

Guide

Water Allocation Plan

Tindall Limestone Aquifer, Katherine

Part 1 Introduction

This guide summarises the Water Allocation Plan (WAP) for the Tindall Limestone Aquifer also referred to as the Tindall Aquifer (Katherine), and should be read in conjunction with the WAP and the Background document.

The Northern Territory Government is committed to the long term management of water resources in the NT. Water Allocation Plans detail sustainable water management strategies that are developed in consultation with the community to ensure the values associated with the relevant water source are protected.

The WAP was written over 2007, 2008 and 2009 by the Water Resource Branch, Department of Natural Resources Environment, the Arts and Sport, Northern Territory Government. The content of the WAP was developed in partnership with the Katherine Water Advisory Committee (KWAC), consisting of 12 voting members representing various sectors of the Katherine community.

The WAP for the Tindall Limestone Aquifer (Katherine) is a legally binding document under the *NT Water Act (the Act)*; the formal approach to the way it has been written cannot be completely avoided. In order to make the WAP easier to interpret this Guide summarises the intent of each of its major provisions. More detailed information about how each provision was developed is provided in the Background document.

From declaration by the Minister for Natural Resources, Environment and Heritage, the WAP has a lifespan of 10 years and will be reviewed after 5 years.

Scope of this Plan

The WAP relates to the section of the Tindall Limestone Aquifer located within the Katherine River surface water catchment boundary, as illustrated in **Schedule 3** and described under **scope of this plan** in Part 1 of the WAP as the Plan area. The Plan area lies within the Daly Roper Water Control District.

Within areas of the Plan area, the Tindall Limestone Aquifer is overlain by other aquifers: the Ooloo Dolostone and Jinduckin Formations. The WAP does not apply to the water contained within the Ooloo Dolostone or Jinduckin Formations.

Most of the flow in the Katherine River that occurs late in the dry season originates from Tindall Aquifer discharge and as such is also referred to within the WAP.

Two water management zones have been established within the WAP area, to manage the impacts of extraction near to the Katherine River. Extraction from the Tindall Aquifer within Zone 1 can impact on the Katherine River within a short period of time. The potential for extraction in Zone 1 to noticeably reduce flows in the Katherine River is minimised through conditions on water trading, bore construction and licensing within that Zone. A map detailing the water management zones is shown in **Schedule 5** of the WAP.

Purpose

The purpose of the WAP is to initiate strategies for sustainably allocating and managing water from the Tindall Aquifer within the Katherine region.

Consultation

The Katherine Water Advisory Committee has been instrumental in the development and review of the WAP and has met on 18 occasions since its formation in February 2007. The KWAC includes representatives from various stakeholder groups including Indigenous land owners, agriculture, horticulture, pastoral, industry, conservation, public water supply, tourism, local government, community and recreation.

The initial draft of the Plan was released on 26 June 2008 for a public submission period and a public information session was held on 16 July 2008 at the Katherine Town Hall. 11 submissions were received from a range of stakeholders and individuals. The draft Plan was revised based on these submissions and released for a second public comment period on 18 December 2008. A further 8 submissions were received resulting in some additional changes prior to the finalisation of the Plan.

Part 2 Planning Context

Basis for water allocation planning

Under section 22B of the *Water Act* there is a provision for the Minister to declare a Water Allocation Plan. Further, the WAP has been made in accordance with the NT Government's commitment to implementing the National Water Initiative. The National Water Initiative requires that Water Allocation Plans are developed to ensure the equitable distribution of water resources between competing uses, including environmental and cultural water requirements.

The availability of water is often considered plentiful and reliable in the Top End, although in actual fact, 90% of annual rainfall falls over the 'wet season' while the remainder of the year is very dry. Perennial rivers in the Northern Territory are exclusively fed by groundwater in the dry season and recharge to these groundwater systems can change each year based on rainfall. The WAP recognises the volume of recharge to the Tindall Limestone Aquifer will vary from year to year and contains provisions to manage discharge to the Katherine River from this water source accordingly.

