Tindall Mataranka to Daly Waters Water Advisory Committee

Meeting Record 2

29 September 2017 – 10.30am
Community Hall, Mataranka

Members Present

Rebecca Mohr-Bell	Independent Chair
Tim Helder	Proxy for Peter Rix Quintis, Water Extraction Licence Holder
Clair O'Brien	Regenerative Agriculture
Kylie Gracey	NT Cattlemen's Association
Helena Lardy	Jilkminggan Community Aboriginal Association
Jocelyn James	Jilkminggan Community Aboriginal Association
Kerry Roberts	Jilkminggan Community Aboriginal Association
Liam Golding	Proxy for Allister Andrews, Jawoyn Association
Vin Lange	TopEnd Farm
David Ciaravolo	Amateur Fishermen's Association of the Northern Territory

By telephone

Kane Younghusband	Horticulturist, Water Extraction Licence holder
Sarah Kerin	Department of Tourism and Culture
David Crook	Research Scientist, CDU

Members Absent

Sharon Hillen	Roper Gulf Regional Council

Advisors Present

Simon Cruickshank	A/Executive Director, Water Resources, DENR
Steve Tickell	Hydrogeologist, Water Resources, DENR
Melissa Woltmann	Hydrogeologist, Water Resources, DENR

Observers

Pru Ducey	DENR, Minutes
Colin Lanzarin	Coodardie Station

1. OPENING

Meeting opened at 10.40am

1.1. Apologies

Sharon Hillen Roper Gulf Regional Council

1.2. Introduction from the Chair

As there were a number of people present who were not at the first meeting, members introduced themselves, and outlined their interest in being part of the Committee.

1.3. Update on Planner

The Committee was advised the successful applicant for the position of Water Planner was offered and accepted the position, but then withdrew to accept a position elsewhere. The position has been readvertised both nationally and internationally, and if no suitable applicant is recruited then more targeted advertising will be undertaken.

Recruitment is also being undertaken for the position of Director Planning and Engagement. Planners will report to this position.

- ❖ Simon Cruickshank will provide an outline of the structure within the Water Resources Division for the information of members.

1.4. Minutes from Meeting 1

Clair O'Brien requested the draft Minutes be amended to show her as representing Regenerative Agriculture.

The Committee agreed the amended Minutes of Meeting 1 held in Katherine on 19 July 2017 were a true and correct record.

2. OVERVIEW OF THE TINDALL LIMESTONE AQUIFER MATARANKA

Steve Tickell gave a presentation covering

- Groundwater basics – what is groundwater, what is an aquifer, where does groundwater fit in the hydrologic cycle
  - The network of water filled spaces in rock fractures, solution cavities and pores between sand grains is termed an aquifer. It stores water and allows it to flow. The Tindall aquifer is a combination of the first two. The Tindall aquifer refers to the aquifer developed in the Tindall Limestone.
  - Wet season recharge. Mounding due to friction. Water tries to find its own level – gravity. Groundwater catchment, similar to surface water catchment. The scale of catchments can range from kilometres to thousands of kilometres. Residence time - days to tens of thousands of years.
  - Dry season – when recharge stops, water continues to drain out of the aquifer. If recharge ceased totally the water would reach the base level and become static. It is rare in nature to reach that stage. Regular annual recharge prevents that happening.
- Distribution of the Aquifer

  - The big picture - Tindall Limestone at Mataranka part of a much more extensive aquifer system.
  - There are 3 sedimentary basins – Georgina, Wiso and Daly. The Plan area is in the Daly Basin.
  - Various diagrams showing a 3D view of the Daly Basin, the fault which cuts the basin near Mataranka, and a geological cross section from south of Warloch Ponds to the Roper River showing the Tindall Limestone and the direction of groundwater flow.
- Recharge – how water gets into the aquifer
  - Diffuse recharge is the widespread seepage of water through the soil into the aquifer. Diffuse recharge occurs when a fracture network is widespread
  - Localised recharge via a stream bed, lake or a cave. Can occur at the same time as diffuse recharge. Is only possible in an unconfined aquifer.
  - Wet season recharge tops the aquifer up, then it drains away in the dry season.
- Flow
  - Groundwater is always draining out and periodically being replenished. As a result there is a continuous movement of water, both horizontally and vertically.
  - Groundwater flows from the north west and the south towards the Roper River
- Discharge
  - Groundwater discharge is groundwater returning to the surface. Stream bed discharge is governed by topography. The amount of discharge and location can change with time as the watertable rises and falls with the season. The Roper River is the lowest point in the landscape so groundwater mainly discharges there.
  - The 3 major River bank springs represent only 20% of the gain in river flow over the Tindall. The rest is via smaller springs and seepages on the river bed.
  - The large swampy area in Elsey National Park is also a place where groundwater discharges through springs and also where vegetation depends on the groundwater.
  - End of dry season river flows have been measured at strategic points along the river to work out where the main groundwater inflows are.
  - Stream flow snapshots show that the river progressively picks up water where it crosses the aquifer. Downstream of the aquifer it starts to loose water through evaporation.
  - The river flows at the end of the dry season are not the same every year. There has been an overall increase since the 1960s when measurements were first made. This is due to higher annual rainfalls experienced over that period.
  - A snapshot of end of Dry stream flows comparing the Roper to other groundwater fed streams in the region. The Flora, Katherine(in the vicinity of the town), Douglas and Fergusson Rivers are also fed by the Tindall aquifer. The Daly River is fed by both the Oolloo and Tindall aquifers.
- Modelling
  - The model is a combined groundwater / surface water (integrated) model of the Daly River Catchment and Daly Basin aquifers.
  - An integrated model: treats the water resources of the Catchment and Daly Basin aquifers in their entirety as “connected waters”; ensures the water is

