Meeting record

Mataranka Tindall Water Advisory Committee

Meeting #: 13

Date: 16 February 2022 **Time:** 10:00am

Venue: Paterson Room, Katherine Research Station and Teams meeting (video and telephone)

Present	
Rebecca Mohr-Bell	Chair
Sarah Kerin	Tourism/environmental interests – Member (Parks and Wildlife Division, DEPWS)
Vin Lange	Irrigated agriculture/Aboriginal economic development interests – Member (Centrefarm / Top End Farm)
Jenny Davis	Environmental interests - Member (Charles Darwin University)
Clair O'Brien	Pastoral interests/Regenerative Agriculture – Member
Julian Martin	Irrigated agriculture interests - Member (Quintis) via TEAMS
David Ciaravolo	Recreational fishing interests – Member (Amateur Fishermen's Association of the NT) via TEAMS
Helena Lardy	Aboriginal water interests - Member (Jilkminggan Community Aboriginal Association) via TEAMS
Bridie Velik Lord, proxy for Kerry Roberts	Aboriginal water interests – (Northern Land Council) via TEAMS
Amy Dysart	Executive Director, Water Resources Division
Adrian Tomlinson	Water Resources Planner, Planning and Engagement (P&E), DEPWS
Jayne Brim Box	Senior Scientist, DEPWS
Isadora Salviano	Water Resources Planner, P&E, DEPWS via TEAMS
Liza Schenkel	Community Engagement, P&E, DEPWS via TEAMS
Clare Taylor	Assistant Director, Planning and Engagement, DEPWS via TEAMS
Pru Ducey	DEPWS (Secretariat)

Apologies	
Rohan Sullivan	Pastoral interests - Member (Cave Creek Station)
Judy MacFarlane	Regional community interests – Member (Roper Gulf Regional Council)

Not present	
Jocelyn James	Aboriginal cultural interests - Member (Jilkminggan Community Aboriginal Association)

NORTHERN TERRITORY GOVERNMENT

Action table

Action arising/outstanding from Meeting 13 – 16 February 2022		
Action	**Action Officer**	**Timeframe/comment/Status**
Actions arising		
Action 13.1 The Chair will resend members a copy of the Controller's response to her e-mail regarding the AWR	Rebecca Mohr-Bell	
Action 13.2: Provide members with a copy of the CSIRO paper	Pru Ducey	
Action 13.3: Report back at Meeting #14 whether it is feasible to prepare an ecohydrological model in time for the draft plan	Amy Dysart	Response to be provided at Meeting #14
Action 13.4: ED Water Resources will circulate or provide additional information about what considerations are made in renewing a licence.	Amy Dysart	At or prior to Meeting #14
Action 13.5: Water Planner (Adrian Tomlinson) to check whether Minyerri is in the plan area.	Adrian Tomlinson	
Action 13.6: Progress a paper on operationalising a precautionary principle in defining the estimated sustainable yield and circulate a discussion paper to the committee for discussion at the next meeting	Adrian Tomlinson Rebecca Mohr-Bell	
Actions outstanding		
11.9 *Run agreed model scenarios and provide a report.*	Water Assessment & Clare Taylor Adrian Tomlinson	Partially complete – 1st phase of modelling complete. Limits to change presentation/discussion at Meeting #12. Further presentation/discussion Agenda Item 4 this meeting (#13) – environmental limits to change – science.
11.10 *Provide a summary of the previous work done by the Committee and key decisions.*	Clare Taylor Adrian Tomlinson	Partially complete – email from WAC Water 16/2/22 with a list of decisions. Outstanding – Adrian Tomlinson will email a more comprehensive list of work the Committee has done.

1. Opening 10:05am

1.01. Welcome and Introduction

The Chair welcomed everyone to the meeting, both those online and present.

Minutes from Meeting 12 were circulated for comment on 26 November 2021. No changes or comments were received by 6 December 2021. Minutes were again circulated for approval on 8 December 2021. No changes or comments were received by 20 December 2021 and the minutes were accepted as final and uploaded to the website.

Minutes and appendices are available at:
https://depws.nt.gov.au/__data/assets/pdf_file/0008/1081772/mataranka-tindall-wac-meeting-12-minutes.pdf

1.02. Attendance and Apologies

As shown.

1.03. Recap on correspondence

See status of Action Item 12.1.

1.04. Status of meeting actions

12.1 Chair to forward any correspondence received on AWR response from Controller of Water Resources

The Chair received a response from the Controller and forwarded this to Committee members. The Controller is limited in what they can do. The intention of the plan and the concern that there may be limited water available are being considered with new licence applications.

Action 13.1 The Chair will resend members a copy of the Controller's response to her e-mail regarding the AWR

12.2 Members to review minutes from Meeting 8 on 13 March 2019 for the Committee's discussion and recommendations regarding the climate period used to model the Tindall system.

Available at https://depws.nt.gov.au/boards-and-committees/water-advisory-committees/tindall-mataranka-daly-waters-advisory-committee/committee-meetings
COMPLETE - This will help inform discussion at today's meeting.

12.3 Members encouraged to read the recent paper on modelling approaches

COMPLETE - *Emailed to members from Pru Ducey 12/10/21*

12.4 Planning team to discuss WAC comments in relation to rainfall and climate change with the Water Assessment team and provide a concise briefing for the next meeting and an opportunity for discussion

COMPLETE – Agenda Item 6 this meeting. Modelling approach – frequently asked questions.

