PERSONAL SUBMISSION TO
SOUTH AUSTRALIAN ROYAL COMMISSION
INTO THE MURRAY DARLING BASIN PLAN
Geoff Wise BVSc MACVS

Please accept the following submission to the Royal Commission.
During April 2018 I received a phone call from from a member of the Royal Commission requesting I make a submission.
An extension for my submission was granted until 30th May 2018.

PERSONAL BACKGROUND

- I have had a career long history of employment with NSW State and Local Government organisations.
- This commenced with over 30 years employment with NSW Department of Agriculture, initially as a Veterinarian and finally as Regional Director of Agriculture for the Orana and Far West Region, covering an area from Mudgee in central NSW to the South Australian border west of Broken Hill, and to the Queensland border.
- For eleven years from 1995 I had a dual role for 11 years as Regional Director, Land and Water Conservation and Western Lands Commissioner, responsible for numerous issues across the western 40% of NSW. Throughout this period, I was the senior regional NSW departmental officer for management and policy development and implementation for all water issues for the Barwon Darling River system from the Queensland to Victorian borders.
- From 2007 to 2012 I was General Manager, Bourke Shire Council. Bourke is pivotally located in the critically challenging section of the Darling River between the Northern and Southern Basins of the Murray Darling System.
- From 2012 to 1016 I was a selected member of the Northern Basin Advisory Committee, answerable to the Murray Darling Basin Authority (MDBA). I was arguably the only member of this committee with no potential personal conflicts of interest.

- My interests in a submission to the Royal Commission are confined solely to the Northern Basin, inclusive of the Menindee region.
- My submission has not followed your preferred process due to the diversity of papers I have included.
- I have been advised that the Royal Commission appreciates copies of any submissions that have been made during the period of the Basin Plan, and as a consequence this submission is dominated by numerous reports I have given to the MDBA. I accept that there is a degree of repetition in the attachments, which can be interpreted that the MDBA was reluctant to listen to community input.
  Each attached paper is catalogued by "year-month-date".
- I support all views made by the Australian Floodplain Association in their submission to the Royal Commission, and will not repeat these issues in this submission.

KEY ISSUES

- **Conflicting objectives and rules between Basin Plan and Barwon Darling Water Sharing Plan**
  - The Commonwealth Basin Plan included an objective of 143 GL "Shares deduction" across the Northern basin to deliver the planned goals for the Barwon Darling River system.
  - The NSW Water Sharing Plans for the catchment systems across the Northern Basin were adopted in isolation of each other, thereby allowing environmental water from the tributaries to the Barwon Darling systems acquired through the Basin Plan processes to effectively loose any environmental status once it entered the Barwon Darling system, and be eligible for extraction by irrigators.
  - This contradiction or paradox of plans that should be complementary was a total failure of due diligence, risk management and cooperative governance between Commonwealth and State governments.
  - This contradiction continues to remain unresolved.

- **Changes of Objects and Purposes for the Basin Plan**

  Since the Basin Plan was launched in 2012, there have been a number of subtle but significant changes to the overall goals of and strategies for the Basin Plan.

  Examples include:

  - MDBA issued for limited circulation a brief memo stating to the effect that the **reliability for irrigator extraction** must not be compromised. In other words, the rights and security for irrigators are paramount, irrespective of the wording within the Water Act 2007, or of the legislated priority of rights for categories of water users.
  - Australian Government and MDBA have adopted a philosophy that the Basin Plan should not lead to any **loss of employment** through strategies to address environmental objectives.
  - In mid 2017, after the Commonwealth Government spokespeople stated there should be **no further buy-back** of licences, supported by the NSW Government spokesperson and by Irrigator leadership, and after the MDBA had recommended a 70 GL reduction from 390GL to 320 GL in the SDL amendment to avoid impacts on local employment, a $78 M buy-back of both intensive and extensive irrigation licences occurred from Menindee.
    - This buy-back is the only case I am aware of across the Northern Basin in which an intensive industry (citrus, grapes, etc) was bought out by the Commonwealth.
    - No socio-economic study was undertaken prior to this buy-out.
    - This buy-out had mayor socio-economic impacts on the small local community.

