirements of Government. The catchment is predominantly native vegetation and has not been developed.

5. Potential for contamination

As the catchment of the Moochalabra Dam is reserved for water supply, the area remains as native vegetation and the contamination threats are minimal. Access to the reservoir and catchment is limited, as the access road is fenced (Plate 2). Figure 3 shows the location of contaminant risks.

Camping

There is some evidence of camping occurring next to the reservoir. Camping can cause contamination of surface water through the indiscriminate dumping of rubbish, effluent disposal, clearing and trampling of bush, and bushfires escaping from camp fires.

Diesel storage at pump station

The Moochalabra Pump Station is outside the catchment area of the dam (Plate 3). Large quantities of fuel are stored in a bunded area, but the bunding is inadequate to capture "jetting" leaks. There is no risk of a fuel spill contaminating the reservoir or catchment public water source. Nevertheless, good fuel management is necessary to properly protect broader water resource values, particularly with regard to the lower King River.

Cattle access to the reservoir area

Although the fence surrounding the dam is in poor condition, there is little circumstantial evidence that the cattle get close to the reservoir. The nature of this ground surface tends to be rocky and rough and the cattle spend their time in the more accessible areas downstream of the dam wall near the King River.

6. Proposed proclaimed area

The existing King River Pools Water Reserve is shown in Figure 2. It was originally declared under the *Country Areas Water Supply* (CAWS) *Act 1947* in 1966 and was enlarged to its present size in 1982. The Water Reserve boundary was established to protect the catchment areas of the Moochalabra Dam and the now disused King River Pools.

The existing Water Reserve is based partly on cadastre and partly on the topographic catchment for King River. As a result, some of the upper reaches of the Moochalabra Dam catchment are not within the reserve.

With the completion of the Moochalabra Dam upgrade, the King River Pools are no longer used as a public water supply source. Therefore the Water Reserve is now amended to include only the Moochalabra Dam catchment (Figure 4). The catchment boundary was defined using topographic contour mapping.

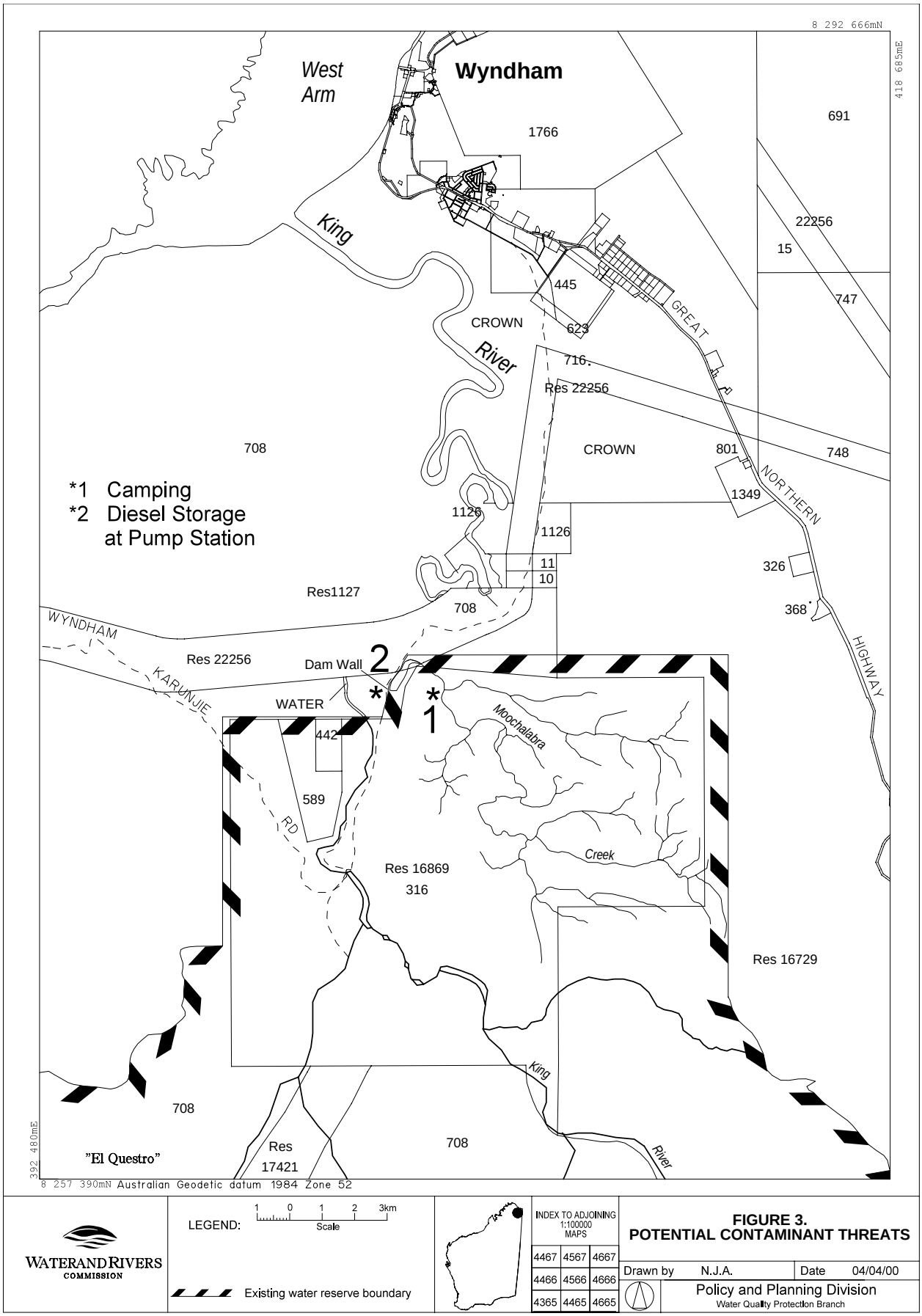
The Moochalabra Dam catchment should be managed for Priority 1 (P1) source protection.

