

# Mataranka Tindall Water Advisory Committee

Time: 10:00am

Date: 12 August 2021

Location: Conference Room, Nitmiluk Ranger Station

<b>Attendees</b>	Rebecca Mohr-Bell	Chair
	David Ciaravolo	Recreational fishing interests – Member (Amateur Fishermen’s Association of the NT)
	Jenny Davis	Environmental interests - Member (Charles Darwin University)
	Rohan Sullivan	Pastoral interests - Member (Cave Creek Station)
	Jocelyn James	Aboriginal cultural interests - Member (Jilkminggan Community Aboriginal Association)
	Julian Martin	Irrigated agriculture interests - Proxy for Mark Hansen resigned (Quintis)
	Vin Lange	Irrigated agriculture/Aboriginal economic development interests – Member (Centrefarm / Top End Farm) via Teams
	Helena Lardy	Aboriginal cultural interests - Member (Jilkminggan Community Aboriginal Association) via Teams
<b>Advisors</b>	Amy Dysart	Executive Director, Water Resources, DEPWS
	Tim Bond	Director Planning and Engagement, DEPWS
	Clare Taylor	Assistant Director Planning and Engagement, DEPWS
	Liza Schenkel	Community Engagement Officer, DEPWS
	Adrian Costar	Director Water Assessment, DEPWS
	Michael Short	Hydrogeologist, DEPWS
	Dale Cobban	Manager Water Resources Modelling, DEPWS
	Hannah Groves	Hydrogeologist
<b>Observer</b>	Bridie Velik-Lord	Northern Land Council
<b>Apologies</b>	Clair O’Brien	Pastoral interests/Regenerative Agriculture – Member
	Sarah Kerin	Tourism/environmental interests – Member (Parks and Wildlife Division, DEPWS)
	Ben Lewis	Aboriginal cultural interests – Observer (Firestick/Jawoyn)
<b>Secretariat</b>	Pru Ducey	DEPWS

Not present	Kerry Roberts	Aboriginal cultural interests - Member (Jilkminggan Community Aboriginal Association)
	Judy MacFarlane	Regional community interests – Member (Roper Gulf Regional Council)

Actions arising from Meeting 11 - 12 August 2021		
Action	Action Officer	Timeframe/comment
<i>Distribute Clare Taylor's contact details to Committee and vice versa.</i>	Pru Ducey	As part of the minutes to go out week of 23 August 2021
<i>Consider amending the Terms of Reference to reflect the expected declaration date of the Water Allocation Plan.</i>	Clare Taylor	The current ToR are considered adequate since the dates included in the text are only indicative and members are appointed until a water allocation plan for the Mataranka Tindall Limestone Aquifer is declared
<i>Circulate the values from the Committee and the Aboriginal values, and the values identified by the Committee</i>	Tim Bond Pru Ducey Liza Schenkel	As part of package that goes out with the minutes
<i>Circulate the Vision, Outcomes and Objectives for the draft plan</i>	Tim Bond Pru Ducey Liza Schenkel	As part of package that goes out with the minutes
<i>Provide a summary sheet on the AWR</i>	Tim Bond	As part of the package that goes out with the minutes
<i>Provide a summary sheet on current water entitlements by management zone</i>	Tim Bond	As part of the package that goes out with the minutes
<i>Provide a paper on the modelling approach taken for noting/identifying any concerns (include climate period, climate change considerations, consecutive dry years, assumptions, economic depth, model peer review history etc)</i>	Michael Short	Mid-September
<i>Provide an assessment of the mid-80s to mid-90s dry period and subsequent recovery to inform WAC decisions</i>	Water Assessment	Papers to be ready at least 10 days before next meeting
<i>Run agreed model scenarios and provide a report.</i>	Water Assessment	Papers to be ready at least 10 days before next meeting
<i>Provide a summary of the previous work done by the Committee and key decisions.</i>	Pru Ducey	Papers to be ready at least 10 days before next meeting
<i>Ensure future Agenda papers summarise the purpose of the agenda item, provide background options and the outcome it is seeking.</i>	Clare Taylor	As part of Agenda for next meeting

<i>Provide a summary of research activities in the WAP area relevant to the WAP</i>	Water Assessment	Mid-September
<i>Pru to conduct Doodle poll to determine suitable date for Meeting #12</i>	Pru Ducey	As part of package that goes out with the minutes
<i>The Chair to take to members not present, the proposal of the Committee writing to the Controller of Water advising her of concerns raised that water may almost be fully allocated and still need to provide for AWR. Bring to her attention in case another application is received.</i>	Rebecca Mohr-Bell	TBC

Agenda No	Agenda Item	Action Required (e.g. information / discussion / decision)
	<b>Meeting opened</b>	10:00am
1.0	<b>Acknowledgement of country</b>	
	<b>Welcome</b>	The Chair welcomed those present. Round table introductions
	<b>Attendance and apologies</b>	Attendance as shown above Apologies noted above
2.0	<b>Committee refresh and induction</b>	
	<p>Committee Terms of Reference (signed 25 January 2021)</p> <ul style="list-style-type: none"> <li>• Envisaged that three meetings will be convened between February and July 2021</li> <li>• Members are appointed until a water allocation plan for the Mataranka Tindall Limestone Aquifer is declared, as per the appointment instrument.</li> </ul> <p>Water Resources Division introduction</p> <ul style="list-style-type: none"> <li>• Has an ambitious schedule – need to double the current number of Water Allocation Plans from 6 to 12</li> <li>• Moving away from having one Planner per Plan to address risk of delays should a planner leave etc.</li> <li>• High priority to complete the Mataranka Tindall Water Allocation Plan</li> <li>• Clare Taylor will be the point of contact for Committee members.</li> </ul> <p><i>Action: Distribute Clare Taylor's contact details to Committee and vice versa.</i></p> <p><i>Action: Consider amending the Terms of Reference to reflect the expected declaration date of the Water Allocation Plan.</i></p> <p>As the plan nears completion there will likely be media interest. The Chair asked members to refer them to herself or Clare Taylor.</p>	

Agenda No	Agenda Item	Action Required (e.g. information / discussion / decision)
3.0	<b>Committee progress</b>	<p>Since the Mataranka Water Advisory Committee last met in 24 October 2019 progress with the draft Mataranka Tindall Limestone Aquifer Water Allocation Plan has been slow. Number of key events have influenced the ability of the water advisory committee to meet and progress the water allocation plan including:</p> <ol style="list-style-type: none"> <li>1. Update of the Daly Roper model in 2020</li> <li>2. COVID restrictions</li> <li>3. Resignations and renewing the Mataranka Tindall WAC</li> </ol> <p>Work has been progressing on the key items since that meeting with a focus on scenario modelling, the results of which will inform the setting of the Estimated Sustainable Yield and other water-sharing arrangements in the Plan.</p> <p>Detail of progress since last meeting:</p> <ol style="list-style-type: none"> <li>1. <b>Upgrade of the coupled Daly Roper model</b> – Water Assessment Branch are presenting at agenda item 7 about the upgrade of the model, its use and outputs. The model gives different perspective on the Tindall Limestone Aquifer to the previous model, which may influence the way we view the water resource and calculate the estimated sustainable yield (ESY).</li> <li>2. <b>Mataranka Tindall natural water balance report</b> – Water balance figures such as aquifer recharge, discharge and storage were presented and discussed at the March and May 2019 Committee meetings. These figures formed the basis of our knowledge about aquifer dynamics, and establishes the baseline on which decisions can be made about acceptable limits of groundwater extraction from each management zone. The upgrade of the coupled Daly Roper model has led to a review of the original report and a revised version is available at <a href="https://hdl.handle.net/10070/822440">https://hdl.handle.net/10070/822440</a>.</li> <li>3. <b>Scenario modelling and analysis</b> – Modelling enables us to make predictions of how features of the water resource such as groundwater levels, spring flows and river flows will perform and change under different water extraction regimes. Nine different water extraction scenarios were modelled ranging from current levels of extraction through to hypothetical expansion of water developments across the Plan area. The outputs for each scenario were analysed with a key finding that the ESY should be based on discharge rather than recharge as presented in agenda item 7.</li> <li>4. <b>Estimated Sustainable Yield (ESY) settings</b> – the results of the water balance report and the scenario modelling work are directly informing the setting of sustainable water-sharing arrangements in the Plan, especially the ESY.</li> <li>5. <b>Protecting groundwater dependent ecosystems</b> – the establishment of a groundwater discharge protection zone was discussed at the May 2019 Committee meeting. Since then Water Resources has been developing a contour map of depth to groundwater with the Plan area to add further scientific rigour around the extent of the groundwater discharge areas in the Plan. This mapping will also assist with identification of wetlands and vegetation communities that might be directly accessing groundwater from the aquifer. Additionally, we need to do further modelling to consider the likely impact of feasible extraction scenarios on groundwater discharges and groundwater levels in the vicinity of GDEs. The results will help to determine appropriate measures for managing the impact of neighbouring licenced groundwater extraction on these values.</li> <li>6. <b>Aboriginal engagement and cultural values mapping</b> – we continue to work with Aboriginal Ranger Groups and Traditional Owners on spring monitoring and cultural values</li> </ol>

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		mapping, including the identification of spring sites which were not previously mapped. Recent liaison with the Northern Land Council is also advancing efforts to ensure that all Aboriginal groups with cultural connections to the Plan area have the opportunity to contribute to the planning process. Next agenda item 4 provides a summary.
4.0	<b>Update on Aboriginal engagement activities</b>	
	Objectives and outcomes of engagement to date	Presentation: Aboriginal engagement update A copy of the presentation is at <b>Appendix 1</b>
	<p>Questions/discussion</p> <ul style="list-style-type: none"> <li>• Meetings with TOs held 11 August 2021, as well as in September and October 2020</li> <li>• Meeting with Centrefarm/Top End Farms planned for later in the month</li> <li>• Community Roadshow closer to plan completion</li> <li>• Identified new sites and springs and the values outlined in the presentation</li> <li>• Do values match the plan values?</li> </ul> <p><i>Action: Circulate the values from the Committee and the Aboriginal values, and the values identified by the Committee.</i></p> <p><i>Action: Circulate the Vision, Outcomes and Objectives for the draft plan</i></p> <ul style="list-style-type: none"> <li>• Some of those present at the meeting on 12 August expressed disappointment that water for the Aboriginal Water Reserve (AWR) water may not be available – this depends on the ESY and existing entitlements.</li> <li>• NLC hearing a clear desire to do business with water. South Mataranka eligible land and AWR. 30% should be available for AWR. Feedback should be taken into account.</li> <li>• WRD is updating and re-running scenarios in model and looking at how water can be allocated to AWR.</li> <li>• If ESY is already allocated a notional allocation is made to the AWR and as more water becomes available it then goes into AWR, e.g. if someone surrenders a licence this water goes into the AWR.</li> <li>• Declaring the plan establishes the ESY after environmental and cultural protection. Water is then allocated to Public Water Supply and Rural Stock and Domestic uses, then AWR and then to the rest of the consumptive pool. The declared plan allows water policy and legislation to come into effect.</li> <li>• Can the Committee make a recommendation to cut back existing licences by a percentage to achieve the AWR? Think that legislative changes would be required - need to rely on other policies in place: use it or lose it, licensees have a number of years to use that water.</li> <li>• Can there be a moratorium on new applications? The Controller of Water does not have this as an option. Proposing to make this change in legislation in May 2022. Getting the plan completed as soon as possible is the best way to improve the decision making process.</li> <li>• AWR impacts communities and the way forward. Eligible land has already been determined and this is how an AWR is calculated</li> </ul>	

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	<ul style="list-style-type: none"> <li>License information is available through the water licensing portal <a href="https://nt.gov.au/environment/water/water-information-systems/water-licensing-portal">https://nt.gov.au/environment/water/water-information-systems/water-licensing-portal</a></li> <li>The Committee can recommend that existing mechanisms are used as quickly and to the fullest extent possible as a priority to ensure AWR water is available.</li> <li>Once the plan is enacted, the AWR is put into effect as well as mechanisms to put water into the AWR. Feedback and comments have been recorded but existing tools will be used to achieve AWR.</li> </ul> <p><i>Action: Provide a summary sheet on the AWR</i></p> <p><i>Action: Provide a summary sheet on current water entitlements by management zone</i></p>	
5.0	<b>Update on 2020-21 aquifer and river conditions</b>	
	Presentation from Water Assessment Branch	Mataranka WAP water observations A copy of the presentation is at <b>Appendix 2</b>
6.0	Contextual information: <b>Recent water licence decisions in the Larrimah management zone</b>	
	Presentation	Recent licence decisions – Larrimah zone A copy of the presentation is at <b>Appendix 3</b>
	<p>Questions/discussion</p> <ul style="list-style-type: none"> <li>The Larrimah management zone is located in Top End, but characteristics are Arid.</li> <li>If Larrimah is considered as a Top End aquifer, less water is available than if it is considered an Arid Zone aquifer.</li> <li>Where we have information on how the aquifer is recharging, we should use that information. Where we have insufficient science available, we use Contingent allocation.</li> <li>Important to note that however you classify an aquifer there are certain steps that need to be followed before a licence decision.</li> <li>WRD based this decision on science. Need to communicate better as we make decisions.</li> <li>Contingent allocations are only made if no scientific information is available. However we have got information on values and science to better inform licence decisions so we need to look at what 80% draw down on Roper River values looks like before this decision is made.</li> <li>Even though arid zone allocation would help with AWR, cultural values are important. Potential water available in the AWR should not be at the expense of environmental and cultural water.</li> <li>Modelling has been done and science is sound.</li> <li>Risk of doing something to an aquifer is greater in the arid zone. Ancient arid zone water can never be replaced so need to be more conservative in arid zone.</li> </ul>	



