TI-TREE REGION WATER RESOURCE STRATEGY

Northern Territory Government
Department of Infrastructure, Planning and Environment

TI-TREE REGION
WATER RESOURCE STRATEGY 2002

ISBN 0 7245 4826 2

Northern Territory Government
Department of Infrastructure, Planning and Environment

ISBN 072454826-2

9 780724 548262

MINISTER'S MESSAGE

The *Ti-Tree Region Water Resource Strategy* is the Northern Territory's first water allocation plan, made under the *Water Act* 1992. The principles of water reform brought into play by that Act originated several years ago under National Competition Policy reforms, which were endorsed by the Council of Australian Governments.

I have pleasure in releasing this strategy for several reasons.

The first is the importance of the Ti-Tree Region to Central Australia and the Northern Territory. The Ti-Tree Region is widely recognised as having potential for further development, particularly in relation to the irrigated horticulture industry; however, there are limits to which the region's water resources can be used to support economic growth, sustain social development and maintain environmental systems. This strategy assigns those limits for part of the Ti-Tree Region, designated the Ti-Tree Water Control District. It aims for the best long-term use of water, balancing social and environmental protection needs whilst allowing for economic growth.

I am pleased that this *Ti-Tree Region Water Resource Strategy* has been developed through a successful regional partnership, with landholders, communities and Northern Territory government agencies working together as part of the Ti-Tree Water Advisory Committee. The strategy is for those in the region who need, use and manage water resources including horticulturalists, pastoralists, communities and government agencies.

The strategy is also a starting point for better understanding of the opportunities for balancing regional development with the conservation of our water resources. It explains the behaviour and interaction of rivers and groundwaters, and describes the range of regional water needs and how they will be met, thereby setting a direction for managing water use within sustainable limits. It guides future assessment, planning, development and management activities.

In accordance with the *Water Act*, I have determined that the *Ti-Tree Region Water Resource Strategy* will have a lifetime of ten years and will be subject to a review within five years, led by the Ti-Tree Water Advisory Committee. I hope that this successful regional partnership, which is an example to other communities across the Territory, will continue for many years to come.

KON VATSKALIS

TABLE OF CONTENTS

PART 1. THE REGION

Map 1 shows the region covered by this strategy.

The Ti-Tree Water Control District is over 14,000 square kilometres in extent and includes all of the Ti-Tree Groundwater Basin and its surrounding catchments.

A population of less than 500 is dispersed over this area: in several small communities including Ti-Tree, Nutriya, Pmara Jutunta and Wilora; on irrigation farms in the western and central zones of the Water Control District; and at Aileron, Pine Hill, Atartinga and Stirling pastoral properties.

The Stuart Highway, the Alice Springs to Darwin Railway and the pipeline from Mereenie Gas Field cross the district. Alice Springs is 200 kilometres to the south and Darwin is 1,300 kilometres to the north.

All water supplies – for town and community use, irrigation and pastoral homestead and stock needs – are drawn from groundwater. Most of these supplies rely on aquifers in the Ti-Tree Basin. Aquifers of good quality and yield are accessible across about 1,000 square kilometres in the district.

Land overlying the Ti-Tree Basin is generally suitable for irrigated horticulture. Extensive areas of sandplain with well-drained soils present few constraints for crop growth. Broad scale mapping of soils has been completed for Pine Hill pastoral property and more localised information is available for selected sites.

Pastoral production and irrigated horticulture are the major economic activities. Irrigation development now totals some 300 hectares, with annual production nearing $20 million. It is likely that the irrigated area on existing holdings will double in the near future.

PART 2. KNOWN WATER RESOURCES

2.1 Overview

The aquifers of Ti-Tree Basin are the major water resource in the region. The basin is a large underground reservoir, recharged directly by rainfall and by seepage from river channels and their floodout areas.

There is an overall flow of groundwater towards the northern part of the basin. Depth below ground level is sufficiently shallow in the northern part that groundwater is lost through evaporation. This loss is the natural groundwater discharge from the basin.

Over long periods of time, the natural groundwater discharge will be balanced by recharge from rainfall and streamflow. Sustainable use of the Ti-Tree Basin must be based on a sound understanding of this regional water balance.

2.2 Rainfall

A continuous record of daily rainfall is available at Ti-Tree between 1922 and 1948 and between 1949 and 1976 at Aileron. Average annual rainfall at Ti-Tree was 290 mm and 270 mm at Aileron. Patchy data is available for later years at each location.

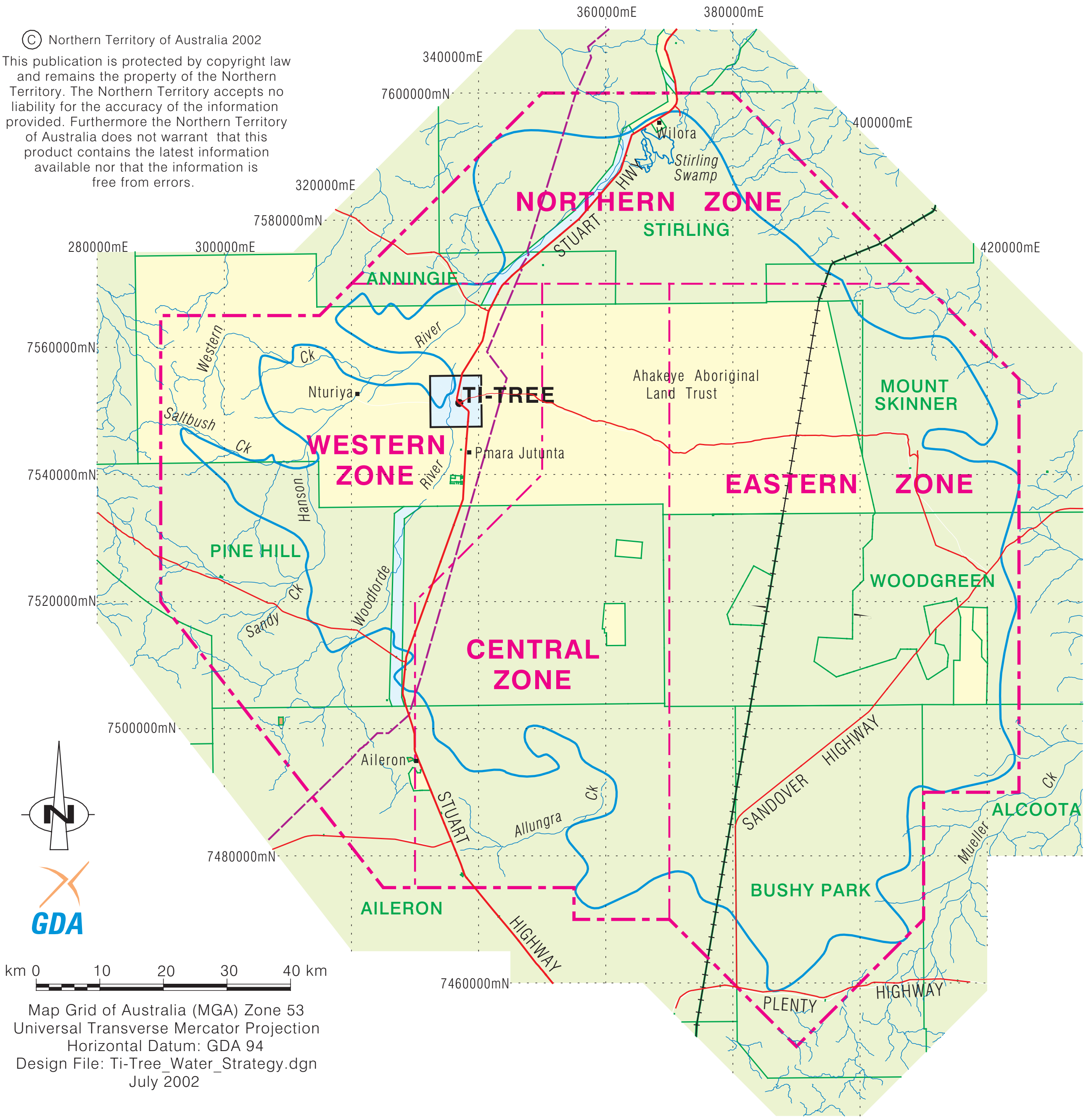
Monthly total rainfalls of more than 100 mm threshold are of specific interest. It is most likely that this threshold must be reached before regional rivers will flow, or rainfall seepage will reach regional aquifers.

