Department of Environment and Resource Management

Barron Resource Operations Plan Amendment

Consultation Report

October 2011

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October 2011

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Message from the Deputy Director-General

Finalisation of the Barron Resource Operations Plan Amendment 2011 was significant for many reasons, not least of which was the level of community consultation that underpinned its development. This report has been prepared to provide a record of the issues that were raised during the amendment process and how they were assessed and dealt with, and in particular those raised in submissions following the release of the draft Barron Resource Operations Plan Amendment.

Although the draft plan included some minor refinements of the initial plan finalised in 2005, the amendment process was principally initiated to implement the Barron Water Resource Plan in the area above Lake Tinaroo. The Upper Barron was excluded from the original resource operations plan to allow extra time to work through a range of operational challenges.

The provisions that flowed from the community input model supporting the process are of note, extending key water reform elements to a much broader area than envisaged by the initial Barron Water Resource Plan.

The main achievement for this hands-on consultation model is the comprehensive trading arrangements introduced to the Upper Barron on plan finalisation, bringing unprecedented management flexibility to water users. Under these arrangements, the original priority area for converting unsupplemented surface water entitlements to tradeable allocations has been significantly extended.

Beyond this, in areas where there is insufficient information for conversion to occur, the plan sets out rules that will allow surface and groundwater licences to be relocated, or for the water taken under them to be seasonally assigned. The latter provisions also apply to the Emerald, Rocky, Spring and Cherry creeks catchments.

In addition, operational rules for the Mareeba Dimbulah Water Supply Scheme have been refined through a minor amendment that allows medium priority water users to carry over the unused parts of their entitlements to the following water year. Environmental release rules for Tinaroo Falls Dam have also been refined to make them more effective.

I would like to thank the Water Advisory Group and members of the broader community for the contribution they have made to the amendment process.

Debbie Best

Deputy Director-General

Department of Environment and Resource Management

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1 Introduction

1.1 Purpose of this report

This report documents the consultation process undertaken by the Department of Environment and Resource Management in preparing the Barron Resource Operations Plan Amendment (the plan).

The report also summarises the issues raised in submissions received through the formal consultation process that followed the release of the Barron Resource Operations Draft Amendment Plan in April 2010 and how these issues were assessed in finalising the plan.

1.2 Background

Resource operations plans are integral to Queensland's water resource planning process. The primary function of a resource operations plan is to implement a water resource plan, which provides an overarching framework that specifies the general goals and constraints needed for sustainable resource management.

Resource operations plans are developed to manage water resources from day to day in a way that maximises overall community benefits, while remaining consistent with the management rules of the water resource plan. Resource operations plans can be amended periodically—for example, to provide for the creation of new tradeable water entitlements and other factors that may not have been able to be addressed when the initial resource operations plan was prepared.

The respective functions of the two plans as strategic and operational parts of a single planning framework are reflected in provisions of the Water Act 2000 (the Water Act). While the Minister for Finance, Natural Resources and The Arts (the minister) is responsible for preparing water resource plans, the chief executive of the department is responsible for preparing the resource operations plans that implement them.

In implementing additional requirements of the water resource plan, the resource operations plan is consistent with the goals and requirements of the Australian Government's National Water Initiative and complementary to other state and federal government agreements and commitments.

The amendment plan includes:

- the conversion of some 200 existing unsupplemented water licences to water allocations that can be traded separate to land, which is a key Queensland Government commitment to water reform under the National Water Initiative
- rules under which trading of these water allocations can occur either permanently or temporarily
- rules for equitably sharing unsupplemented water during periods of low water availability
- rules that allow groundwater licences in the Atherton Subartesian Area and water licences for specific streams downstream of Tinaroo Falls Dam to be relocated from one parcel of land to another
- changes to the existing rules for sharing water that SunWater supplies from Tinaroo Falls Dam to allow water users to carry over part of any unused allocation from one water year into the next water year
- minor modifications to the rules under which water is released from Tinaroo Falls Dam.

Revision and amendment of the water resource plan

The Water Resource (Barron) Plan 2002 (water resource plan) was finalised in December 2002 to provide for the sustainable allocation and management of water in the Barron River and upper Walsh and Mitchell catchments. The water resource plan also addressed groundwater management provisions for the Atherton and Cairns Northern Beaches subartesian areas.

Intention to prepare a draft Barron Resource Operations Plan to implement the water resource plan was announced in 2003. However, water users in the Upper Barron were concerned that the anticipated schedule for plan preparation would not allow sufficient time for effective management arrangements to be developed for their area. Therefore, the initial Barron Resource Operations Plan finalised in 2005 dealt mainly with:

- operational rules for Tinaroo Falls Dam and the Mareeba Dimbulah Water Supply Scheme, Kuranda Weir and Copperlode Dam
- the conversion of more than 1600 supplemented entitlements to tradeable water allocations
- management arrangements for the Cairns Northern Beaches Subartesian Area
- a reserve of 4000 megalitres (ML) of unallocated water for use in the Cairns local government area.

However, the initial plan also allowed for an amendment to be made to incorporate operational rules for managing water above Tinaroo Falls Dam when suitable arrangements had been agreed in consultation with water users.

The Upper Barron Water Advisory Group was formed in 2004 to facilitate focussed input from respresentatives of the unsupplemented water using community in the area upstream of Tinaroo Falls Dam. The department and the Upper Barron Water Advisory Group met more than 30 times.

As the process advanced, a far more comprehensive management approach for the Upper Barron than had been envisaged under the initial water resource plan took shape. It became clear that to address the extensiveness of the proposals, the water resource plan would first have to be amended to provide the legislative authority for the provisions to be implemented under the resource operations plan.

The Barron Water Resource (Amendment) Plan 2009 provided for—

- the creation of a new subcatchment area (area H), comprising Rocky, Spring and Cherry creek catchments that were formerly part of the Lower Barron River subcatchment area (area A)
- a revised rate for establishing annual volumetric limits for area-based licences for the area upstream of Tinaroo Falls Dam (subcatchment areas C and H)
- no unallocated water being available above Tinaroo Falls Dam
- expanding the priority area for water trading upstream of Lake Tinaroo
- applications for licences that would lead to increased water usage in the management area B part of the Atherton Subartesian Area to be refused.