P1 source protection areas are declared to ensure that there is no degradation of the water source. P1 areas are declared where the provision of the highest quality public drinking water is the prime beneficial land-use.

P1 source protection is appropriate as:

- the resource is of strategic importance to Wyndham;
- the Moochalabra Dam is the sole supply of water for Wyndham;
- the land is in public ownership; and
- current land-uses are compatible with P1 source protection.

As well as being managed as a P1 source protection area, a Reservoir Protection Zone should be implemented. This consists of a two-kilometre buffer area around the top water level of the reservoir which is truncated by the catchment boundary. It includes the dam wall itself. Public access to this area should be restricted.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418 685mE
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King
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CROWN
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CROWN
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NORTHERN
1349
*1 Camping
*2 Diesel Storage at Pump Station
1126
1126
11
10
326
Res1127
708
368
HIGHWAY
WYNDHAM
Res 22256
Dam Wall
2
KARUNJIE
WATER
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1
Moochalabra
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River
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Existing water reserve boundary
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4365 4465 4665
WATERANDRIVERS COMMISSION
FIGURE 3.
POTENTIAL CONTAMINANT THREATS
Drawn by N.J.A.
Date 04/04/00
Policy and Planning Division
Water Quality Protection Branch

7. Management of potential water quality risks

7.1 Protection objectives

The objective of this plan is to protect this water source in the interest of providing safe drinking water to Wyndham. However, the rights of existing approved land uses to continue in the Moochalabra Dam Catchment Area are recognised.

The Priority 1 classification proposed for this catchment has the fundamental water quality objective of risk avoidance. The overall source protection objective for this catchment is to maintain existing water quality and initiate measures to improve water quality where possible.

The Priority 1 classification will ensure future development within the Moochalabra Dam Catchment Area is consistent with the objective of water source protection in the area.

7.2 Best management practices

There are opportunities to significantly reduce risks to water quality by carefully considering site design and management practices. The adoption of best management practices for land-use activities is encouraged to help protect water quality.

Education (e.g. signs and informative material) is a key mechanism for bringing the attention of the public to water quality protection measures.

On freehold land the Commission aims to inform landowners and managers about protection of public drinking water sources by issuing environmental management guidelines and other informative material. The Commission recommends the use of best management practice for water quality protection through the provision of management advice.

7.3 Land-use planning

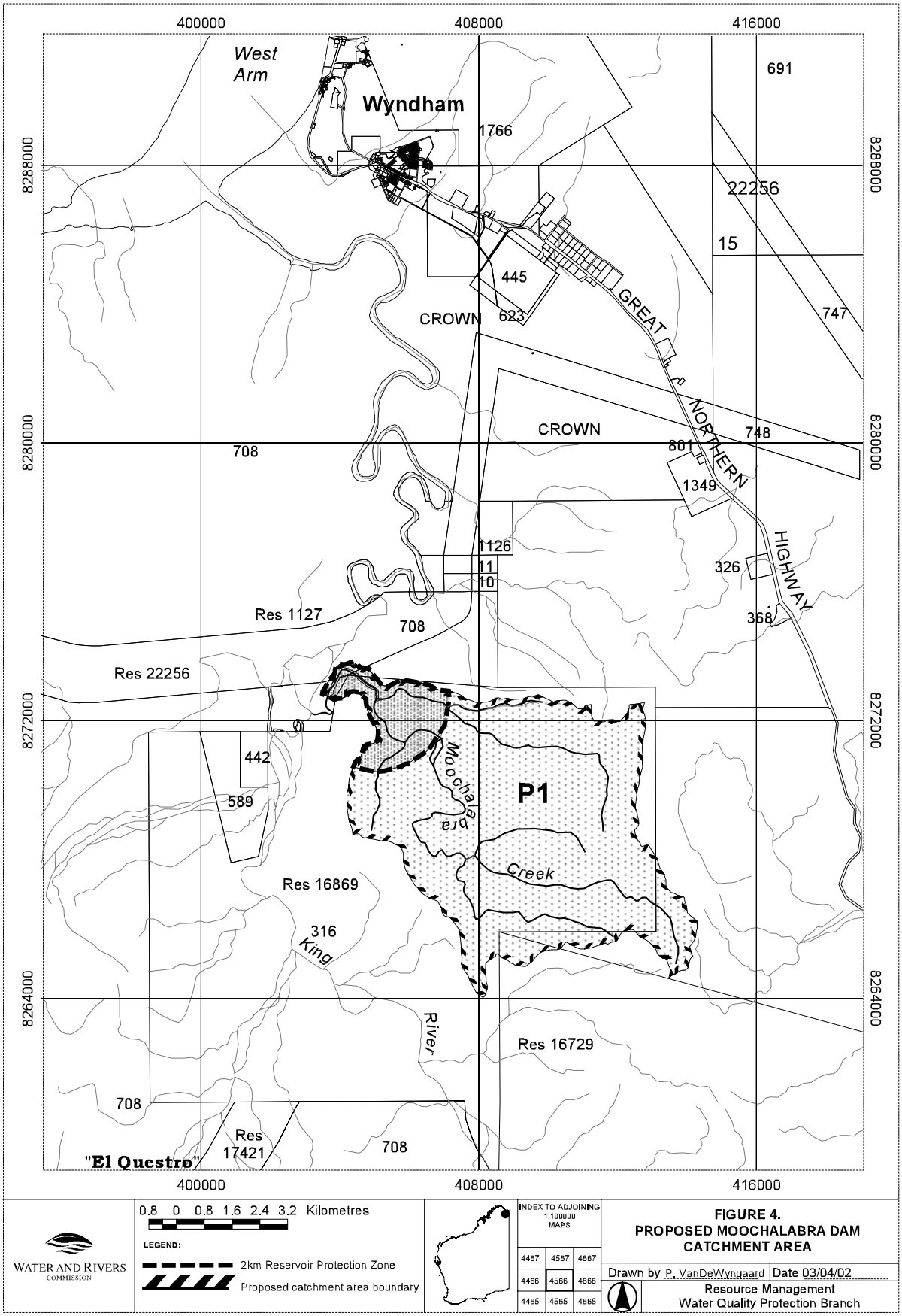
Establishing appropriate protection mechanisms in statutory land-use planning processes is essential to secure the long-term protection of water sources.