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7.0	<b>Roper Hydrological Model – use and outputs</b>	
	Characterisation of the Mataranka Tindall management zones and summary of scenario modelling results	<p>Daly – Roper Water Resource Assessment</p> <ul style="list-style-type: none"> <li>Hydrogeology / basins / catchment / AQF system</li> <li>Model (history, domain, application)</li> <li>Management zones</li> <li>Water resource characteristics (Top End / Arid Zone)</li> <li>Modelling scenarios / results</li> <li>Determining available yield</li> </ul> <p>A copy of the presentation is at <b>Appendix 4</b></p>
	<p>Questions and discussion</p> <ul style="list-style-type: none"> <li>2010 to current has no cease to flows even though usage has gone up. This is because higher rainfall has compensated for increased usage. Three cease to flows in 1960s at Red rock, this was a dry time with no/minor extractions</li> <li>Model does not include floodplain flow, it was designed for low flows, this was looking at sustaining springs through the dry season</li> <li>Daly-Roper model Version 3 is coming</li> <li>Are we looking at contingent allocations to apply in the WAP or are we going to get to environmental and cultural water requirements Larrimah zone?</li> <li>It would be useful to understand what are Top End and Arid contingent allocations are based on</li> <li>We won't factor in recharge as we can't measure this very well. Suggest we use what we know is in storage</li> <li>If we set consumptive pool to an economic base of 100m, water bores can still drill deeper</li> <li>The ESY for Larrimah is proposed to be based on storage. Since water in this zone is below 30m it is unlikely there are GDEs.</li> </ul>	
8.0	<b>Water management tools and adaptive management measures</b>	
	Discussion of management tools to be applied in the water allocation plan	
	<ul style="list-style-type: none"> <li>The Department is proposing to use discharge volumes into the Roper River for the Northern and Southern management zones since these are Top End, recharge driven zones, and use the change in aquifer storage volume in the Larrimah zone since this is classed as Arid with infrequent recharge, as a basis for determining ESY. We need more information and to digest information</li> <li>Engagement with TOs regarding management zones has not been undertaken yet</li> <li>Where boundaries are drawn, need to be able to communicate what is allowable in that space. How you use recharge/discharge for licensing is not relevant. What is allowable for environmental and cultural values?</li> <li>Broadly happy. Northern and Southern zones and being managed on discharge. Need to ensure not over allocated and unable to deliver water downstream. Larrimah is clearly not Top End, but is it an arid system?</li> <li>In the Larrimah zone, we are looking at the consumptive pool coming from storage rather than being based on recharge or discharge. Not factoring in recharge or flow from Georgina Basin</li> <li>ESY to be decided at next meeting</li> </ul>	

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		<ul style="list-style-type: none"> <li>• What are the principles you base this on? We may be giving away intergenerational water in Larrimah zone. What are the environmental and cultural risks?</li> <li>• We need to base decisions on science, list what model based on, and clearly document assumptions and limitations. The plan will document assumptions and limitations</li> <li>• We link modelling to a point of truth. Put real world data up against modelling data. Must be able to monitor within 12 months</li> <li>• What is the safe amount of pumping in the next decade? We need to phase things in so we can pull back if required. Could do scenarios for 20/50/70/100 GL. It takes 6 weeks to run and analyse a model scenario</li> <li>• Need to flag issues such as secondary salinisation</li> <li>• How are stock water use and licenses considered in the model? An impact of climate change may be the need for more stock water. Yes we have a methodology but stock water usage is relatively small and changes very little</li> <li>• Think we should be repeating the last 50-60 years rather than 100 years</li> <li>• There is no evaporation data prior to 1970. Uncomfortable using that as there is no Mataranka data for that period to check. We have seen a systematic increase in rainfall over 100 years. Not happy using data that is no longer happening</li> <li>• Climate change projections. NASY project included climate change scenarios. CO<sub>2</sub> affects vegetation. Mataranka (and Katherine region) looks like the impact of climate change will be wetter</li> <li>• Looking for Committee's level of comfort with the modelling time period</li> <li>• The Committee has a lot of people with on ground knowledge. It is concerning there have been 2 failed wet seasons, what if we have 4, 5 or 10 failed wet seasons</li> <li>• We have a 10-11 year dry period in the record we propose for modelling, and can see how the system comes back</li> <li>• Climate change – variability is likely to increase. Roper flow is already variable</li> <li>• Announced allocations are a really important management tool</li> <li>• We can flag for next meeting: <ul style="list-style-type: none"> <li>- Annual Announced Allocations and what they might look like. Larrimah zone – might be longer period than annual.</li> <li>- Conversation regarding water security levels.</li> <li>- Trade guidelines</li> </ul> </li> </ul> <p><i>Action: Provide a paper on the modelling approach taken for noting or identifying concerns (include climate period, climate change considerations, consecutive dry years, assumptions, economic depth, model peer review history etc)</i></p> <p><i>Action: Provide an assessment of the mid-80s to mid-90s dry period and subsequent recovery to inform WAC decisions</i></p> <p><i>Action: Run agreed model scenarios and provide a report</i></p> <p><i>Action: Provide a summary of the previous work done by the Committee and key decisions</i></p> <p><i>Action: Ensure future Agenda papers summarise the purpose of the agenda item, provide background options and the outcome it is seeking</i></p>



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9.0	Contextual information: <b>Water regulatory reform - changes to the Water Act that affect water allocation planning</b>	
	Verbal summary	A copy of the presentation is at <b>Appendix 5</b>
	Information about key matters for consideration in preparation of the water allocation plan	<a href="#">Water Regulatory Reform 2021-2023 Information paper</a>
10.0	Contextual information: <b>Other water resource programs running in parallel with the water allocation planning process</b>	
	Strategic Regional & Environmental Baseline Assessment (SREBA)	<a href="#">Strategic Regional &amp; Environmental Baseline Assessment</a>
	Roper River Water Resource Assessment (RoWRA)	<a href="#">Roper River Water Resource Assessment</a>
	Geological and Bioregional Assessment (GBA)	<a href="#">Geological and Bioregional Assessment</a>
	Questions / discussion	<ul style="list-style-type: none"> <li>• Drilling on Elsey. Who was engaged? Elsey bores – waiting on AAPA certificates</li> <li>• CSIRO's RoWRA project is modelling the Roper including potential surface water harvesting dam sites</li> <li>• Quite a lot of research happening and the moment</li> <li>• From a Community perspective everyone is worried about what they are seeing up the road, and the impact of not having an AWR</li> <li>• Need a background paper on climate</li> <li>• Valuable to know evidence of review</li> <li>• Today has been incredibly useful.</li> </ul> <p><i>Action: Provide a summary of research activities in the WAP area relevant to the WAP</i></p> <p><i>Action: The Chair to take to members not present, the proposal of the Committee writing to the Controller of Water advising her of concerns raised that water may almost be fully allocated and still need to provide for AWR. Bring to her attention in case another application is received.</i></p>

Agenda No	Agenda Item	Action Required (e.g. information / discussion / decision)
	Opportunity for further discussion after meeting close	
11.0	<b>Next meeting dates</b> Dates for meeting #12, #13 and #14	<p>Meeting #12 – last week in October in Mataranka</p> <p>Meeting #13 – to review draft Plan (late January tbc)</p> <p>Meeting #14 – to review comments following public consultation (late March tbc)</p> <p><i>Action: Pru to conduct Doodle poll to determine suitable date for Meeting #12</i></p>
12.0	<b>Key messages from this meeting</b>	<p>Summary</p> <ol style="list-style-type: none"> <li>1. We have a summary of where we have got to with the modelling and what is remaining</li> <li>2. We need to better understand the assumptions and limitations</li> <li>3. Papers to be provided 10 days before meeting and identify what the Committee needs to discuss/decide/recommend.</li> </ol> <p>To inform ESY in North Mataranka and South Mataranka zone:</p> <ul style="list-style-type: none"> <li>• Use GW discharge as a metric up to 20% impact (Top End)</li> <li>• Climate data 1970-2020</li> <li>• Scenario modelling based on discharge</li> <li>• Assess springs and other metrics</li> </ul> <p>To inform ESY for Larrimah zone</p> <ul style="list-style-type: none"> <li>• Use storage (Arid Zone)</li> <li>• Climate data 1970-2020</li> <li>• Scenario modelling based on storage eg 20%, 50%, 80% of productive base @ 100 m (saturated thickness) over 100 years</li> <li>• Use datasets from MTF for likely extraction sites</li> <li>• Assess springs and other metrics</li> </ul>
	<b>Meeting closed</b>	3:10pm

Department of Environment, Parks and Water Security

# Aboriginal engagement update

Liza Schenkel/Water Planning and Engagement Unit



## Community water values and advice

- Understand why water is important for culture, community and environment (plants & animals, habitats)
- Aboriginal people speak for their cultural water values and how to protect them
- Signs of a healthy water system – what things should we monitor?

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# What we have been doing

- Engaging with Aboriginal Water Advisory Committee members – outside of WAC forums
- Community meetings - Mataranka, Jilkminggan, Larrimah, Ngukurr, Katherine
- Traditional owner specific meetings with Land Council
- Attending local events: Ngukurr festival and Barunga Festival
- School activities
- Working with Aboriginal Ranger Groups on-country to understand water system and monitor conditions ( Mangarrayi, Yugul Mangi and Jawoyn).

## What's ahead

- Cultural values mapping with Centrefarm (end month/early Sept)
- Draft plan consultations -community roadshow with Land Council

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## Water values...signs of healthy water system

- Sacred water places are not drying out
- Water flowing over Roper Bar all year
- Fish and river animals can move up and down the river
- Water for healing and ceremony is available when needed
- Food plants can be collected in the usual places
- River water stays good for drinking
- Enough water for floodplain animals
- Turtles are nesting and eggs can be collected
- Enough fish for catching at the usual places
- River, creeks and springs are flowing at good levels
- Families can camp and swim at usual places
- Hunting is good near river, creeks and on floodplains
- Trees on banks have water
- Water not too hot, water smells good is clear and clean not too much algae

## Summary of major issues and concerns


- Water governance -strong views that TOs should have more say/be involved in permission to drill bores and licences to take water
- How is water use in the region benefiting aboriginal people
- Water needs to be used responsibly
- Water can be shared as long as it doesn't damage the river
- Need good water quality for communities and outstations
- Aboriginal water reserve - no water available already licenced out
- Climate and water use is affecting the river
- Want better consultation, site clearances about new bores
- If the Roper isn't flowing over the Roper Bar it isn't good
- Our water could become more salty



Department of Environment, Parks and Water Security

# Mataranka WAP water observations

Michael Short (Water Assessment Branch)



## North Mataranka –by the numbers

### 2018-19

Rainfall: 734 mm (1,976 GL) **lowest since 2011-12**  
Potential evaporation: 2,677 mm (7,207 GL) **highest since 1987-88**  
Recharge: Approx. 1 mm (~2 GL) **lowest since 2012-13**

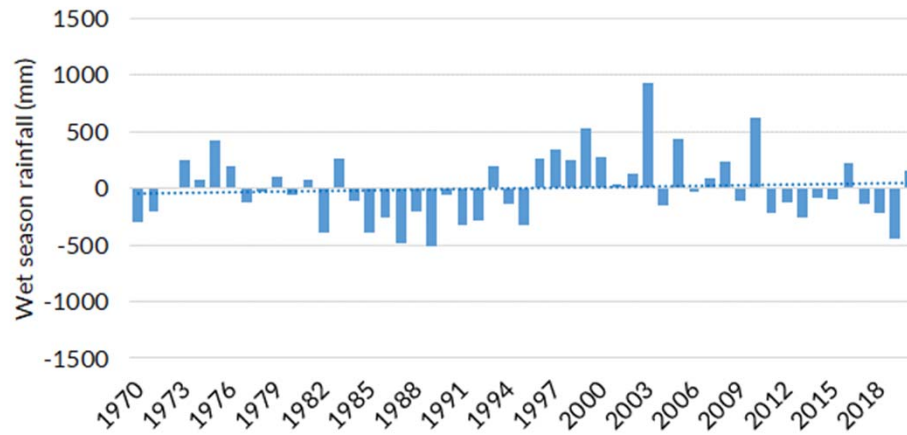
### 2019-20

Rainfall: 510 mm (1,373 GL) **lowest since 1989-90**  
Potential evaporation: 2,732 mm (7,357 GL) **highest on record (since 1970)**  
Recharge: Approx. 2 mm (~6 GL) **2<sup>nd</sup> lowest since 2012-13**

### 2020-21

Rainfall: 1,103 mm (2,969 GL) **highest since 2016-17**  
Potential evaporation: 2,446 mm (6,585 GL) **lowest since 2011-12**  
Recharge: Approx. 40 mm (~100 GL) **highest since 2010-11**

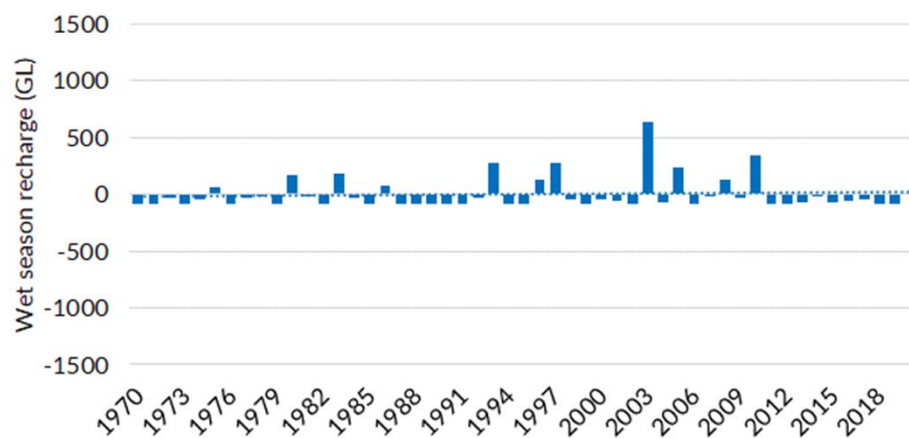
## North Mataranka – rainfall trends



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## North Mataranka – recharge trends

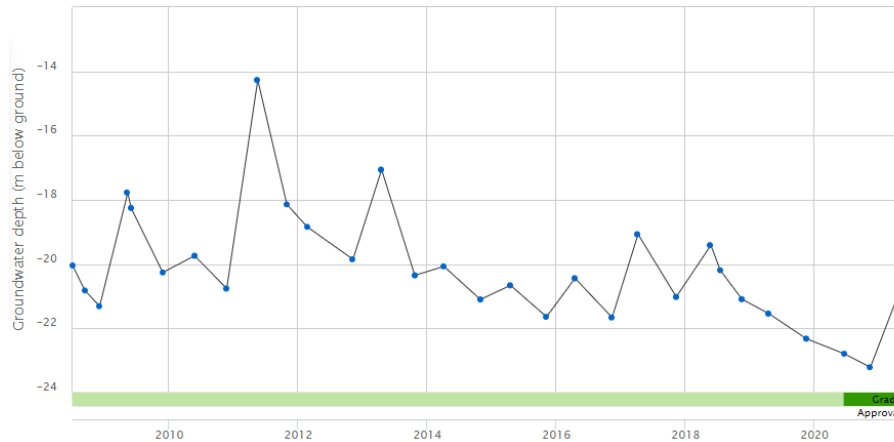


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## North Mataranka – groundwater levels