not allocated twice; and provides greater accuracy since the dynamics of the river account for changes in spring discharge as calculated by the model (ie. groundwater discharge is related to river height).

- Modelling provides: confidence in our understanding of the system; an indication of how the natural system might have behaved if we did not impact it; the ability to forecast the impact of future development, so we can decide if it is acceptable; and, the ability to forecast effects of climatic variations in the future.
- Darcy's Law - In 1856 Henri Darcy experimented with water flowing through sand filled pipes. He came up with a simple mathematical equation linking flow, area of aquifer through which the water flows, difference in head (the slope of the water table), and a property of the aquifer itself known as hydraulic conductivity (the ease at which water passes through the aquifer). It now forms the basis for most of the calculations of groundwater flow. It is also the basis of the groundwater part of the Daly Model.

  Flow = Hydraulic Conductivity x Slope x Area

  If we know any three of these, we can calculate the remaining one.
  We can use this equation to make a quick estimate of how much water is flowing through an aquifer
- The groundwater system is Dynamic. It changes constantly. Similar to your bank account, available reserves are constantly changing. Ideally you need to prepare a budget to manage finances. Money in from various sources, money out via various methods. The balance continually changes but must be managed within certain limits. The hydrologic cycle can be viewed in a similar way.
- The first step in making a model is to make a simple version of how the system works, a conceptual model. Break down into components that can be measured or estimated. This leads to a water balance of…….inputs and outputs.
- The next step is the extent of the aquifer is mapped, and the aquifer is divided into many blocks. The number of blocks will depend on how much you already know about the aquifer. Darcy's law is then applied to each block.
- The model tries to simulate changes in the flow and water level with time. The model also accounts for interaction between aquifer and river. It will estimate dry season river flows for different rainfalls and pumping regimes. It is used as a tool to set pumping amounts that will preserve minimum river flows.
- We know how the water table fluctuates, and use this to fine tune the model. The Model tries to simulate this. If it gives a rubbish result you change some of the parameters eg.Hydraulic conductivity until the model gives a more accurate result.
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❖ Presentations will be updated to include some additional information for each slide, and copies will be provided to members.

❖ Memory sticks will be purchased for members, and copies of the presentations will be uploaded.

❖ Steve Tickell will provide copies or a link to the maps that were available at the meeting.

- ❖ A Glossary of definitions will be provided for key terms.

3. OVERVIEW OF WATER MONITORING PROGRAMS IN THE TINDALL MATARANKA DALY WATERS WATER ALLOCATION PLAN AREA

Simon Cruickshank gave a presentation covering

- Water monitoring is undertaken to
  - comply with legislation – *Water Act*
  - build knowledge of the resource
  - develop and calibrate models
  - support Water Allocation (Implementation) Plans
- Water monitoring data is used in consideration of short, medium and long term issues
- Monitoring data allows generation of water information products (reports and models) that guide water management activities (licensing and water allocation planning) to meet broader objectives of water management
- Monitoring is undertaken at strategic locations to address specific knowledge requirements
- In the Plan area there are:
  - 28 groundwater sites – 14 with loggers
  - 12 surface water sites – 7 with loggers – 3 of these are gauging stations
  - Water Quality is tested in May and October
- Surface Water Monitoring
  - Fully instrumented sites for continuous long term monitoring are called Gauging Stations
  - Less important sites may consist of a temporary data logger for short term (3 year) installations – no infrastructure required
  - At Springs – we measure Flow and water quality (to see if the flow rate changing over time)
- Different equipment and instruments are used depending on the type of water you measure and how frequently you measure it
  - Groundwater
  - Surface Water
  - Water Quality
  - Rainfall
  - Metadata
  - Other Services – Flood Forecasting and Alerting
- A Gauging Station is installed for long term continuous Surface Water monitoring
- A data logger can be installed at a short term measuring site, and doesn't require other infrastructure. It can be used to measure groundwater and river levels. It is less reliable than a gauging station and has a limited life.
- Instruments at Gauging stations and discrete logger sites measure water level (not flow) every 15 minutes. Water level can be plotted over time – called a hydrograph. A hydrograph shows how often a river floods, how long a river typically floods for, and the range of water level from wet season to dry. Sites are visited periodically to verify the instrumentation working properly.
- Minimum river levels at the end of the dry season can change depending on how much rain there was in the wet season, sometimes they show impacts from land use.