11.9 Run agreed model scenarios and provide a report.

Partially complete – First step of running scenarios has been undertaken. This will be reported once the "limits of change" work is complete, as this defines the criteria to

report model performance against. Refer limits to change presentation/discussion at Meeting #12. The presentation and discussion scheduled for Agenda Item 4 of today's meeting furthers this work.

11.10 Provide a summary of the previous work done by the Committee and key decisions.

Partially complete – email from WAC Water 16/2/22 with a list of decisions made by the Committee.

Outstanding – Water resources planner will email a more comprehensive list of work the Committee has done in addition to its key decisions.

1.05. Declaration of Interests

Nil Declared

2. Update on Water Resources business

Executive Director (Amy Dysart) asked members whether there were any issues they wished to discuss.

The recently published paper Groundwater sources for the Mataranka Springs (Northern Territory, Australia), which provides information about the age of water around Mataranka springs and the source of this water was raised. Does this require a reconsideration of the assumptions about how these springs are protected?

A committee member advised that their reading was the paper added to but did not contradict current understandings. It highlights three major sources of groundwater being relatively new groundwater from north, local shallow groundwater and much deeper groundwater from the south. Multiple lines of evidence suggest that system is quite connected and that deeper groundwater contributions from the south are significant.

Executive Director advised that the Department was acutely aware of the complexity of the system. The new paper will be integrated into the information base for water resources management. There is significant, ongoing work for the Roper River Water Resource Assessment, scheduled to continue until 2024-25. It is therefore necessary to balance what is used now as opposed to what might be used in the future.

It was suggested authors CSIRO scientists could be asked to review modelling. This would be one way of making sure this information is incorporated.

A member proposed an ecohydrological conceptual model could be developed. These could provide links between ecology with hydrogeology, and show links between the different processes we believe are important. If funding was available for a consultant, the member suggested it could be done quite quickly. Executive Director expressed concern that any additional work would stretch out the time frames and may be better done for the next plan.

Action 13.2: Provide members with a copy of the CSIRO paper Groundwater sources for the Mataranka Springs (Northern Territory, Australia)

Action 13.3: The Executive Director to report back at Meeting #14 whether it is feasible to prepare an ecohydrological model in time for the draft plan

A member queried whether extraction licence applications could not be assessed during plan preparation, as they were aware this had happened elsewhere.

Executive Director noted that this was beyond the legislated powers of the Controller and done so under exceptional circumstances at the request of the Chair of the Central Land Council in the case in question. As a statutory committee it would not be appropriate to request the Controller to be unlawful as Water Act requires her to consider water licence applications as they are received.

- **Application in the Roper River for Ilmenite mining operations**

A Notice of Intent has been advertised and closes on 21 February 2022.

The Ilmenite mine has been extracting water from the Roper River for a number of years. With mining activities being incorporated into the *Water Act*, Australian Ilmenite Resources are now required to apply for a water licence. The application is for an increased entitlement, taking water from the river all year, including water derived from the Tindal Limestone Aquifer.

The Controller will consider the feedback received as part of her decision making process.

The Department has been working extensively around the policy in relation to water storage infrastructure and taking surface water flows. A draft policy will be released at the end of March for comment for a month. The department also has legislated responsibilities the *Water Act* regarding interference with a waterways.

A concern was raised about individuals' comments being passed on to the applicants in a small community. Executive Director noted this comment but confirmed it is a two way transparent process. Public comments are provided to the applicant who has a chance to respond.

- **Aboriginal Water Reserve**

In 2021 draft regulations were provided to all four land councils as part of the consultation process to finalise the regulations. An independent barrister has been engaged to consider the legislation and draft changes based on the feedback. The department will be going back to the land councils with that feedback and proceed toward resolving the regulations by the middle of the year.

It was queried whether legislative changes were required to the Federal Land Rights Act and whether this would delay access to the Aboriginal Water Reserve. Executive Director confirmed changes to Federal legislation were needed but the Minister can provide those powers to the Land Councils in the interim. Applicants were encouraged to submit applications as soon as possible.

It was noted that the process to get the legislation and regulations in place has been going on for a number of years and that Minister Wyatt and his office have been well-briefed over the last couple years on this matter. There was risk that is posed by being on the eve of a federal election whereby the current Government will shortly be entering caretaker mode with a possible change of government. The NLC is disappointed that it has taken so long to get the legal arrangements sorted and there has been a significant lack of collaboration.

- **Application of unused water policy in the region**

Given the current situation and effects of COVID-19 the Department decided not to actively pursue unused water in 2021. This will be reassessed for 2022.

- **Vaccination requirements**

All workers under the mandatory vaccination direction, will be required to have a booster dose of the COVID-19 vaccine. Workers in high risk settings will be required to have their booster dose of the COVID-19 vaccine by 11 March 2022. The remainder of Territory workers included in the mandatory vaccination policy, will be required to have their booster dose by Friday 22 April 2022.

Secretariat are awaiting advice from Cabinet in regards to booster requirements for Committee members and will provide this information when they receive it.

Proposed new Board appointees will now be required to provide COVID-19 vaccination certificates (or exemptions) for sighting prior to documents going to the relevant Minister for consideration.

3. Update – process to finalise the plan

Water Planner (Adrian Tomlinson) presented Information on the updated process to finalise the plan. A copy of the slides from the presentation is at Appendix 1.

4. Environmental limits to change - science

Dr Jayne Brim Box presented information on Environmental limits to change – science.