- In the above example, it was reported that the seller received $40 M as **compensation** to offset decommissioning of the irrigation infrastructure, and forfeiting any rights to re-establish irrigation.
  - To my knowledge, no irrigator across the Northern Basin has previously received any compensation to close down their enterprise.

- **Failure of MDBA to assess and address greatest Risks**
  - In my opinion, the MDBA has failed in due diligence and risk management to identify and address their greatest risks.
    - The simple message from the numerous attachments to this submission is that the MDBA failed to undertake appropriate risk assessment and due diligence.
    - MDBA accepted actions by State Governments without evaluation, interrogation or questioning.

- **Lack of commitment to Basin Plan by State Governments**
  - From the time of the Cap decision by the Commonwealth Government in mid 1990's, Queensland chose to allow ongoing development in extractions for about a decade.
  - NSW released their Barwon Darling Water Sharing Plan in October 2012, allowing greater access to low flows that compromised the Basin Plan, released one month later.
    - There appears irrefutable evidence that the final NSW Barwon Darling Water Sharing Plan was never shared with the MDBA for their consideration or endorsement.

- **Failure of MDBA to understand the limitations of their "scientific approaches"**
  - The Basin Plan and the Northern Basin Review process consistently focused on long term averaging.
    - This approach is fundamentally flawed for a highly variable flowing ephemeral river system such as the Barwon Darling.
    - Over an extremely long term (eg a century), without any ongoing changes to circumstances, "extraction rates may average out". In the interim, communities, individuals, and numerous animal and plant species my have become extinct.
  - The MDBA consistently used modelling of flows to develop their recommendations for the Review.
    - The most critical flow considerations necessary are for low flows, and the MDBA consistently received advice from modellers that models are unreliable for determining low flow predictions.
    - Despite these warning, decisions were based on the modelled information.
    - A far more appropriate approach should have been to consider individual flow event behaviour.
    - Model outputs bore no relation to individual flow behaviour for low flows.

ATTACHMENTS I SUBMITTED TO VARIOUS MEETINGS OF NORTHERN BASIN ADVISORY COMMITTEE

- **130209 Response to request from MDBA for actions for "Improving (Reviewing) the scientific basis of environmental water requirements in the Condamine- Balonne and Barwon Darling"**
  - Key recommendations I offered in this response were:
    - The necessity for absolute clarity of the issues (problems), and evaluation to ensure the proposed actions would address the problems.
    - Northern Basin must be flow event managed. Use of long term averaging, and models associated with this concept, can provide false or meaningless outputs for one of the most highly variably flowing river systems in the second driest continent in the world (after Antarctica).
    - The MDBA must understand the State Water Sharing Plans and other State policy changes and how these impact on the goals for the Basin Plan.
  - None of these recommendations were acted on by the MDBA at least for the first four yours of the Review period, and then after the Four Corners program in mid 2017.

- **130405 Understanding the Unregulated Darling River Catchment**
  - This paper provides background to why use of modelling extractions for annual compliance is inappropriate, and includes three recommendations to MDBA, none of which were acted upon.

- **140413 Draft discussion Paper prepared by Geoff Wise Amendment to MDBA Northern Basin Work Plan**
  - This paper lists 13 recommended priority actions to be considered by MDBA other than Environmental Science, Water Recovery and Social and Economic Assessments.
  - None of these 13 actions were given any genuine consideration by the MDBA prior to the Four Corners Program in 2017.

- **150115 PROPOSED AGENDA ITEM FOR BREWARRINA MEETING 18-19 FEBRUARY 2015**
  This paper proposes five recommended priority issues for the Northern Basin Review (additional to those listed in paper "140413" [immediately above [] that impact on the implementation of the Basin Plan and the confidence of communities or the SDL review.

