



Gingin Water Group Inc.

Notes on GWG Water Issues Bus Tour

Prepared by John Braid, consultant to the Gingin Water Group Inc (GWG) in collaboration with GWG President David Rickson, and GWG committee.

This report is presented to the Shire of Gingin as acknowledgement of the support provided by the Shire to the GWG and in particular the provision of the Community Bus for the water issues bus tour on the 18th April 2013.

Background to the GWG Water Issues Bus Tour

The bus tour to get first hand information on water resource in the Gingin area arose out of discussions during the public forum following to the GWGs inaugural AGM in March 2013.

The forum was informed of a variety of opinions from local landholders, business operators and hydrogeologists. However, as the timing of the meeting was during the caretaker period of WA Government, Agency representatives were unable to attend. Their absence left many questions unanswered. The State Agency people contacted recognised the problems created by their absence at the forum and greatly appreciated the opportunity to contribute to the tour.

The one hundred people who attended the forum sent a strong message that sustainable water resource allocation/use is a high priority for the Gingin community.

It was then suggested that a familiarisation tour be arranged so that the new GWG committee could speak directly to Agency representatives and at the same time gain a greater sense of the variety of issues with water resource use in the Gingin area.

GWG member, Peter Ansell coordinated the tour and George Grant acted as Tour Guide, facilitating conversation on a variety of issues.

Following is a list of people participating in the day's activities:

- George Grant, Gingin landholder and water borer contractor
- Reg Beale, Gingin landholder and Shire Councillor
- David Rickson, GWG President
- Peter Ansell, orchardist and GWG Committee member
- Rian Moore, consultant hydrologist

- Don Telfer, District Manager DAFWA
- Sandy Pate, Perth NRM Regional Landcare Facilitator
- Jacqueline Styants, Perth NRM Water Program Manager
- Adrian de Toit, Hydrologist & GWG member
- Sally Calder, Landholder & GWG Secretary
- Kevin House, Landholder & GWG member
- Liz Weston, DoW A/Director of Regional Management and Water Information
- Chris O'Boy, DoW Hydrogeologist
- Mike Kelly, DoW Allocations and Acting Regional Manager
- Andrew Tuffs, DoW Hydrogeologist
- George Gifford, landholder & GWG member
- Justine Lawn, DEC Wetlands Officer
- Moe Tiong, DoW Water Planning Officer
- Martin Aldridge, MLC Agricultural Region
- Susan Worley, DoW Director of Water Planning
- Lorraine Wyse, Landholder & GWG member
- Tony Collotti, Driver
- John Braid, GWG Consultant
- Jim Trandos and Trandos Farms personnel
- Sam Burton, Hydrogeologist to Trandos Farms.

Tour Itinerary

The assembly point for the tour was the Anglican Church carpark opposite the Gingin Shire Office. The GWG President, David Rickson outlined the itinerary and introduced the participants.

The bus travelled out along Cockram Rd, turned into Honeycomb Rd, across Brand Hwy into Coonabidgee Rd, out to Gingin Brook Rd and west to Military Rd.

Morning tea was at the Gingin Observatory.

Following the stop at Gingin Observatory, the bus backtracked along Military Rd to Chitna Rd turning into and travelling west to George Grant's property and the Bookine Bookine lakes system.

The bus then continued west along Chitna Rd turning east into Gingin Brook Rd and then into Cowalla Rd and travelled north, turning into Beermullah West Rd. Travelling east and turning into Jocks Av then travelling south to the DoW bore field site just past Bootine Rd.

At the completion of the bore field visit, the tour back tracked to Bootine Rd and east to Brand Highway, then south to Trandos Farms.