5. Reflections on the presentation in item 4 – what values need the highest level of protection?

Members made the following comments:

- Very informative presentation.
- It raises many questions about how we ensure these key values are protected.
- Broadly agree with the approach of looking at palms, barramundi, sawfish as iconic species of the Roper River.
- The presentation reaffirms the complexity and connectivity of system. Pleased that barramundi are identified as an umbrella species.
- One member commented "I guess it is about understanding what the natural current variation is, and not going beyond that."
- Red Lily is very important. It has been getting lower and drying out only in the past couple of years. Upstream, little Red Lily area has pretty much dried out. The water is not getting out to lagoons. Concerned that if trees and surfaces are drying out, why are we putting more stresses on the system by encouraging more water licences?

  Jayne Brimbox queried whether members had any information about an anecdotal report of an excavation in recent decades which appears to have been draining Red Lily and causing erosion which may require remediation?

  Members advised they were aware of CSIRO reports documenting indigenous management from 60 years ago but not recent excavations
- Umbrella species and filling knowledge around flood plain are very important from a biodiversity perspective. We need to make sure all these things are known and incorporated in a model before off site storage is considered.
- Committee members highlighted the following environmental considerations:
    - riffles are important not just as a potential barrier for species migration but for bringing oxygen into system.

- riparian vegetation should be considered as a food for source (e.g. for the gulf snapping turtle). Keeping continuity of riparian vegetation is key to this function.
- Not only umbrella species but other aquatic flora and fauna should be considered.
- there is little written up information on stygofauna. Palms as umbrella species for GDEs may also act as a proxy for subterranean GDEs.
- in considering umbrella species such as sooty grunter consider also the water requirements for their invertebrate food sources (e.g. shrimp).
- local mussels may be significant.

6. Modelling approach – frequently asked questions (FAQ)

Water Planner (Adrian Tomlinson) provided members with a briefing paper answering questions raised at previous meetings in relation to the modelling approach and briefly went through these. This document is at Appendix 2.

- Members did not raise any specific questions about the FAQ paper. Some members indicated they were satisfied with the information contained in the FAQ paper.
- It was commented that the plan must work within the uncertainty highlighted in the FAQ about future conditions caused by climate change, limits to modelling and the regional conditions.

Discussion on how to manage uncertainty associated with climate change and modelling followed

- It was commented water licenses should not be locked in for a long periods (5 and 10 year periods being appropriate) because of climate change.
- Risks to industry need to be recognised and managed. It needs to be clear upfront that industry may not have the certainty it needs. Beyond the time period of the licence, licences need to be reviewed and recognised that future entitlements might change due to climate change.
- Licence holders need some level of certainty in relation security of water in order to finance etc. This needs further discussion. It is incumbent on us to allocate water in a way which consider the needs of industry, by enquiring and work out what industry needs.
- Annual announced allocations are an important way to manage this uncertainty. If we are talking about potentially having large licences on the strength of off stream storage, those crops that are going to be planted, will almost certainly big broad acre, but these are annual not perennial crops. If we want to consider all those things, and they should be able to swing in and out of it, long licences are not as critical as they are with tree crops.
- The Roper system flows in the wet season and recharge are both highly variable. This is understood by people doing broad acre cropping. There is a tendency to favour security even with opportunistic cropping. There needs to be a conversation about reducing the amount of water licensed to give further certainty to those holding licenses.
- Renewal of current licences. Seven licences with ten year terms are due for renewal 2023 and there will be further licences due for renewal 2024. Is the unused water policy applied in considering renewals? Executive Director advised that under section 90 of the *Water Act* there are a number of factors the Controller must take into account in deciding whether to grant, amend or modify a licence. These include usage, compliance and impact on other users.

Action 13.4: ED Water Resources will circulate or provide additional information about what considerations are made in renewing a licence.

- Concern was raised that water licences which are transferred when properties are sold for new activities are not scrutinised in the same way as for new licences. For example a property that was initially used for grazing and is now a tree farm. The commenter felt new land owners should be required to provide information on their plans when they apply to transfer that water licence.
- A member expressed concern that licences could be issued for an inefficient use of water.
- The Chair stated that currently under the Water Act the licence does transfer with the sale because water is linked to land. When they receive water licence it is linked to beneficial use category. If the beneficial use remains as agriculture but with a different crop. If changing the beneficial use to industrial or mining then they would need to notify the Department and provide information and reasons. The Chair felt that that the current arrangements were appropriate.
- Another member commented that not publicly advertising licence renewals, creates some uncertainty as to what is being proposed for that development going forward.
- The member emphasised the importance of managing renewals because we are on the cusp of a number of licences coming up for renewal.
- It was suggested that scenario modelling take into account what is used at the moment.
- Is there any possibility that when a parcel of land is sold, and the water was not being used, but is now being used by new owner, the Department looks at that to see if it is speculation?
- Executive Director advised that *Water Act* does not contain strong provisions around the bona fides of the applicant. There is the possibility of changing regulations in the future. Pricing is being considered under Strategic Water Plan and she expected continued reform to the *Water Act*, although to date there hasn't been strong support from stakeholders to make incremental changes.