It is appropriate that the proposed catchment area and priority classification be recognised in the Shire of Wyndham – East Kimberley's Local Rural Strategy and subsequently in its Town Planning Scheme.

7.4 Emergency response

Escape of chemicals during unforeseen incidents and use of chemicals during emergency response can cause contamination of water sources. The Shire of Wyndham – East Kimberley Local Emergency Management Advisory Committee (through the Broome Emergency Management District) should be familiar with the location and purpose of the Moochalabra Dam Catchment Area. A locality plan should be provided to the Fire and Rescue Services headquarters for the HAZMAT Emergency Advisory Team. The Water Corporation should have an advisory role in any HAZMAT incident in the Moochalabra Dam Catchment Area.

Personnel who deal with WESTPLAN - HAZMAT incidents within the area should be given ready access to a locality map of the Catchment Area. These personnel should receive training to ensure an understanding of the potential impacts of spills on the surface water resource.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HIGHWAY
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368
Res 1127
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Res 22256
8272000
442
589
Moochalabra
P1
Creek
Res 16869
316
King
River
8264000
Res 16729
708
Res 17421
"El Questro"
708
0.8 0 0.8 1.6 2.4 3.2 Kilometres
LEGEND:
2km Reservoir Protection Zone
Proposed catchment area boundary
INDEX TO ADJOINING 1:100000 MAPS
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4466 4566 4666
4465 4565 4665
WATER AND RIVERS COMMISSION
FIGURE 4.
PROPOSED MOOCHALABRA DAM
CATCHMENT AREA
Drawn by P. VanDeWyngaard
Date 03/04/02
Resource Management
Water Quality Protection Branch

Recommendations

1. The King River Pool Water Reserve should be abolished and the proposed Moochalabra Dam Catchment Area as shown in **Figure 4** should be gazetted.
2. Planning strategies should incorporate the management principles outlined in the Water and Rivers Commission's *Land Use Compatibility in Public Drinking Water Source Areas* (see Appendix 1) and reflect the priority 1 classification given to the Catchment Area.
3. Any land-use proposals within the Catchment Area should be referred to the Water and Rivers Commission for comment.
4. Signs should be erected at entry points to the Moochalabra Dam Catchment Area to define the Catchment Area and promote public awareness of the need to protect water quality.
5. A reservoir protection zone should be established around the Moochalabra Reservoir. This should consist of a two-kilometre buffer from the top water level of the reservoir, which is truncated by the catchment boundary. It includes the dam wall itself. Access points should be either signposted or controlled to prevent unauthorised public entry.
6. Camping, fishing and hunting should be excluded from the catchment area.
7. The fencing should be monitored by the Water Corporation, with a view to reviewing the fencing options should stock become a threat to the source water quality.
8. A surveillance program should be established to identify any incompatible land-uses or potential contaminant threats in the Catchment Area, and enforce by-laws under the CAWS Act. Surveillance and the enforcement of the relevant by-laws of the catchment area should be delegated to the Water Corporation.
9. Incidents covered by WESTPLAN – HAZMAT in the Moochalabra Dam Catchment Area should be addressed through the following measures:
    - The Shire of Wyndham – East Kimberley Local Emergency Management Advisory Committee (through the Kimberley Emergency Management District) being familiar with the location and purpose of the Moochalabra Dam Catchment Area.
    - The locality plan for the Moochalabra Dam Catchment Area being provided to the Fire and Rescue Services headquarters for the HAZMAT Emergency Advisory Team.
    - The Water Corporation advising the HAZMAT Emergency Advisory Team during incidents in the Moochalabra Dam Catchment Area.
    - Personnel dealing with WESTPLAN - HAZMAT incidents in the area being given ready access to a locality map of the Catchment Area and training to understand the potential impacts of spills on the surface water resource.
10. Diesel storage facilities should be reviewed to ensure protection of local water resource and environmental values.
11. Implementation of the recommendations in this Plan should be reviewed annually. The Source Protection Plan should be reviewed after five years.