Description of this water source

All water described as 'this water source' in the WAP, refers to water within the part of the Tindall Limestone Aquifer bounded by the Katherine River Catchment. This Plan focuses on managing the part of the Tindall Aquifer where groundwater flows towards the Katherine River. However, the Tindall Aquifer formation does extend beyond the Plan area and also discharges to the Roper, Flora and Douglas Rivers.

The Tindall Limestone Aquifer is a cavernous aquifer system that is largely overlain by the Ooloo and Jinduckin geological formations. The Tindall Aquifer is said to be confined by these formations, as water does not infiltrate through them to the Tindall Aquifer. Recharge to the Tindall Aquifer only occurs in areas where it is in direct contact with the ground surface as occurs around Katherine. This is described as the unconfined area and shown in **Schedule 3** of the WAP.

The average recharge to the Tindall Limestone Aquifer is 74,000ML/yr. This was determined using a hydrologic model and rainfall records from the period 1957- 2006. 64,000ML/yr is from rainfall recharge and 10,000ML/yr comes from the sandstone plateau, to the north of

Katherine. The total licensed extraction volume in the 2006/07 water year was 26,544ML/yr, however the estimated actual use in that year was 16,468ML/yr.

Public Benefits associated with this water source

Water from the Tindall Aquifer provides many social and economic benefits to the Katherine region because it provides for agricultural and industrial development and subsequently employment and growth. There are also significant ecological and cultural values associated with the Katherine and Daly Rivers, which flow all year round because of the water discharged from the Tindall Aquifer in the dry season. The public benefits described in this part of the Plan are:

- Environmental and Cultural
- Public Water Supply
- Rural Stock and Domestic and other small volume groundwater uses
- Agriculture, Horticulture and Industry
- Economic growth

Assumptions

Some assumptions have been made in the WAP because of some limitations in knowledge, particularly in regards to climate change and environmental and cultural flows.

Measurements of river flow and height show that nearly all the flow in the Katherine River late in the dry season comes from the Tindall Aquifer. Historic flow data from 1957 to 2006 at the Katherine Railway Bridge was used to determine the average annual discharge from the Tindall Aquifer to the Katherine River. The WAP recognises that rainfall will vary from year to year, and includes strategies to vary the volume of water that is made available to users each year. The WAP does not predict the possible effect of climate change on the long term availability of water from the Tindall Limestone Aquifer but does provide mechanisms to adjust extraction levels on an annual basis in response to changing rainfall patterns.

At present there is limited information regarding exactly how much water is needed to protect specific environmental and cultural values in the Katherine River. However, historic flow measurements from 1961 onwards demonstrate that the Katherine River flows naturally all year round. The Plan ensures that water from the Tindall Aquifer will continue to discharge into Katherine River, maintaining flows throughout the dry season. The extraction limit will be adjusted depending on how much recharge occurs during each wet season, ensuring that the majority of recharge goes to the environment.

Whilst it is recognised that cultural flows and environmental flows are not the same, the Plan assumes that the provisions for environmental flows will maintain the condition of places that are valued by both Indigenous and non-Indigenous people for cultural purposes. Further research and monitoring to improve our understanding of environmental and cultural flows will be initiated as part of the implementation of the WAP.

Beneficial Uses

Water contained within the Tindall Limestone Aquifer is shared between beneficial uses, which are a way of describing the purposes for which water is valued.

Non-consumptive use	Consumptive use	Example of Beneficial use
Environment		Limestone cave system and river ecology
Cultural		Indigenous subsistence and recreation such as camping and fishing
	Public Water Supply	Katherine town drinking water
	Agriculture	Irrigation of crops
	Aquaculture	Commercial production of fish and crustaceans
	Industry	Irrigation of lawns in schools and gardens attached to commercial premises
	Rural stock and domestic	Water for houses & livestock in rural areas

Part 3 Outcomes, Objectives, Strategies and Performance Indicators

The WAP has been developed with the vision to ensure that the water contained within the Tindall Limestone Aquifer is managed sustainably and a balance is created between the environment and all other uses.