Following lunch and presentations at Trandos Farms, the bus returned to Gingin at 4pm

Major areas of conversation

- Stock and domestic usage drawing from the superficial aquifer is not licensed or monitored
 - Comment from George Grant that the perched water tables in the area have remained reasonably constant, suggesting that rainfall recharge has been adequate to maintain levels
 - Appears to be little knowledge on the role of the superficial aquifer in maintaining Gingin Brook flows
 - An example of the complex nature of the groundwater was demonstrated to the tour group on a property off Coonabidgee Rd, just to the south of Coonabidgee Swamp area. The owner's superficial bore has been sucking air for more than a year. Immediately adjacent to the superficial bore is a bore tapping the perched aquifer which is able to provide sufficient water for stock purposes. Note that the saturated zone of this water source is approximately 1m in depth.
 - The landholder also noted that up until 'a few' years ago it had not been necessary to water stock as the Gingin Brook provided year round water for that purpose.
 - The landholder also provided anecdotal comment that 'flood' irrigation practices undertaken by some farmers has contributed the reduced flows of Gingin Brook
 - Areas south of Gingin Brook that have had significant declines in water table beyond that could be attributed to a reduced rainfall;
 - Coonabidgee Swamp dropped 8 to 10 metres
 - Wedgetail Rd dropped 6 meters
 - Chitna Rd/Barragoon lake system dropped 3-4 metres
- The Tour Group was advised that water quality from the superficial aquifer is highly variable and locality specific, ranging from fresh to saline and in many areas having a high iron content discolouring the water.
- Department of Water officers advised that the area south of the Gingin Brook & Moore River and west of Brand Highway was included in the Gngangara groundwater areas allocation plan
 - The zone described above has had the allocation 'capped', meaning that there will not be further extraction licences granted
 - Any proposed development requiring water in this zone will need to arrange either a transfer or trade of an existing licence allocation
 - The trade/transfer option is subject to DoW approval and requires something similar to an extraction application
- The superficial aquifer in the tour area is part of the system known as the Gngangara Mound
 - Comment that the groundwater from the Gngangara Mound flows north towards Gingin Brook appears to be contradicted by superficial groundwater level contours contained in the Tufts report (DoW, HG 54) and the McHugh et al report (DoW, HG 53). The McHugh et al report shows the Gngangara mound location west of Muchea & Bullsbrook, but north of the

- mound, the flow is generally east to west and at the Brook, the groundwater flow mimics the alignment of the Brook.
- Data contained in the DoE's State of the Mound report in 2005, indicates a decline in water table levels up to 6m in the northern parts of Gngangara Mound. This appears to be consistent with the observations of George Grant.
 - Changes in environmental condition over time
 - Large scale clearing associated with the European settlement contributed to higher flow rates through increased run-off and groundwater infiltration resulting in higher water tables. The pre-European condition is not precisely known
 - Impacts of a drying climate maybe shifting the flow regime back towards the 'pristine' condition. Note the recorded 25% decrease in rainfall since the early 70's has a flow-on effect of as much as 40% reduction in runoff and recharge.
 - Changes to wetlands
 - The Tour group was shown areas where wetlands had appeared to regress along the water periodicity, in some cases from permanently inundated to either intermittently inundated or seasonally waterlogged.
 - The regression was most obvious in the vicinity of Barragoon Lakes
 - In some cases, either bushfire or controlled burns through the drying wetlands has changed their vegetation structure to being Flooded Gum dominated rather than Paperbarks. As both of these species like to keep their 'feet wet', this maybe the normal regeneration strategy. Note, however, that the Paperbarks are fire sensitive. Fire will kill them and they rely on seedling recruitment whereas the Flooded Gums have a re-sprout survival strategy.
 - The DEC representative outlined the classification of wetlands as outlined in the Geomorphic Wetlands Coastal Plain dataset (DEC, 2013) and indicated that a change in wetland structure was normal but added that usually occurred over a geological time scale.
 - Historical irrigation practises focussed on channel or flood irrigation. These practises have been held responsible for much of the decrease in Brook flow over the past ten to fifteen years.
 - A consequence of the channel irrigation practice is significant alteration of the original stream bed layout
 - DoW advised the Group that no new surface extraction licences involving this practice will be approved but it is difficult to claw back an historical practise.
 - Gingin Brook, since European settlement, has been a perennial freshwater stream. This the case until the summer of 2002 when, for the first time, the section west of Brand Highway to approximately the confluence with Mungala Brook ceased to flow. In recent years, flow ceases as early as November and doesn't flow again until autumn rains typically in April.
 - The Tuffs report shows the Brook has three major sections; headwaters to Brand Highway; Brand Highway to Nolans Bridge;

Nolans Bridge to the confluence with the Moore River at Neergabby. Note that the section description here is deliberately aligned to landmarks rather than precise groundwater processes.