Implementation strategy

No	Description	Implemented by	Timing
1.	Abolish the King River Pool Water Reserve and gazette the revised Moochalabra Dam Catchment Area.	Program Manager, Protection Planning (WRC)	2002/2003
2.	Incorporate water source protection into land-planning strategies.	Shire of Wyndham - East Kimberley, Ministry for Planning	Ongoing
3.	Referral of all rezoning, subdivision and development proposals within the Catchment Area to the WRC.	Shire of Wyndham - East Kimberley, Ministry for Planning, Department of Environmental Protection, Department of Minerals and Energy and other statutory agencies	Ongoing
4.	Erect signs: (i) Develop guidelines for signage. (ii) Determine number and location of signs required. (iii) Erect signs.	 (i) Program Manager, Protection Planning, WRC (ii) Regional Manager, North West Region, WRC Regional Business Manager, North West, Water Corporation (iii) Regional Business Manager, North West, Water Corporation	 (i) 2002 (ii) 2002/2003 (iii) to be determined
5.	Implement a reservoir protection zone around the Moochalabra Dam.	Regional Business Manager, North West, Water Corporation	ASAP
6.	Exclude recreation: (i) Make regulations to exclude camping, fishing and hunting in the catchment under CAWS by-laws. (ii) Enforce through surveillance and by-laws.	 (i) Program Manager, Protection Planning, WRC (ii) Regional Business Manager, Water Corporation	 (i) 2002/2003 (ii) Ongoing

7.	Monitor fencing situation.	Water Corporation	2001/2002
8.	Develop and implement a surveillance program for the Catchment Area: (i) Delegate catchment to Water Corporation for surveillance and bylaw enforcement. (ii) Implement surveillance.	(i) Water and Rivers Commission (ii) Regional Business Manager, North West, Water Corporation	(i) 2002/2003 (ii) Ongoing
9.	Address incidents covered by WESTPLAN – HAZMAT in the Moochalabra Dam Catchment Area through the following measures: (i) The Shire of Wyndham - East Kimberley Local Emergency Management Advisory Committee (through the Kimberley Emergency Management District) being familiar with the location and purpose of the Moochalabra Dam Catchment Area. (ii) The locality plan for the Moochalabra Dam Catchment Area being provided to the Fire and Rescue Services headquarters for the HAZMAT Emergency Advisory Team. (iii) The Water Corporation advising the HAZMAT Emergency Advisory Team during incidents in the Moochalabra Dam Catchment Area. (iv) Personnel dealing with WESTPLAN – HAZMAT incidents in the area being given ready access to a locality map of the Catchment Area and training to understand the potential impacts of spills on the surface water resource.	(i) Shire of Wyndham - East Kimberley Local Emergency Management Advisory Committee (through WRC - North West region) (ii) Program Manager, Protection Planning, WRC (iii) Water Corporation, North West (iv) Shire of Wyndham - East Kimberley Local Emergency Management Advisory Committee	(i) ASAP (ii) 2002/2003 (iii) ongoing (iv) ongoing
10.	Review effectiveness of bunding arrangements for fuel storage and upgrade where necessary.	Water Corporation	ASAP
11.	Review implementation of this plan and recommendations.	Water Quality Protection Branch (WRC)	(i) Review implementation strategy annually (ii) Full review after 5 years

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Laws, A.T. (1991), *Explanatory Notes on the Wyndham 1:250 000 Hydrogeological Sheet*, GSWA hydrogeological series explanatory notes - sheet SE51-6.

NH&MRC (1996), *Australian Drinking Water Guidelines*, National Water Quality Management Strategy, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 1996.

Water Authority of Western Australia (1994), *Wyndham Water Supply Source Review and Assessment*, Report No. WP 173, Water Authority of Western Australia.

Water Corporation (1997), *Wyndham Water Treatment Review*, Planning Report, Infrastructure Development Branch.

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Glossary

Abstraction	Pumping groundwater from an aquifer.
Allocation	The quantity of groundwater permitted to be abstracted by a well licence, usually specified in kilolitres/year (kL/a).
Alluvium (alluvial)	Detrital material which is transported by streams and rivers and deposited.
Aquifer	A geological formation or group of formations able to receive, store and transmit significant quantities of water.
Bore	A narrow, lined hole drilled to monitor or withdraw groundwater.
Catchment	The area of land which intercepts rainfall and contributes the collected water to surface water (streams, rivers, wetlands) or groundwater.
Confined Aquifer	An aquifer that is confined between shale and siltstone beds and therefore contains water under pressure.
Diffuse Source Pollution	Pollution originating from a widespread area, e.g. urban stormwater runoff, agricultural runoff.
Effluent	The liquid, solid or gaseous wastes discharged by a process, treated or untreated.
Groundwater	Water which occupies the pores and crevices of rock or soil.
Hydrogeology	The study of groundwater, especially relating to the distribution of aquifers, groundwater flow and groundwater quality.
Leaching / Leachate	The process by which materials such as organic matter and mineral salts are washed out of a layer of soil or dumped material by being dissolved or suspended in percolating rainwater; the material washed out is known as leachate. Leachate can pollute groundwater and waterways.
m AHD	Australian Height Datum. Height in metres above Mean Sea Level +0.026 m at Fremantle.
Nutrient Load	The amount of nutrient reaching the waterway over a given time (usually per year) from its catchment area.
Nutrients	Minerals dissolved in water, particularly inorganic compounds of nitrogen (nitrate and ammonia) and phosphorus (phosphate) which provide nutrition (food) for plant growth. Total nutrient levels include the inorganic forms of an element plus any bound in organic molecules.