RN035860 – 35 km WNW of Mataranka

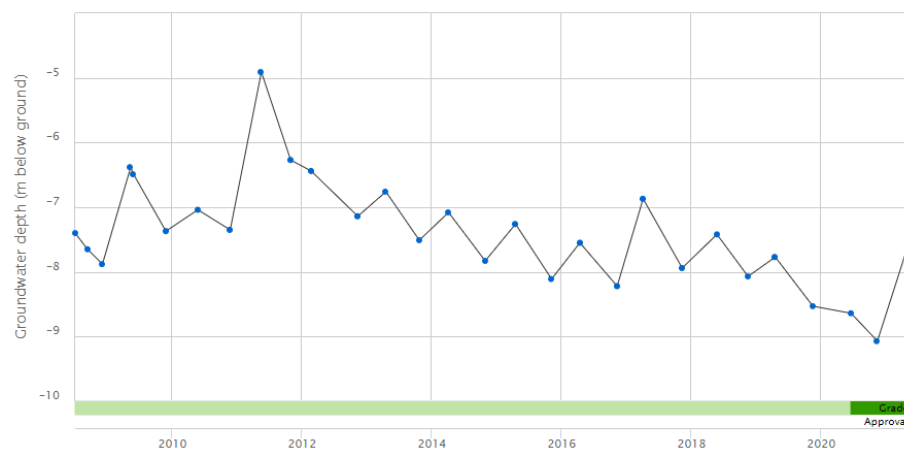


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## North Mataranka – groundwater levels

RN035519 – 10 km WNW of Mataranka



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## South Mataranka – by the numbers

### 2018-19

Rainfall: 706 mm (2,661 GL) **lowest since 2015-16**  
Potential evaporation: 2,721 mm (10,255 GL) **highest since 1987-88**  
Recharge: Approx. 2 mm (~6 GL) **lowest since 2012-13**

### 2019-20

Rainfall: 568 mm (2,139 GL) **lowest since 1992-93**  
Potential evaporation: 2,757 mm (10,390 GL) **highest since 2018-19**  
Recharge: Approx. 4 mm (~15 GL) **lowest since 2012-13**

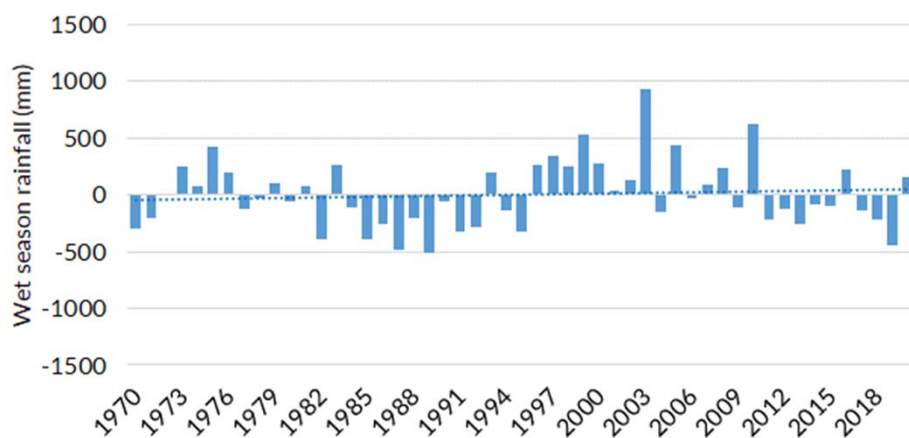
### 2020-21

Rainfall: 1,196 mm (4,506 GL) **highest since 2010-11**  
Potential evaporation: 2,471 mm (9,315 GL) **lowest since 2011-12**  
Recharge: Approx. 70 mm (~250 GL) **highest since 2010-11**

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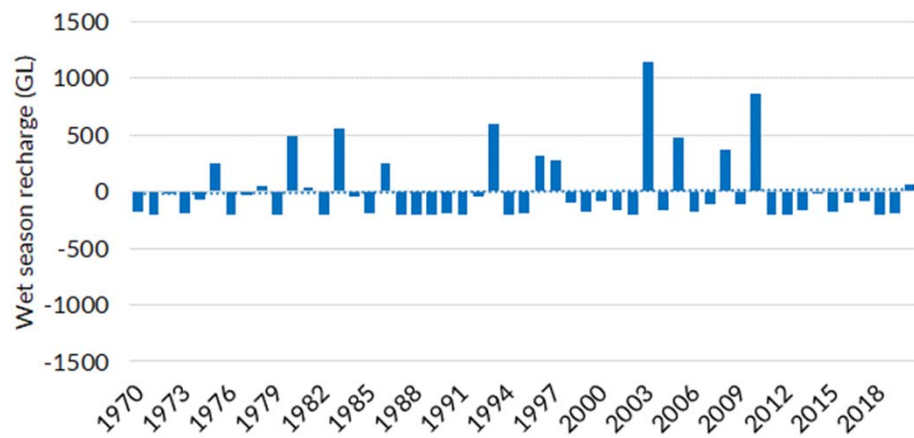
## South Mataranka – rainfall trends



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## South Mataranka – recharge trends

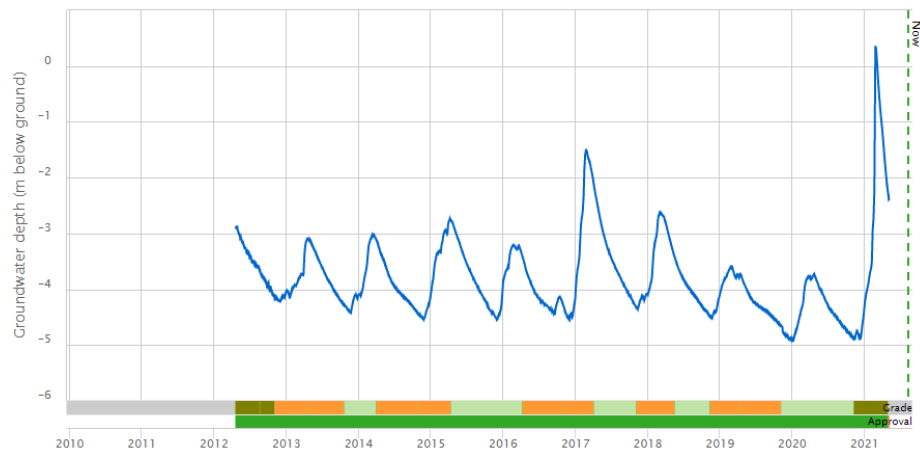


9



## South Mataranka – groundwater levels

RN035769 – Mataranka Homestead airstrip (8 km W of Mataranka)

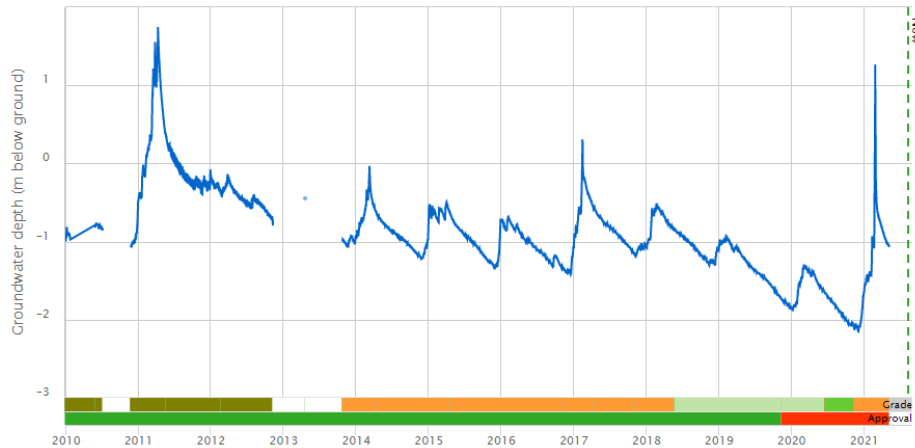


10



## South Mataranka – groundwater levels

RN034038 – Elsey Cemetery park (20 km S of Mataranka)

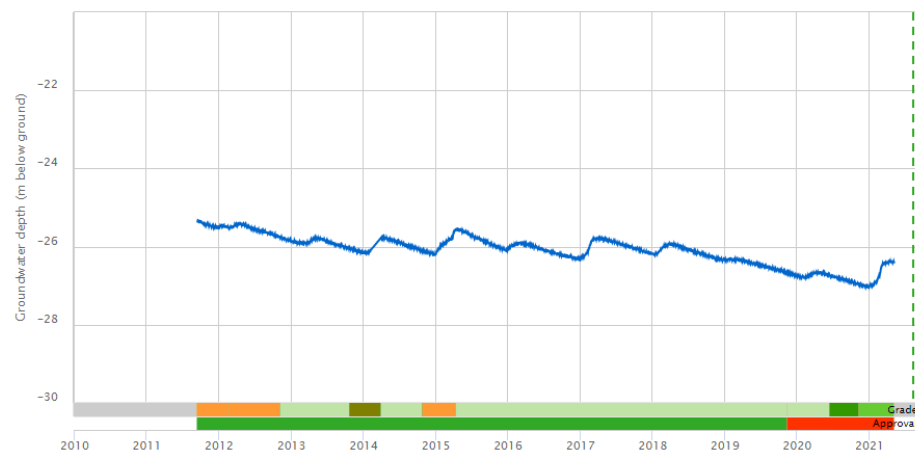


11



## South Mataranka – groundwater levels

RN035929 – south Elsey Station (45 km SW of Mataranka)



12





## Larrimah – by the numbers

### 2018-19

Rainfall: 534 mm (1,505 GL) **lowest on record (since 1970)**  
Potential evaporation: 2,785 mm (7,856 GL) **highest since 2014-15**  
Recharge: 0 mm (0 GL) **typical**

### 2019-20

Rainfall: 593 mm (1,672 GL) **3<sup>rd</sup> lowest on record**  
Potential evaporation: 2,786 mm (7,859 GL) **highest since 2014-15**  
Recharge: 0 mm (0 GL) **typical**

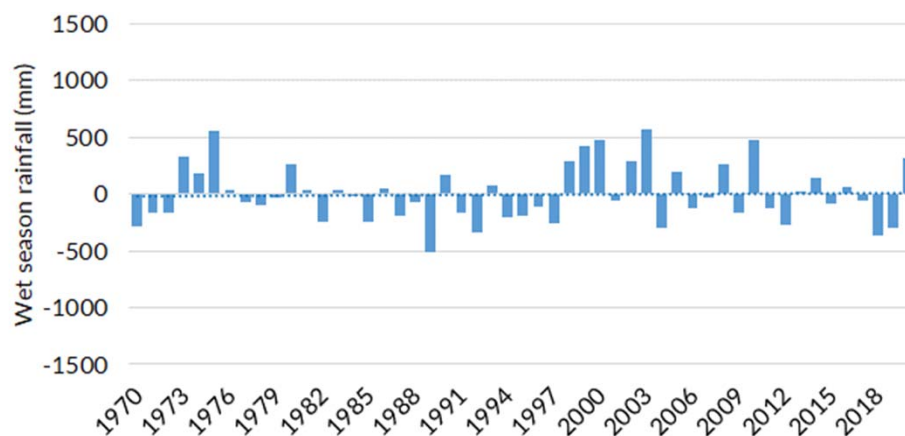
### 2020-21

Rainfall: 1,215 mm (3,428 GL) **highest since 2010-11**  
Potential evaporation: 2501 mm (7,055 GL) **lowest since 2017-18**  
Recharge: Approx. 0.1 mm (<0.5 GL) **minor recharge occurred**

13



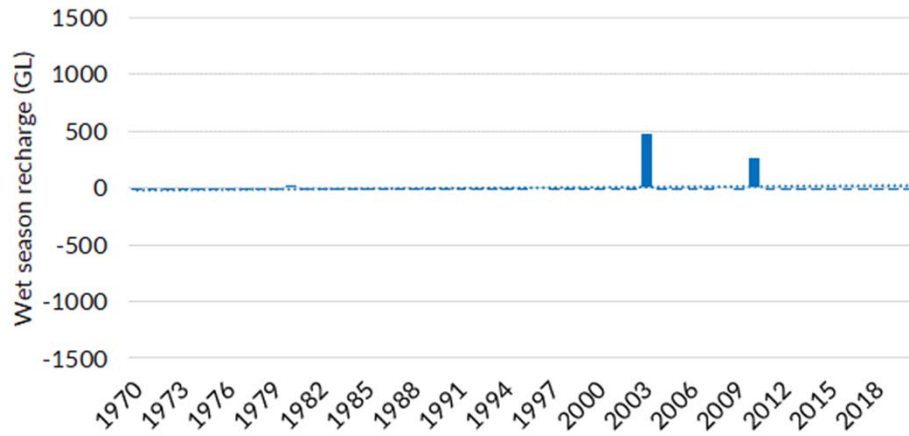
## Larrimah – rainfall trends



14



## Larrimah – recharge trends

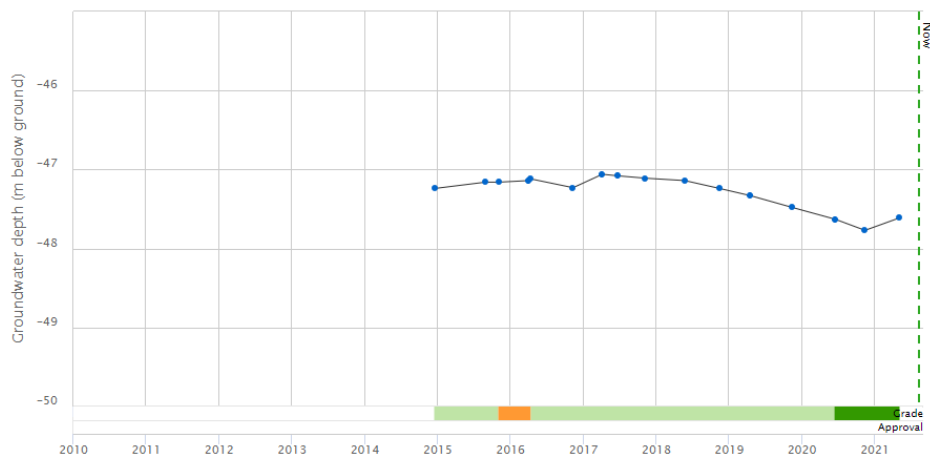


15



## Larrimah – groundwater levels

RN038811 – Larrimah north (10 km N of Larrimah)