Over the 54 years between 1922 and 1976, the records show that 28 years had at least one month in which the 100 mm threshold was reached or exceeded. This suggests that recharge to aquifers can be expected once every two years, on average.

The longest period without meeting the threshold was four years at Ti-Tree and five years at Aileron. While threshold rains occur quite regularly and reliably over the Ti-Tree Basin, only a small fraction reaches its aquifers.

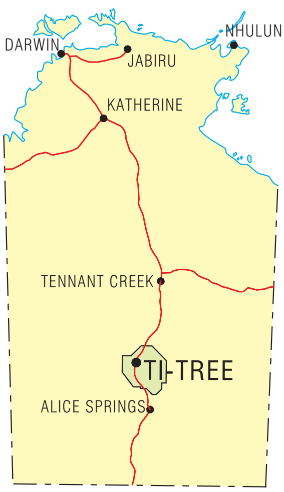
Chemical and isotopic analysis of the aquifer waters indicates that long-term average recharge from direct rainfall is about 2 mm/year, equivalent to 2 ML/year for each square kilometre of the Ti-Tree Basin.

© Northern Territory of Australia 2002
This publication is protected by copyright law and remains the property of the Northern Territory. The Northern Territory accepts no liability for the accuracy of the information provided. Furthermore the Northern Territory of Australia does not warrant that this product contains the latest information available nor that the information is free from errors.



Map Grid of Australia (MGA) Zone 53
Universal Transverse Mercator Projection
Horizontal Datum: GDA 94
Design File: Ti-Tree_Water_Strategy.dgn
July 2002

LOCALITY PLAN



GENERAL FEATURES

- General Extent of Ti-Tree Basin
- Property Boundary
- Highway
- Minor Road
- River or Creek
- Gas Pipeline
- Railway
- Water Control District Boundary
- Community

LAND TENURE

- Pastoral
- Freehold
- Vacant Crown Land
- Reserve

For further information contact:
Director Resource Development, Natural Resources Division,
Department of Infrastructure, Planning and Environment.
Ph. (08) 8999 3630, Fax. (08) 8999 4403
Goyder Centre, Chung Wah Terrace, Palmerston,
Northern Territory of Australia.

Northern Territory Government
Department of Infrastructure, Planning and Environment

TI-TREE REGION
WATER RESOURCE STRATEGY 2002

REGIONAL SETTING

Map 1

2.3 Surface Water

Map 2 shows the surface water features of the region.

The district contains all of the Hanson River catchment south of Mount Stirling. Its largest tributary is the Woodforde River. Both rivers flow across the north western part of the Ti-Tree Basin. Mueller Creek crosses a small portion of the south east corner of the basin. No other rivers cross the basin but runoff drains onto floodout areas from several catchments around the edge of the basin.

Table 1: Catchment and Floodout Areas for Ti-Tree Basin

	Area Draining onto Ti-Tree Basin	Floodout Area over Ti-Tree Basin
South of Ti Tree		
Hanson River	1,200 km^2	130 km^2
Woodforde River	470 km^2	90 km^2
Allungra Creek	450 km^2	50 km^2
Mueller Creek	300 km^2	10 km^2
Streams near Mt Skinner	280 km^2	80 km^2
TOTAL	**2,700 km^2**	**360 km^2**
North of Ti Tree		
Hanson River	1,200 km^2	230 km^2
Streams near Wilora	700 km^2	40 km^2
TOTAL	**1,900 km^2**	**270 km^2**

Stream records have been collected only on the Woodforde River. Water levels have been monitored continuously since 1975. Discharges have been measured only a few times however, and the height data cannot be reliably translated into volumetric flow rates.

The water level data show that the Woodforde River probably flowed in 18 out of the 21 years up to 1996. Comparing river and rainfall data shows that whenever monthly rainfall exceeded 100 mm there was at least a one metre rise in the river. Raised river levels lasted for only one or two months, almost always between December and March.

The river height record confirms the highly ephemeral nature of streamflow in the region. The potential for dams has not been assessed but is considered to be very low, other than perhaps for stock water storages.

No permanent surface water bodies exist in the region. Stirling Swamp occasionally forms at the northern edge of Ti-Tree Basin, collecting flood runoff from the Hanson River and the ridges to the east of Wilora. This swamp is believed to act as an evaporation area for shallow groundwater leaving the basin.

2.4 Groundwater

Maps 3 and 4 show groundwater features of the region.

General Extent and Variability

Total Dissolved Solids, referred to as salinity, broadly indicates the potential uses of groundwater. Drinking water and irrigation supplies are generally preferred to have salinity of less than 1,000 mg/L (or 1,000 parts per million). Some irrigated crops tolerate salinity up to 1,500 mg/L. There is little or no economic use, at this time, for water with salinity over 1,500 mg/L, other than as stock water.

Table 2: Water Quality of Ti-Tree Basin

Salinity Level	Groundwater Extent
Under 1,000 mg/L	1,800 km^2
1,000 to 1,500 mg/L	4,300 km^2
Over 1,500 mg/L	2,500 km^2

The best quality groundwaters are found in thin layers of sand and gravel within aquifer systems that are generally more than 40 metres thick. It is most likely, however, that water may only be economically extracted over 20 to 30 metres of the thickness in each aquifer system.