- Flow at the end of the Dry – the Roper river gains as it flows downstream with input from springs. Once river is beyond the aquifer it loses flow as it goes downstream due to evaporation.
- Flow at the end of the Wet – there is roughly double the flow at end of aquifer than at the end of the dry, but similar flow as at the end of the dry at Roper Bar
- Metadata is data providing information about the data, such as
  - Location information
  - Elevation – compare river levels to groundwater levels in bores
  - Commencement of data
  - Types of data available
- Gauging stations measure continuous river level (not flow). Flow is measured in Rivers and Springs using specialist equipment. The flow value only relates to river level at that particular river height. Flow measurements are time consuming.
- To determine flow for different river heights when it hasn't been measured we plot flow for a range of river heights. This is called a rating table. A rating table allows a river flow to be estimated for any river height.
- Some research projects are undertaken through the Australian Government's National Environmental Science Program (NESP)
- Other projects include
  - Fish Tracking – determine relationship between flows and fish movement. What flow may restrict the movement of fish, turtles etc
  - Long Section – slope of the river – used for modelling
- Challenges to monitoring include
  - access
  - Crocodiles
  - Climate
  - Technology
  - Insects
- Reporting
  - Minimum flow report (0.76 m3/s in 2016)
  - Snapshot reports are available at https://denr.nt.gov.au/land-resource-management/water-resources/water-allocation-plans/tindall-mataranka-daly-waters-water-allocation-plan/reports-and-publications
- Data systems
  - Water Data portal https://nt.gov.au/environment/water/water-data-portal
  - Licencing Decision portal https://denr.nt.gov.au/land-resource-management/water-resources/water-licensing-portal
  - Bureau of Meteorology http://www.bom.gov.au/

  All data is freely available. Some products interconnect with other products such as the Licensing portal. Data is fed to other users in near real time, such as the Bureau of Meteorology for flood forecasting.

4. OPEN DISCUSSION

Update on Strategic Aboriginal Water Reserve (SAWR) Policy

The draft Strategic Aboriginal Water Reserve Policy is currently with Cabinet and it is hoped this will be considered in early October. The next step will be developing a

Communications Strategy around the Policy, and arranging for presentations to Water Advisory Committees.

Members advised that neither of the Land Councils nor the NT Cattlemen's Association received any feedback on their submissions. The meeting was advised that all comments are included as an addendum within the report and the initial report was available on the DENR website.

This has since proved to be incorrect. However on checking the consultation report attached to the policy, NT Cattlemen's Association and CentreFarm are acknowledged as having provided face to face feedback as well as written submissions. The stakeholder consultation findings quote these submissions including a joint submission from the land councils endorsed by CentreFarm.

Trading Policy
Will be available for public comment, and some stakeholder engagement will be undertaken.

Underutilised Water and Recouping of unused water
Based on pumpage data received, some licence holders are not using all of the allocation.

In response to a question on whether the Department had received legal opinion on this, members were advised that Office of the Solicitor for the Northern Territory provides advice on all significant Water Policy including both of these. The policies are still in draft form, and some elements are being worked through in legal terms. An Agency workshop will look at this policy, as we need to be able to work with, and enforce it. The Policy recognises that some resources are over allocated and a mechanism is needed to deal with this, and other areas are not fully utilised.

Productivity Commission Inquiry into National Water Reform
The Productivity Commission releases documents looking at water reform from a national perspective including Aboriginal Reserves, transfer of water from rural to urban areas, and utilities. The Department is preparing a submission from NTG .

Mining and Petroleum
It was an election commitment that Mining and Petroleum activities be included in the *Water Act*. This requires legislative change, and there are a number of processes to be followed. A lot of the documentation has been written. One element currently being worked through relates to penalties and charges. The scheduled timetable is to get the Bill to Parliament in February 2018.

Effective methods of Engagement between Planners and Aboriginal people

- Vin Lange will provide a link to the Indigenous Engagement Framework, and requested the Executive Summary be circulated and once we have a Planner, this be an integral part of the planning process.

Consideration of Agenda Items for next meeting/s
It is important for the Committee to maintain momentum. There is still a lot of information that can be presented to inform the Committee for when a Planner is appointed.

Options discussed for presentations included:

- Modelling
- Sustainable Yield and Beneficial Uses
- Strategic Aboriginal Water Reserve Policy
- Trade Policy
- Management of Unused Water Entitlements
- Ecological Values – use of water and the levels required to protect assets and values
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It is important Aboriginal members start to think about cultural flows and values as this can be a challenge for the Planner.

5. NEXT MEETING

It was proposed the next meeting be held in 2 months, around the end of November. The Chair will circulate options for dates through Doodle Poll. Members were requested to respond with their preference.

Meeting Closed 1.30pm