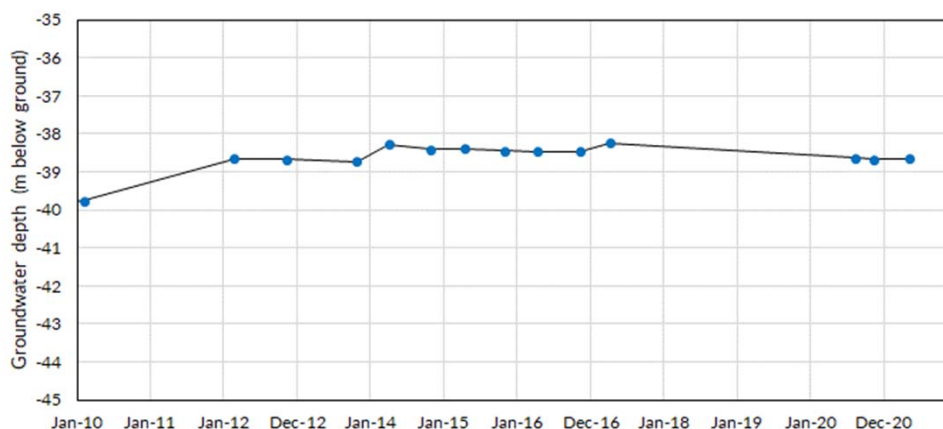


16



## Larrimah – groundwater levels

RN029013 and RN041440 – Maryfield Station (40 km SSW of Larrimah)



17



## Roper River – by the numbers

Statistics @ Mataranka Homestead gauge

**2018-19**

Total discharge: 220 GL **lowest in over ten years**

Peak flow: 117 cumecs (February) **lowest in over ten years**

**2019-20**

Total discharge: 169 GL **lowest in over ten years**

Peak flow: 71 cumecs (February) **lowest in over ten years**

**2020-21**

Total discharge: 1,224 GL **highest since 2010-2011**

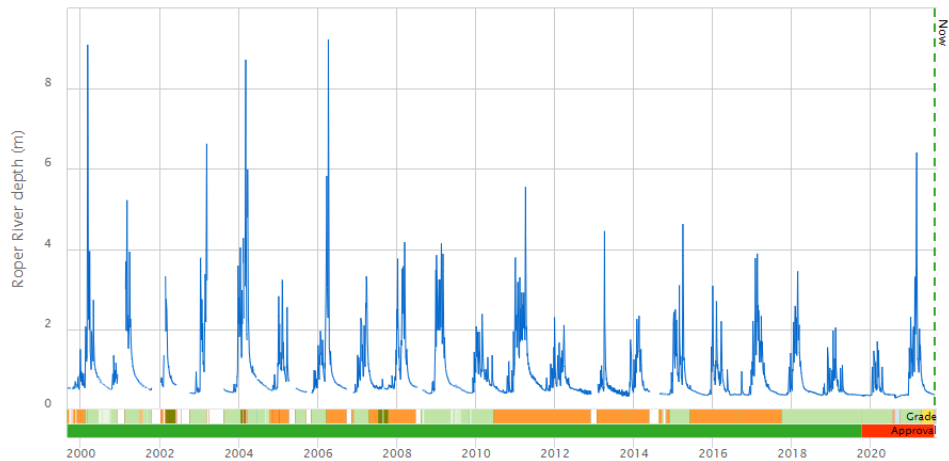
Peak flow: 1,321 cumecs (February) **highest in over ten years**

18



# Roper River – water levels

G9030176 – downstream of Mataranka Homestead






Department of Environment Parks and Water Security

# Mataranka WAC meeting

12 August 2021

Amy Dysart, Executive Director Water Resources





## Recent license decisions

Larrimah management zone

# Overview

Date	Activity
August - October 2020	Drafting - Technical Report 55/2020 Classification of the Top End and Arid Zone for Northern Territory Water Resources
27 November 2020	The Acting Controller's granted the groundwater extraction licence to NT Land Corporation for its land in the Larrimah area.
December 2020 / January 2021	Environment Centre NT and the Northern Land Council on behalf of the Wubulawan Aboriginal Land Trust and the Mangarrayi Aboriginal Land Trust applied to the Minister for Environment to review the Controller's decision.
15 March 2021	The Minister engaged a Water Resources Review Panel to provide advice about the decision.
16 April 2021	Published - Technical Report 55/2020 Classification of the Top End and Arid Zone for Northern Territory Water Resources
18 June 2021	Due to a potential or perceived conflict of interest with her role as Minister for Planning and association with the NT Land Corporation the matter was referred to the Minister for Health for a decision. The Minister for Health made a new decision to not to grant the licence.
July 2021	The department engaged the National Centre for Groundwater Research and Training to undertake an independent review of Technical Report 55/2020. Following the independent review the department has published a revised Technical Report.
Ongoing	The department will update the Framework to ensure the characteristics of the water resource are aligned to the zones.

# NT Allocation Planning Framework

## 2. Contingent allocation rules

In the absence of directly related research, contingent allocations are made for environmental and other public benefit water provisions and consumptive use. These are explained below.

### 2.1 Top End (northern one third of the Northern Territory)

#### 2.1.1 Rivers

#### 2.1.2 Aquifers

### 2.2 Arid Zone (southern two thirds of the Northern Territory)

#### 2.2.1 Rivers

#### 2.2.2 Aquifers



## Reviewed definition

### Top End

Hydrological and hydrogeological summary:

- Distinct wet and dry season, with over 95% of rainfall occurring Oct-Apr
- Rainfall greater than 600 mm in most years
- Seasonal runoff of greater than 0.5 ML per hectare in most years
- Streamflow with daily peak flows more than 10x average wet season flows
- Seasonal (wet season) groundwater recharge in most years

### Arid

Hydrological and hydrogeological summary:

- No distinct wet season, less than 95% of rainfall occurring between Oct-Apr
- Variable and episodic rainfall, with less than 600 mm occurring in most years with
- Runoff of less than 0.5 ML per hectare per year, commonly with consecutive years of no streamflow
- Groundwater recharge occurs rarely (actual evaporation is greater than rainfall in most years) or not at all

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## Reviewed definition (cont.)

### Top End

Typical water resource characteristics:

- **Rivers** are strongly influenced by the strength of the wet season monsoon. Runoff builds at the beginning of the wet season then tails off into the dry season, often stopping before the end of the dry season. Streamflow may depend on whether there is groundwater discharge to the stream system, such as discharge from aquifers in the Daly and Roper river catchments.
- **Aquifers** are strongly influenced by the recharge seasonality. Shallow unconfined aquifers in the Top End receive seasonal recharge from wet season rainfall and, depending on their storage capacity (based on the depth of the vadose zone) and seasonal rainfall characteristics, they may either store water (such as the Tindall Limestone Aquifer) or 'fill-and-spill' (such as the Howard Groundwater System).

### Arid

Typical water resource characteristics:

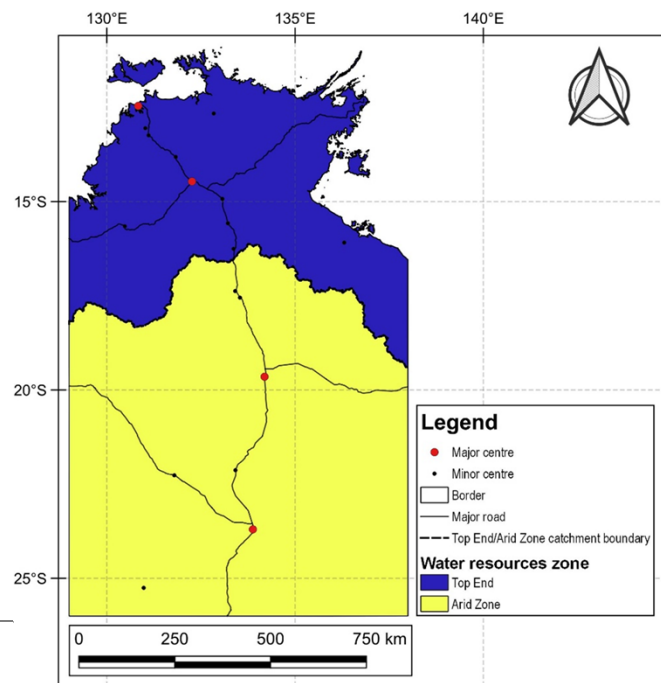
- **River** runoff is generally unpredictable – rainfall and runoff events may be years to decades apart. Events are influenced by cyclones and monsoon systems moving south and travelling inland from the Top End during the wet season, and occasionally by frontal systems or northwest cloud bands delivering rain to Central Australia over the winter months.
- **Shallow aquifers** are recharged through episodic flooding as a result of large rainfall events rather than regular steady rainfall, for example in the flood out areas of the Woodforde River and Allungra Creek of the Ti Tree Basin. Flooding occurs so infrequently that it may be many years or decades before an event results in effective aquifer recharge and storage replenishment for the Western Davenport region. Deep aquifers in the Arid Zone may not receive any (or negligible) modern recharge.

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## Contingent

In situations, where a water resource does not have sufficient information available, the boundary described in the map should be used.



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## Water Act reform

Continuing 2021-23

## Statute Law Amendment Bill

Territory Economic Reconstruction introduced in May 2021 and currently being debated for the Water Act includes:

- clarify water extraction licensing requirements associated with **Sustainable Precinct Development**
- clarify the circumstances for **longer licence tenure**
- contemporise timeframes by specifying business days



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## Environmental Omnibus Bills

- improve definitions for tidal water, interference with a waterway, water resource and ESY
- clarify Aboriginal water reserve provisions
- clarify non-consumptive and consumptive beneficial uses
- clarify water allocation plan requirements and
- establish a hierarchy of water
- establish trade provisions across the Territory
- establish a power for the **Controller to declare an area** for a period that applications are not accepted
- streamline requirements for notices about licence decisions reducing costs to licence applicants and recognising the transparency in information available on the Department's web site

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## Environmental Omnibus Bills (cont.)

- clarify the **relevant factors** to consider in making licence and permitting decisions
- **clarify licence** renewal, transfer and surrender provisions
- extend the time period associated with a commencement of enforcement proceedings to provide sufficient time to investigate complex and difficult environmental offences.
- **transfer function of reviewing decisions** from the Minister to the Northern Territory Civil and Administration Tribunal (NTCAT)
- amalgamate provision to declare exemptions

Link to the information paper

<https://depws.nt.gov.au/water/legislation/water-act>

Department of Environment, Parks and Water Security

## Questions

# Daly-Roper Water Resource Assessment

[www.nt.gov.au](http://www.nt.gov.au)



## Contents

- Hydrogeology / basins / catchment / AQF system
- Model (history, domain, application)
- Management zones
- Water resource characteristics (Top End / Arid Zone)
- Modelling scenarios / results
- Determining available yield

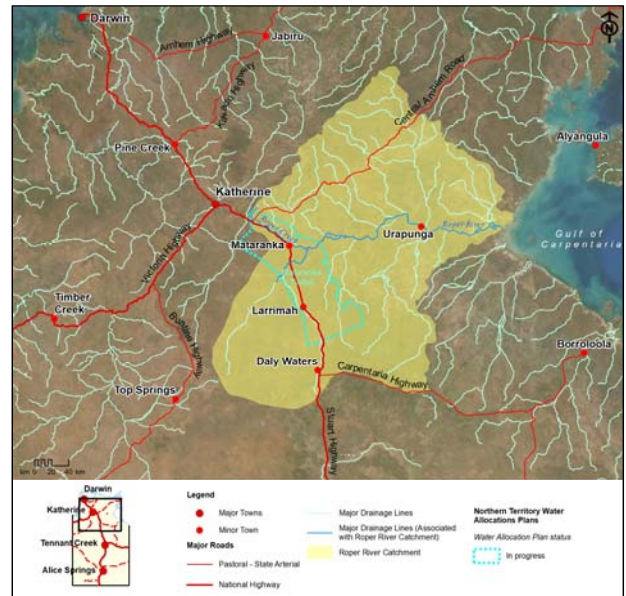
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[www.nt.gov.au](http://www.nt.gov.au)



## Roper River

- Perennial flowing
- Catchment area ~82,000 sq km
- Drains to Gulf of Carpentaria
- Losing and gaining system

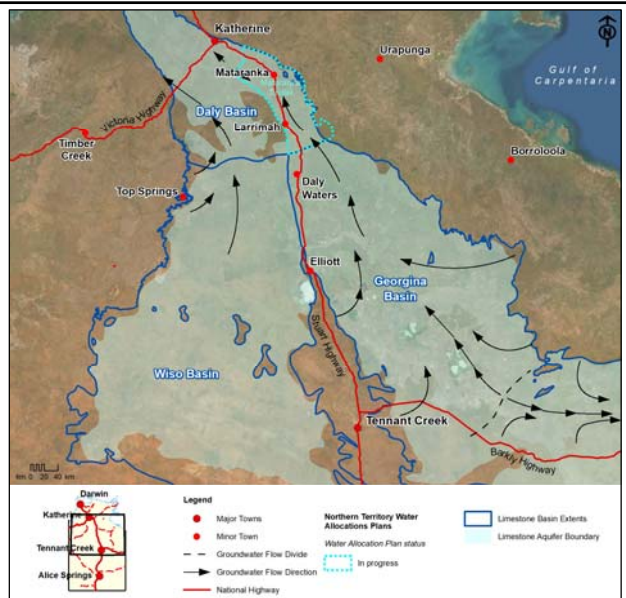


[www.nt.gov.au](http://www.nt.gov.au)



## Basins

- Daly (basin of interest)
- Georgina
- Wiso
- Consist of limestones
- Cambrian age (488-542 Ma)
- Daly Basin receives lateral GW flow from Georgina & Wiso
- Travel time 50,000 years