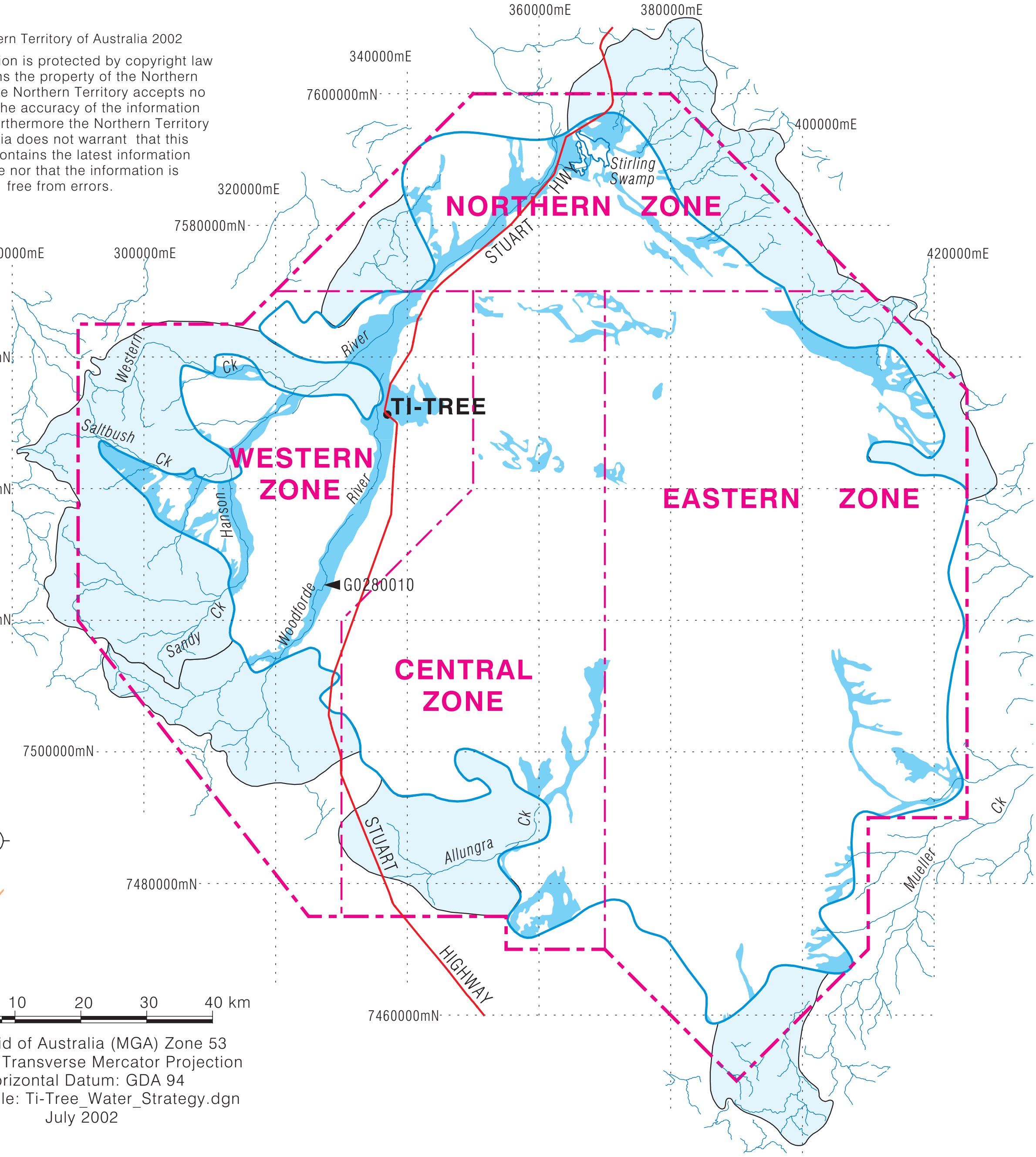
At the broad regional scale, the best quality aquifer systems yield between 7 and 10% of their volume as water supplies. This means that an overall average of 20 ML is potentially available for each hectare of aquifer area.

Also, the rate at which aquifers can deliver water to bores varies across the basin. This variability is described in terms of typical bore pump rates of either greater or less than 5 L/second.

Table 3: Extent of Better Quality Water in Ti-Tree Basin

	Western Zone	Central Zone	Eastern Zone	TOTAL
Salinity under 1,000 ppm and bore supply likely to be greater than 5 L/second				
Groundwater volume stored	150,000 ML	1,040,000 ML	950,000 ML	**2,140,000 ML**
Aquifer area	7,500 ha	52,000 ha	47,500 ha	**107,000 ha**
Salinity under 1,000 ppm and bore supply likely to be less than 5 L/second				
Groundwater volume stored	530,000 ML	290,000 ML	610,000 ML	**1,420,000 ML**
Aquifer area	26,500 ha	14,500 ha	30,500 ha	**71,000 ha**

© Northern Territory of Australia 2002
This publication is protected by copyright law and remains the property of the Northern Territory. The Northern Territory accepts no liability for the accuracy of the information provided. Furthermore the Northern Territory of Australia does not warrant that this product contains the latest information available nor that the information is free from errors.



GDA

km 0 10 20 30 40 km

Map Grid of Australia (MGA) Zone 53
Universal Transverse Mercator Projection
Horizontal Datum: GDA 94
Design File: Ti-Tree_Water_Strategy.dgn
July 2002

GENERAL FEATURES

- Highway
- River or Creek
- Water Control District

SURFACE WATER FEATURES

- General Extent of Ti-Tree Basin
- ◄ G0280010 Gauging Station
- Surface Water Catchment Areas
- Alluvium in Active Channel Deposits and Floodplains

For further information contact:
Director Resource Development, Natural Resources Division,
Department of Infrastructure, Planning and Environment.
Ph. (08) 8999 3630, Fax. (08) 8999 4403
Goyder Centre, Chung Wah Terrace, Palmerston,
Northern Territory of Australia.