- **150227 BARWON DARLING SYSTEM and INTERSECTING STREAMS UPDATE**
  - This paper highlights the risks to the Basin Plan by allowing State Government operating rules to continue unabated, without pro-active intervention such as introduction of strategies recommended through NBAC
  - No action was taken by MDBA on the two recommended actions.

- Ultimately a poorly constructed offer for buy-back of licences from the Barwon Darling occurred, predictably with virtually no effective result.

- **160216 NORTHERN BASIN ADVISORY COMMITTEE MEMBERS REPORT ON MEMBER ISSUES**
  - This report highlighted critical concerns I held following being the NBAC representative as a participant in an Environmental Science Working Group (ESWG) meeting on 15/02/2016 and an Environmental Science Technical Advisory Group (ESTAG) meeting on 16/02/2016.
  - This report contains three major critically important recommendations to MDBA.
  - It was only at about this stage of the Northern Basin Review that some members of the MDBA seemed to understand that issues that had been raised repeatedly since early 2013 may be of some relevance or significance.

- **160314 Northern Basin Context**
  - This paper provides the reader with my broad perspective of the Northern Basin, considered over an extended period of time and change, including public quotes I made as far back as 1998.
  - I do not recall whether I submitted this paper to the MDBA, and it was never expected to create responses or actions.

- **160611 INFORMATION AND IMPLICATIONS RELATING TO BARWON DARLING**
  - I prepared this paper in frustration that the MDBA had not undertaken a detailed analysis of the implications of the Barwon Darling Water Sharing Plan during the period prior to mid 2016.
  - The paper highlights changes created by the 2012 Barwon Darling Water Sharing Plan, and their impacts on the Basin Plan.
  - There were no effective rapid responses to the five recommendations I made.

- **160721 DARLING RIVER at RISK or a DEAD DARLING**
  - This paper contains further data and analysis that highlights significant risks for the Darling River.
  - My conclusion was that whilst the Basin Plan is aimed at creating a balance across the entire Basin, the NSW BD WSP has effectively created significant local impacts within the Barwon Darling, both in volumes of extraction opportunities and potentially in seasonality of extractions.
    - Whilst we are aware of the natural variability of flows, **the additional impacts of Northern Basin Wide extractions have potentially reduced the Darling River to being at environmental risk in approximately 30% of years.**

- The additional impacts created by the NSW BD WSP are anticipated to have a massive compounding impact on low flows when environmental flows are most vulnerable.
- **Personally, I remain of the opinion that unless the NSW BD WSP is radically reviewed, our future societies may be looking at a "Dead Darling", from Bourke to the Murray, with the occasional drowning by irregular large flood events. The influences of the Basin Plan within this section of the Darling River will be inconsequential, other than in increasing the securing of flows to irrigators through their access to environmental water acquired by the Commonwealth within tributaries to the Barwon Darling system.**

- **160729 PERSONAL SUBMISSION through NBAC to MDBA**
  - This paper was submitted in response to a request, relating to the individual responses from NBAC member's views on whether the 390GL planned reduction for the Northern basin should be amended.

- **160821 REPORT from MDBA MEETINGS at BOURKE, BREWARRINA, WALGETT 10th to 12th August 2016**
  - This report captures messages exchanged between MDBA personnel and community members towards the end of the Northern Basin Review period.
  - 12 recommendations are made with no evidence that they have ever been given any serious consideration.

- **161018 DARLING RIVER FLOWS AT WILCANNIA and BOURKE**
  - This paper describes the conclusions from analysis of long-term publically available records of river flows at Wilcannia and Bourke.
  - The paper highlights the impact of water extractions since upstream irrigation development.
  - The paper has two appendices that follow.