A consultation report was released in 2009 to document how the issues raised during the water resource amendment process were assessed and addressed can be viewed at the department's website.

Release of the Barron Resource Operations Draft Amendment Plan

In April 2010, the Barron Resource Operations Draft Amendment Plan (draft plan) setting out the proposed arrangements for implementing the amended water resource plan was released for public comment.

The draft plan also provided for refinements to the initial resource operations plan, including operational changes for the Mareeba Dimbulah Water Supply Scheme.

A total of 70 submissions were received, mainly relating to rules for seasonal water assignment and water sharing arrangements for both supplemented and unsupplemented water. Summaries of how the issues and concerns raised in the submissions were dealt with are included in the following section.

The resource operations plan referral panel

An independent resource operations plan referral panel (the referral panel) was established to review the issues raised in submissions received on the draft plan. The referral panel members represented a range of interests and were selected for their knowledge of water resource planning in Queensland, their analytical and problem-solving skills and their ability to formulate recommendations and solutions for dealing with issues raised in submissions.

To strengthen the referral panel's objectivity, members were drawn from outside the plan area. Section 102 of the Water Act sets clear parameters for the role and responsibilities of the referral panel. The referral panel made recommendations for issues raised in submissions which were within the panel's roles and responsibilities. Issues were not referred to the panel if:

- they related to the water resource plan (that is, if the issue raised was related to an issue that had previously been dealt with in the water resource plan)
- they were not relevant to a proposed water allocation, environmental management rule, water sharing rule or an implementation schedule (as defined by section 102(1) of the Water Act)

- they were inconsistent with the outcomes and objectives of the water resource plan
- the chief executive was satisfied that the draft plan should be amended in accordance with a submitter's proposal.

All properly made submissions were analysed and collated by the department before being referred to the referral panel. The referral panel's recommendations were considered by the chief executive in finalising the plan.

Where to obtain a copy of the plan amendment

The finalised plan amendment can be obtained from departmental offices in Cairns and Mareeba or the department's website <www.derm.qld.gov.au/wrp/barron>.

2 Issues raised in consultation

A total of 70 properly made submissions were received on the draft plan. The department reviewed and analysed all the submissions received. All submissions were recorded, assessed and validated, including assessment against the water resource plan objectives. This chapter summarises key issues raised, relevant background information relating to each issue, the relevant draft plan provisions, and how the issues were addressed in finalising the plan.

2. 1 Resource operation plan amendments

2.1.1 Water allocation changes

A. Permanent trading and seasonal assignment (temporary trading) for the Upper Barron

Background

Under the initial water resource plan, only the unsupplemented water entitlements on the Barron River upstream of Lake Tinaroo were to convert to tradeable water allocations.

Following the decision to delay inclusion of the Upper Barron in the initial Barron Resource Operations Plan, the water advisory group formed to support the amendment process made a case for the conversion area to be extended.

In consultation with the department, agreement was reached on allowing entitlements in other streams and tributaries to convert to water allocations. Through the water resource plan amendment process, the scope for establishing tradeable water allocations was expanded.

Resource operations plan provisions

The draft plan amendment provided for about 200 unsupplemented entitlements to convert to water allocations in—

- the Upper Barron River and its tributaries
- Leslie Creek and its tributaries
- Mazlin Creek to its confluence with Priors Creek
- Peterson Creek and its tributaries.

Within these catchment areas, the converting entitlements were to be grouped into 14 trading zones (Figure 1). The draft plan provided for permanent trading between zones that fell within a catchment area, subject to specified maximum and minimum volumes for each zone not being exceeded. Water taken under an allocation could be seasonally assigned, but only within the zone of origin.

The issue that arose

A total of 51 submissions were received asking that seasonal assignments be allowed between zones under arrangements similar to those proposed for permanent trading. The submitters believed there would be greater demand for seasonal transfers because it would allow water users to explore the potential for trading to support their needs. Once the benefits of trading had been demonstrated and demand patterns established, permanent trading would be more likely to follow.

How the issue was assessed

Allowing water to be seasonally assigned between subcatchment zones had been considered during draft plan preparation, but was not adopted because permanent trading, a priority National Water Initiative goal, would be prevented if the maximum and minimum limits for each zone had been reached by seasonal assignments.

In recognition of the degree of support expressed in submissions, it was concluded that allowing for inter-zonal seasonal assignment could promote the broader benefits of water trading without risking planning goals or contravening the intent of the National Water Initiative.