Outcomes are the overall goals that this Plan is striving to achieve. Many of these are long term goals and may be partly reliant on factors beyond the scope of the WAP. These outcomes include:

- maintaining ecosystems that depend on the Tindall Aquifer in good condition;
- ensuring Katherine and the Tindal RAAF base have access to a sufficient quantity of quality water;
- providing water to Indigenous landowners for economic development purposes;
- maximising the economic benefits arising from agricultural development and other uses;
- maintaining flows throughout the dry season at sites of Indigenous cultural importance.

Specific objectives are also included to complement the above outcomes. The objectives are intended to be achieved during the 10 year life of the Plan. The WAP details the management strategies designed to achieve each objective. Performance indicators are those things that will be measured to determine whether the outcomes and objectives of the WAP are being met.

The information in this section has been presented in a table under **Clause 18** of the WAP, so the reader can view the outcome and associated objectives and strategies that have been set to achieve them. The table summarises each of the objectives and strategies and provides a reference to the relevant detailed section of the Plan.

The Plan will be monitored and assessed by measuring the performance indicators. This includes measuring annual extraction, groundwater levels, discharge from the Tindall Limestone Aquifer to the Katherine River, water quality and the ecological health of the Katherine and Daly Rivers.

The performance indicators and monitoring program is provided in **Appendix 2** of the WAP. The specific details of the monitoring program will be included in an Implementation Strategy released following the declaration of the WAP.

Part 4 Water for Environmental, Indigenous Cultural and other Instream Public Benefit Outcomes

River flows are critical for the survival and function of ecosystems as well as the maintenance of social and cultural values. The Katherine and Daly Rivers rely on groundwater discharge from the Tindall Aquifer to maintain flow all year round. To ensure this continues, the WAP protects a significant percentage of discharge from the Tindall Aquifer every year for this purpose. Due to variable rainfall, and consequently recharge and discharge from year to year, the WAP has made provisions for three different scenarios:

1. During **very dry** years, 87% of the groundwater discharging into the Katherine River will be reserved for environmental and other river-based public benefit outcomes whilst 13% is available for extraction.
2. During **dry** years, 80% of the groundwater discharging into the Katherine River will be reserved for environmental and other river-based public benefit outcomes, whilst 20% is available for extraction.
3. During **normal to wet** years, 70% of the groundwater discharging into the Katherine River will be reserved for environmental and other river-based public benefit outcomes whilst 30% is available for extraction.

Definitions of very dry, dry and normal to wet years are contained within the respective **'Note' sections in PART 4** of the WAP.

Part 5 Water for Rural Stock and Domestic and Other Small Volume Groundwater Uses

The estimated use of water from the Tindall Aquifer for rural stock and domestic purposes and other small volume groundwater uses is 1,128ML/yr. This estimate considered the number of stock (based on 50L/head/day) and the number of houses (based on 4.5ML/yr) that use groundwater from the Tindall Limestone Aquifer within the WAP area.

Water used for rural stock and domestic purposes is exempt from licensing under section 14 of *the Act*. Small volume groundwater users (<5ML/yr/property) and stock water use within the Daly Roper Water Control District are not required to be licensed under an exemption to the Act.

Part 6 Licences to Take Groundwater

Licence Security Categories and Reliability

There are four licence security categories each representing a different level of reliability. Reliability is defined as the percentage of years that a licence holder would have been able to access their full licence volume, based on historic rainfall and flow data in the Katherine River from 1957-2006. The reliability is specified to give licence holders an understanding about how often they would access their full annual licence volume if past climatic conditions are similar in the future.

The security categories are as follows:

1. Total security – licence holders can expect access to their maximum annual licence volume in all but extreme circumstances.

2. High security – licence holders can expect access to their maximum annual licence volume in about 70% of years.
3. Medium security – licence holders can expect access to their maximum annual licence volume in about 30% of years.
4. Low security – licence holders can expect to access to their maximum annual licence volume in about 15% of years.