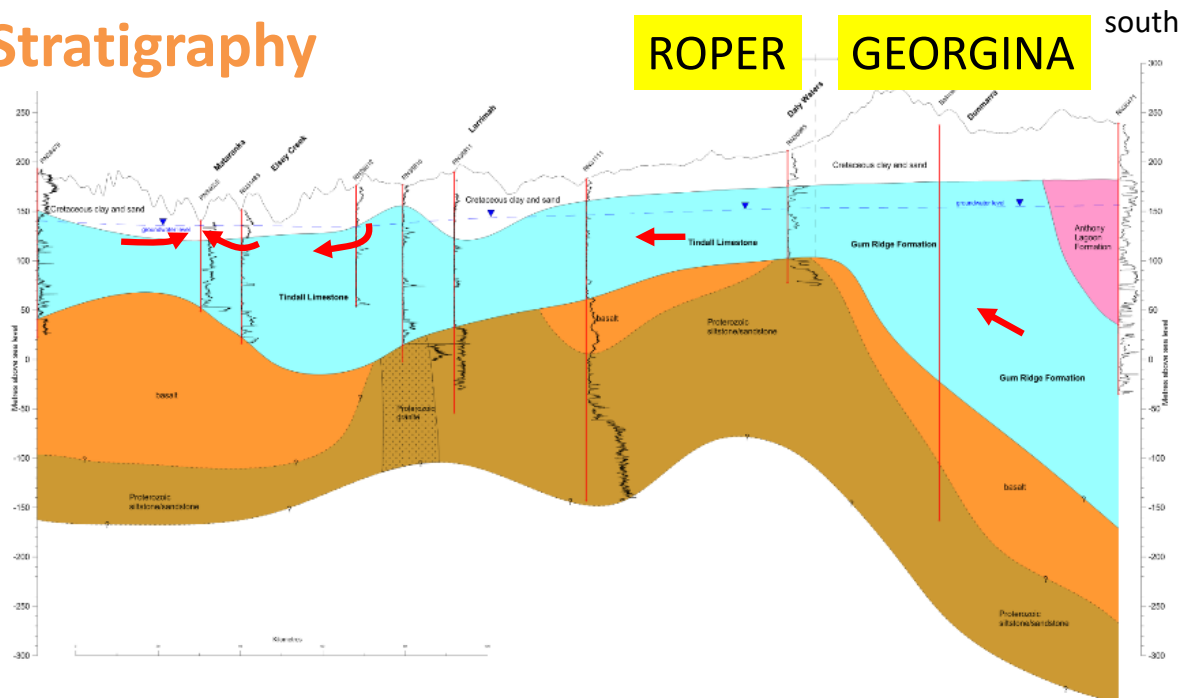


[www.nt.gov.au](http://www.nt.gov.au)





# Stratigraphy

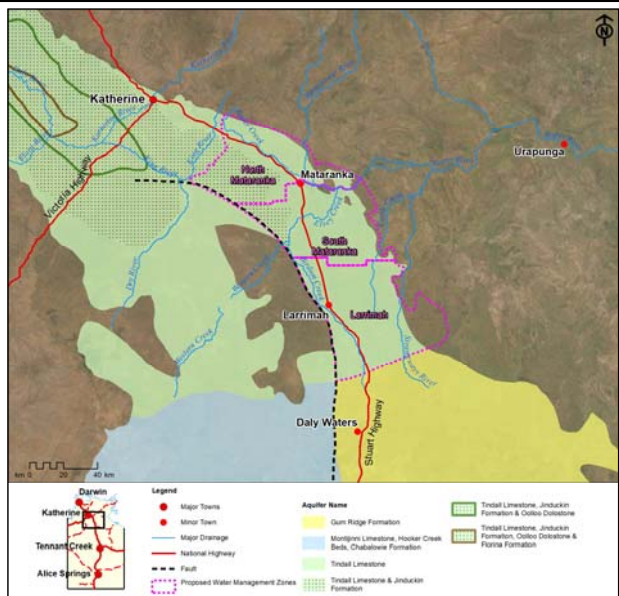


## Aquifers

- Tindall Limestone Aquifer (TLA)
- Hosts significant GW resources



GW found in karst weathering / solution cavities



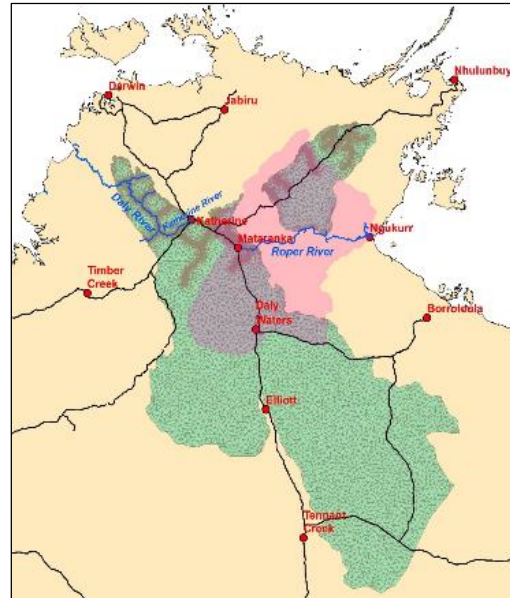
[www.nt.gov.au](http://www.nt.gov.au)





# Model

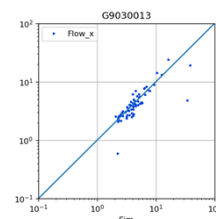
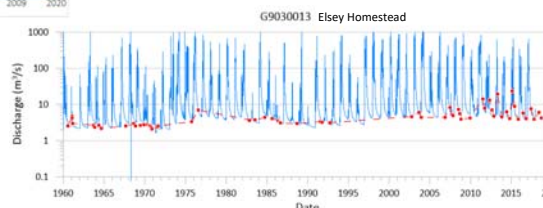
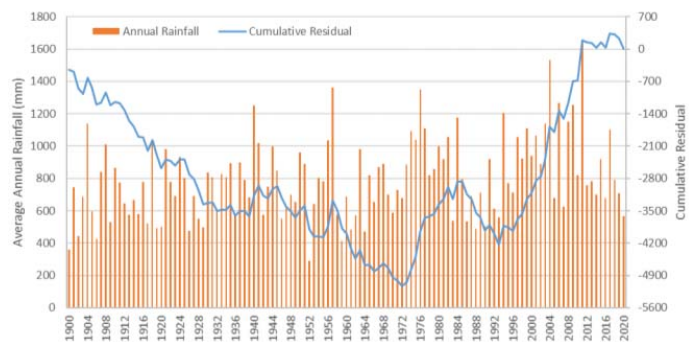
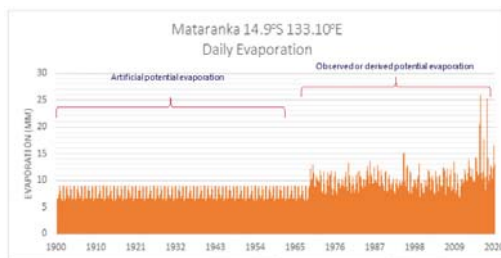
- Integrates TLA & Roper River
- Daly-Roper model (Version 2)
- Independently reviewed
- Calibrated - model compared with observations
- Used for planning & water allocation licenses



[www.nt.gov.au](http://www.nt.gov.au)



# Model calibration



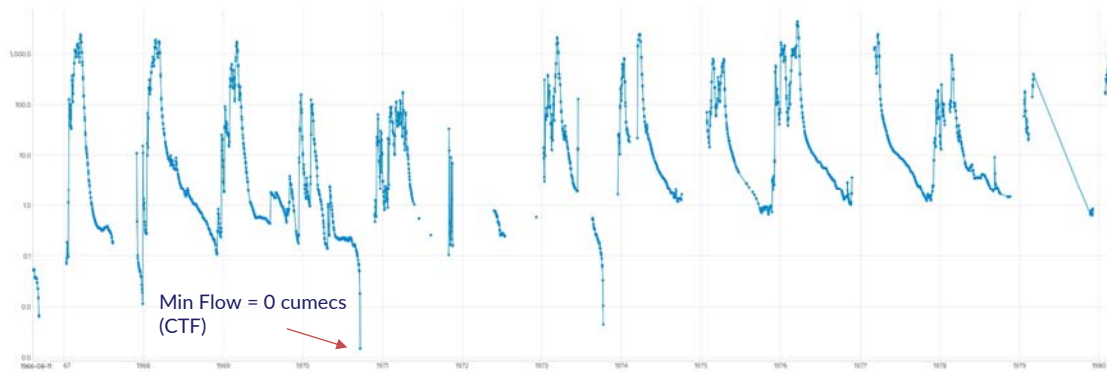
[www.nt.gov.au](http://www.nt.gov.au)



## Data Records

Flow\* 1966 (Start of Record) to 1980

- Minimum flow reached over time period: 0 cumecs (CTF)



\*Measured flow at Red Rock, includes extraction

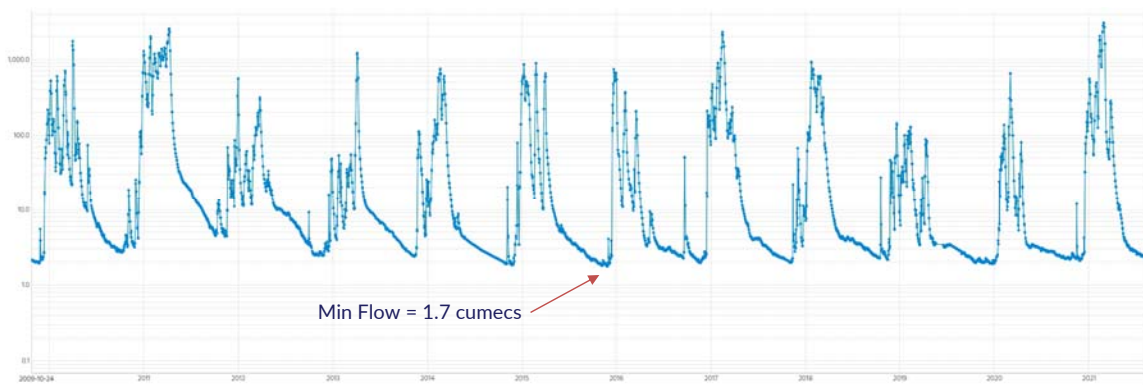
[www.nt.gov.au](http://www.nt.gov.au)



## Data Records

Flow\* 2010 to Current (2021)

- Minimum flow reached over time period: 1.7 cumecs

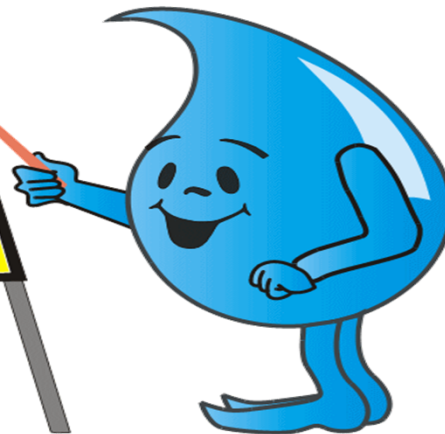


\*Measured flow at Red Rock, includes extraction

[www.nt.gov.au](http://www.nt.gov.au)



Any  
Questions?

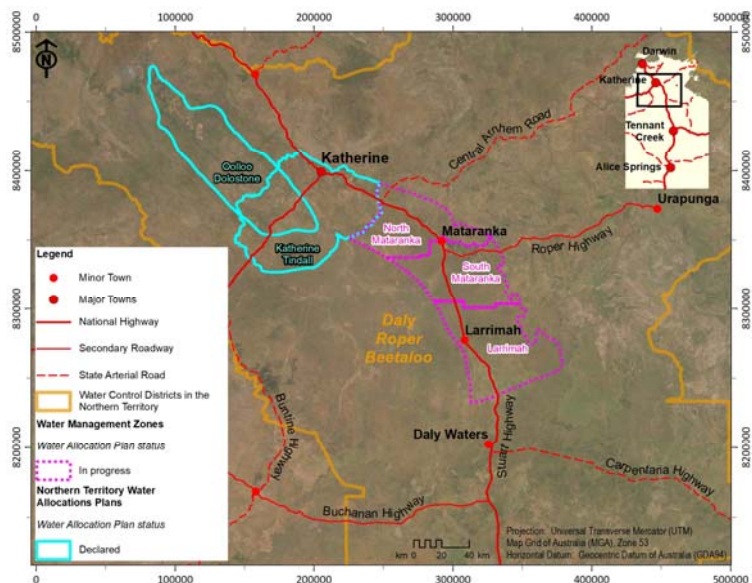


[www.nt.gov.au](http://www.nt.gov.au)



## Management zones

- North Mataranka
- South Mataranka
- Larrimah



[www.nt.gov.au](http://www.nt.gov.au)



# Classification of water resources

- Top End / Arid Zone
- Related to climatic & hydrologic characteristics
- **Top End**
  - >> Regular annual/seasonal events
- **Arid Zone**
  - >> Significant rainfall events separated by several years OR decades

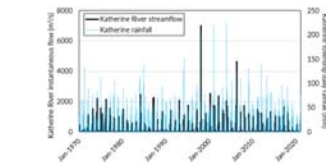


Figure 2-2: Typical rainfall and runoff patterns for Top End rivers. Example provided is of Katharine River instantaneous flow (at bridge gauge G2140002) and Katharine township rainfall (BOM site 14902).

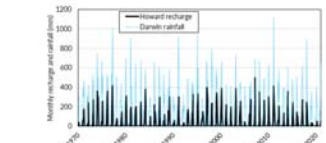


Figure 2-3: Typical rainfall and recharge patterns for a Top End aquifer. Example provided is modelled recharge for the Howard Groundwater System and Darwin airport rainfall (BOM site 14013).

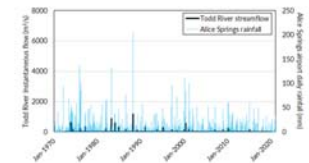


Figure 2-4: Typical rainfall and runoff patterns for an Arid Zone river. Example provided is of Todd River instantaneous flow (ANZAC Creek gauge G0000007) and Alice Springs airport rainfall (BOM site 15598).

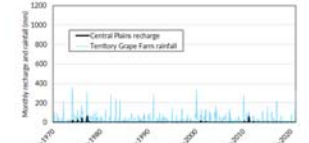


Figure 2-5: Typical rainfall and recharge patterns for an Arid Zone aquifer. Example provided is modelled recharge for the Central Plains area in the Western Desert region and Territory Grape Farm rainfall (BOM site 15643).