Pesticides	Collective name for a variety of insecticides, fungicides, herbicides, algicides, fumigants and rodenticides used to kill organisms.
Point Source Pollution	Specific localised source of pollution, e.g. sewage or effluent discharge, industrial waste discharge.
Pollution	Water pollution occurs when waste products or other substances, e.g. effluent, litter, refuse, sewage or contaminated runoff, change the physical, chemical, biological or thermal properties of the water, adversely affecting water quality, living species and beneficial uses.
Recharge	Water infiltrating to replenish an aquifer.
Recharge Area	An area through which water from a groundwater catchment percolates to replenish (recharge) an aquifer. An unconfined aquifer is recharged by rainfall throughout its distribution. Confined aquifers are recharged in specific areas where water leaks from overlying aquifers, or where the aquifer rises to meet the surface.
Runoff	Water that flows over the surface from a catchment area, including streams.
Saltwater Intrusion	The inland intrusion of saltwater into a layer of fresh groundwater.
Scheme Supply	Water diverted from a source (or sources) by a water authority or private company and supplied via a distribution network to customers for urban, industrial or irrigation use.
Storage Reservoir	A major reservoir of water created in a river valley by building a dam.
Stormwater	Rainwater which has run off the ground surface, roads, paved areas etc and is usually carried away by drains.
Treatment	Application of techniques such as settlement, filtration and chlorination to render water suitable for specific purposes including drinking and discharge to the environment.
Unconfined Aquifer	An aquifer containing water, the upper surface of which is lower than the top of the aquifer. The upper surface of the groundwater within the aquifer is called the watertable.
Wastewater	Water that has been used for some purpose and would normally be treated and discarded. Wastewater usually contains significant quantities of pollutant.
Water Quality	The physical, chemical and biological measures of water.
Watertable	The upper saturated level of the unconfined groundwater.
Wellfield	A group of bores to monitor or withdraw groundwater.

Appendices

Appendix 1. Land Use Compatibility in Public Drinking Water Source Areas

LAND USE COMPATIBILITY IN PUBLIC DRINKING WATER SOURCE AREAS

Purpose

These notes provide the Commission's views on practices and activities related to the quality of the State's water resources. They are recommendations only, and may be varied at the discretion of the Commission.

The notes provide a basis for developing formal guidelines in consultation with key stakeholders.

Scope

These notes provide guidance on land use within Public Drinking Water Source Areas (PDWSAs).

PDWSAs include Underground Water Pollution Control Areas, Water Reserves and public water supply Catchment Priority 1 Areas declared under the Metropolitan Water Supply, Sewerage and Drainage Act 1909, and the Country Areas Water Supply Act 1947.

The notes are not intended to override the statutory role and policy of other State or local government authorities. Project proponents will need to fulfil their legal responsibilities including those covering land use planning, environmental, health and building permit matters.

PDWSA Protection Framework

The Water and Rivers Commission is responsible for managing and protecting Western Australia's water resources. The Commission has policies for the protection of public drinking water source areas that include three levels of priority classification of lands within PDWSAs.

Priority 1 (P1) source protection areas are defined to ensure that there is **no degradation** of the water source. P1 areas are declared over land where the provision of the highest quality public drinking water is the prime beneficial land use. P1 areas would typically include land under Crown ownership. P1 areas are managed in accordance with the principle of **risk avoidance** and so land development is generally not permitted.

Priority 2 (P2) source protection areas are defined to ensure that there is **no increased risk of pollution** to the water source. P2 areas are declared over land where low intensity development (such as rural) already exists. Protection of public water supply sources is a high priority in these areas. P2 areas are managed in accordance with the principle of **risk minimisation** and so conditional development is allowed.

Priority 3 (P3) source protection areas are defined to **manage the risk of pollution** to the water source. P3 areas are declared over land where water supply sources need to co-exist with other land uses such as residential, commercial and light industrial developments. Protection of P3 areas is achieved through **management guidelines** for land use activities. If the water source does become contaminated, then water may need to be treated or an alternative water source found.

In addition to priority classifications, **well-head protection zones** and **reservoir protection zones** are defined to protect the water source from contamination in the immediate vicinity of production wells and

reservoirs. Well-head protection zones are usually circular, with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. Reservoir protection zones usually consist of a 2 kilometre buffer area around the top water level of a reservoir and include the reservoir itself. These zones do not extend outside water reserves. Special conditions apply within these zones.

Tables showing land use compatibility with the Commission's PDWSA protection strategy

These tables should be used as a guideline only. More detailed information on the Commission's recommendations as activity guidelines or notes is available for some land uses. These can be found on the 'Protecting Water' web page on the Commission's Internet site (www.wrc.wa.gov.au). Alternatively information relating to land use and development within PDWSAs including those not listed in the tables, can be obtained from the Commission's Water Quality Protection Branch.