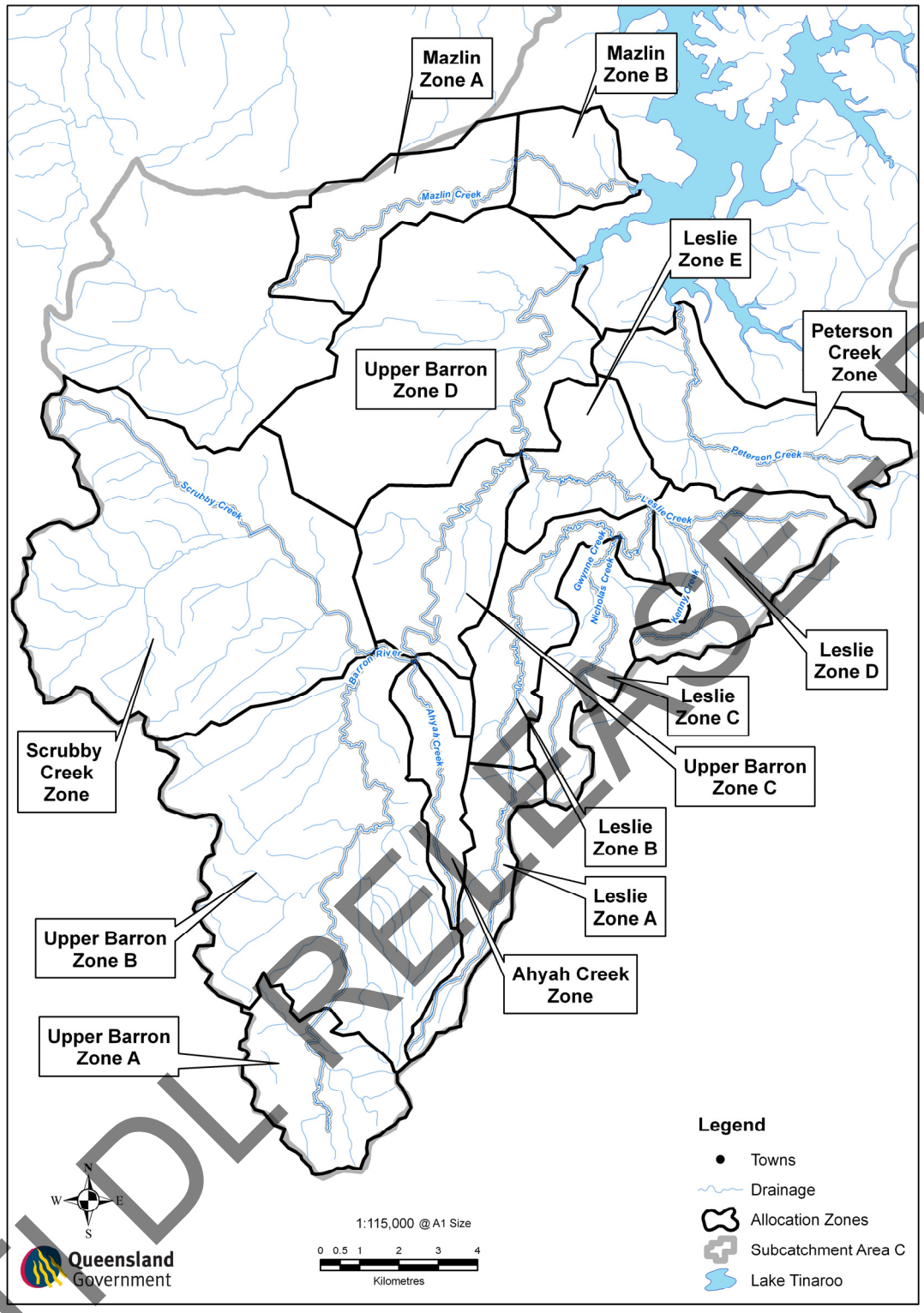

Figure 1: Water Allocation Zones

The finalised provisions

The final plan has been changed to allow seasonal assignment of water taken under allocations between zones within each of the subcatchment areas, subject to totals remaining within the band specified by minimum and maximum volumes for each zone.

B. Reconfiguration of water allocation zones

Background

The ability to trade an entitlement is a key outcome of establishing water allocations. Another outcome is that water allocations have an associated level of security described by water allocation security objectives set out in a water resource plan. Any rules or decisions, such as water trading rules, must be tested for their compliance with these objectives to prevent the security of water allocations being eroded.

The issues that arose

A submitter asked for a review of the Ahyah Creek zone boundaries and suggested that water trading be allowed between the Ahyah Creek zone and the zone directly downstream (the Upper Barron zone c). The water advisory group asked for similar trading arrangements to be considered between the Leslie Creek and the Upper Barron River zones downstream of the Barron River and Leslie Creek confluence.

How the issues were assessed

Hydrologic modelling was used to test the localised effects of moving water allocations within a zone and from one zone to another. The model outputs were used to establish zone boundaries and trading volumetric limits that maximised the flexibility for trading without compromising the water security of the entitlements.

Streamflows are more reliabable in the Upper Barron River than they are in Ahyah and Leslie creeks and therefore entitlement holders on the Barron River enjoy a higher level of security for their water allocations. Allowing water allocations to be traded from Ahyah Creek or Leslie Creek into the Upper Barron River would pose risks to the higher water security of the existing Upper Barron River zone allocations.

The finalised provisions

The Ahyah Creek zone remains unchanged and best reflects the hydrologic difference between the stream and the Upper Barron River. The final plan has retained the provisions that prevent water allocations from being traded from the Ahyah Creek zone or Leslie Creek zones into the Upper Barron River zones to ensure the security of water allocations in the Upper Barron River zones is not put at an unacceptable risk.

C. Allowable rate of take and effects of trading

Background

To support improved management and measurement of water usage, the water resource plan requires unsupplemented entitlements to be specified against a range of criteria. Included are an entitlement's purpose, its location, nominal volume, volumetric limits—including a daily volumetric limit—and the maximum rate at which water can be taken.

Daily volumetric limits, unless stated on an existing entitlement, were to be based on ratings for a range of pump sizes provided in the water resource plan. For other types of entitlement, rates were to be based on an assessment of the type of entitlement and an estimate of the amount that could be taken.

However, in special cases, the plan allows for the rate to be based on the type of entitlement, the capacity of the pump and the irrigation and distribution system associated with the entitlement for the previous 10 years.

The draft plan provisions

Chapter 7 of the draft plan specified rules for determining the attributes of water allocations in the event of them being subdivided, or relocated either seasonally or permanently. The rules were structured to ensure that the overall attributes of the original entitlement were unchanged. For example, the sums of the annual, seasonal and daily volumetric limits for the subdivided water entitlement must equal the attributes for the original entitlement.

The issue that arose

Several submitters wanted an assurance that water trading would not impact on the rate of take for entitlements. This is because irrigation systems were designed based on the rate of take for a specific pump duty, and a proportionate reduction associated with a subdivision would render irrigation systems inoperable. They believed

reconfiguring pumps and nozzles to comply with a reduced rate-of-take would be costly and impractical, and submitted that constraints based on maintaining the daily volumetric limit associated with the original entitlement would be more appropriate.

How the issue was assessed

An entitlement that has been subdivided or seasonally assigned will require the entitlement holder to nominate the attributes for the subdivided entitlements that are either in proportion with the subdivided volumetric limits or can be summed to equal the original value. For example, the nominal volume of a water allocation must be subdivided proportionately with the nominal volume to annual volumetric limit ratio. However a split of the rate of take may be at any ratio decided by the entitlement holder provided the subdivided values add up to 100 per cent of the rate of take of the entitlement being subdivided. This means that the entitlement holder can retain the rate of take required to meet their needs.