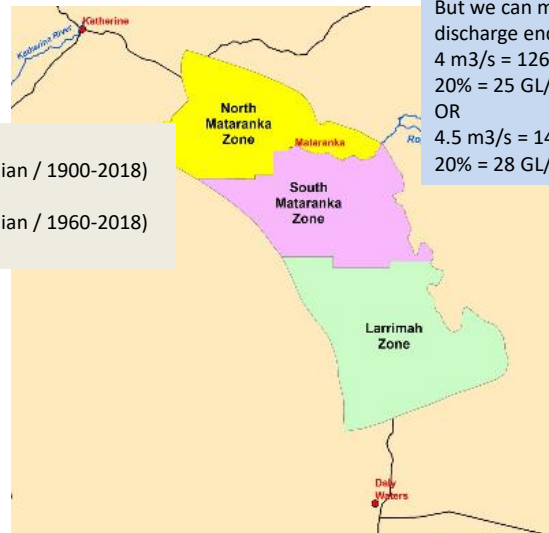
www.nt.gov.au



## Management zones

- Top End
  - North Mataranka
  - South Mataranka
- Arid Zone
  - Larrimah
- NT Water Allocation Planning Framework & consumptive use
  - Top End: up to 20% of flow (rivers) / up to 20% of annual recharge (aquifers)
  - Arid Zone: up to 5% of flow (rivers) / up to 80% of storage over a 100 year period

Recharge:  
 130 GL/y (median / 1900-2018)  
 20% = 26 GL/y  
 170 GL/y (median / 1960-2018)  
 20% = 36 GL/y



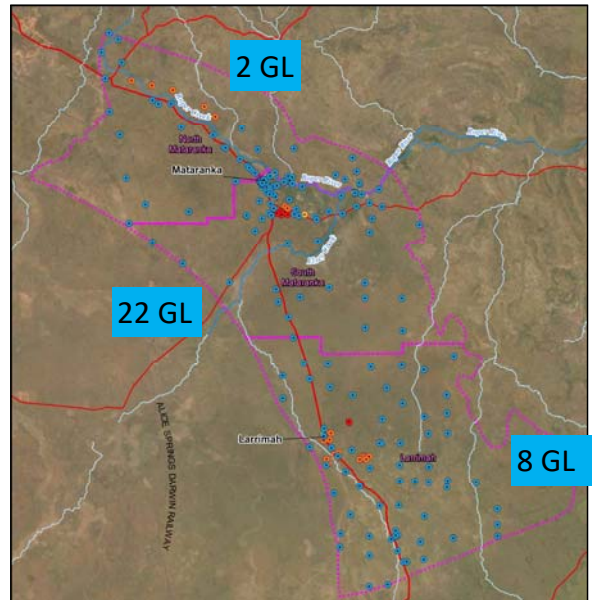
But we can measure discharge end of dry:  
 4 m³/s = 126 GL/y  
 20% = 25 GL/y  
 OR  
 4.5 m³/s = 142 GL/y  
 20% = 28 GL/y

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## Modelling scenarios

- Natural conditions – no pumping in the model domain
- Full allocation entitlements – GW and SW extractions (37 GL/yr)



[www.nt.gov.au](http://www.nt.gov.au)



## Modelling results

- Natural conditions
- Full allocation
- GW discharge change @
  - SW nodes:
    - ❖ Mataranka HS
    - ❖ Elsey HS
    - ❖ Moroak HS
- Surface flows at Judy Crossing and Red Rock
- Bore GW : discharge conversion:
  - Springs
    - ❖ Bitter Springs
    - ❖ Rainbow Springs
- Larrimah GW Heads

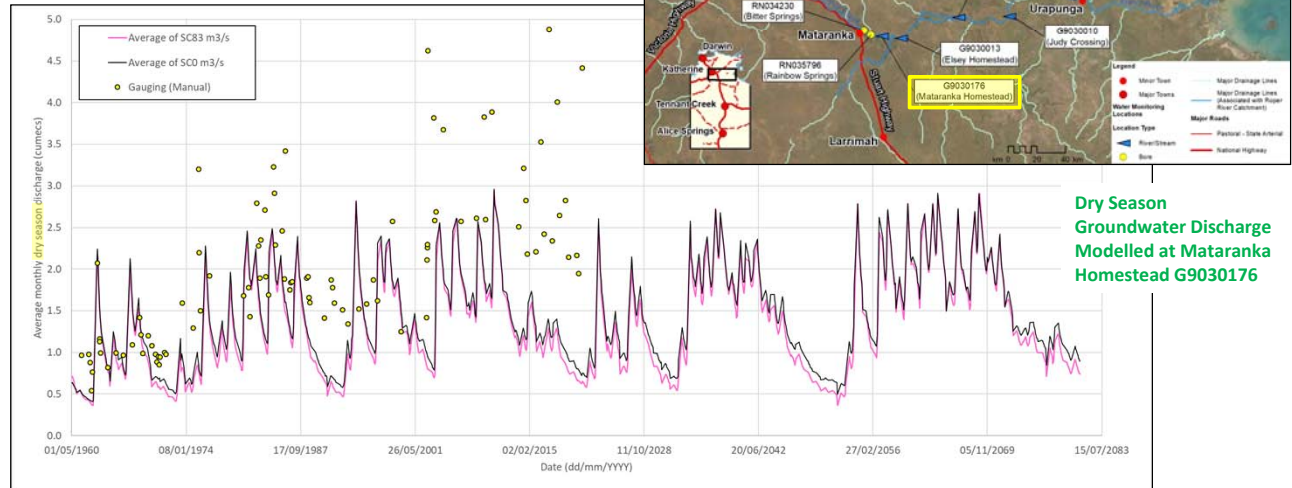


[www.nt.gov.au](http://www.nt.gov.au)





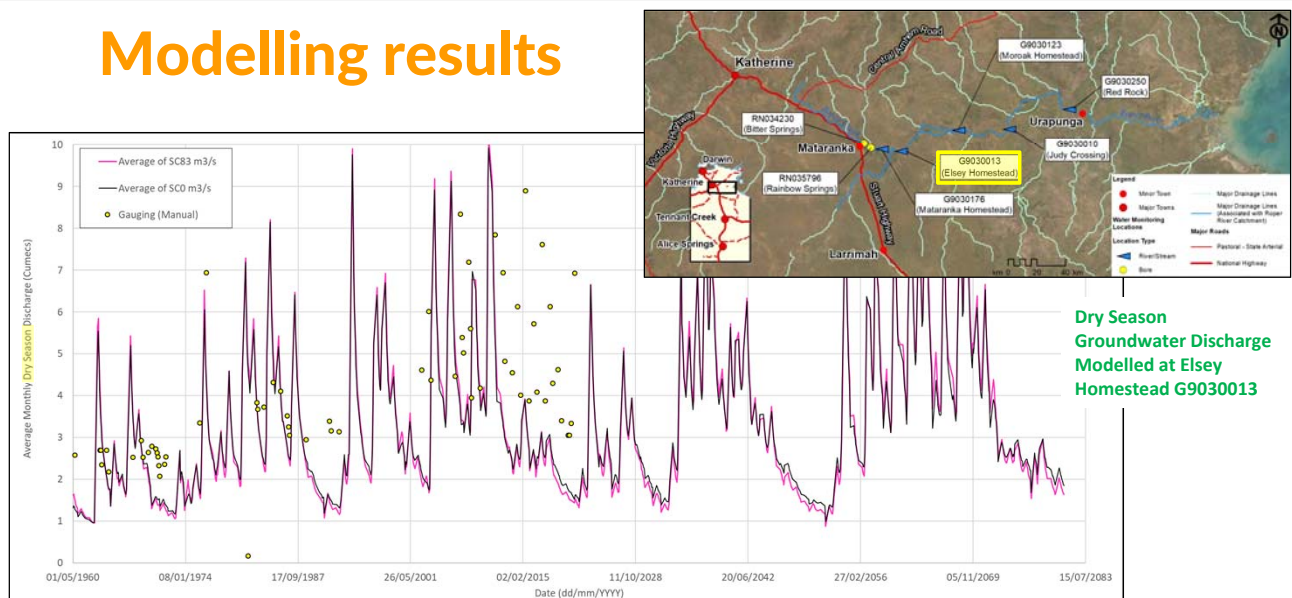
# Modelling results



[www.nt.gov.au](http://www.nt.gov.au)



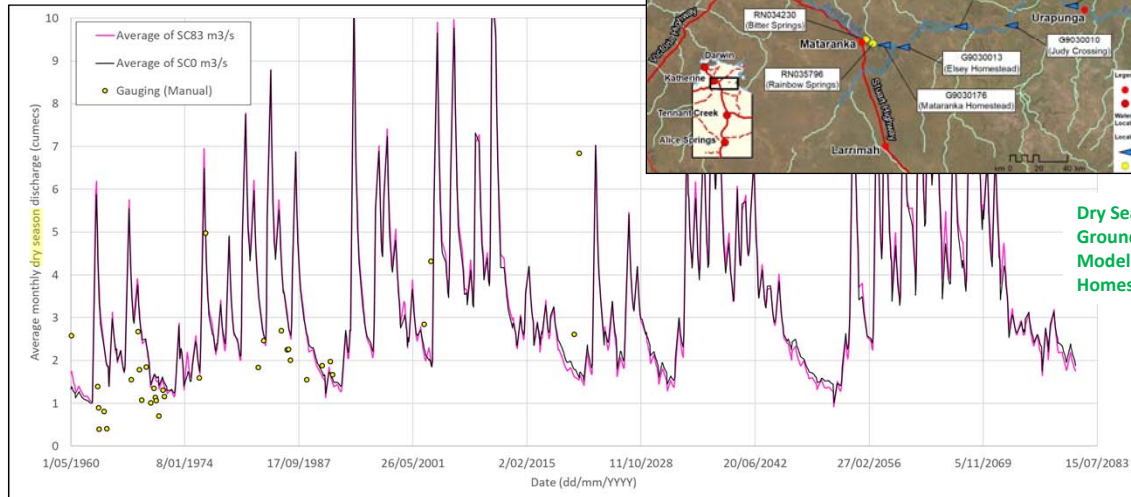
# Modelling results



[www.nt.gov.au](http://www.nt.gov.au)



## Modelling results

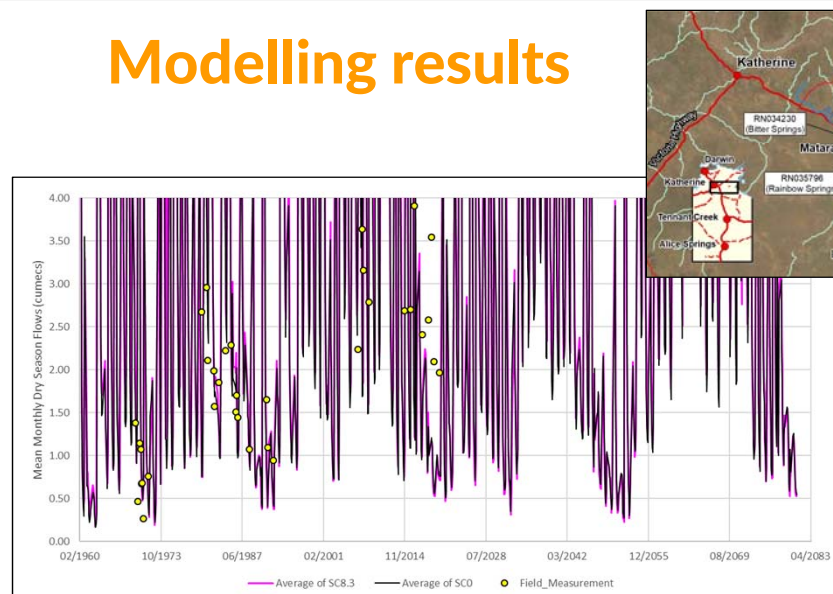


Dry Season  
Groundwater Discharge  
Modelled at Moroak  
Homestead G9030123

[www.nt.gov.au](http://www.nt.gov.au)



## Modelling results



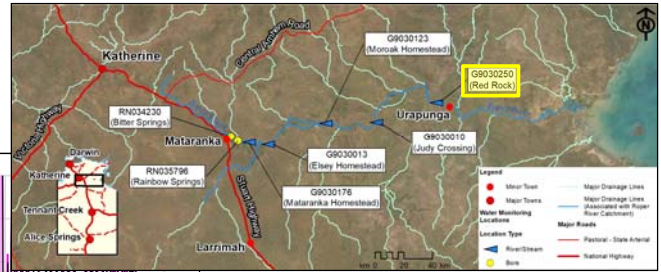
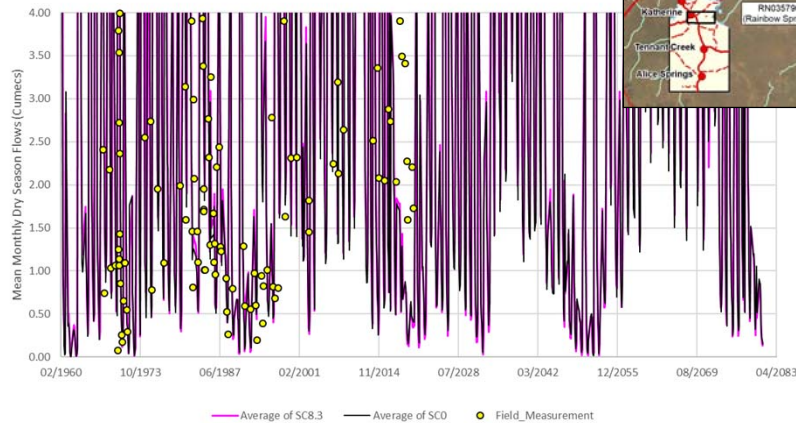
Modelled [dry season] surface  
flows at Judy Crossing  
G9030010

[www.nt.gov.au](http://www.nt.gov.au)





# Modelling results



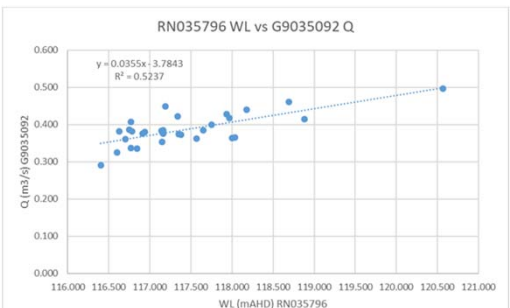
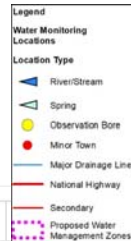
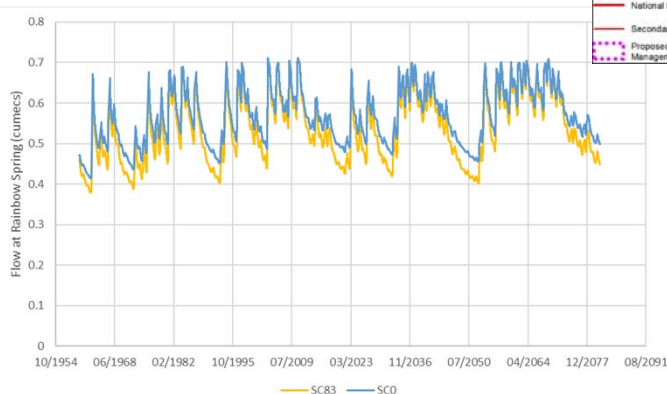
Modelled [dry season]  
surface flows at Red Rock  
G9030250