It is important to note the above figures are based on the past 49 years of climatic data and represent periods of above and below average rainfall. The reliability of licences in each security category is actually much higher when based on more recent rainfall data. For example, medium security licence holders would have received their maximum annual licence volume in 7 out of the last 10 years because rainfall has been consistently above average during this time. Further comparisons are shown in **Table 1 of PART 6** in the WAP.

Limits to licences

When declared, the WAP will issue licences with a combined total volume of 34,503ML/yr. This volume is shared between various beneficial uses, and security categories, as detailed in **Table 2 in PART 6** of the WAP.

Rules for granting licences

From the commencement of the WAP no additional licences will be granted. When the WAP is reviewed, if it is determined that more water can be made available for use without reducing the reliability of existing licences, or degrading environmental or cultural values, new applications for licences may be accepted.

Licences that will be issued at the commencement of the WAP for the beneficial uses of agriculture, industry, aquaculture and public water supply have been based on licence applications and associated property development plans. Each applicant determined their own water use estimates which were then checked against recognised industry standards for the Katherine region. This ensured an equitable approach to determining licence volumes based on proposed development. For example, if two users were each growing the same area of the same crop they would be issued with the same volume of water. The standardised crop water use figures used to determine licence volumes are provided in **Schedule 7** of the WAP.

Other clauses in this section have been developed to protect water quality and reduce impacts of extraction through new bores on existing users in the Tindall Aquifer and Katherine River.

Licence applications

No applications for a new licence to extract water from the Tindall Aquifer will be accepted prior to the 5 year review of the WAP.

However, applications can be accepted if they are made as part of an approved water trade, transfer of licence through property sale or as a result of subdivision. An approved application form must be submitted with supporting information about the proposed development for which the water will be used. Further conditions relating to licence applications are listed in **Part 6** of the WAP.

Transfer of water licenses through property sales & subdivision

Where an NT portion is sold with a valid water licence, a new licence will be issued to reflect the change of ownership once the sale is confirmed with NRETAS. Whilst the volume is

transferred automatically the licence will still be subject to the 5 and 10 year review, as specified in **Part 8** of the Plan. If additional water is required by a new owner, further water may be acquired through trading water from another willing licensee, subject to the conditions of the WAP.

In situations where a NT portion with a valid water licence is subdivided or rezoned, the licence is cancelled and one or more of the owners of land to which the old licence related, may apply for a new licence(s). The total amount applied for under any new licences in this case must not exceed the previous licensed volume and must be in accordance with the level of development on the new NT Portions.

Assignment of Risk

The WAP ensures that the reliability of licences will not be reduced as a result of future water management decisions, but acknowledges that it cannot control the risks of reduced water availability resulting from seasonal or long term changes in rainfall, temperature or natural events like drought or contamination. These risks are borne by the licence holders.

Part 7 Rules for management of licences to take groundwater

Extraction Limit

The Tindall Aquifer and Katherine River are highly connected systems and late dry season flows in the river are dominated by discharge from the Tindall Aquifer. In the WAP, it is recognised that recharge to the Tindall Limestone Aquifer will vary from year to year and as such the volume of water that may be accessed under licences may be adjusted annually.

Annual extraction limits are calculated by predicting the late dry season flows in the Katherine River at the railway bridge using a computer model and the recorded rainfall from the previous wet season. **Table 3 in Part 7** of the WAP shows what the extraction limit will be based on the predicted late dry season flow at the Katherine Railway Bridge. Whenever the predicted late dry season flow is at least 2.1 cubic metres per second all licences issued under this Plan can extract their full licence limit for that year.

The extraction limits ensure the environmental flow provisions and stock and domestic requirements as described respectively in **Part 4 and Part 5** of the WAP are maintained.

Announced allocations and accounting

To ensure the environmental and cultural flow objectives in the WAP are achieved, the volume of water extracted under licences issued under the Plan will be monitored as follows:

- The accounting year for annual water use begins on May 1 and continues for 12 months.
- Pumpage figures are to be provided at the end of every month.
- Carrying over of unused water allocations on yearly or monthly basis is not permitted.
- The volume of water that may be extracted under a licence each year will be announced prior to May 1 and must not be exceeded.