- **161018 DARLING RIVER FLOW TOTALS AT WILCANNIA**
  - This paper is Appendix A to 161018 DARLING RIVER FLOWS AT WILCANNIA and BOURKE
  - This spread-sheet highlights the analysis of flow comparisons at Wilcannia before and after the 1994 Cap decision

- **161018 Appendix B to 161018 DARLING RIVER FLOWS AT WILCANNIA and BOURKE**
  - This paper describes significant aspects of NSW water licence policy changes in the Barwon Darling River system over the last two decades.

- **161112 ACHIEVING SUSTAINABILITY of the DARLING RIVER DOWNSTREAM of BOURKE**
  - This paper was the last formal opportunity for me as a member of NBAC to provide a report and recommendations to MDBA relating to the finalisation of the Northern Basin Review.
  - It reinforces the consistent message I had been conveying to the MDBA since formation of NBAC in late 2012, that the MDBA has overlooked critical factors throughout the Review process.
  - The paper made seven recommendations relevant to the finalisation of the Northern Basin Review.

- **161129 CHANGES IN RELIABILITY OF LOWS IN DARLING RIVER AT WILCANNIA**
  - This paper is one version of several brief papers demonstrating an analysis of flows at Wilcannia.
  - I am aware that the Royal Commission has been provided with one of these versions through another submission.
  - The language I have used is statistically inappropriate, yet the message conveyed does not change.

    Statistically, for the first example quoted:
    - I should not have concluded: "a *1,000% decrease in reliability of Decembers with zero flows"*
    - I should have concluded: *"A 1,000% (or ten fold) increase in Decembers with zero flows"*.

- **170219 SUBMISSION in RESPONSE to the NORTHERN BASIN REVIEW of the MURRAY DARLING BASIN PLAN**
  - This paper was my submission to the Northern Basin Review public response opportunity.

- **170928 SUBMISSION TO SENATE INQUIRY INTO INTEGRITY OF THE WATER MARKET IN THE MURRAY-DARLING BASIN**
  - This paper was my submission to the Senate Inquiry.
  - Many of the points in this Senate submission are repetitive of points made elsewhere in my submission to the Royal Commission.

- **171128 COMPARISONS BETWEEN IRRIGATION EXTRACTION RATES and END OF RIVER SYSTEM FLOW RATES in the UNREGULATED BARWON DARLING RIVER SYSTEM**
  - This paper highlights the false conclusions drawn by using long term averaging.

End

Geoff Wise BVSc MACVP JP

130209 Comments by G Wise re Draft Project Proposal

Improving (Reviewing) the scientific basis of environmental water requirements in the Condamine- Balonne and Barwon Darling

The following are some of my spontaneous thoughts as I read the draft Project Proposal:

- P1 para 2 "research...including the basis for the long term average SDL's..."
  - I agree with this provided it includes questioning the logic of using "long term average SDL's" on a system which has huge unpredictable flow variability. There is some evidence that managing extractions for different flow rates may be a more prudent approach to achieve environmental outcomes than concentrating on SDL's.
- P1 para 3, first bullet point
  - Refers to "knowledge gaps in relation to environmental water requirement". There is a strong argument that the first requirement should be to ensure there is an agreed clarity and understanding of the agreed "key environmental sites" for which water management intervention may be required to deliver environmental water.
- P1 para 3, second bullet point
  - This refers to challenges for modelling water recovery scenarios. I strongly believe the Northern Basin requires investment in "modelling event based environmental flow scenarios". For a system with such massive flow variability, modelling should be focused on what cannot be measured, rather than on what is being measured, no matter how inaccurately.
    I am eager to give a presentation to the NBAC to highlight this point.
- P1 last para
  - Clarity needs to be stated regarding the timeframe for "work done to date". For example, the environmental consequences of access rule changes along the Barwon Darling in the first decade this century need to be assessed as part of the study.
- P1 last para, P2 second para
  - Reference is made to "sites" in describing the Lower Balonne Floodplain, Narran Lakes and Barwon Darling River system. The word "sites" has been used by MDBA to describe "environmental sites". Hence clarification is required whether the whole of the "Barwon Darling River system" is one of the key environmental sites identified to be addressed by the Basin Plan.
- P2, Scope, second para
  - The scope should include the use of modelling environmental flows as a tool to establish if a target is being reached.
- P2 second last para
  - The paper implies that "risk assessments" will only be undertaken in regard to the "risk of SDL delivering an environmental outcome". If there is proposed to be any changes to current extraction rules, "risk assessments" should also be included to evaluate the social and economic consequences.