[www.nt.gov.au](http://www.nt.gov.au)



# Modelling results

## Rainbow Spring Flow



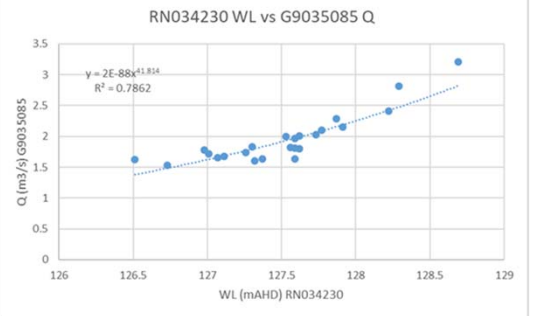
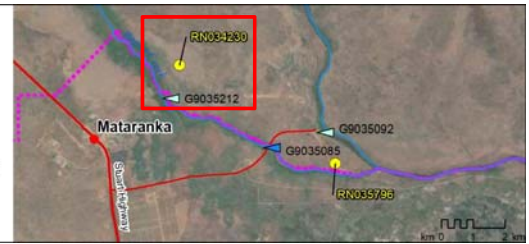
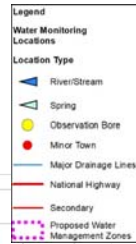
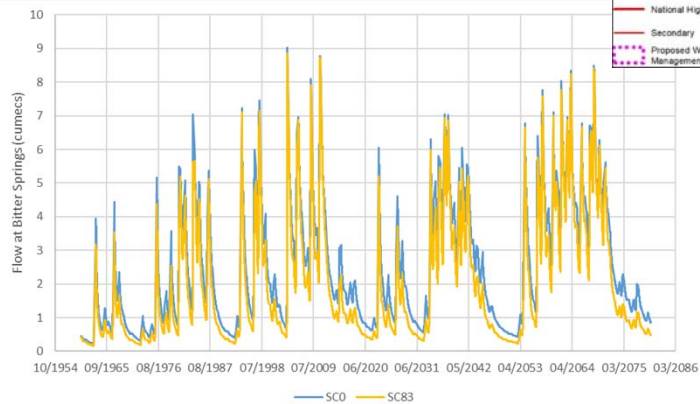
Flow calculated using correlation with nearby groundwater bore

[www.nt.gov.au](http://www.nt.gov.au)



# Modelling results

## Bitter Springs Flow



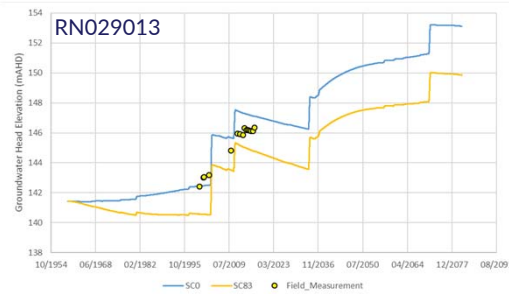
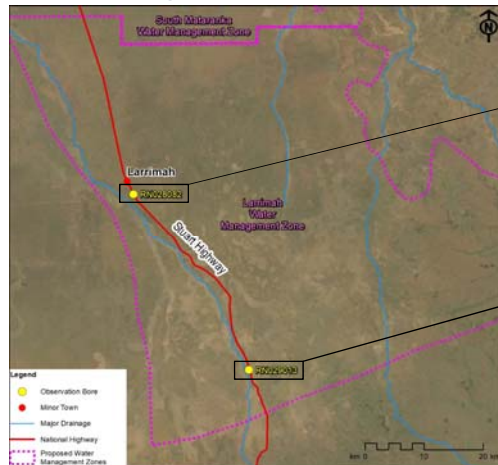
Flow calculated using correlation with nearby groundwater bore

www.nt.gov.au



# Modelling results

## Modelled groundwater head elevation – Larrimah



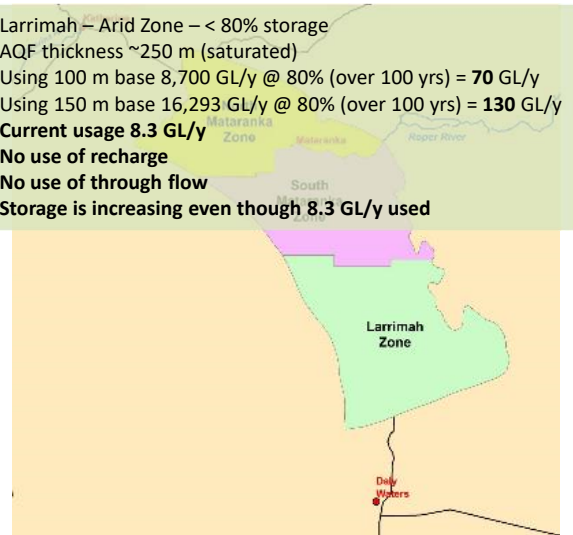
www.nt.gov.au



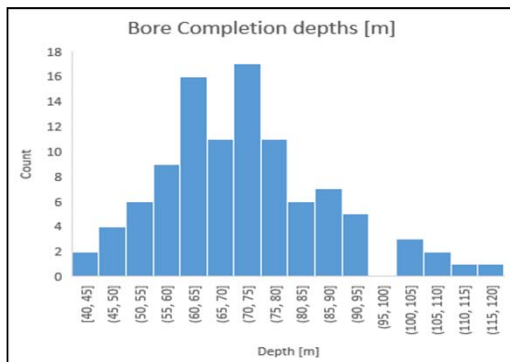
## Management zones

- Top End
  - North Mataranka
  - South Mataranka
- Arid Zone
  - Larrimah
- NT Water Allocation Planning Framework & consumptive use
  - Top End: up to 20% of flow (rivers) / up to 20% of annual recharge (aquifers)
  - Arid Zone: up to 5% of flow (rivers) / up to 80% of storage over a 100 year period

Larrimah – Arid Zone – < 80% storage  
 AQF thickness ~250 m (saturated)  
 Using 100 m base 8,700 GL/y @ 80% (over 100 yrs) = **70 GL/y**  
 Using 150 m base 16,293 GL/y @ 80% (over 100 yrs) = **130 GL/y**  
**Current usage 8.3 GL/y**  
**No use of recharge**  
**No use of through flow**  
**Storage is increasing even though 8.3 GL/y used**



[www.nt.gov.au](http://www.nt.gov.au)

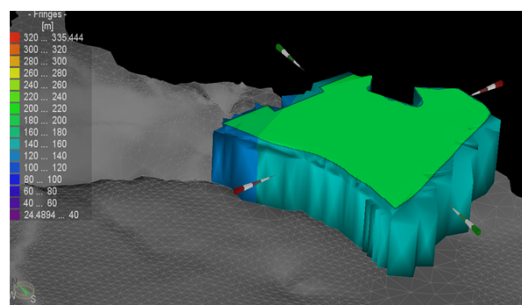


Economically accessible water depth	Storage GL	GW Take* GL/year
0 - 100mbgl	8,757	70
0 - 150mbgl	16,293	130

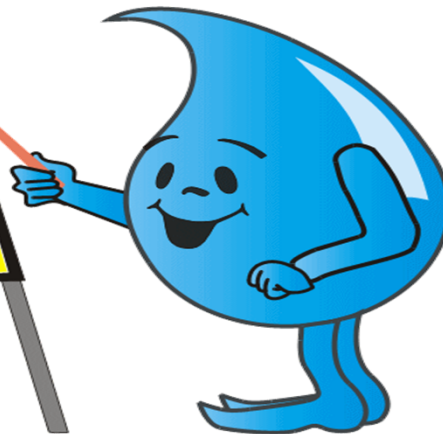
\*80% of storage over 100 years

## Storage in Larrimah Zone

- Saturated surface at 1/5/2021
- Ground elevation from SRTM (ground surface)
  - SRTM – 100m
  - SRTM – 150m



**Any  
Questions?**



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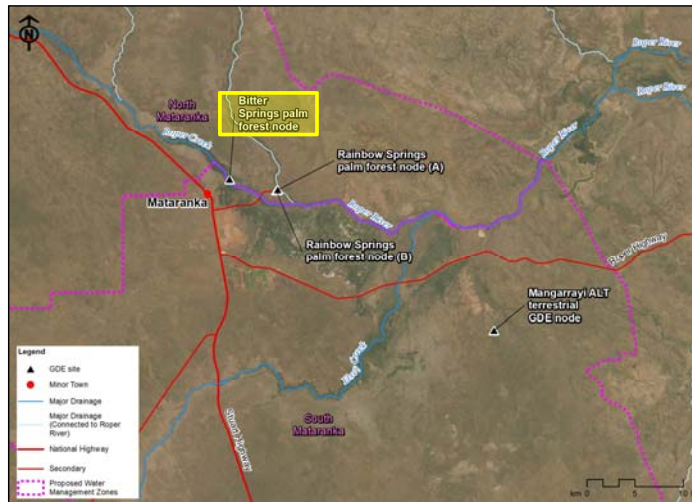
**OPTIONAL SLIDES**

[www.nt.gov.au](http://www.nt.gov.au)

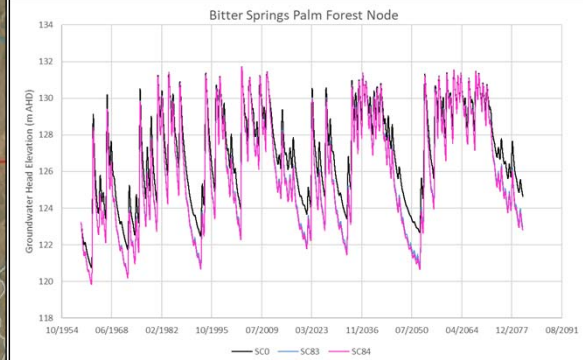




# Modelling results



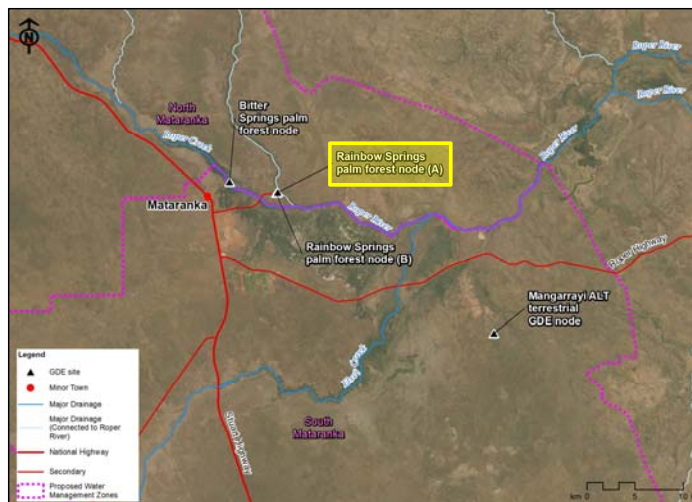
Groundwater Head Elevation  
Modelled at Bitter Springs Palm  
Forest Node (GDE Location)



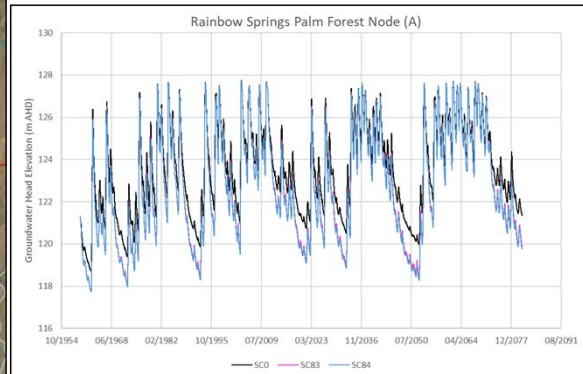
[www.nt.gov.au](http://www.nt.gov.au)



# Modelling results



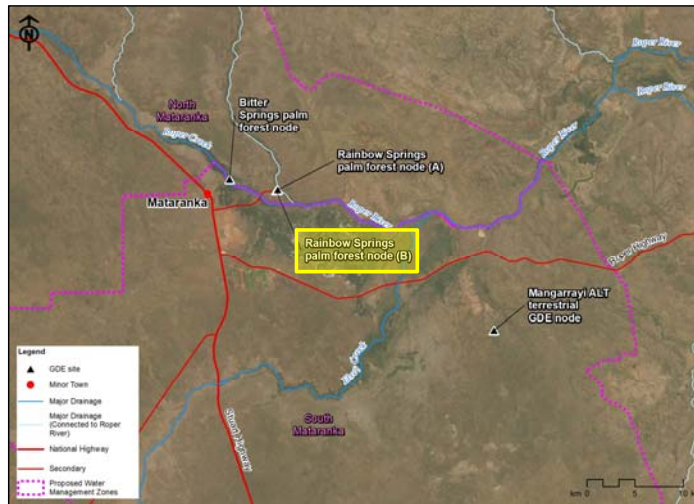
Groundwater Head Elevation  
Modelled at Rainbow Spring Palm  
Forest Node A (GDE Location)



[www.nt.gov.au](http://www.nt.gov.au)

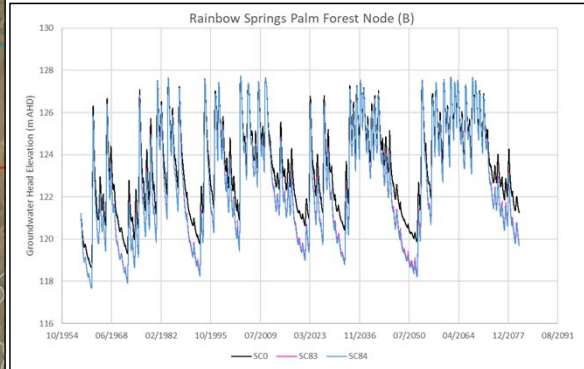


# Modelling results

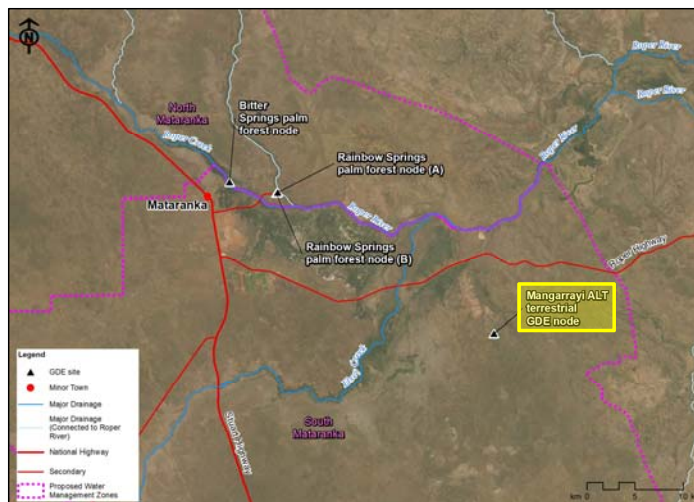


[www.nt.gov.au](http://www.nt.gov.au)