7. Cultural values – limits to change

- The challenges placed upon Traditional Owners in giving feedback and discussing requirements for protecting cultural values because of COVID restrictions on face-to-face meetings and travel was recognised.
- NLC advised it is working with the WAC members who represent Aboriginal interests to identify possible cultural values or sites of cultural significance and the expectations for these. This work is limited to the areas where WAC members can talk for Country (i.e. around Jilkminggan and the Mataranka areas of the plan) and has focused on locations for which there is existing water flow and groundwater monitoring data. This enables western monitoring information on river flows to be linked to cultural site condition.
- Currently awaiting for modelling information for a number of locations to come through from the Department to will allow some broader conversations with relevant Traditional Owners and Custodians on this.
- Further, extensive stakeholder engagement with Traditional Owners along the river is also planned during the consultation period on the draft plan

(Bridie from NLC provided the above update as Helena had to step away from the meeting for a short time, which unfortunately coincided with this discussion.)

8. Water for drinking and extractive uses – limits to change

A short briefing paper was provided with the Agenda.

Water Planner (Adrian Tomlinson) gave a short presentation. A copy of the slides from the presentation are available at Appendix 3.

Towns and Communities (Outcome 3)

- Ngukurr's drinking water supply was discussed. It was advised it has more or less moved solely to groundwater now.
- It was queried whether Minyerri water supply was derived from within the plan area.

Action 13.5: Water Planner (Adrian Tomlinson) to check whether Minyerri is in the plan area.

- Water for drinking must include fresh water for drinking when people move through country.

Unlicensed rural stock and domestic (Outcome 3)

- Unlicensed take from the river from downstream of plan area was highlighted as significant and needs to be considered. The commenter suggested it could cause potential impacts on river flows despite our best efforts to manage extractions from the Tindall Limestone Aquifer.
- It was commented that all surface water extraction should be licensed.
- It was noted that exemptions were previously removed for the mining sector and so exemptions can be removed.
- The importance of identifying and monitoring unlicensed use was emphasised.

Sustainable regional economic development (Outcome 4)

- Making water available from the Aboriginal Water Reserve was **flagged** as a priority value. It was noted that since the committee documented its values, provisioning the AWR had been recognised on a hierarchy above other non-priority consumptive uses. The plan needs to reflect this hierarchy.
- Suitable security levels for extractive use is a key consideration and how this is achieved needs to further discussion by the committee.
- Condition of Elsey National Park was **flagged** as a priority value.
- It was queried whether there were any requirements for tourism and recreational uses of water that would not be met by effectively meeting environmental and cultural water requirements? Members advised:
    - no barriers to movement along river, while recognising this needs to respect cultural requirements for sacred sites
    - maintaining the Roper River large iconic barramundi. Fish need to use that freshwater habitat and to migrate in order to reach their biological potential and this set the Roper River apart.
- It was recognised that it was difficult to prioritise some values over others. It was better to focus on an overall outcome.

9. Discussion – what other questions or topics could inform testing of the limits of change?

Not discussed.

10. Looking forward – evaluating the modelling scenarios

A short briefing paper was provided with the Agenda. Committee members raised the following points during the discussion:

- Licence security levels need further discussion.

- Using a precautionary approach while information was still being gathered was suggested to avoid the risk of over-allocation, as has occurred elsewhere. In describing how this would apply the member suggested that in a lightly licensed resource like Larrimah, when ESY is calculated, we look at not look licensing above 40% or 50% of the modelled resource and use the five year review to look at real data to advise the Controller/Department on whether this could be raised. A staged development scenario would allow the development to occur with surety for investors and test environmental responses including salinization risks.
- Support was received for this suggestion based on minimising ecological risks, impacts on economies and societies from "clawing back" licences and the need to test how models respond to actual use.
- It was queried whether there was any barrier to setting a low estimated sustainable yield. Executive Director encouraged the WAC to consider the term of the plan and the option of staged consumptive pool rather than the lower estimated sustainable yield.
- Members discussed how a precautionary approach could be applied and whether guidelines were available on how to do this.
- It was suggested a paper on how the precautionary approach could be operationalised was needed.

Action 13.6: Progress a paper on operationalising a precautionary principle in defining the estimated sustainable yield and circulate a discussion paper to the committee for discussion at the next meeting.

11. Next meeting dates – dates for Meeting #14

It is likely there will be a shorter meeting in March, with a larger meeting in May. Note that this may extend the process by 6-8 weeks.

12. Key messages and actions from this meeting

Not discussed.

Attachments

Appendix 1. Presentation agenda item 3

Appendix 2. Presentation agenda item 6

Appendix 3. Presentation agenda item 8

Meeting closed 3.00pm

Department of Environment, Parks and Water Security

Mataranka Water Advisory Committee Meeting #13

NORTHERN TERRITORY GOVERNMENT

10.15AM
Process to finalise the WAP

Developing a water allocation plan

Situation Analysis

- Information gathering stage. Describes:
  - water resources, including numerical model (last meeting and **meeting 13**)
  - environmental, cultural and social values (ongoing)
  - current consumptive use and demand (ongoing)

Objectives and criteria

- Vision, outcomes, objectives (meeting 9)
- **Have not set *criteria* for assessing estimated sustainable yield (ESY) options** *(introduce limits to change approach in **meeting 12** & consider in **meeting 13**)*

Estimated sustainable yield

- Run different extraction scenarios through numerical model **(meeting 13 & 14)**
- Identify the optimum estimated sustainable yield that meets criteria **(meeting 14)**
- Make allocations to beneficial uses

Management arrangements

- Guidelines for how the ESY can be accessed **(meeting 14 and 15)**
- Protection areas showing where special guidelines apply (tabled meeting 8)
- Implementation arrangements e.g. monitoring and evaluation