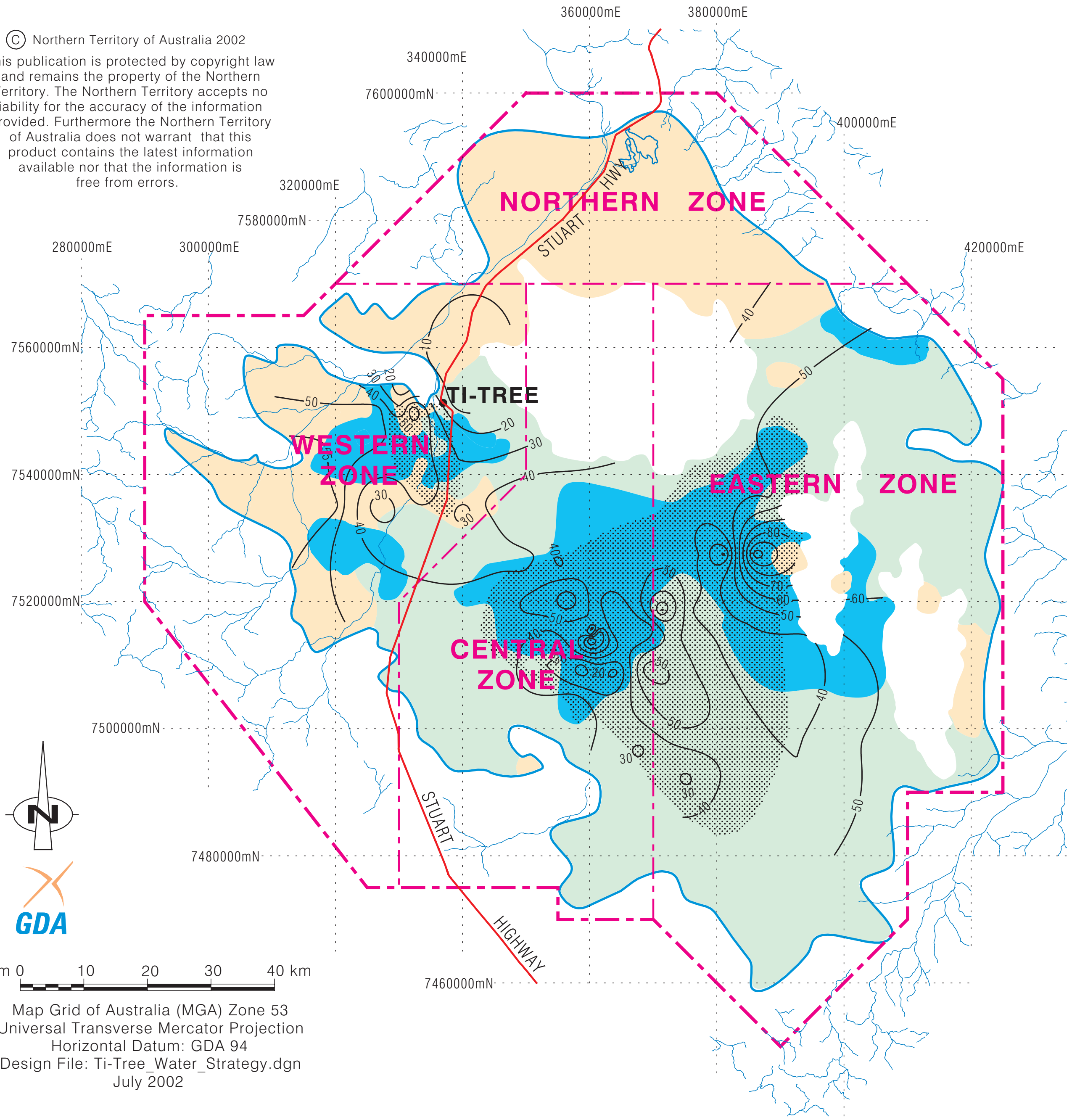
TI-TREE REGION
WATER RESOURCE STRATEGY 2002

SURFACE WATER RESOURCES

Map 2

Northern Territory Government
Department of Infrastructure, Planning and Environment

© Northern Territory of Australia 2002
This publication is protected by copyright law and remains the property of the Northern Territory. The Northern Territory accepts no liability for the accuracy of the information provided. Furthermore the Northern Territory of Australia does not warrant that this product contains the latest information available nor that the information is free from errors.



Map Grid of Australia (MGA) Zone 53
Universal Transverse Mercator Projection
Horizontal Datum: GDA 94
Design File: Ti-Tree_Water_Strategy.dgn
July 2002

GENERAL FEATURES

- Highway
- River or Creek
- Water Control District

AQUIFER FEATURES

- General Extent of Ti-Tree Basin
- Groundwater Yield > 5.0 L/s
- Aquifer Thickness - metres (35)
- Areas containing groundwater with Total Dissolved Solids less than 1000 mg/L
- Areas containing groundwater with Total Dissolved Solids between 1000 and 1500 mg/L
- Areas containing groundwater with Total Dissolved Solids greater than 1500 mg/L

For further information contact:
Director Resource Development, Natural Resources Division,
Department of Infrastructure, Planning and Environment.
Ph. (08) 8999 3630, Fax. (08) 8999 4403
Goyder Centre, Chung Wah Terrace, Palmerston,
Northern Territory of Australia.

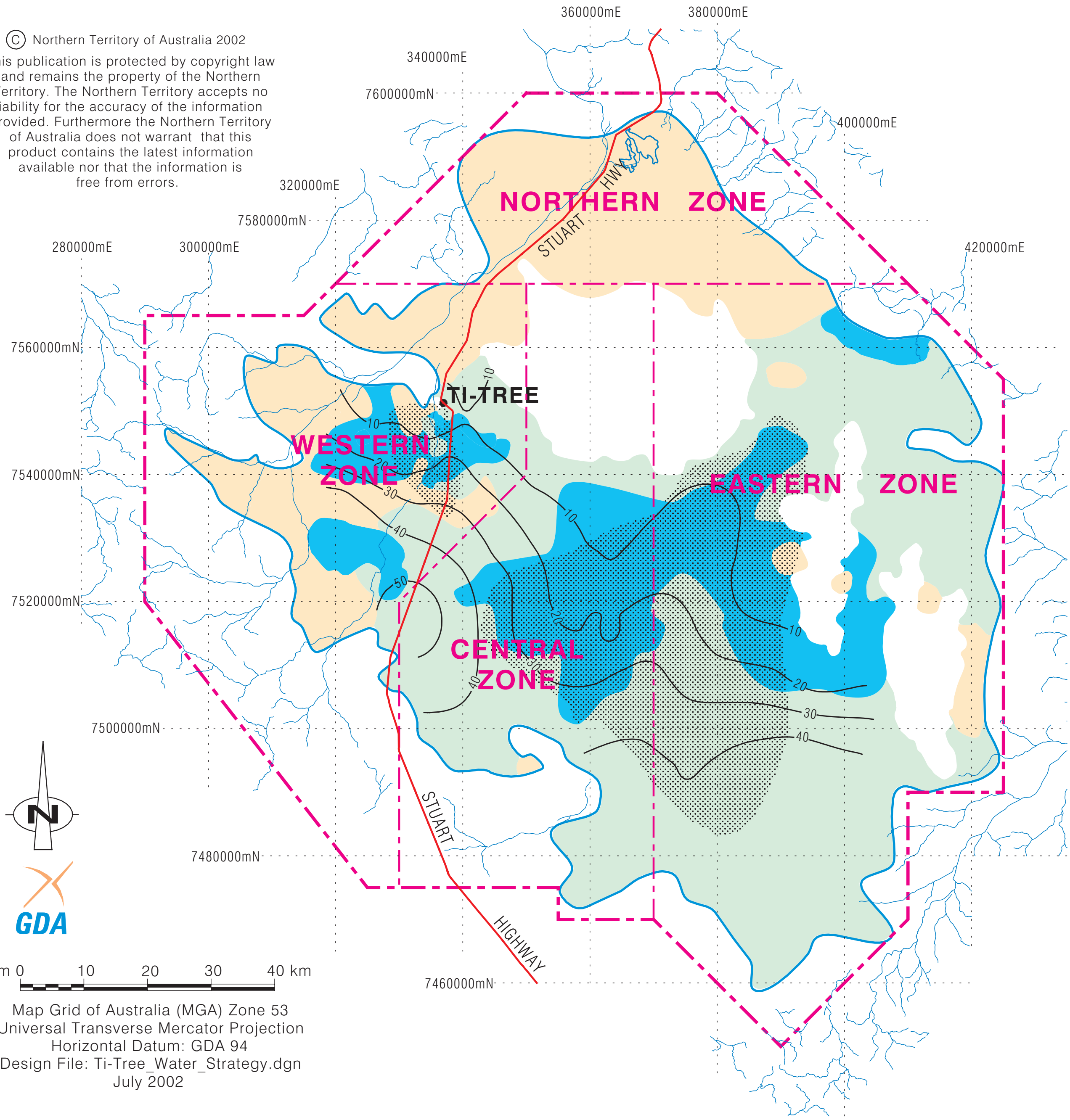
Northern Territory Government
Department of Infrastructure, Planning and Environment

TI-TREE REGION
WATER RESOURCE STRATEGY 2002

AQUIFERS

Map 3

© Northern Territory of Australia 2002
This publication is protected by copyright law and remains the property of the Northern Territory. The Northern Territory accepts no liability for the accuracy of the information provided. Furthermore the Northern Territory of Australia does not warrant that this product contains the latest information available nor that the information is free from errors.