Groundwater Head Elevation  
Modelled at Rainbow Spring Palm  
Forest Node B (GDE Location)

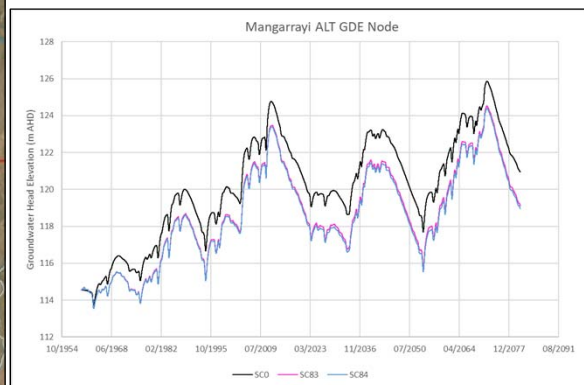


# Modelling results

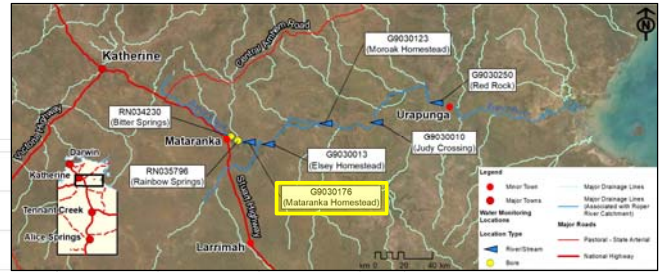
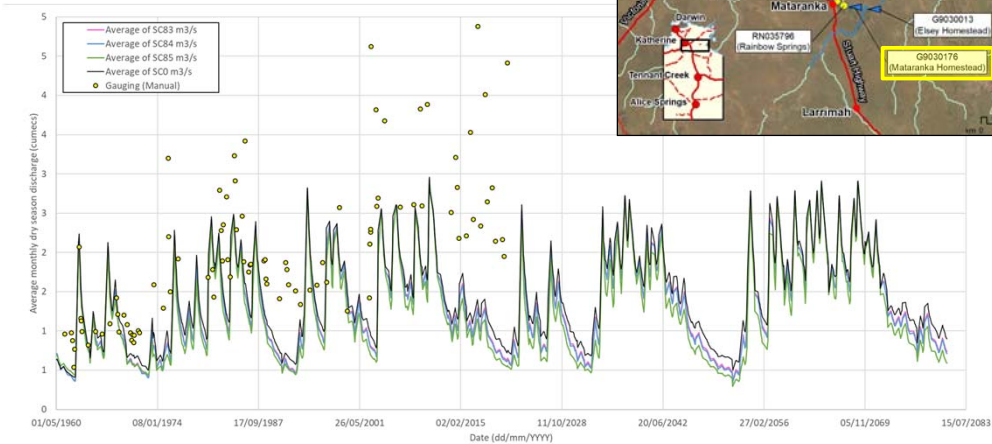


[www.nt.gov.au](http://www.nt.gov.au)

Groundwater Head Elevation  
Modelled at Mangarrayi ALT  
Terrestrial GDE Node (GDE Location)



# Modelling results

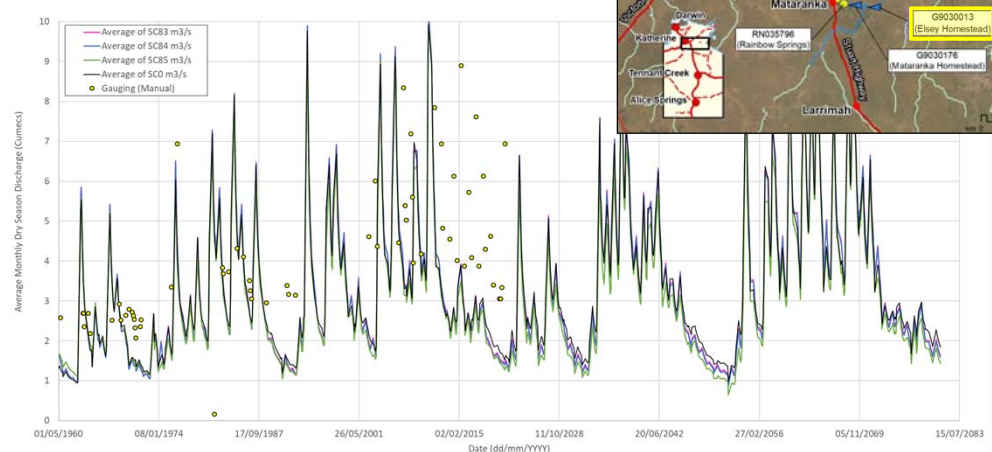


Groundwater Discharge  
Modelled at Mataranka  
Homestead G9030176

[www.nt.gov.au](http://www.nt.gov.au)



# Modelling results



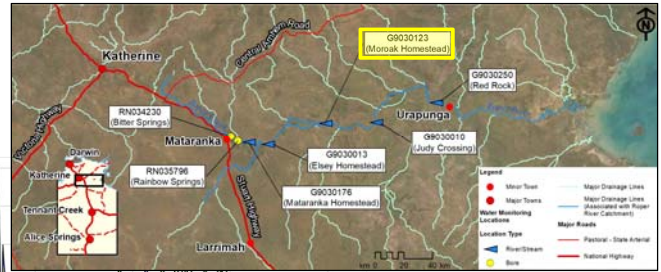
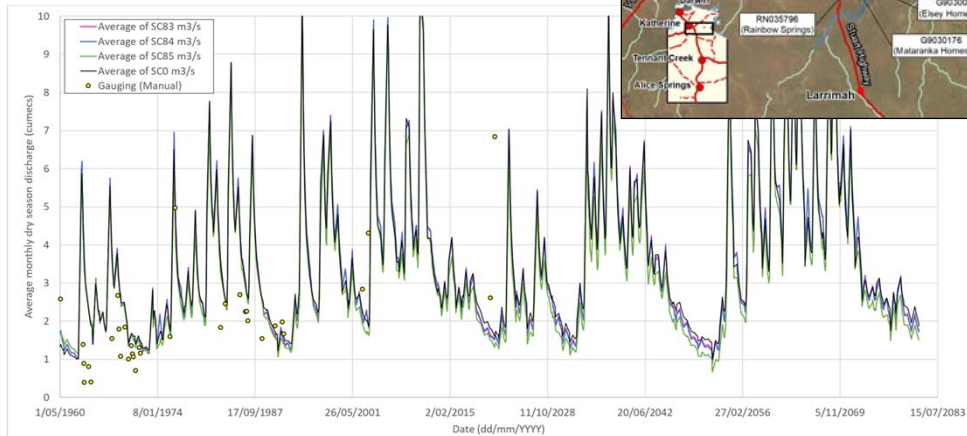
Groundwater Discharge  
Modelled at Elsey  
Homestead G9030013

[www.nt.gov.au](http://www.nt.gov.au)





## Modelling results

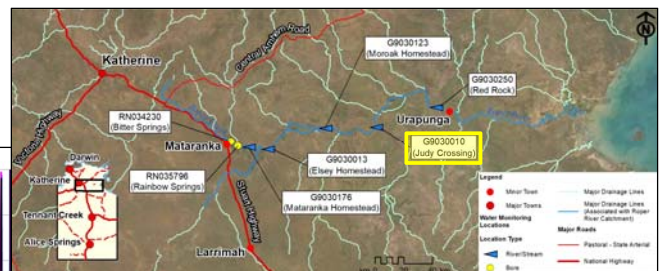
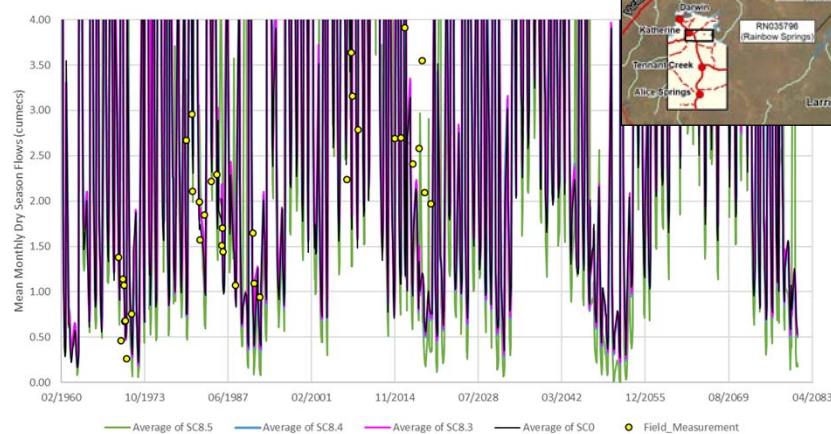


Groundwater Discharge  
Modelled at Moroak  
Homestead G9030123

[www.nt.gov.au](http://www.nt.gov.au)



## Modelling results

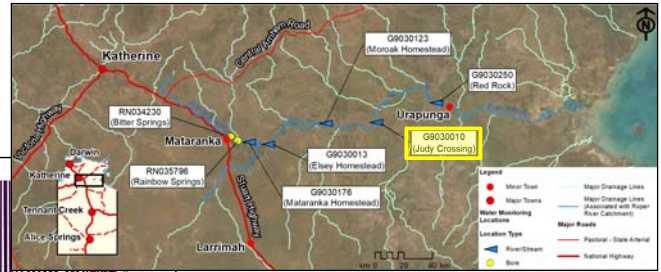
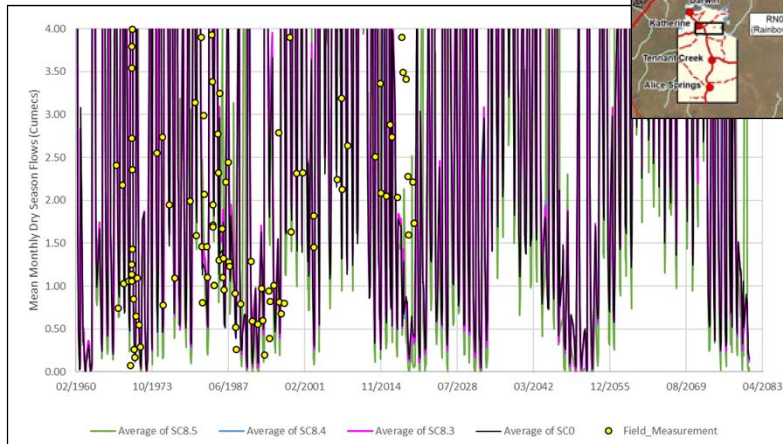


Modelled [dry season]  
surface flows at Judy Crossing  
G9030010

[www.nt.gov.au](http://www.nt.gov.au)



# Modelling results



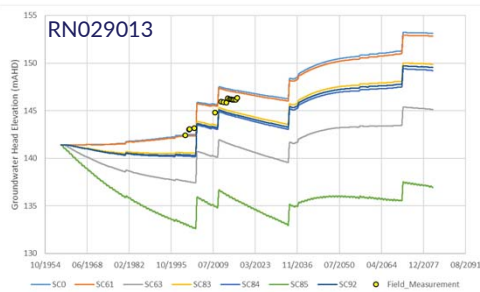
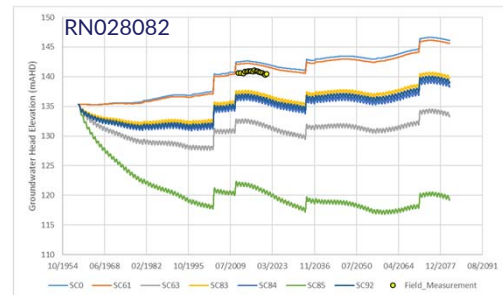
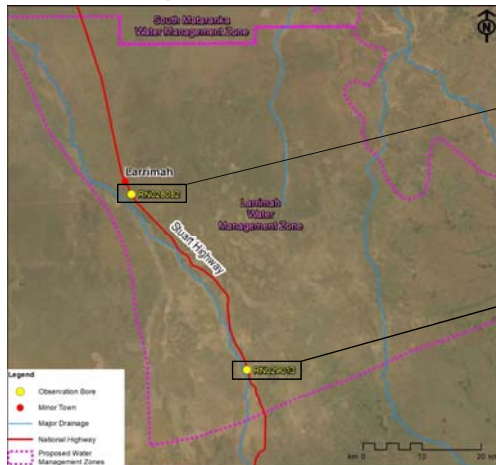
Modelled [dry season]  
surface flows at Red Rock  
G9030250

[www.nt.gov.au](http://www.nt.gov.au)



# Modelling results

Modelled groundwater head elevation – Larrimah



[www.nt.gov.au](http://www.nt.gov.au)





## Water Act reform

Continuing 2021-23

## Statute Law Amendment Bill

Territory Economic Reconstruction introduced in May 2021 and currently being debated for the Water Act includes:

- clarify water extraction licensing requirements associated with **Sustainable Precinct Development**
- clarify the circumstances for **longer licence tenure**
- contemporise timeframes by specifying business days

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## Environmental Omnibus Bills

- improve definitions for tidal water, interference with a waterway, water resource and ESY
- clarify Aboriginal water reserve provisions
- clarify non-consumptive and consumptive beneficial uses
- clarify water allocation plan requirements and
- establish a hierarchy of water
- establish trade provisions across the Territory
- establish a power for the **Controller to declare an area** for a period that applications are not accepted
- streamline requirements for notices about licence decisions reducing costs to licence applicants and recognising the transparency in information available on the Department's web site

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## Environmental Omnibus Bills (cont.)

- clarify the **relevant factors** to consider in making licence and permitting decisions
- **clarify licence** renewal, transfer and surrender provisions
- extend the time period associated with a commencement of enforcement proceedings to provide sufficient time to investigate complex and difficult environmental offences.
- **transfer function of reviewing decisions** from the Minister to the Northern Territory Civil and Administration Tribunal (NTCAT)
- amalgamate provision to declare exemptions

Link to the information paper

<https://depws.nt.gov.au/water/legislation/water-act>

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Department of Environment, Parks and Water Security

## Questions