Existing activities

The Commission recognises that many activities were established before the introduction of these tables. The Commission will negotiate with the operators of non-conforming activities to develop agreed management practices to minimise the impact on water resources. The Commission may also provide information to operators on best management practices for existing compatible and conditional activities.

Proposed activities

These tables do not replace the need for assessment of proposed activities by the Commission. Please consult the Commission for advice on any land use proposals in Public Drinking Water Source Areas that may impact on water resources.

Definitions used in the following tables

Compatible The land use is compatible with the management objectives of the priority classification.

Conditional The land use can be compatible with the management objectives of the priority classification, with appropriate site management practices. All conditional developments / activities should be referred to the Commission for assessment on a case specific basis.

Incompatible The land use is incompatible with the management objectives of the priority classification. Any such development proposals received may be referred for formal Environmental Impact Assessment under Environmental Protection Act.

Extensive Where limited additional inputs are required to support the desired land use. eg supplementary animal feed only during seasonal dry periods.

Intensive Where regular additional inputs are required to support the desired land use. eg irrigation, fertilisers and non forage animal feed dominates.

More information

We welcome your comment on these notes. They will be updated from time to time as comments are received or activity standards change. The Commission is progressively developing Water Quality Protection Notes and Guidelines covering land uses described in the following tables. Advice on available guidance documents may be obtained by contacting the Commission.

If you wish to comment on the notes or require more information, please contact the Commission's Water Quality Protection Branch at the Hyatt Centre in East Perth.
Phone: (08) 9278 0300 (business hours) or Fax:(08) 9278 0585.
E-mail: use the {feedback} section at our Internet address (http://www.wrc.wa.gov.au) citing the topic and version.

Tables showing land -use compatibility with PDWSA protection objectives

AGRICULTURE – ANIMALS

Land use	Priority 1	Priority 2	Priority 3
Animal saleyards and stockyards[14]	Incompatible	Incompatible [7]	Conditional [7]
Apiaries on Crown land	Conditional	Conditional	Conditional
Aquaculture eg. crustaceans, fish, algae	Incompatible	Conditional	Conditional
Dairy sheds	Incompatible	Incompatible [11, 15]	Conditional [15]
Feedlots	Incompatible	Incompatible	Conditional
Livestock grazing - pastoral leases	Conditional	Compatible	Compatible
Livestock grazing - broad acre (extensive)	Incompatible	Conditional [11]	Compatible
Livestock grazing (intensive)	Incompatible	Incompatible	Conditional [11]
Piggeries	Incompatible	Incompatible	Incompatible
Poultry farming (housed)	Incompatible	Conditional	Conditional
Stables	Incompatible	Conditional	Compatible

AGRICULTURE – PLANTS

Land use / practices	Priority 1	Priority 2	Priority 3
Broad land cropping i.e. non-irrigated	Incompatible	Conditional [1]	Compatible
Floriculture (extensive)	Incompatible	Conditional	Compatible
Floriculture (intensive)	Incompatible	Incompatible	Conditional
Horticulture- hydroponics	Incompatible	Conditional	Conditional
Horticulture - market gardens	Incompatible	Incompatible	Conditional
Orchards	Incompatible	Conditional	Compatible
Nurseries (potted plants)	Incompatible	Conditional	Compatible
Silviculture (tree farming)	Conditional	Conditional	Compatible
Soil amendment (clean sand, loam, clay, peat)	Incompatible	Conditional	Compatible
Soil amendment (industry by-products & biosolids)	Incompatible	Incompatible	Conditional
Turf farms	Incompatible	Incompatible	Conditional
Viticulture (wine & table grapes)	Incompatible	Conditional	Compatible

DEVELOPMENT – COMMERCIAL

Land use	Priority 1	Priority 2	Priority 3
Aircraft servicing	Incompatible	Incompatible	Conditional [6]
Airports or landing grounds	Incompatible	Incompatible	Conditional [6]
Amusement centres	Incompatible	Incompatible	Compatible [6]
Automotive businesses	Incompatible	Incompatible	Conditional [6]
Boat servicing	Incompatible	Incompatible	Conditional [6]
Catteries	Incompatible	Compatible	Compatible
Caravan and trailer hire	Incompatible	Incompatible	Conditional [6]
Chemical manufacture / formulation	Incompatible	Incompatible	Conditional [6]
Consulting rooms	Incompatible	Incompatible [7]	Compatible [6]
Concrete batching and cement products	Incompatible	Incompatible	Conditional
Cottage Industries	Conditional	Conditional	Compatible
Dog kennels	Incompatible	Conditional	Conditional
Drive in / take-away food shops	Incompatible	Incompatible	Compatible [6]
Drive -in theatres	Incompatible	Incompatible	Compatible [6]
Dry cleaning premises	Incompatible	Incompatible	Conditional [6]
Dye works	Incompatible	Incompatible	Conditional [6]
Farm supply centres	Incompatible	Incompatible [7]	Conditional
Fertiliser manufacture / bulk storage depots	Incompatible	Incompatible	Conditional
Fuel depots	Incompatible	Incompatible	Conditional
Garden centres	Incompatible	Incompatible	Compatible
Laboratories (analytical , photographic)	Incompatible	Incompatible	Conditional [6]
Markets	Incompatible	Incompatible	Compatible [6]