Map Grid of Australia (MGA) Zone 53
Universal Transverse Mercator Projection
Horizontal Datum: GDA 94
Design File: Ti-Tree_Water_Strategy.dgn
July 2002

GENERAL FEATURES

- Highway
- River or Creek
- Water Control District

AQUIFER FEATURES

- General Extent of Ti-Tree Basin
- Groundwater Yield > 5.0 L/s
- Depth to Watertable - metres
- Areas containing groundwater with Total Dissolved Solids less than 1000 mg/L
- Areas containing groundwater with Total Dissolved Solids between 1000 and 1500 mg/L
- Areas containing groundwater with Total Dissolved Solids greater than 1500 mg/L

For further information contact:
Director Resource Development, Natural Resources Division,
Department of Infrastructure, Planning and Environment.
Ph. (08) 8999 3630, Fax. (08) 8999 4403
Goyder Centre, Chung Wah Terrace, Palmerston,
Northern Territory of Australia.

Northern Territory Government
Department of Infrastructure, Planning and Environment

TI-TREE REGION
WATER RESOURCE STRATEGY 2002

DEPTH TO WATERTABLE

Map 4

Recharge

Analysis of groundwater chemistry shows that direct rainfall infiltration into the Ti-Tree Basin over the past several thousand years has averaged about 2 mm/year.

In the more recent past, over the last 30 years, recharge has been recorded in monitoring bores throughout the basin. Water levels can quickly rise by up to several metres following heavy rainfall.

An estimate has been made of recharge in the Ti-Tree Farms area using water level data from monitoring bores. Recharge to groundwater in this area between 1967 and 1975 was estimated to total 12,000 ML.

In order to estimate recharge more widely throughout the basin, a simple catchment model has been used to calculate combined recharge both directly from rainfall and from river floods. The model calculates direct recharge from rainfall at an average rate of 2 mm/year. Flood recharge from catchment runoff is only calculated when rainfall exceeds 100 mm/month and is equivalent to less than 1.5% of annual rainfall.

Rainfall recorded between 1921 and 1983 at Ti-Tree and Aileron is used in the model. Calibration of the model relies on calculated recharge in the Ti-Tree Farms area matching the previous estimate of 12,000 ML from 1967 to 1975, that was based on monitored groundwater levels.

Applying the model over the entire Ti-Tree Basin then leads to the following summary of average recharge rates for any 10 year period.

Table 4: Groundwater Recharge in Ti-Tree Basin

Ti-Tree Basin Average 10 year Recharge Rates	Western Zone	Central Zone	Eastern Zone
Flood recharge	2,980 ML/yr	2,120 ML/yr	1,320 ML/yr
Direct rainfall	690 ML/yr	1,350 ML/yr	1,580 ML/yr
TOTAL	**3,670 ML/yr**	**3,470 ML/yr**	**2,900 ML/yr**

Regional Groundwater Throughflow

Regional mapping of water levels shows that there is a general flow of groundwater from south to north. This flow splits to the west and east of Mt Solitary and then recombines in the Hanson River valley at Mt Stirling. Shallow groundwater may be lost by evaporation in this area, from Stirling Swamp.

Groundwater levels over the western, central and eastern zones of the basin were mapped in 1985 and 1994. Localised water level depressions in the irrigation areas had little effect and natural processes of groundwater flow dominated at the broad regional scale.

The difference in groundwater level contours between 1985 and 1994 showed that the average outflow rates were 2,000 ML/yr from the western zone, and 5,600 ML/yr from the central zone.

2.5 Summary

The preceding pages are a severe distillation of rigorous and extensive assessment work to date. They also contain extrapolations, approximations and sheer guesswork. In full light of this disclaimer, current knowledge and understanding of the occurrence and behaviour of water resources in the Ti-Tree Basin is summarised in the table below.

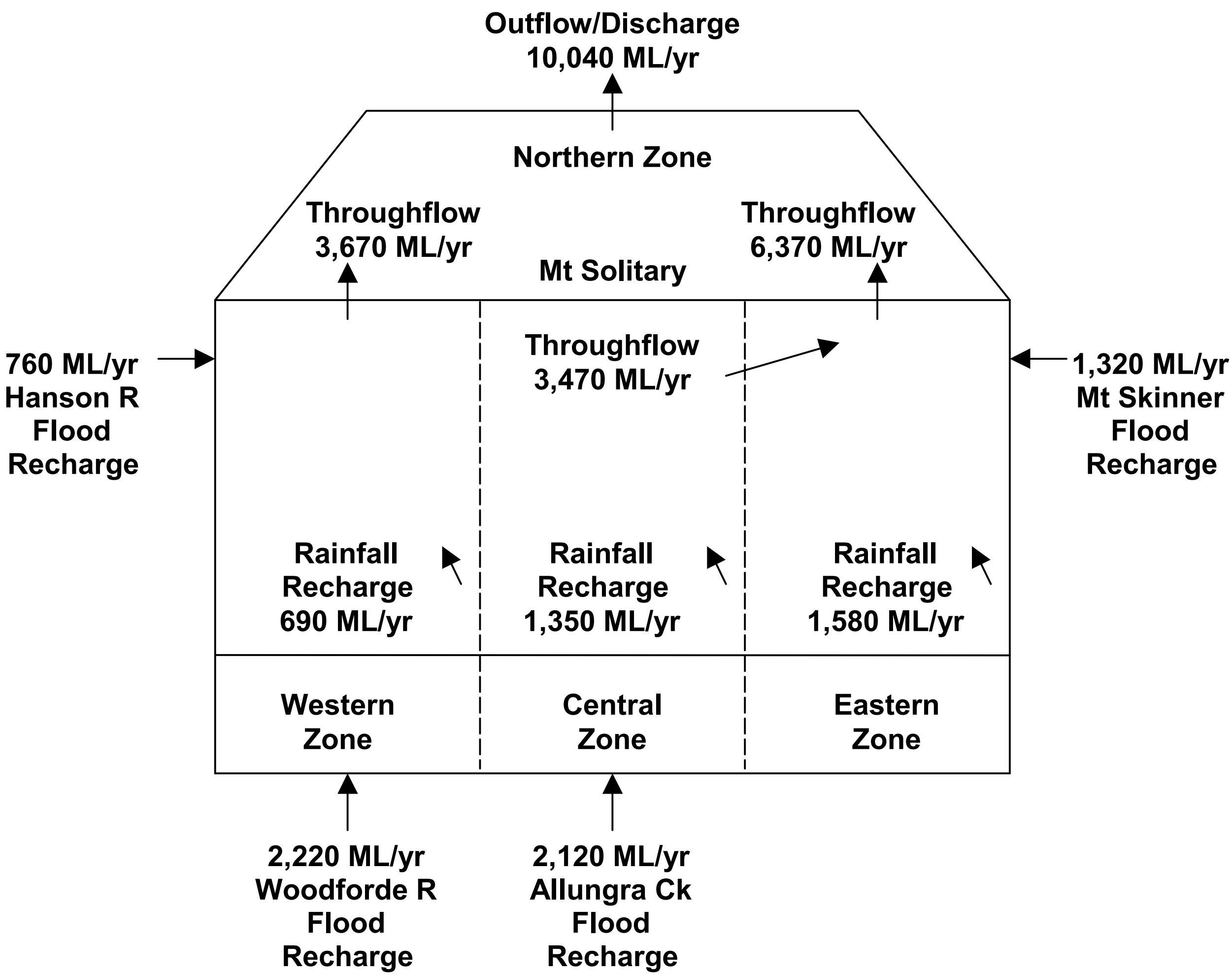
Table 5: Interaction between Surface and Groundwater in Ti-Tree Basin