The plan also allows the rate of take to be amended up to the maximum rate specified in schedule 8 of the water resource plan for the authorised pump size on the existing development permit. This provides an opportunity for the rate of take to be increased to accommodate trading and minimise effects on irrigation system capabilities.

The finalised plan

There has been some rewording in the final plan to clarify the provisions. The provisions require that the sums of key attributes, such as rate of take, seasonal and daily volumetric limits must tally the specifications of originating entitlements following subdivision or amalgamation. The originating entitlement holder can apply for a ratio or split of the rate that best suits their existing pumping capabilities and needs.

2.1.3 Water sharing rules for unsupplemented water allocations

Background

Demand for irrigation water from the Barron River and its tributaries is highest in the dry season when flows are principally maintained by groundwater discharging from aquifers adjacent to streams. These low, or base flows, diminish as the dry season progresses. At the same time, demand for irrigation water generally increases towards the end of the dry season. To ensure that environmental needs are met during the dry season and to share water amongst water users, the draft plan was required to propose environmental management and water sharing rules for the Upper Barron.

The draft plan provisions

To address low flow management in the unsupplemented streams of the Upper Barron, incremental restrictions on daily volumetric limits were to apply to water allocation extractions as flows diminished. Restrictions were to be lifted incrementally as flow volumes increased.

The proposed restriction formulas for each subcatchment area were given in tables 14D–14G, and for withdrawing the restrictions in tables 14H–14K.

Under the rules, restrictions of 25 per cent of the daily volumetric limit would begin when flows fell and remained below the first of three thresholds specified for each of the respective areas for seven consecutive days. Restrictions of 50 per cent of the daily volumetric limit were to apply when flows remained below the second threshold for seven days, with full restrictions proposed in the event of the third threshold being similarly triggered.

The restrictions were to be progressively lifted as increasing flows passed and remained above each of a reciprocal series of flow thresholds for 21 consecutive days.

The issue that arose

In 51 submissions it was argued that the restrictions should be introduced only when flows remained below thresholds for 14 consecutive days, and that they should be withdrawn when flows stayed above the respective rising flow thresholds for only seven days.

The submitters believed a seven-day trigger period would not allow water users sufficient time for management adjustments, and that the subsequent level of restrictions could be introduced while users were still adjusting to the previous one. The submissions echoed similar concerns raised by members of the water advisory group.

It was also argued that the 21-day periods specified for lifting the restrictions were excessive. Some of the trigger thresholds were seen as too high and the submitters called for the thresholds to be lowered to reduce the occurrence of the restrictions being introduced.

How the issue was assessed

The submitters' proposed alternative rules were extensively assessed using the department's hydrologic model to compare their effects on predevelopment flows with those of the method proposed in the draft plan and a scenario where no rules applied.

The results of the comparative assessment of flows in Mazlin Creek during the 1993–94 dry season are shown below in Figure 2. It can be seen that at higher flows, there is little difference between the scenarios, because demand for irrigation water at these times is comparatively low, resulting in little effect being evident on the predevelopment case. Of particular note, is the presence of flows above one ML/day for 100 per cent of days under the predevelopment case.

However, as diminishing flows approach 10 ML/day and demand increases, the scenarios begin to diverge, with the most pronounced effects evident under the 'no rules' case, which shows a dramatic increase of about 60 per cent in the occurrence of no flows—that is flows of less than one ML/day.

Divergence between the proposed alternative rule and the draft plan provisions becomes increasingly evident as flows approach the critical one ML/day where a 6 percentage increase in the number of very low flow days. Although the difference might appear relatively small, during the dry season stage of the water cycle, the presence of additional water in the system under the draft plan rules is regarded as environmentally significant, whereas the proposed alternative and would compromise the water resource plan's environmental flow objectives.