Land use	Priority 1	Priority 2	Priority 3
Mechanical servicing	Incompatible	Incompatible	Conditional [6]
Metal production / finishing	Incompatible	Incompatible	Incompatible
Milk transfer depots	Incompatible	Incompatible	Conditional
Pesticide operator depots	Incompatible	Incompatible	Incompatible
Restaurants and taverns	Incompatible	Incompatible	Compatible [6]
Service stations	Incompatible	Incompatible	Conditional [6]
Shops and shopping centres	Incompatible	Incompatible [7]	Compatible [6]
Transport & municipal works depots	Incompatible	Incompatible	Conditional
Vehicle parking (commercial)	Incompatible	Incompatible	Compatible
Vehicle wrecking and machinery	Incompatible	Incompatible	Conditional
Veterinary clinics / hospitals	Incompatible	Incompatible [7]	Conditional [6]
Warehouses	Incompatible	Incompatible [7]	Conditional [6]

DEVELOPMENT – INDUSTRIAL

Land use	Priority 1	Priority 2	Priority 3
Heavy Industry	Incompatible	Incompatible	Incompatible
Light or general Industry	Incompatible	Incompatible	Conditional [6]
Power Stations / Gasworks	Incompatible	Incompatible	Incompatible
Petroleum refineries	Incompatible	Incompatible	Incompatible

DEVELOPMENT – URBAN

Land use	Priority 1	Priority 2	Priority 3
Aged and dependent persons group dwellings	Incompatible	Incompatible	Compatible [6]
Cemeteries	Incompatible	Incompatible	Conditional
Civic buildings	Incompatible	Conditional [7]	Compatible [6]
Clubs -sporting or recreation	Incompatible	Conditional	Compatible [6]
Community halls	Incompatible	Conditional [7]	Compatible
Family day care centres	Incompatible	Incompatible [7]	Compatible [6]
Funeral parlours	Incompatible	Incompatible	Compatible [6]
Health centres	Incompatible	Incompatible	Compatible [6]
Hospitals	Incompatible	Incompatible	Conditional [6]
Medical, veterinary, dental centres	Incompatible	Incompatible	Compatible [6]
Toilet blocks and change rooms	Incompatible [7]	Conditional	Compatible

EDUCATION / RESEARCH

Land use	Priority 1	Priority 2	Priority 3
Community education centres	Conditional [7]	Conditional [7]	Compatible [6]
Primary / Secondary Schools	Incompatible	Incompatible	Compatible [6]
Scientific Research	Conditional	Conditional	Compatible
Tertiary Education Facilities	Incompatible	Incompatible	Conditional [6]

EXPLORATION, MINING AND MINERAL PROCESSING

Land use	Priority 1	Priority 2	Priority 3
Extractive industries (sand, clay, peat and rock)	Conditional [2]	Conditional [2]	Conditional [2]
Mineral and energy source exploration	Conditional [4]	Conditional [4]	Conditional [4]
Mining	Conditional [4]	Conditional [4]	Conditional [4]
Mineral processing	Incompatible	Incompatible	Conditional [4]
Oil or gas extraction / decontamination for transport	Conditional [4]	Conditional [4]	Conditional [4]
Tailings dams	Incompatible	Incompatible	Conditional [4]

PROCESSING OF ANIMALS / ANIMAL PRODUCTS

Land use	Priority 1	Priority 2	Priority 3
Animal product rendering works	Incompatible	Incompatible	Incompatible
Abattoirs	Incompatible	Incompatible	Incompatible
Dairy product factories	Incompatible	Incompatible	Conditional [6]
Food Processing	Incompatible	Incompatible	Conditional [6]
Manure stockpiling /processing facilities	Incompatible	Incompatible [7]	Conditional
Tanneries	Incompatible	Incompatible	Incompatible
Wool-scourers	Incompatible	Incompatible	Incompatible

PROCESSING OF PLANTS / PLANT PRODUCTS

Land use	Priority 1	Priority 2	Priority 3
Breweries	Incompatible	Incompatible	Conditional [6]
Composting / soil blending (commercial)	Incompatible	Incompatible	Conditional
Forestry product processing- chip-mills, pulp / paper, timber preservation, wood / fibre works	Incompatible	Incompatible	Conditional
Vegetable / food processing	Incompatible	Incompatible	Conditional [6]
Wineries	Incompatible	Conditional [15, 18]	Conditional [15]

SUBDIVISION

Land use	Priority 1	Priority 2	Priority 3
Rural subdivision to a minimum lot size of 4 ha	Incompatible	Compatible	Compatible
Rural subdivision to a lot size less than 4 ha	Incompatible	Incompatible	Incompatible
Special rural subdivision to a minimum lot size of 2 ha	Incompatible	Conditional [8, 9]	Conditional [8]
Special rural subdivision to a lot size between 1 and 2 ha	Incompatible	Incompatible	Conditional [8, 9]
Special rural subdivision to a lot size less than 1 ha	Incompatible	Incompatible	Incompatible [9]
Urban subdivision	Incompatible	Incompatible	Compatible [6]
Industrial subdivision	Incompatible	Incompatible	Conditional [6]