	Western Zone	Central Zone	Eastern Zone
Aquifer storage with bore yield over 5 L/s	150,000 ML	1,040,000 ML	950,000ML
Aquifer storage with bore yield under 5 L/s	530,000ML	90,000 ML	610,000 ML
Rain recharge rate	690 ML/yr	1,350 ML/yr	1,580 ML/yr
Flood recharge rate			
• Woodforde River	2,220 ML/yr	-	-
• Hanson River	760 ML/yr	-	-
• Allungra floodout	-	2,120 ML/yr	-
• Mt Skinner floodout	-	-	1,320 ML/yr
Total Recharge Rate	3,670 ML/yr	3,470 ML/yr	2,900 ML/yr
Regional Throughflow	**3,670 ML/yr** out of zone to north west	**3,470 ML/yr** to eastern zone	**6,370 ML/yr** out of zone to north east

2.6 Regional Water Balance

Based on these broad estimates for recharge and throughflow, it is possible to present the first coarse model of the regional water balance for the Ti-Tree Basin.

Figure 1: Ti-Tree Basin Water Balance for Natural Conditions



PART 3. WATER USE

3.1 Current Uses

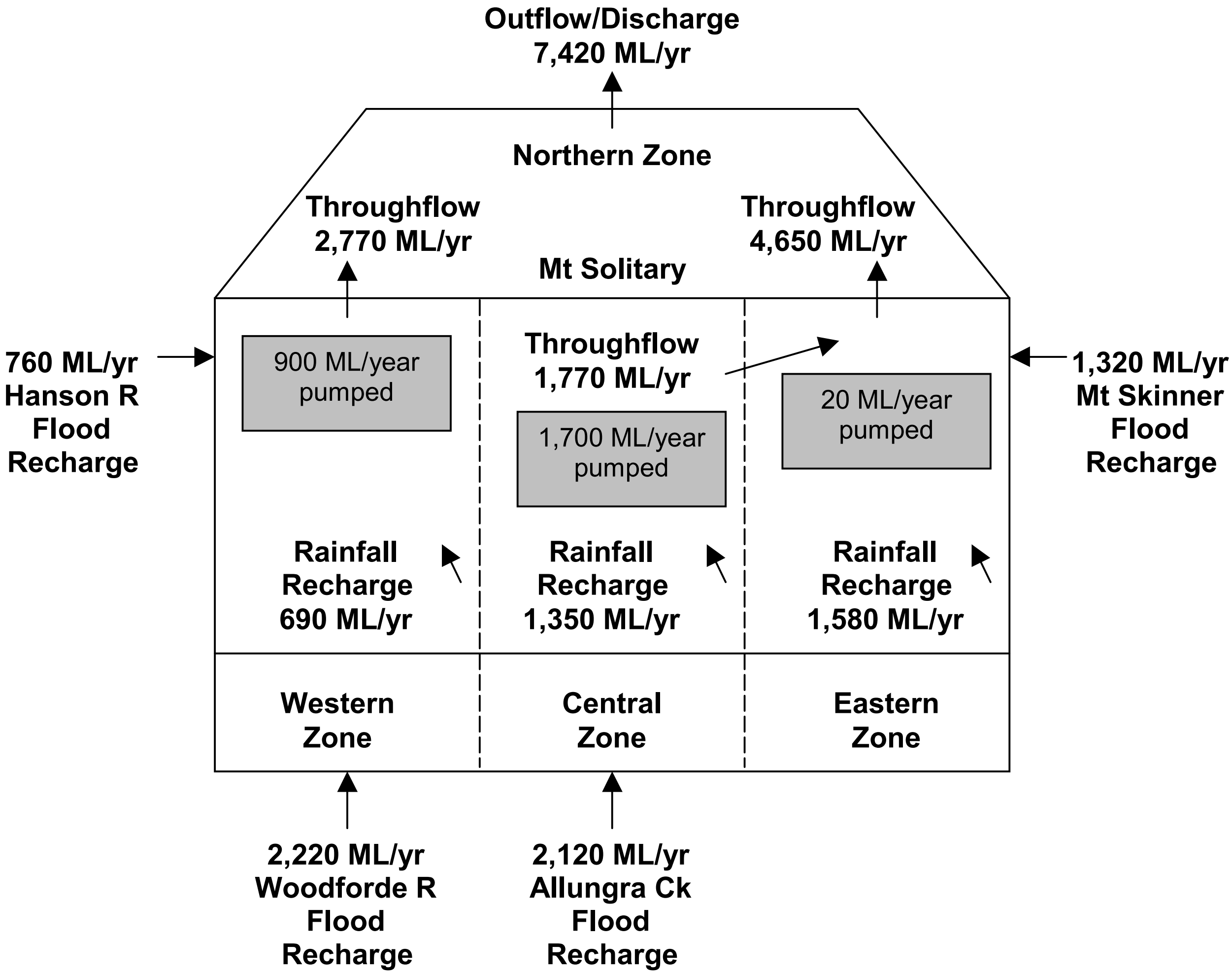
Irrigated horticulture has the largest demand for groundwater extraction from Ti-Tree Basin. Community water supplies rely entirely on groundwater. Pastoral properties use smaller groundwater supplies for homestead and stock water use.

Table 6: Current Water Use from Ti-Tree Basin (2002)

	Western Zone	Central Zone	Eastern Zone
Irrigated Horticulture	800 ML/yr	1,700 ML/yr	-
Public Water Supply	90 ML/yr	-	10 ML/yr
Homestead and Stock	10 ML/yr	-	10 ML/yr
TOTAL	**900 ML/yr**	**1,700 ML/yr**	**20 ML/yr**

A broad picture of the effect of current development is shown when water use is factored into the regional groundwater balance. This suggests that continued use at current rates can be sustained by long term natural recharge.

Figure 2: Ti-Tree Basin Water Balance for Current Use Rates



3.2 Future Prospects

The description of current development shown in Figure 2 indicates that it may be possible to increase groundwater extraction; however, this picture is based on broad aquifer characteristics for the region.