NORTHERN TERRITORY GOVERNMENT

Plan timeline

WAC advice	Milestone	Proposed
✓	Limits to change agreed	Feb 22
✓	ESY & management arrangements agreed	March 22
✓	draft WAP complete	May 22
	draft WAP approved by Minister	June 22
	draft WAP out for public comment	July 22
✓	consultation report	Aug 22
	Plan to Minister	Oct 22

NORTHERN TERRITORY GOVERNMENT

Meeting 13 today

LIMITS TO CHANGE & ESY

- Consider criteria (limits to change) *(Items 4, 5, 7, 8)*
- ESY logic *(this session)*
- Further discussion on numerical modelling approach *(Item 6)*
- Feedback on scenarios to be modelled *(Item 10)*
- Aboriginal Water Reserve eligible land *(Item 2)*

NORTHERN TERRITORY GOVERNMENT

Meeting 14

Late March

ESTIMATED SUSTAINABLE YIELD

- Results of modelling
- Estimated sustainable yield
- Allocations
- Management arrangements
- Monitoring and evaluation
- Advice on drafting the plan

NORTHERN TERRITORY GOVERNMENT

Meeting 15

May

DRAFT PLAN FEEDBACK

- Draft Water Allocation Plan
- Plans for public consultation

Meeting 16

August

RESPONSE TO SUBMISSIONS

- Feedback on submissions and responses
- Draft report on communications and engagement
- Advice on finalising the plan
- Reflect on process

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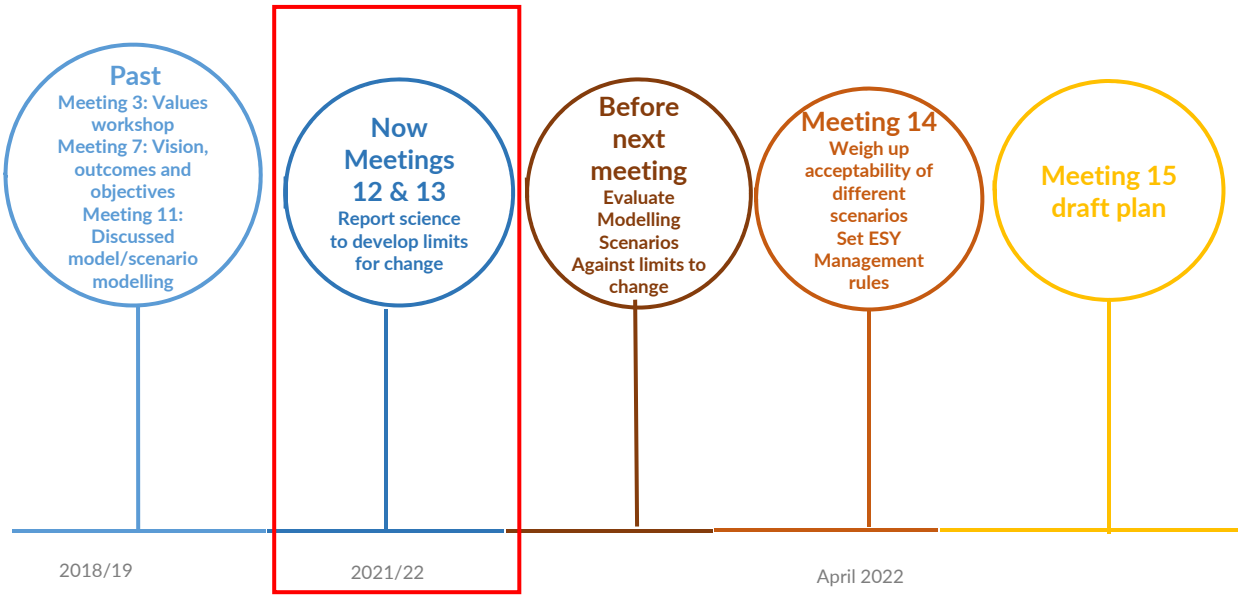
Connecting with past work



Today

1. Discussing the science
2. Checking the main values have been captured
3. Preparing for the estimated sustainable yield conversation by identifying the key values
4. Key values and targets have already been discussed in meetings 3, 4 and 9

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From meeting 9 - Vision

The waters of the

Mataranka Tindall Limestone Aquifer

*are **shared** between all users in a*

sustainable**, **reliable** and **equitable

manner

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From Meeting 9: Outcomes and Objectives

	Outcome	Statement (refer notes)
1	Environment and ecological integrity	The MTLA aquifer, and its connected surface waters, continue to maintain the ecological integrity of aquatic and associated terrestrial ecosystems and dependent cultural, recreational, and social values within the Plan area, including those downstream ecosystems which are highly dependent on Roper River flows from the Plan area.
2	Aboriginal and other cultural values	Cultural flows and culturally significant water-dependent sites which are essential to sustaining traditional Aboriginal land use and cultural practices are protected from the potential impacts of groundwater extraction in the Plan area
3	Drinking water and non-licensed extraction	Towns, communities and rural properties have access to a quality, reliable water supply for domestic and visitor consumption (including downstream communities dependent on baseflow contributions from the Plan Area), and provision is made for current and future stock watering requirements.
4	Licensed extractive use	Sustainable management of the Tindall Limestone aquifer and connected surface flows is supporting the region's economic development by: a)enabling water allocations to responsible and productive water consumptive industries such as agriculture and tourism, while avoiding detrimental impacts on environmental and cultural values. b) supporting commercial development opportunities on Aboriginal lands in the Plan area through implementation of the Strategic Aboriginal Water Reserve.