Note: Subdivision of lots to any size within Priority 1 areas is incompatible

SPORT AND RECREATION

Land use	Priority 1	Priority 2	Priority 3
Equestrian centres	Incompatible	Incompatible	Compatible
Golf courses	Incompatible	Incompatible	Conditional [1]
Motor sports ie permanent racing facilities	Incompatible	Incompatible	Conditional
Public swimming pools	Incompatible	Incompatible	Conditional
Recreational parks -irrigated	Incompatible	Incompatible	Conditional [1]
Rifle ranges	Incompatible	Conditional	Compatible

STORAGE/ PROCESSING OF TOXIC AND HAZARDOUS SUBSTANCES (THS)

Land use	Priority 1	Priority 2	Priority 3
Above ground storage of THS	Conditional	Conditional	Conditional
Underground storage tanks for THS	Incompatible	Incompatible	Conditional

TOURISM ACCOMMODATION

Land use	Priority 1	Priority 2	Priority 3
Bed and breakfast accommodation	Incompatible	Conditional [16]	Compatible
Caravan parks	Incompatible	Incompatible	Conditional [6]
Farm stay accommodation, rural chalets	Incompatible	Conditional [16]	Compatible
Motels, hotels, lodging houses, hostels, resorts	Incompatible	Incompatible	Compatible [6]

WASTE TREATMENT AND MANAGEMENT

Land use	Priority 1	Priority 2	Priority 3
Injection of liquid wastes into ground water	Incompatible	Incompatible	Incompatible
Landfills -Class I, II or III	Incompatible	Incompatible	Conditional
Land use	**Priority 1**	**Priority 2**	**Priority 3**
Landfills -Class IV and V	Incompatible	Incompatible	Incompatible
Recycling depots	Incompatible	Incompatible	Conditional
Refuse transfer stations	Incompatible	Incompatible	Conditional
Sewers (gravity)	Incompatible	Incompatible	Compatible
Sewers (pressure mains)	Incompatible	Conditional	Compatible
Sewage pump stations	Incompatible	Conditional	Conditional
Used tyre storage / disposal facilities	Incompatible	Incompatible	Incompatible
Wastewater treatment plants	Incompatible	Incompatible	Conditional
Wastewater application to land	Incompatible	Incompatible [17]	Conditional

OTHER DEVELOPMENTS

Land use	Priority 1	Priority 2	Priority 3
Caretaker's housing	Incompatible [7]	Conditional	Compatible
Communications receivers / transmitters	Conditional	Conditional	Conditional
Construction projects (not shown elsewhere)	Conditional	Conditional	Conditional
Drinking water treatment plants	Conditional	Conditional	Conditional
Forestry	Conditional [1]	Compatible	Compatible
Major transport routes	Incompatible	Conditional [10]	Compatible
Construction /Mining camps,	Conditional	Conditional	Conditional
Prisons	Incompatible	Incompatible	Conditional [6]
National and Regional Parks [13]	Compatible	Compatible	Compatible
Nature reserves	Compatible	Compatible	Compatible

Table reference notes:

1. Conditions may limit fertiliser and pesticide application.

2. Conditions cover the storage of fuels and chemicals, the depth of excavation in relation to the water table with specified guidelines for rehabilitation.

3. Conditions cover the storage and use of fuel and other chemicals.

4. Conditions placed via the Department of Minerals and Energy lease and / or Environment Minister's / Department of Environmental Protection approval.

5. Special rural development must have appropriate provisions under the Town Planning Scheme, to prevent introduction of land uses and practices that pose an unacceptable risk to water resources.

6. Must be connected to deep sewerage, except where exemptions apply under the current Government Sewerage Policy.

7. May be accepted if this facility is necessary to support acceptable land use in the area and is consistent with State and local government planning strategies.

8. Lots should only be created where land capability allows effective on-site soakage disposal of treated wastewater. Conditions apply to siting of wastewater disposal systems in areas with poor land drainage and / or a shallow depth to groundwater, animals are held or fertiliser is applied. Alternative wastewater treatment systems, where approved by the Health Department, may be accepted with maintenance requirements.

9. An average rather than minimum lot size may be acceptable if the proponent can demonstrate that the water quality objectives of the source protection area are met, and caveats are placed on titles of specified blocks stating that further subdivision cannot occur.

10. Conditions cover road design, construction and the types of goods that may be carried.

11. May be permitted if animal stocking levels (number of animals per hectare) are consistent with source protection objectives.

12. May be permitted if the type, volume and storage mechanisms for chemicals are compatible with water quality protection objectives.

13. Visitor and management infrastructure and facilities must be appropriately sited and maintained.

14. This does not include on-farm / pastoral lease stock-yards used for animal husbandry

15. Waste management practices must be compatible with source protection objectives.

16. Conditions apply on density of accommodation in Priority 2 areas.

17. May be permitted if the quantity and quality are compatible with water quality protection objectives.

18. Size of annual grape crush does not exceed 500 tonnes and grapes sourced from operator's vineyards within the P2 area.

Appendix 1: Plates of the Moochalabra Dam Catchment Area

Plate 1. Moochalabra Dam showing the furrows at the toe of the dam waiting for revegetation

Plate 2. Access to Moochalabra Reservoir is controlled

Plate 3. Bunding arrangements for diesel storage at the Moochalabra Pump Station. Bunding is inadequate to capture 'jetting' leaks.