- P3, last para, P4 first para
    - If the Science panel only involves ecology and hydrology science skills, social, economic and community "stakeholders" considerations may be overlooked.

NOTES:

I regret that I have not read any of the three references referred to, and as such, some of my comments in this paper may be misguided, for which I apologise. Easy access to these three references for all NBAC members may be beneficial.

My simplistic project description where flow variability is the greatest feature of the system is thus:

- Clearly identify the "problem" required to be addressed
    - Clarify that this "problem" is an agreed problem amongst key stakeholders
- Be open minded in selecting potential options to address the agreed problem
    - (For example, do not assume that changing SDL's will address the problem)
- Evaluate short listed options for their ability and probability of addressing the agreed problem, including a risk assessment of both achieving a desired outcome and untoward consequences.

The two key questions which should constantly be in the minds of all involved are:

- Will any ultimate recommendation make a meaningful difference?
- Does it make common sense?

Four policy influences which require scientific evaluation for effective outcomes:

- *2000* *Raising Commence to pump thresholds*
- *2007* *Introduction of parts of Heads of Agreement*
- *2008 onwards* *Water buybacks –eg Toorale, Colli Farms*
- *2012* *Introduction of Water sharing Plan*

In view of this project proposal, I remain eager to give a power-point presentation to the NBAC asap, as I believe it may throw some light on my comments above. If possible, I would like to incorporate this presentation into our February meeting.

I apologise that these comments have been shared so late before the teleconference, but last week I was away from where I had confidentially recorded my password to Govdex.

Geoff Wise

9th February 2013

UNDERSTANDING THE UNREGULATED DARLING RIVER CATCHMENT

WHY USE OF MODELLING EXTRACTIONS FOR ANNUAL COMPLIANCE IS INAPPROPRIATE

The Science of Data

Observed verses Modelled Diversions

- The differences between observed diversions and retrospectively modelled diversions varies widely.
  - *As examples, in 4 consecutive years the differences compared to observed extractions were:*
    +59%, + 85%, -33% and -27%.
  - *The average difference is approximately 24%.*

- Over 14 consecutive years, the cumulative difference between Observed less Modelled, is a deficit of 54GL, whereas licence holders believed they have a carry-over credit of 768 GL.

Error bands in input data

Modelling differences to measured extractions

- Up to 24% variations

Gauge conversion errors

- Up to 30% for low flows
- Up to 100% for high flows

Meter errors

- Up to 30%

Conclusion

Poor Data analysed gives
Bad Information leads to
Bad Conclusions results in
Bad Policy

- **ABOUT MODELLING**
  - An annual retrospective estimate of water which may have been extracted under 1993/94 levels of development
    - 1993/94 baseline data depended on data with wide variations
    - Annual estimates depends on data with wide variations
    -
- **WHAT HAS CHANGED in 19 YEARS SINCE 1993/94?**
  - New developments in Queensland
  - Raising commence to pump thresh-holds
  - 2006 Heads of Agreement from 523 GL to 173 GL
  - New metres
  - Annual entitlements reduced to 143 GL
  - Model corrected from 173 GL to 198 GL
  - Model still to consider corrections for new metres
  - 2012 Water Sharing Plan
  - 2012 Basin Plan

- THE CHANGES PROVIDE THE NEW BASE LINE, SO ATTEMPTS AT RETROSPECTIVE COMPARISONS TO 1993/94 ARE NOT WARRANTED.