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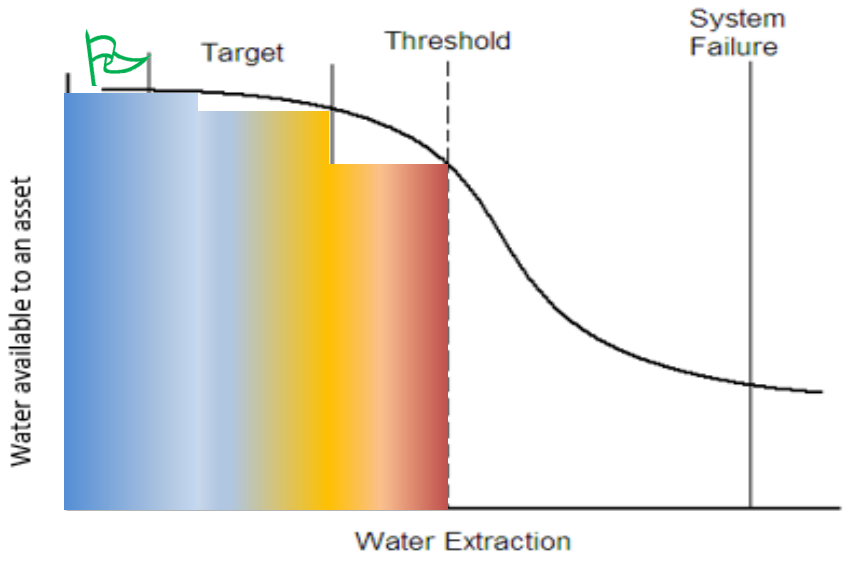
Key values conversation

- Inevitably there are trade-offs
- Amplify common benefits
  - e.g. preserving amenity and cultural values in Elsey National Park also benefits environmental values)
- Avoid conflict –
  - e.g. Groundwater discharge protection zones separate extraction from sensitive ecosystems
- Different levels of risk for different values (e.g. statutory obligations for listed species such as sawfish or protection of sacred sites)

NORTHERN TERRITORY GOVERNMENT

Managing for different levels of risk



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Flagging values for strong protection

	Outcome	Requires a low risk of threshold being exceeded
1	Environment and ecological integrity	
2	Aboriginal and other cultural values	
3	Drinking water and non-licensed extraction	
4	Licensed extractive use	

Keep it simple

1. Mataranka Tindall Limestone aquifer supports many values
2. Just flag the major ones - not those where there is flexibility
3. As ecosystem functions as a whole it is expected that many values can be protected using the same umbrella rule e.g. flow over Roper Bar
4. Use what we know now and recognise what we need to learn
5. Listen to experienced voices

Appendix 2

Attachment 1. Frequently Asked Questions – Modelling approach

The 'Modelling Approach' paper proposes using post 1970 climate data whereas the previous Departmental advice was to adopt a longer record. What is the reason for the change from that previously endorsed by the Water Advisory Committee*?*

A 2020 review of the Daly Roper model (DR2) (Middlemiss, 2020) identified that model results were very sensitive to evapotranspiration rates *(evapotranspiration is the sum of evaporation from the land surface plus transpiration from plants)***.**

Limited potential evapotranspiration (PET) data exists prior to 1970. Synthetic PET data would therefore need to be used for this period but it shows large variations (both positive and negative) in recharge compared to using observed PET (Figure 1). Therefore, the period where both observed PET and rainfall data are available is the most suitable to use in modelling because the data are the most representative of observed conditions.

There is also very limited observed streamflow and groundwater level data to validate the model prior to 1970.

For the above reasons the climate period 1970-2019 has been adopted as the modelling dataset.

Does the shorter climate increase the risk of the modelling results being unreliable?

The use of climate data from after 1970 **reduces** the risks of modelling being unreliable because it avoids the risks that:

1. a key model input, evapotranspiration, is unreliable prior to 1970
2. the climate during the plan period is significantly different to that in 1900-1970
3. the modelling results are biased results due to bias in pre-1970 input data
4. There is a lack of observational data for model calibration in the earlier period.

Is a rainfall record of 50 years appropriate?

Thirty years of data is considered to be the best predictor of current conditions by the Bureau of Meteorology (BoM), and natural variance within the 30 years is a better predictor of the next 30 years.

The Darwin office of the Bureau of Meteorology has previously supported the Department's approach to using the most recent climate data for modelling (pers. comm. J. Lisonbee, BoM, to I. Smith, DEPWS, May 2013).

As the Department has a longer flow data record commencing in 1970 rather than 1992, this is recommended for use to incorporate known dry periods in the mid-1980s.

How can we be confident about model performance in dry periods if there are a lack of groundwater level observations during the dry period 1985-1990?

Although there are no groundwater level observations from before approximately the mid-1990s, there are river discharge records for that period. These flow data are an indicator of aquifer discharge during the dry season and have been used to calibrate the model in the absence of groundwater level data pre-1990. Whilst this is not ideal, the approach allows a longer sequence of predicted flows during the extended dry period in the late 1980s.

Clearly it would be better to have a longer groundwater level monitoring record for a greater range of climate circumstances. This is a limit in the data available and cannot be overcome by running the model for a longer time.

What about groundwater recharge?

We know that it is now hotter in the Territory and that the nature of rainfall events (infrequent but large events) is changing because of climate change, both of which change how recharge occurs.