- The headwaters section is referred to as a gaining stream, continually fed by discharge from the Mirrabooka and superficial aquifers and to a lesser extent from the Leederville aquifer
 - The centre section (west of Brand Highway) is referred to as a losing stream. In this section stream flow discharges to the superficial aquifer. When the flow in this section drops to a threshold rate, all flow discharges to the superficial aquifer and stream flow ceases. This now regularly occurs during the summer months
 - The lower reaches, downstream from Nolans Bridge, is again fed from the Mirrabooka and superficial aquifers with some contribution from the Leederville just upstream from the confluence at Neergabby
 - Excessive surface water extraction in the lower reaches has been held responsible for this section of Gingin Brook drying during the summer months
- Water Allocation
 - Noted that the granting of large extraction licenses was the genesis for the formation of the GWG group
 - Agency representatives allayed much concern with explanations of the process that license applications have to fulfil and the compliance they must follow to retain their allocation
 - It was noted that these large users are following best practice irrigation practices, whilst many smaller holders are still using inefficient and antiquated practices
 - Agency representatives stressed that allocation will be based upon a water balance. Water balance simply entails what is required for ecological services and what can be sustainably extracted
 - DoW is committed to a program of investigation of groundwater resources to obtain a better understanding of what is sustainable extraction (refer Tuffs presentation)
 - Groundwater allocation plan will focus on extraction licences, not on 'homestead' use
 - Allocations are assessed annually but can only be revised every five years
 - Interim measures to reduce extraction will only occur where a license is surrendered or forfeited
 - Annual assessment can be viewed on the DoW website under the Evaluation Statements tab
 - Pine plantation impacts on water resources
 - Examples of pine tree deaths were visible at several points, including the large FPC plantation on Cowalla Rd
 - From previous investigation the deaths are attributed to stress resulting from a drying soil profile. Pines do not tap into the saturated zone (superficial aquifer) but rather the unsaturated zone. With reduced rainfall there is reduced infiltration resulting in reduced soil

- moisture. The combination of increased extraction and reduced recharge has resulted in a lower water table and a drier soil profile
- There is an irony in that less than a decade ago, it was considered good practice to plant recharge areas with pines to reduce recharge and manage rising water tables. The tactic was generally successful but now in combination with a drying climate this tactic is having negative impacts in susceptible areas
 - Surface water extraction licences are recognised by DoW as a problem and it is proposed that this allocation will be scaled back over time to permit only riparian rights (stock and homestead watering.)
- Community scepticism/angst as a barrier to effective management was raised by both GWG and Agency people
 - The contentious Swan Coastal Plain Wetlands Policy that was released about a decade ago was identified as the primary source of the scepticism. Unfortunately there remains a residue of mistrust that is going to be difficult to dispel.
 - This issue has also had the effect of water resource monitoring being restricted to public lands which may skew the groundwater modelling

Presentations

Andrew Tuffs, DoW Hydrogeologist responsible for the drilling program to baseline study the hydrogeology in the Gingin Groundwater Area and author of HG 54, Groundwater-surface water interaction along Gingin Brook Western Australia

- The tour visited the bore field site at Jocks Av, near Bootline Rd. This site is the No 3 well exploring the deep aquifers. This is part of a series of twelve such bore fields in four east-west transects of the Gingin groundwater area. The transects begin at Seabird and finish at Wedge Island
- Drill core recording showed confining clays and ancient marine deposits and are providing valuable insights into the detailed hydrogeology of the area
- Tuffs reiterated the points raised on the tour at the Trandos farms presentations and provided handouts of aquifer interaction diagrams and cited the HG 54 report for those wanting greater detail.