Another aspect that must be taken into account is interference between bores and borefields. A model has been developed for planning bore and borefield spacings to avoid overlap of pumping drawdown cones. The separation areas required for a range of borefield sizes are shown below.

Table 7: Borefield Separation Areas for Ti-Tree Basin

Annual Extraction (ML/yr)	Number of bores in borefield	Maximum Pump Rate (L/sec)	Maximum Drawdown (m)	Separation Area ($km^{2)}$
3,000	15	15	18	256
1,000	5	15	14	64
600	3	15	6	25
200	1	15	7	9
100	1	7.5	3	4

As a guide for continuing development in the region over the next 10 years, it is assumed that:

Western Zone

Irrigators in the Ti-Tree Farms area will utilise water up to full licensed extraction limit of 2,000 ML/year. This level of use meets the irrigation potential for all farms and is within the probable long term recharge rate. There is a need, however, to establish a borefield management plan to minimise drawdown interference between bores in this relatively concentrated irrigation area.

Additional irrigation up to 1,000 ML/year may take place in the western zone, provided that drawdown interference between borefields is avoided.

Long term requirements for public water supply in the western zone are not expected to exceed 200 ML/yr, which is sufficient for a population of 1,000.

Central Zone

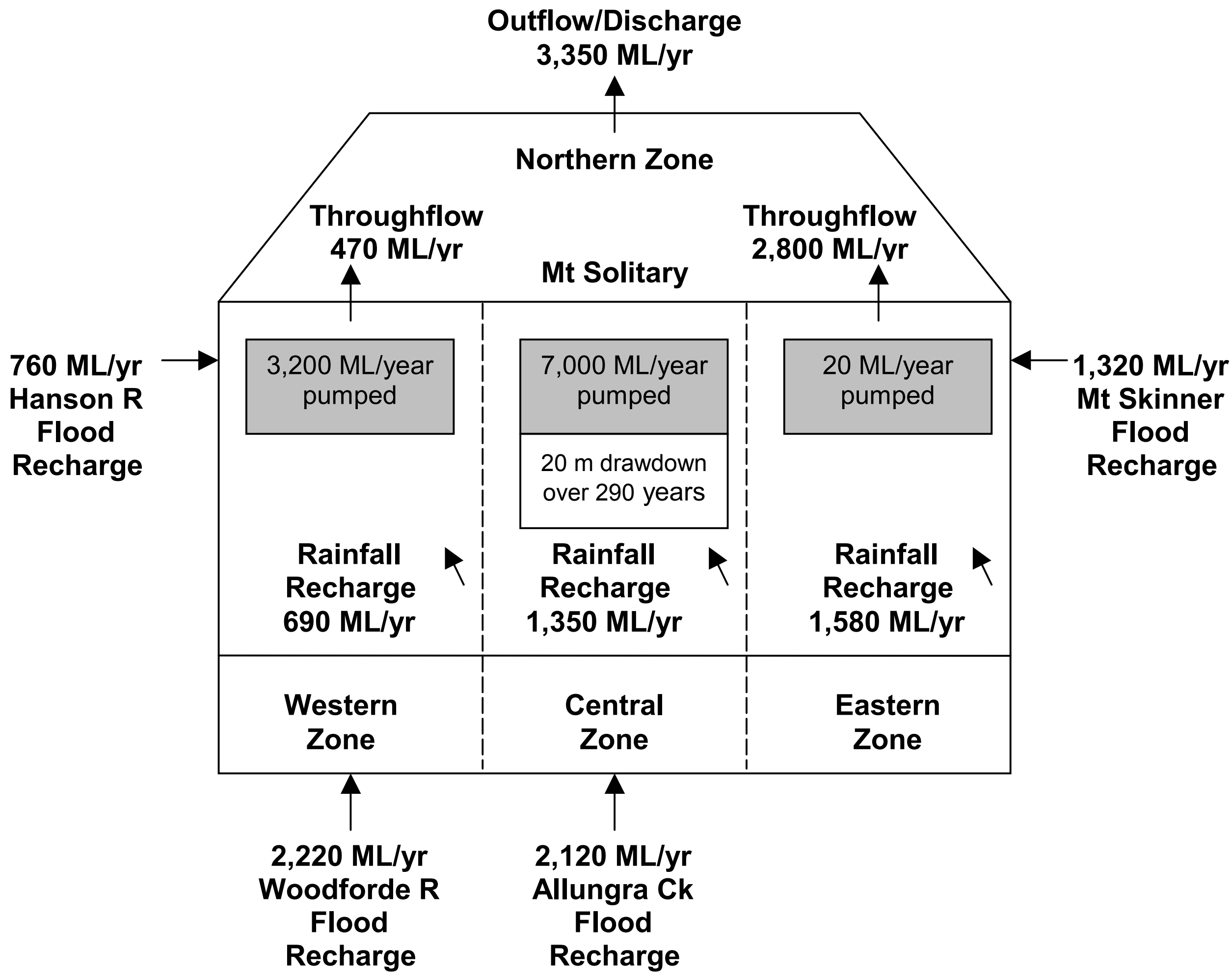
Water use will be at full licensed extraction limits (4,000 ML/year in total) in the near future for the existing farms. These farms are already located at the separation distance required to avoid drawdown interference. Three new farms using 1,000 ML/yr each can be accommodated in the remaining area of higher yielding good quality groundwater, and all required separation distances between borefields can be achieved.

Eastern Zone

Irrigation development prospects in the eastern zone are yet to be defined with any certainty, however the potential is under investigation.

Factoring these increased levels of extraction into the regional water balance shows that groundwater outflow from the western zone reduces by 87%. In the central zone, extraction is greater than recharge and the aquifer is mined at a rate which could take over 200 years for regional water levels to fall by 20 m. Eastern zone outflow will be halved due to the loss of throughflow from the central zone. These effects are shown below:

Figure 3: Ti-Tree Basin Water Balance for Future Use Rates



Cultural and Environmental Uses

In the absence of any clear knowledge to the contrary, it is assumed that regional groundwaters have no cultural significance and it is similarly assumed that there are no ecosystems reliant on shallow groundwater aquifers. Regional surveys will be necessary to test these assumptions.

These surveys should also include the ephemeral streams, swamps and waterholes throughout the region for which cultural and environmental significance are also currently unknown.

PART 4. WATER ALLOCATON AND USE RIGHTS

4.1 Surface Water Resources

Rivers and wetlands in the region are recognised for their primary ecosystem support role. They may also carry cultural significance. All rivers and wetlands in Ti-Tree Basin and its surrounding catchments are allocated primarily for environmental and cultural uses, plus limited allocation for homestead and stock water supplies. This allocation will also preserve the function of regional catchments in recharging Ti-Tree Basin aquifers.

4.2 Groundwaters

Beneficial uses have been recognised only for the better quality groundwater resources at this stage. Approximately 80% are allocated for irrigation, with the remaining 20% allocated for homestead and stock needs, public water supply requirements, and other unidentified demands, as shown below.