A POSITIVE EXAMPLE IN USE OF MODELLING

- 2012 Findings by NOW and MDBA in understanding Water Shepherding
  - *35% water in Barwon River feeds environment before Menindee*
  - *35% water reaching Menindee feeds environment before reaching Murray River*
- Hence 58% water in Barwon feeds environment of NSW Barwon Darling River system
  - *This 58% has historically been called "transmission loss" & never attributed as environmental benefit*
- Of the remaining 42% in the Barwon River
  - *Some to extractions in NSW, Vic & SA*
  - *Remainder to Murray River environment and Murray Mouth*

A NEGATIVE EXAMPLE RELATING TO USE OF MODELLING

- In March 2013, NSW Office of Water advised that markers at Menindee were resurveyed and levels corrected, resulting in an apparent increase in water level and volume of approximately 5%.
  - *This data correction equated to approximately 50 GL of additional "environmental" water at that point in time.*
  - *This correction cannot be effectively retrospectively adjusted for modelling.*
  - Since 1997/98, continuous retrospective modelling of extractions has been regularly occurring, backdated to an interim notional baseline set for 1993/94 (19 years ago).

- *14 years of modelled data based on available data sources has concluded that 54 GL cumulative excess extractions have occurred.*
- *Questions must be asked whether the reliability of data and the work involved justifies the conclusions.*

RECOMMENDATIONS

NBAC RECOMMENDATION 1

NBAC recommends to MDBA that action be initiated to discuss with the Independent Audit Group the limitations in the use of modelling for annual compliance audits for the Darling River System, using the Unregulated Barwon Darling System as an example.

NBAC RECOMMENDATION 2

NBAC recommends to MDBA to seriously consider the ability of key stakeholders (Government Agencies) in being able to maintain current reliable data sets to allow good science to be undertaken, and to take appropriate strategic actions if poor data sets are inevitable.

NBAC RECOMMENDATION 3

NBAC recommends that MDBA critically analyse policies, procedures, practices and language used and make appropriate changes which may progressively empower and engage stakeholders in achieving the objectives of the Basin Plan.

Draft discussion Paper prepared by Geoff Wise

Amendment to MDBA Northern Basin Work Plan

The current plan has a box with three categories thus:

- Environmental Science
- Water Recovery
- Social and Economic Assessments

This "box" is used in several documents, such as the April 2014 draft for discussion "Reviewing the scientific basis of environmental water requirements in the Condamine Balonne and Barwon Darling: a synthesis", on page 1.

I recommend that a fourth category should be added, titled "Policy Review" or something similar.

Components of this "Policy Review" table could include, but not necessarily be limited to:

- Conversion factors
- Uncompleted commitments in the NSW Heads of Agreement for the Cap determination for the Barwon Darling River System.
- Linkages between separate Water Sharing Plans
- Accuracy of the IQQM in Northern Basin, for each of Regulated and Un-Regulated rivers
- Use of modelling outputs verses use of absolute data
- Reliability of gauging station data
    - consideration of standard deviations
    - Coping with errors which creep in to gauges
- Evaluation of policy tools which provide the greatest "gains"
    - Eg change in commence to pump rules verses change in access volumes
- Monitor and evaluate outcomes of past and future policies and policy changes
    - Eg implementation of CAP
- Social, economic and environmental changes and opportunities associated with ongoing changing policies
    - Eg Removal of "not withstanding" clause from all licences on Barwon Darling over recent years
- Monitor and evaluate water held by Commonwealth Water Holder as this water flows downstream
- Evaluation of differences between NSW and Queensland regarding different Coal seam gas policies
    - In Queensland, CSG Water and Irrigator water are understood to be treated the same, whereas in NSW they are understood to be treated differently
- Risk assessment of identified "needs" not being completed by third parties
    - Eg concern that State Governments may not have the staff/skills/resources/priorities to undertake identified needs for the Basin Plan
- Implications from the introduction of water shepherding

- How are environmental gains going to be monitored and evaluated
- What other policy changes will need to be made to provide for shepherding.