Jim Trandos, Sales Manager Trandos Farms

- Outlined the farms history and the business decisions required to establish this section of the business
- Emphasised that Trandos Farms enlisted local businesses and products in conducting its activity wherever possible
- Noted that water use at the farm was based upon evaporation rates and amount of water delivered was matched to that on a daily basis. The business needed to be very aware of water usage and the more efficient the usage the better the bottom line
- Noted that little was wasted, crop stubble was turned back into the soil, waste or damage product was fed to the farm's cattle and that pest control was largely biological
- There is no plan to expand the farm production beyond its current level

Sam Burton, Hydrogeologist to Trandos Farms

- Outlined the process Trandos Farms had to adhere to get an extraction licence
- Noted that the farm had 15 production bores and monitoring bores fitted with 5 data loggers
 - Monitoring bores are to better understand the aquifer that in turn will result in sustainable use

Liz Weston, DoW Acting Director of Regions and Water Information

- Acknowledged the need for DoW to maintain and build partnerships with community such as the GWG
- Undertakes to continue to work to understand the local issues and work towards solutions
- Acknowledged that the complexity of the Gingin hydrogeology complicated water allocation planning
- Stated that the Gingin Groundwater Allocation Plan was a high priority to release for comment in the near future

Susan Worley, DoW Director of Water Planning

- Supported Liz Weston's statements
- A range of factors to be taken into account when water planning, primarily water for productivity and ecosystem requirements
 - Generally looking at regional scale impacts being less than a 1.5m reduction in W/T levels but acknowledged local variance would be taken into the mix
- Noted that south of Gingin Brook is covered by the Gngangara Groundwater Allocation Plan and that water extraction licences have been capped in this area
- Generally the water balance for the Gingin groundwater plan have been recalculated to reduce water available to the allocation plan
 - Recognises that a drying climate will mean less water available and that we will need to be more efficient in doing more with less.
 - Suggested that this is common challenge and that we need to work in collaboration with local communities
- Noted that the DoW position on metering is currently being reviewed
 - Examination of what level of extraction would/should require metering
 - Noted that generally, metering will be around the need for risk management rather than a blanket approach
 - In reply to appeal procedures (SAT) it was noted that water allocation plans greatly reduced SAT appeals and their success if it could be demonstrated that the allocation plan was followed. Note that SAT determines only if a decision is administratively correct.

Opportunities for the GWG to explore arising from the Water Issues Bus Tour

Note that although numbered the following list is not prioritised.

1. Promotion of community awareness of the water resource issues in the Gingin area
 - a. Connecting with individual landholders and grower groups to promote water use sustainability of the Gingin groundwater area
 - b. Provide support to individuals seeking funding to promote sustainability
 - i. Enhance connections with community through provision of services, eg basic water quality testing of bores and streamlines
 - c. Build partnerships with community and State Agencies to promote water use efficiency strategies
 - i. Develop working relationships with NRM groups eg. NACC, Perth NRM, Moore Catchment Council, Chittering Landcare Centre
 - ii. Continual development of collaborations established with DoW, DEC & DAFWA
2. Identification of environmental assets connected particularly with wetlands and waterways in the Gingin Area.
 - a. Encouraging streamline & wetland revegetation and protection
 - b. Promoting farming practices that both protect the assets and provide farming efficiency
 - i. Recognising the need to manage weeds & ferals in excluded areas
 - c. Is there a case for artificially increasing water flow to these assets?
3. Promote efficient and sustainable use of water resources eg off stream stock watering
 - a. DAFWA, DoW and regional NRM groups (NACC & Perth NRM) could be critical partners in developing these programs.
4. Investigation of the impact of Agro-Forestry (Pines in particular) at local level.
 - a. There is growing evidence that plantations located in recharge areas have resulted in reduction of water discharge to Gingin Brook
 - b. Particularly a problem in perched water areas where there are/were localised springs or seeps
 - c. FPC would be a critical partner in this investigation
5. Community promotion of findings from the bore field monitoring program being undertaken by DoW and lead by DoW's Andrew Tuffs
 - a. Foster relationship with DoW to ensure GWG is considered a relevant stakeholder
 - b. Carry comment and links on the GWG website
6. Recognise the need for a utilitarian approach to water usage
 - a. Promote the effective and beneficial practices of the "big" users
 - b. Encourage users on a smaller scale to undertake similar best practices
 - c. Monitor the reporting of the "big" users to ensure compliance (report on whether they are doing the right thing)
 - d. Recognise the difficulties of small land holders in meeting best practice and assist them to do so

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