Table 8: Water Allocation for Ti-Tree Water Control District

WATER USE	% WATER RESOURCE ALLOCATED FOR EACH WATER USE			
	ALL RIVERS AND WETLANDS	TI TREE BASIN GROUNDWATERS – salinity under 1,000 mg/L		
		Western Zone	Central Zone	Eastern Zone
Irrigation	-	80%	80%	-
Public Water Supply	-	10%	-	-
Environment & Cultural	95%	-	-	-
Homestead & Stock Supply	5%	1%	1%	1%
Reserved For Later Allocation	0%	9%	19%	100%

No beneficial uses have been identified for the more saline groundwater resources and they are not included within the regional water allocation plan at this stage. In the event that definable uses emerge, such as irrigation of salt-tolerant crops or mineral processing, then the allocation plan will be expanded to include these groundwaters.

4.3 Surface Water Use Rights

The predominant allocation to environmental and cultural use of all rivers and wetlands requires that only minor extractions, diversions or damming of streams for homestead and stock water supplies will be permitted. These water supplies will not divert more than 5% of stream flow or catchment runoff.

In addition, water quality will continue to be protected against waste discharge and pollution to protect the natural water quality conditions as far as possible.

4.4 Groundwater Use Rights

Apart from homestead and stock water supplies, all extraction of groundwater must be licensed under the *Water Act*. The total of all licensed extractions in any zone of the Ti-Tree Basin will not exceed the sustainable groundwater yield of that zone.

For the western zone, 3,200 ML/yr is considered to be a sustainable yield not likely to exceed the average recharge rate for the zone. Total use by all groundwater extraction licences in the western zone will not be allowed to exceed 3,200 ML/yr. Licences issued in the western zone may be traded, but only within the western zone.

For the central zone, 7,000 ML/yr is considered to be a sustainable yield which, while exceeding the average recharge rate for the zone, will result in an acceptable long term rate of loss from groundwater storage. Total use by all groundwater extraction licences in the central zone will not be allowed to exceed 7,000 ML/yr. Licences issued in the central zone may be traded, but only within the central zone.

All groundwater extraction licences in both the western and central zones are to be renewed or issued, for a ten year term (renewable) and will recognise that water use may increase over time with staged irrigation development and maturing crop demands.

Licences for which annual entitlements are not used within a reasonable period after issue, will be reviewed and may be revoked in full or in part.

In addition to regular reporting of bore pumping rates, water level and salinity monitoring is to become a mandatory condition on all licences. Reporting of watered crop areas will also be mandatory for all licensed irrigation use. Penalties will be applied for all failures to meet licence conditions.

All applications for new groundwater extraction licences exceeding 100 ML/yr must be accompanied by a business plan to clearly demonstrate the feasibility of the project and justify its location and use of water.

PART 5. IMPLEMENTING THE STRATEGY

5.1 Roles and Responsibilities

Primary responsibility for promoting, reviewing and updating the strategy will require the **Ti-Tree Water Advisory Committee** to:

- advise on matters restricting implementation of the strategy;
- participate in decision-making for sustainable water development;
- liaise with and provide feedback from stakeholders;
- report annually on progress in implementing the strategy; and
- direct the periodic major review of the strategy.

These responsibilities will be reflected in formal Terms of Reference for the Committee to be agreed by the Minister. A charter of operations will be also established, to define the committee's relationship with the **Department of Infrastructure, Planning and Environment** and the **Department of Business, Industry and Resource Development** in terms of:

- liaison with other industry associations and government committees;
- provision of technical support from to assist in developing the strategy; and
- administrative support for effective communication with stakeholders.

Natural Resources Division, Department of Infrastructure, Planning and Environment will consult with the Committee and stakeholders to ensure achievement of water resource management outcomes identified in the strategy and will exercise due diligence in the exercise of regulatory and licensing powers. Natural Resources Division will also undertake water resource assessment and provide the technical advice needed for informed decision-making.

Irrigators and the **Power and Water Corporation** will monitor and report in accordance with regulatory requirements under the *Water Act* to:

- aid in the efficient use of water;
- provide data for more sustainable operation of borefields.

5.2 Strategic Work Plan

An approved work plan will be undertaken by the Department of Infrastructure, Planning and Environment, assisted by other agencies where appropriate, under the guidance and direction of the Ti-Tree Water Advisory Committee.

The Ti-Tree Water Advisory Committee will report progress and recommend revisions on the work plan to the Minister, in conjunction with government's annual budgetary processes.

The inaugural *Ti-Tree Region Water Resource Strategy* Work Plan is set out in the table below.

Table 9. ***Ti-Tree Region Water Resource Strategy*** **Work Plan (2002)**

To Improve Knowledge

	Action	Target
1.	Monitor regional rainfall, streamflow, groundwater levels and water quality and report annually.	Annually
2.	Determine aquifer recharge, throughflow and change in storage and report regional water balance annually.	Annually
3.	Review regional monitoring programs and recommend improvements to assist determination of water balance.	2002; 2004
4.	Investigate and report on surface and groundwater pollution vulnerability in each zone of Ti-Tree Water Control District and recommend appropriate action.	2002; 2004
5.	Investigate and report on natural groundwater chemistry eg. Uranium, nitrates.	2003
6.	Determine environmental and/or cultural water requirements for surface and groundwater resources in each zone of Ti-Tree Water Control District.	2003

To Improve Information

7.	Report monitoring data and findings of water resource investigations to regional stakeholders on a regular basis, including annual regional seminar/field days in conjunction with other agencies and research institutions.	Continuing
8.	Publish regular newsletters covering Ti-Tree Water Control District issues.	Continuing
9.	Publish continuing series of Fact/Information Sheets for Ti-Tree Water Control District and conduct advisory/extension consultation programs to include: • Bore construction and maintenance guidelines; • Bore metering and monitoring guidelines; • Borefield design and operational guidelines; • Aquifer development guidelines; • Irrigation guidelines; • Bore licensing guidelines; and • Licence trading guidelines.	Continuing
10.	Publish a review of historical and prospective regional development covering the period from (say) 1950 to 2020.	Commence 2003
11.	Publish natural resources atlas for Ti-Tree Basin with updates every 5 to 10 years.	2005; 2010

To Improve Management

12. Institute water level, salinity and pumpage monitoring by all licence holders in the Ti-Tree Water Control District.	2002; continuing
13. Based on 2001 modelling of groundwater behaviour, prepare a strategic plan for development and operational management of bores in the Ti-Tree Farms Area.	2003
14. Reassess sustainable yield in the Western and Central Zones of Ti-Tree Water Control District based on monitoring of groundwater behaviour and bore operations.	2004
15. Recommend a water allocation plan for groundwater resources in the Eastern Zone of Ti-Tree Water Control District.	2004
16. Define new water resource development potential in all areas where groundwater salinity is less than 1,000 mg/L.	2004
17. Preliminary assessment of new development potential in all areas where groundwater salinity is greater than 1,000 mg/L.	2005
18. Review all licensed entitlements on the basis of reassessed sustainable yield and the strategic development and operational plan for bores in the Ti-Tree Farms Area.	2005

GLOSSARY

ha	hectares
km^2	square kilometres
L/s	litres per second
m	metre
M	million
mg/L	milligrams per litre equates to parts per million (ppm)
ML	megalitres
ML/year	megalitres per year
ML/yr	megalitres per year
mm	millimetre
mm/month	millimetres per month
mm/year	millimetres per year
TDS	total dissolved solids