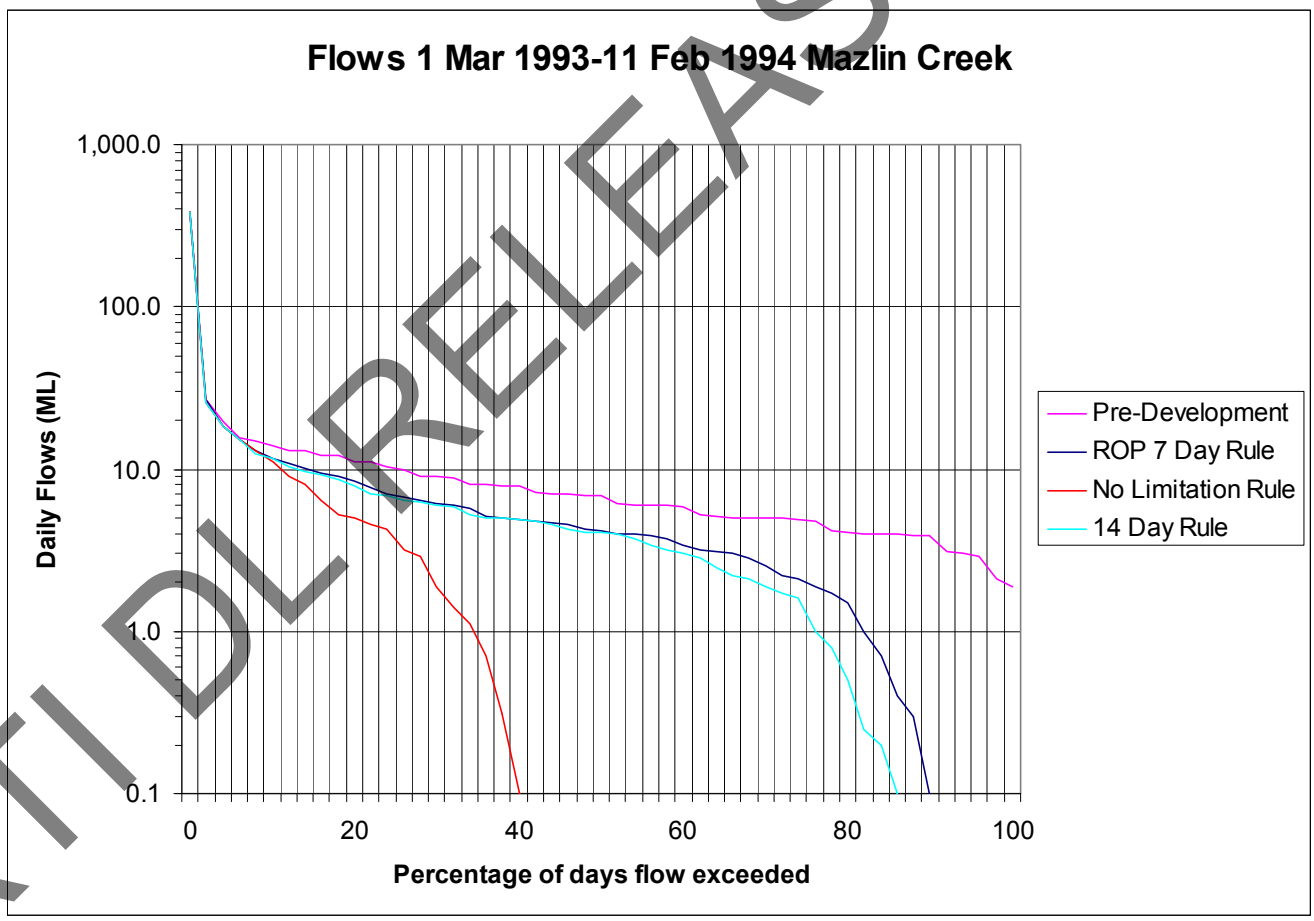

Figure 2. Flow duration curves

Note that the 'y' scale is logarithmic. Divergence between the predevelopment and developed scenarios begins to occur at flows of about 10 ML/day, when water is less abundant and demand increases. Divergence becomes greatest when entitlements are fully used in the absence of restrictions. Divergence between the plan provisions and

the alternative scenario proposed in the submissions becomes most pronounced at about 8 ML/day. Flows are poorer under the alternative because restrictions are introduced more slowly and eased more quickly.

The issue was reviewed by an independent referral panel, which recommended that the draft plan provisions remain unchanged.

The finalised plan

The final plan's rules for initiating and withdrawing restrictions in the priority area upstream of Tinaroo Falls Dam are unchanged and are consistent with the water resource plan's envirnomental flow objectives. This approach best reflects the dynamic nature and seasonality of watercourses in the Upper Barron and would not result in excessively frequent activation of restrictions that would present management difficulties for water users. The 21 day period for withdrawing restrictions is considered appropriate because of the importance of allowing flows to recover following the dry season.

2.1.4 Atherton Subartesian Area management zones

Background

During the amendment process, the water advisory group and others in the Upper Barron successfully argued for groundwater licences to be allowed to transfer within subartesian management areas A and B of the Atherton Subartesian Area.

The draft plan provisions

Groundwater licences in the Atherton Subartesian Area could be transferred to different land, or the water taken under them seasonally assigned, within the location zones specified for management areas A and B.

The issue that arose

Several submitters disputed the validity of the delineation of the zones proposed for management area A, arguing that they should instead have been based on the surface water catchment boundaries for the areas. A single submitter with property in two zones believed the zones should be amalgamated.

The department received correspondence claiming that some existing water licences in management area B may be invalid and that plan provisions allowing limited trading of groundwater licences should be abandoned.

How the issue was assessed

The zones proposed in the draft plan were based on factors such as the hydrologic characteristics of the aquifer, and the aquifer's geology and uniformity. However, alternative boundaries that also recognised the importance of ground and surface water interaction were considered in finalising the zone boundaries under the plan amendment and was consistent with the method used for establishing zones in management area B of the Atherton Subartesian Area.

In finalising the plan, the department recognised the significant benefits to the broad water-using community of the Atherton Tablelands, including the flexibility the plan amendment provides through groundwater trading. This was a key consideration in proceeding with the finalisation of the plan and the retention of the proposed trading provisions for groundwater licences in management area B.

All existing water entitlements in the Atherton Subartesian Area are recognised as valid water entitlements under the Water Act.

The finalised plan

The relocation zones for management area A have been redrawn to approximate the surface water catchments and are shown in Figure 3. The provisions for groundwater trading remain unchanged in recognition of the benefits that water trading will bring for groundwater users on the Atherton Tablelands.

2.1.5 Surface flow correlation in Atherton Subartesian Management Area B

Background

Under the water resource planning process, groundwater management rules are generally based on water levels measured in the aquifers themselves. However, this method relies on the availability of data from monitoring bores that, ideally, are part of an integrated network. This approach was possible in management area A of the Atherton Subartesian Area where the established monitoring network provides the necessary information for a long period of time. However, for management area B, which has fewer bores in a larger area with significant hydrologic variability, an alternative method was needed.

The draft plan provisions

In the draft plan, it was proposed that groundwater availability in zones 1–4 and zone 9 of Atherton Subartesian Management Area B was to be correlated with surface flow at Picnic Crossing gauging station on the Barron River which is downstream of its confluence with Leslie Creek. The use of the surface water gauging station would serve a dual purpose of addressing any data gaps in the bore monitoring network and would account for the significant hydrologic connections between the aquifers of management area B and the adjacent streams.

The issue that arose

A total of 49 submitters called for management of the five area B zones to be based on observation bore data. They submitted that if the department considered the area B observation bores inadequate for the task, data from bores in area A could be used to supplement deficiencies.

Two of the submitters argued that management based on observation bore data was particularly important for zone B9, which is covered by Peterson Creek and discharges directly into Lake Tinaroo. In support of their proposal, the submitters offered, at their own cost, to install a logger in an unused bore on one of their properties in zone B9 and to allow the department access to the equipment.

How the issue was assessed

The department considered the feasibility of managing area B under the arrangements proposed by the submitters, including the use of bore data from management area A. However, because of known linkages between stream baseflows and groundwater levels and the differences between the aquifer properties of area B and the more downstream aquifers of area A, there were concerns that adopting the method could cause uncertain outcomes for the water security of surface water users. Additionally, there is evidence of groundwater use impacting on surface water baseflows in Peterson Creek, but little if any evidence of a correlation with the hydrogeology of area A.