Geoff Wise

13th April 2014.

PROPOSED AGENDA ITEM FOR BREWARRINA MEETING 18-19 FEBRUARY 2015

Submitted by Geoff Wise 16th January 2015

BROAD AGENDA ITEM:

PRIORITY ISSUES IN THE NORTHERN BASIN WORK PROGRAM

SPECIFIC AGENDA ITEM:

Update of progress with, and additions to the "LOG of EXTERNAL CONSIDERATION ISSUES and ASSOCIATED ACTION that IMPACT on the IMPLEMENTATION of the BASIN PLAN and the CONFIDENCE of COMMUNITIES or the SDL REVIEW"

BACKGROUND

- NBAC agreed that this log would be developed and maintained, and associated actions would be identified, as recorded in minutes thus:
  Minutes Meeting 9 30th April – 1st May 2014 Goondiwindi
  Agenda Item 7: NBAC's Priority issues for providing advice
  External considerations
  43. Mr Wise provided an overview of his draft discussion paper in relation to "external considerations". Members discussed how best to keep track of the issues raised in the paper and ***agreed*** *to develop and maintain a log of issues and identify associated action that impact on the implementation of the Basin Plan and the confidence of communities in the Northern Basin Program or the SDL Review.*
  44. ***The Northern Basin Advisory Committee:***
  (a) ***endorsed*** *the process for inclusion of priority issues in the Northern Basin Work Program, and*
  (b) ***endorsed*** *the updated work program noting the underlying desire to include more detailed agreed priority actions from the working groups.*

- A copy of the paper referred to in the minutes of meeting 9, prepared by Geoff Wise, dated 13th April 2014, is attached.

CURRENT SITUATION

- The log of external issues and identified associated action should be tabled at every NBAC meeting, but this does not appear to be done.
- From discussions during the meeting held in Canberra on 24-25th November 2014, it would be appropriate that the issue captured by the examples of environmental flows from the Gwydir and Macquarie systems becoming eligible for extractive use on reaching the Barwon River should be added to this log, together with a recommended associated action.
- From discussions relating to management of the autumn 2014 flow in the Condamine Balonne, such as the complementarity or otherwise of Water Sharing Plans and Water Harvesting policies, it is considered that an appropriate additional issue should be logged, with a recommended action.

- Responsibility for management and accountability of "natural flows" requires discussion and consideration by NBAC, with an expectation that an additional issue may be logged.

RECOMMENDATIONS

- The log of "external consideration" issues and associated action that impact on the implementation of the Basin Plan and the confidence of communities or the SDL review, as agreed at Meeting 9 of NBAC, be tabled at every NBAC meeting.
- NBAC determine which, if any, of the issues listed in the paper by Geoff Wise dated 13th April 2014, and tabled at Meeting 9, be included in the log.
- The following additional issues be added to the log:
    - All water identified as "Environmental water" should maintain its environmental water status irrespective of how many different catchments it may flow through.
        - Action: Water Sharing Plans be amended at the first possible opportunity to ensure that environmental water entering each Plan's catchment maintains its environmental water status.
    - Shepherding of Environmental Water is an essential expectation if the intent of the Basin Plan is to be realised, yet lack of complementarity between current Water Sharing Plans does not seem to allow for such shepherding.
        - Action: Water Sharing Plans be amended at the first possible opportunity to ensure that shepherding of environmental water through all catchments is ensured.
    - Natural flows protected from extraction through current Water Sharing Plans is understood to have the potential to be extracted under Harvesting Rights rules.
        - Action: Harvesting Rights Rules be reviewed at the first possible opportunity to ensure complementarity between Water Sharing Plans and Harvesting Rights Rules for the management of "natural flows embargoed from extraction".
    - It is understood that no agency currently has responsibility for management and accountability of "natural flows embargoed from extraction and harvesting", which can result in this water becoming eligible for extraction in circumstances when an official environmental or cultural flow occurs simultaneously.
        - Action: The Commonwealth Environmental Water Holder or an alternate body assume responsibility and accountability for all "natural flows embargoed from extraction and harvesting".
        - Action: All necessary policies and rules be reviewed, and amended if necessary, to ensure that official environmental and cultural flows can not create circumstances where "natural flows embargoed from extraction and harvesting" can be activated for extraction.