Each year an announced allocation to licences will be determined prior to May 1, based on the calculated extraction limit. The announced allocation is the percentage of the maximum annual licence volume that may be taken during the water accounting year.

If the extraction limit is calculated to be greater than the sum of annual licence volumes, then up to 100% of the maximum annual licence volume may be extracted by all licensees in that water accounting year.

If the extraction limit is calculated to be less than the sum of annual licence volumes the announced allocation to licences will be determined according to the below criteria:

- Reductions will be placed on low security licences first;
- Once low security licences have been reduced to zero; medium security licences will then be reduced;
- Once medium security licences have been reduced to zero, high security licences will then be reduced.

In times of severe water scarcity, the Controller may require water conservation measures to be adopted by total security licences and unlicensed rural stock and domestic users and other small volume groundwater users.

The announced allocation process is detailed in **Clause 32** of the WAP.

Water trading

The WAP has provisions for temporary and permanent trading of water under a valid licence from one person to another. Temporary trades refer to the transfer of annual licence volumes from one licence to a new licence. The new licence expires at the end of the water accounting year and is subject to the same conditions and announced allocation as the traded licence. Permanent trades can only be made once full property development as proposed by the licensee has been achieved to the satisfaction of the Controller.

Licensees will only be able to trade up to their annual license volume. For example, if an efficiency gain is made, the licensee may wish to trade the volume of water saved to another user. It will not be acceptable for a licensee to trade water that has been allocated in accordance with a property development plan that has not eventuated.

To manage local impacts due to extraction, two water management zones have been declared. Only 15% of the total extraction limit is permitted from Zone 1 in order to protect flows in the Katherine River. A trade into Zone 1 will only be permitted if the resultant extraction from this zone will not exceed 15% of the total extraction limit for that year.

Provisions for water trading are detailed in **Clause 34** of the WAP.

Part 8 Review of this Plan

Review of extraction Limit

In accordance with *the Act*, the WAP must be reviewed at intervals not longer than five years. During a review, the amount of water provided for environmental, Indigenous cultural and other river-based public benefit outcomes, may be modified if the results of the monitoring program, or new research findings demonstrate that it is necessary to do so.

As such, the extraction limits may also be amended to account for any changes to environmental and cultural flow provisions.

Rules for amending and renewing licences

Upon declaration of the WAP, all licences were issued to meet the demand of properties at their full development. During the 5 year review of the WAP, licences may be reviewed and amended.

At the time of the review, if the progress of on-ground development is not in accordance with what was proposed by the licensee, the licence volume may be reduced. Circumstances that have affected the progress of the proposed development will be considered as part of the review.

If the level of development is in accordance with the licence holders' development program at the time of the review, the licence volume will not be reduced unless all licences are required to be reduced to provide for required changes to environmental and cultural flow provisions.

Any water that is recovered through reviewing licences will be re-assigned to:

- meet any additional environmental or cultural flow requirements that are identified during the review;
- account for any increase in demand from rural stock and domestic and other small volume groundwater uses;
- provide water to Indigenous land owners for economic development purposes
- improve reliability targets for licence security categories at full development;

Part 9 Licence conditions

Mandatory licence conditions apply to all licence holders and are a requirement of *the Act*, its Regulations and associated Approved Forms.

Part 10 Bore Construction Permit conditions

Bore construction permits are required for the construction of all bores within the Daly Roper Water Control District including the Tindall Aquifer, irrespective of their intended use or capacity. Bore construction permits will not be issued to properties that have access to reticulated water, when the intended purposes is for rural stock and domestic or other small volume groundwater uses not requiring more than 5ML/yr.

Mandatory conditions also apply to bore construction permits issued in the WAP area to achieve some of the stated outcomes of the WAP.

Part 11 Monitoring and Evaluation

Monitoring of the performance indicators specified in **Part 3** of the WAP shall be directed by the Controller of Water Resources. The monitoring program is in **Appendix 2** of the WAP.

An Implementation Strategy released following the declaration of the WAP describes how the objectives and strategies made in the WAP will be achieved and provides specific details about how the monitoring program will be implemented.