Although, as the two submitters noted, Peterson Creek discharges directly into Lake Tinaroo and does not contribute to the flow at Picnic Crossing gauging station, departmental data confirm the existence of a correlation between flows at that point and the discharge of groundwater in zone B9 to Peterson Creek as measured at a gauge board on Peterson Creek near Yungaburra.

The department accepts that management rules are based on observation bore data and the base flows in Peterson Creek would be preferable for area B, but the existing monitoring network is not sufficiently comprehensive to support this approach. Area A, the central part of the Atherton Subartesian Area adjacent to Lake Tinaroo benefits from a more comprehensive observation bore network that resulted from incremental improvements that paralleled comparatively rapid water usage growth in the area, notably in the latter part of the last century. The extensive data generated by this network over many years have contributed significantly to an improved understanding of the correlation between surface and underground water in area A.

Developing a comparable understanding of the groundwater hydrology is more complex for area B, which occupies higher, more rugged country than area A and is hydrologically and geologically much less uniform.

Although an observation bore improvement program now under way in area B will support a possible review of the provisions in the future, it will be several years before sufficient data become available for comprehensive analysis. The data that becomes available needs to record water level behaviour across a range of wet and dry season conditions before it can be used in an effective analysis.

While the department appreciated the offer made in the submissions by two submitters prepared to share the costs of equipping a private bore in zone B9 with a data logger, the proposal was problematic.

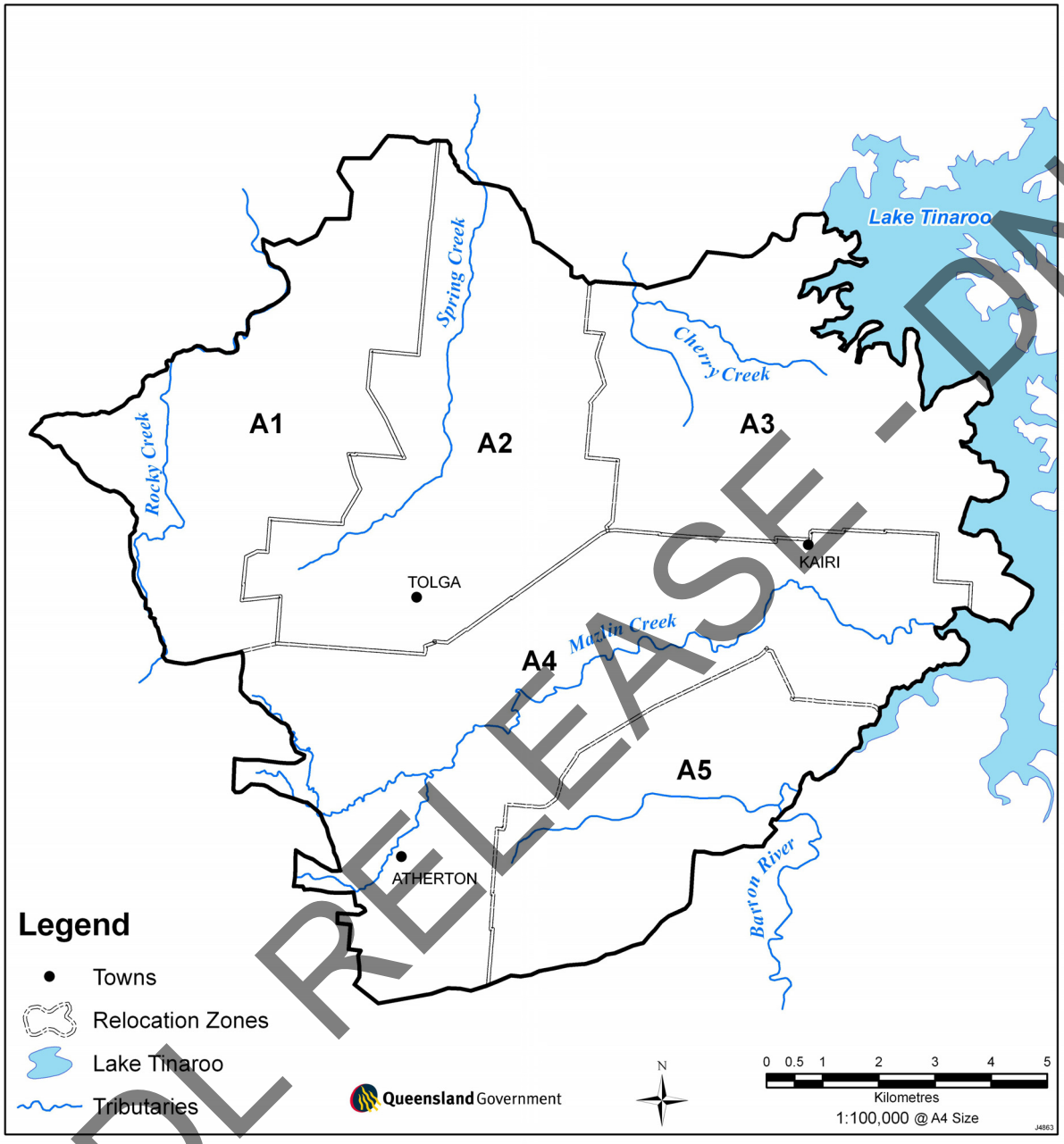

Figure 3. Zones for Atherton Subartesian Management Area A

Monitoring bores must be constructed to national standards to ensure that data are consistent and compatible. Ideally, monitoring bores should be located on public land where they can be freely accessed and maintained. However, the department acknowledges and thanks the submitters for the gesture.

The issue was considered by the referral panel which agreed that until an alternative management method, preferably based on direct bore observation, became available, the proposed approach represented the most practicable and equitable alternative.

Resource operations plan provisions

The provisions are unchanged. The department has installed several new monitoring bores in management area B. Sites were selected for their suitability to support improved water sharing arrangements, and the final plan allows

for an amendment to be made if and when sufficient information becomes available to support the introduction of an alternative approach.