CSIRO modelling of recharge generally expects recharge to increase under all warming scenarios considered (https://territorystories.nt.gov.au/10070/341517/0/0).

Because of the effects of climate change we do not expect a return to pre-1970 climate conditions.

What happens if we encounter a worst case scenario in the plan period?

As we are living in a time of climatic uncertainty water allocation plans should be able to encompass the range of possible climatic conditions over their five year (review) and ten year (renew) terms.

Applications for new groundwater and surface water extraction licenses are also assessed prior to issuing a licence. So while there might be a volume of water available (consumptive pool) under the plan there is also ongoing assessment of any additional potential extraction, which can take into account system performance over the plan period.

Worst case climatic scenarios are directly addressed by the Annual Announced Allocations, which enable the Minister to reduce allocations on a year by year basis, depending upon aquifer performance under the preceding wet season.

Additional functions under the Water Act 1992, which allow for dynamic water resources management within the term of a water allocation plan include:

- water resource monitoring
- licence conditions including adaptive management triggers,
- licence duration
- licence security levels.

Is the modelling approach is best practice and consistent with BOM, CSIRO advice?

Yes. WRD has adopted advice from those federal agencies (as well as Geoscience Australia), and follows the Australian Groundwater Modelling Guidelines. CSIRO modelling on recharge implications has been summarised (https://territorystories.nt.gov.au/10070/341517/0/0). Neither this study nor advice recommend using the findings to produce synthetic daily time-step climate datasets as is needed prior to 1970.

CSIRO recommend that the results/implications of climate change projections for water planning can only be used for general policy settings that incorporate an assessment of risk because of the large the error bars in the projections.

Levels of uncertainty in climate need to be recognised and accommodated in robust monitoring and policies that can quickly respond to unforeseen changes.

References

Middlemis, H. (2020). Cambrian Limestone Aquifer and Roper River Model Upgrade 2020 Independent Review. Prepared by HydroGeoLogic for NT Department of Environment, Parks and Water Security (DEPWS). 3 November 2020.

Short, M.A. (2019). Projected Climate Change Effects on Diffuse Recharge in the NT: Summary for Major Groundwater Resources, Technical Report 23/2018D. Northern Territory Department of Environment and Natural Resources, Northern Territory Government. Palmerston, Northern Territory

Short, M. and Cobban, D. (12 Oct 2021) Paper to Mataranka Tindall Water Advisory Committee Mataranka Tindall WAP Development: Modelling Approach

Figures

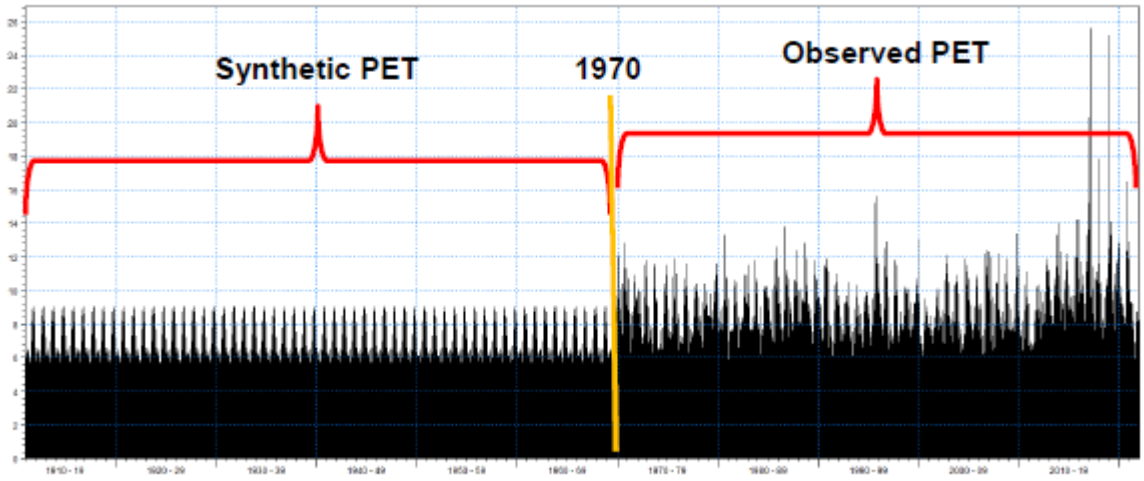

Figure 1. Example of daily potential evapotranspiration (PET) data from SILO for the Mataranka area.

Figure 1 from discussion paper provided to the Mataranka WAC (Date X) showing the difference between observed and synthetic potential evapotranspiration.