2.1.6 Relocation of water licences

Background

To meet demand in the absence of any potential for unallocated water to be made available under the plan, the water advisory group asked for licence trading to be allowed in parts of the Upper Barron where entitlements would not convert to water allocations.

The advisory group believed this was a particularly important consideration for the newly-created subcatchment area H, comprising the southern tributaries of the Barron River immediately downstream of Lake Tinaroo and the underlying part of zone B9 of the Atherton Subartesian Area. Supplemented water from the Mareeba Dimbulah Water Supply Scheme can be accessed in this area, including through seasonal and permanent water allocation trading rules that have been in place since 2005.

The draft plan provisions

Surface water and subartesian licences would be allowed to move, or the water taken under them seasonally assigned, within their zones of origin throughout the Upper Barron, including subcatchment area H, and the underlying part of subartesian zone B9. Similar flexibility was proposed for surface licences in the Emerald Creek part of subcatchment area A, downstream of Tinaroo Falls Dam.

The issues that arose

There was general support for the provisions, although several submitters called for surface water and groundwater licences to be inter-tradeable. A single submitter believed that all licences in subcatchment areas A (Lower Barron River), D (Douglas, Four Mile and Two Mile creeks), E (Walsh River), F (Upper Walsh River) and G (Emu Creek) should be allowed to trade.

How the issues were assessed

On the face of it, allowing surface water and groundwater entitlements to be inter-tradeable would appear logical in a system where the availability of the respective resources is closely connected. However, developing the water sharing rules and exchange rates needed to accommodate the method without putting planning outcomes and objectives at risk would be complex and take time.

The integrated management of connected surface and ground water resources is favoured under the National Water Initiative and reflected to some extent in the management provisions for the Upper Barron. Progression to a more sophisticated approach involving trading between water sources would not be prudent until a much longer record of streamflow and groundwater level measurements, as well as metered water use information, become available.

On considering the case for extending licence trading to all parts of subcatchment area A and to subcatchment areas D, E, F and G, the department concluded that demand in these areas, where stock and domestic requirements are the prevalent use, was insufficient to merit more extensive provisions. Additionally, an analysis of metered use records indicated that there are considerable proportions of some entitlements that are not being used in the existing relocation zones —for example on Emerald Creek. In other parts of the Emerald Creek catchment, most licences are being used for stock and domestic purposes and which would not normally be relocated to other land. This means that there is likely to be limited additional water made available by allowing trading between these zones and limited demand for water trading.

Resource operations plan provisions

Provisions allowing for the permanent relocation and seasonal assignment of water licences in the Upper Barron, including subcatchment area H, and the Emerald Creek part of subcatchment area A are unchanged.

2.1.7 Carryover water in the Mareeba Dimbulah Water Supply Scheme

Background

The initial resource operations plan did not provide for the unused parts of water allocations in the Mareeba Dimbulah Water Supply Scheme to be carried over to the next water year. However, interim provisions predating the water resource planning process have continued under a departmental agreement with SunWater that has been renewed annually. Water users have petitioned for carryover provisions to be formally addressed.

The draft plan provisions

The draft plan proposed a method for allowing the unused parts of medium priority water allocations to be carried over from one water year to the next. To ensure that the provision was not detrimental to the security of other entitlements, any carryover water held by a water user was to be cancelled six months from the beginning of the new water year or when:

- Tinaroo Falls Dam spilled, or
- The level in Tinaroo Falls Dam was at or less than 668 m AHD, which was intended to represent 75 per cent of the storage capacity.

The issues that arose

Several submitters saw the proposed rules as too restrictive and doubted they would be effective. They believed carryover water should be available throughout the water year, and believed the exact meaning of 'spilling' was not defined. It was also suggested that the volume used to cancel carryover should be expressed by percentage rather than height of water in storage.

How the issues were assessed

Several options were tested in the department's hydrologic model to establish how much water needed to be stored in Tinaroo Falls Dam at the start of the water year to support water being carried over for underused allocations without adversely impacting on the share of water available to water allocation holders at the beginning of each water year (announced allocation).

It can be seen from Table 1 that an announced allocation of 100 per cent can be maintained without an allowance for carryover when the storage is between full and three-quarters full (100 per cent and 75 per cent). In a system without access to carryover, by the time the volume has fallen to 60 per cent, announced allocations of 76 per cent can be supported at the beginning of the water year. When carryover arrangements are introduced into the rules, the announced allocations at the start of the water year for a carryover cutoff at 75 per cent of storage reduce to 62 per cent. At lower storage cutoff levels, the announced allocations at the start of the water year reduce significantly.

Consultation with Sunwater indicated that their preferred cutoff level would be at a storage height of 668m AHD. This is equivalent to 81 per cent of storage. The department's modelling showed that some further scope for carryover could be accomeodated below 81 per cent. However, adopting a cutoff level below 75 per cent would diminish the certainty with which irrigators could plan their water use for the coming water year because of a low announced allocation. The scenarios with cutoff levels down to 50 per cent of storage do however meet the water allocation security objectives, mainly because of the reliable wet season inflows in the early part of the calendar year at which time the announced allocation can be raised.

Table 1: Correlation between storage volume and announced allocations under carryover provisions

Tinaroo Falls Dam Capacity	Storage volume (ML)	Storage height (m AHD)	AAMP (announced allocations—medium priority) without carryover	AAMP (announced allocations—medium priority) with carryover
100 per cent	438 920	670.42	100 per cent	100 per cent
75 per cent	316 095	667.0	100 per cent	62 per cent
60 per cent	263 352	664.53	76 per cent	27 per cent
50 per cent	219 460	662.67	55 per cent	6 per cent

After considering the submissions and reviewing the assessment data, the referral panel recommended the department's proposal to adopt the 75 per cent cutoff storage level equivalent to a storage height of 667m AHD.

The final plan

The storage height at which carryover will be cancelled at the start of a water year has been changed to 667m AHD to reflect the intended storage volume of 75 per cent, and is now expressed as a percentage of storage capacity. The provisions remain otherwise unchanged.

2.2 Other issues

2.2.1 Unallocated water

The issue that arose

Several submitters believed development and growth opportunities for irrigation would be constrained because the draft plan did not provide for unallocated water to be made available other than the 4000 ML reserved for the future needs of Cairns. The need to retain this reserve for future urban water needs was reinforced through the Far North Queensland Regional Water Supply Strategy 2010, which identifies that future new water supplies may need to be sourced from groundwater resources and the Barron River at Lake Placid.

How the issue was assessed

The reserve was expressly set aside to support the needs of the growing urban community in the Cairns local government area. The water is available only at Lake Placid near Cairns and could not be made available upstream, including within the Mareeba Dimbulah Water Supply Scheme.

The water trading arrangements provided for under the resource operations plan enables additional water for irrigation to be sourced through water trading provisions for supplemented water from Tinaroo Falls Dam and the new water trading provisions for unsupplemented water finalised through the plan amendment, including opportunities for the relocation of water licences.

2.2.2 In-stream storages—overland flow

The issue that arose

Several submitters believed the plan should allow for private storages to be built on gullies and minor tributaries.

How the issue was assessed

The Barron Water Resource Plan does not deal with overland flow water, which is the typical source of water for gully dams. This means that neither the water resource plan nor the resource operations plan prevents the construction of offstream storages.

If the construction of the private storage is on a minor tributary that is considered to be a watercourse, then the plan specifies rules that allow small in-stream storages to be built for specific purposes.

2.2.3 Water year specification

The issue that arose

Previously, the water year specified for surface water and groundwater entitlements were different. The department identified that there would be difficulties in having different water years in managing and accounting for water trading.

How the issue was assessed

Under the resource operations plan, the water year for all types of water will begin on 1 July. This is consistent with the practice in most parts of the state and will ensure that all water trading and water sharing rules and monitoring and reporting will be conducted to the same standards.

2.2.4 Land and water management plans

The issue that arose

The water advisory group recommended that relatively simple requirements for land and water management plan guidelines be developed for the priority area above Lake Tinaroo to facilitate the movement of water under the plan's trading provisions.

How the issue was assessed

Requirements for land and water management plans are dealt with by the Water Act, which specifies the circumstances under which they must be prepared to ensure that uses are sustainable and will not result in negative consequences for the natural environment, such as salinity. Broadly speaking, rules apply where water is traded to land, other than where irrigation is an established activity, and used in two out of three years. The guidelines for developing them address local factors, such as soil types, salinity and runoff and are not dealt with under the water resource planning process.

2.2.5 Licences that already specify an annual volume

The issue that arose

One entitlement holder raised concerns about their entitlements being specified volumetrically under provisions of the amended water resource plan.

How the issue was assessed

In one instance, an entitlement that expressed an area also had a condition stipulating an annual volume. Under the plan provisions, where an existing licence specified a volume, the area licence conversion factor given in the plan would not be used to determine the entitlement's volume. The provision recognised that the historic use associated with these licences could not legally have exceeded the volume already specified in conditions on the licence.

2.2.6 Area-volume conversion

The issue that arose

Several submissions raised the issue of the factor that was to be used to convert area licences to volumetric entitlements. Some submitters believed the 10 ML per hectare rate specified for the Upper Barron should be applied elsewhere, including streams that discharge into the Mitchell River catchment. Others said entitlement volumes should reflect usage levels that had been driven by irrigation practices. A submitter believed the social and economic impacts of the conversion rate had not been considered.

How the issue was assessed

The area licence conversion factor was determined during preparation of the original water resource plan and its amendment, and cannot be revised through the resource operations plan amendment process.

The Upper Barron subcatchment areas C and H are different in many ways to the catchments in other parts of the Barron Water Resource Plan area. The rainfall in subcatchment areas C and H (mean annual rainfall at Atherton is 1410 millimeters) is much higher that the rainfall in the Upper Mitchell (mean annual rainfall at Mareeba is 920 millimeters) and the Upper Walsh (mean annual rainfall at Dimbulah is 775 millimeters). This affects the water availability and streamflows of the respective catchments, and supports a more reliable year-round supply of water for irrigation in subcatchment areas C and H.

Additionally, the soil characteristics in subcatchment areas C and H are more suitable for multi-cropping practices than other areas like the Upper Mitchell. Existing usage patterns and the availability of supplies from alternative sources, including water from Tinaroo Falls Dam, were also important considerations.

All these factors influenced the need for higher conversion rate in subcatchment areas C and H under the water resource planning process, and were informed through community consultation activities, including meetings with the water advisory group.

2.2.7 Minor changes and corrections

In amending the resource operations plan, several minor corrections and changes were made. Transitional provisions—for example, requirements for specific licences to be issued or for entitlements to convert to water allocations—that have now been implemented, have been removed as this is no longer required.

In addition, spelling errors and typographical mistakes have been corrected.

There has been some rewording of the permitted and prohibited changes to water allocation provisions in chapter 7 to clarify the intended meaning of the provisions. The water sharing rules for unsupplemented water in subcatchment C have been restructured to clarify the meaning of the provisions. The water sharing rules for groundwater in management area A have also been reworded to clarify the intent and to ensure the water sharing rule provisions for unsupplemented water and groundwater have consistent structure.

Some updating of provision numbers has also occurred as a result of changes to the plan.

3 Implementing requirements of the water resource plan

Water allocations replaced all existing entitlements scheduled for conversion in the Upper Barron priority area on the day the resource operations plan came into effect. The trading and allocation change rules set out in the final plan also came into force, and the department will be responsible for managing all allowable activity associated with the provisions. All relevant application forms and related guidelines associated with the provisions can be accessed at departmental service centres and offices or at <www.derm.qld.gov.au/watermanagement>.

Other elements of the resource operations plan are being progressively implemented, with area-based licences now being converted to volumetric entitlements with priority being given to entitlements in the relocation zones specified in schedule 7.

The Department of Environment and Resource Management is also dealing with outstanding licence applications that have been held under the effects of the moratorium.

The department will also be consulting with water users about notification processes and the implementation of water sharing rules. Information about daily stream flow for Picnic Crossing, Leslie Creek and Mazlin Creek gauging stations is available at < http://watermonitoring.derm.qld.gov.au/host.htm>. Water users are able to closely monitor the likelihood of flows receding to trigger thresholds for the activation of water sharing rules.