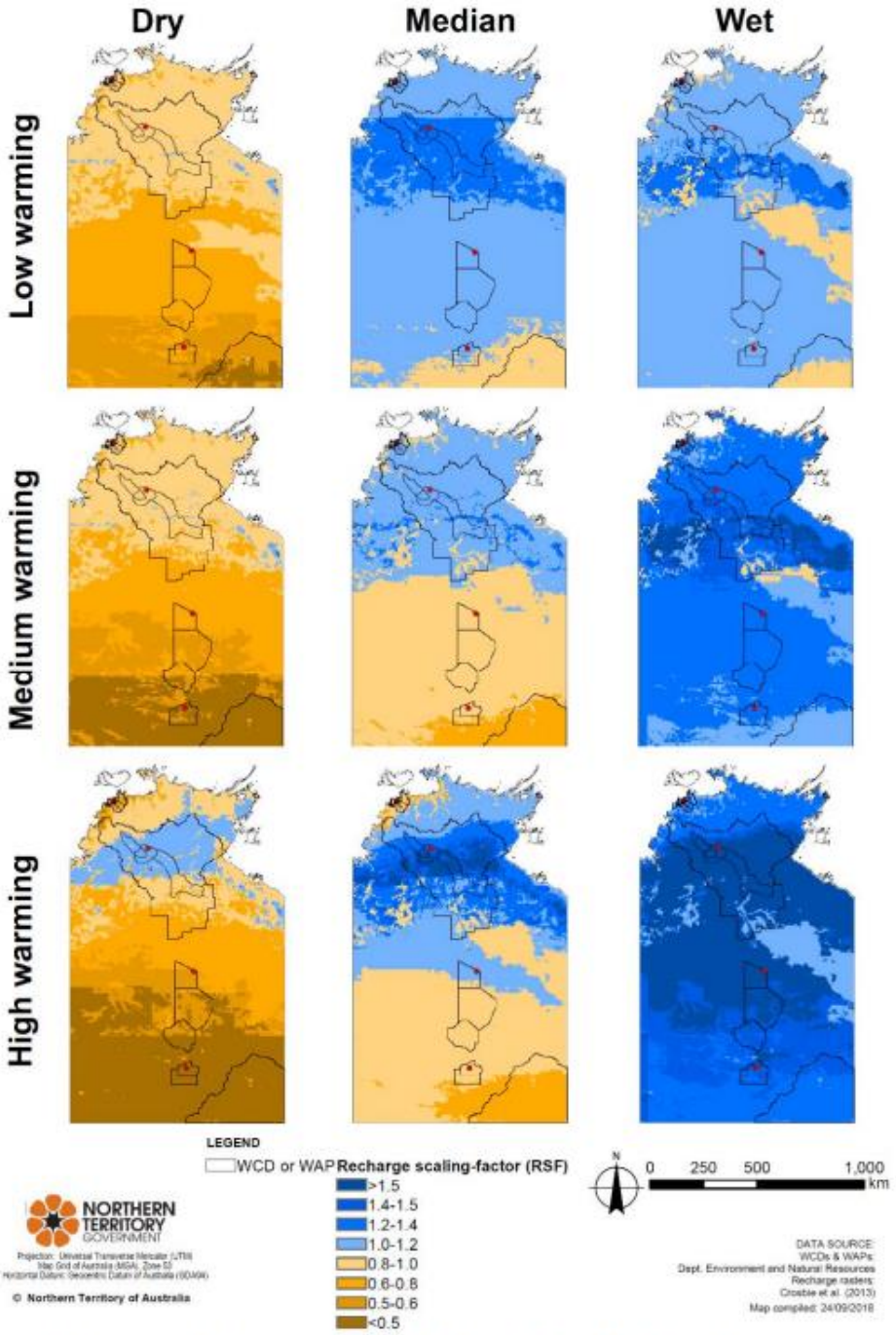

Figure 2 Projected recharge scaling-factors for a 2050 climate relative to 1990 across the Northern Territory

Figure 2: Extract from Short 2019 summarising the CSIRO recharge modelling results as they apply to major NT groundwater resources (recharge scaling factor is defined as the modelled recharge rate for a 2050 climate relative to the modelled recharge rate for 1990 climate (i.e. 353 ppm CO2). For example, a modelled RSFs of 0.5, 1.5 and 1.0 would indicate a 50% decrease, 50% increase or no change, respectively, in the 1990 recharge rate in 2050.)

13.35AM
Water for drinking and extractive uses – limits to change

8

Outcome 3: Drinking water and non-licensed extraction

From meeting 7

Consideration	Desired Outcome
Towns and Communities (Outcome 3)	**Towns, communities and rural properties** have access to a quality, reliable water supply for domestic and visitor consumption (including **downstream communities** dependent on baseflow contributions from the Plan Area), and provision is made for current and future **stock watering requirements**

Outcome 3: Drinking water and non-licensed extraction (towns and communities)

From meeting 3

Consideration	Desired Outcome	Any flags?
Towns and Communities (Outcome 3)	• Ngukurr's drinking water source is not compromised • All remote communities have enough water of suitable quality • Mataranka Town Water Supply is secure • Water supplies do not impact cultural sites or environmental values • Domestic water supplies are not impacted.	

Outcome 3: Drinking water and non-licensed extraction (towns and communities)

From meeting 3

Consideration	Desired Outcome	Any flags?
Unlicensed rural stock and domestic	• Domestic water supplies are not impacted • Stock supplies are not impacted by groundwater drawdown or changes to river flows	

Outcome 4: Licensed extractive use for sustainable regional economic development

From meeting 3

Consideration	Desired Outcome	Any flags?
Sustainable regional economic development (Outcome 4)	• Security of entitlements • Entitlements are robust to climate variability • Aboriginal Water Reserve is realised • Water quality is not impacted in a way that impacts recreational or consumptive uses	

Outcome 4: Licensed extractive use for sustainable regional economic development

From meeting 3: (Note these are primarily covered in Outcome 1)

Consideration	Desired Outcome	Any flags?

Sustainable regional economic development (Outcome 4)	• Tourism and recreational uses are not impacted by adverse impacts upon:
	  • picture postcard water clarity
	  • barramundi fish stocks
	  • freshwater flows
	  • riparian vegetation
	  • ecosystems
	  • no barriers to movement along river.
	(Elsey NP has 200,000 visitors per year)
		Condition of Elsey NP