IN CONFIDENCE, WITHOUT PREJUDICE

BARWON DARLING SYSTEM and INTERSECTING STREAMS UPDATE

BACKGROUND

- For at least 12 months NBAC discussions attempted to highlight the benefits of seeking to retire inactive licences from both the Barwon Darling System and the Intersecting Streams in NSW.
- The inactive licences on the Barwon Darling are the majority of the total A Class licences, being those with access to the lowest commence to pump height limits, plus a proportion of the B Class licences. These totalled approximately 16 GL of annual entitlement.
- Since the new rules were introduced on the Barwon Darling in July 2007, each licence holder has been able to accumulate successive carry-over unused water entitlements. A conservative estimate of 100GL accumulated carry-over water may be in these "inactive accounts".
- An estimate of 9 GL of licences are held on the Intersecting Streams, with virtually all being inactive licences. These were embargoed from use from about 1994 until Water Sharing Plans were approved about 2 years ago. They can now be activated.
- **NBAC's primary reason to urge that action be taken to retire these licences through buyback tender process has been to reduce the risks of these licences being activated; ie to future-proof the desired outcomes of all purchases of active water throughout the Northern Basin.**
- On 28th October 2014 two members of NBAC met Parliamentary Secretary Hon S Birmingham and discussed this matter, and obtained his support for representatives of all appropriate agencies to meet to identify the merits of this proposal, and how it could be progressed. Assurances were given by Senator Birmingham and others that the two NBAC representatives would be invited to be engaged in this ongoing process.
- The Cap management and to a lesser extent the subsequent Water Sharing Plan on the Barwon Darling have evolved by use of long term averaging, but it is fallacious to assume that these provide the adequate levers which are necessary for a river system which requires an event based management strategy.
- On the Intersecting Streams, many licences can now be activated at "visible flow" levels.
- Over the last 18 months, the benefits of water buy-back on various tributaries to the Barwon Darling have been clearly evident, such as environmental water acquired from the Macquarie, Gwydir and Condamine Balonne systems each contributing to maintaining low flows at the Bourke weir during different flow events. Maintaining low flows in the Barwon Darling system is one of the primary goals of the Basin Plan.
- Historically, maximum pump sizes (pump diameter) have been specified for each class of licence on the Barwon Darling, with A Class being the smallest maximum allowable diameter, and C Class the largest maximum allowable diameter. In recent years, these restrictions have effectively

been removed. Each Access Licence may specify the agreed maximum pump diameter, but approval can be obtained for this to be varied.

- Historically, there is strong evidence that the majority of licence holders, business owners and community representatives are fundamentally committed to work with the MDBA and others to move towards the intend of the Basin Plan. There are very few people blatantly ignoring this intent.
- The makeup of ownership of water licences on the Barwon Darling has changed dramatically over recent years.
    - One current operator acquired their first financial interest in licences on the Barwon Darling approximately 7 years ago, and now holds approximately 50% of all licence entitlement on the river system.
    - A second new operator acquires their first interest in the last year, being a sizable share that could be in the order of 20% of all licence entitlement.

CURRENT SITUATION

- At the NBAC meeting last week members were told that an active irrigator has recently been granted permission to use a B Class pump to extract A Class water. Whilst this may be "within the rules", it was strongly opposed by public sentiment.
- A large number of holders of inactive licence holders from both the Barwon Darling and the Intersecting Streams indicated at Brewarrina by a show of hands that they are prepared to sell, or retire, their licences. Many of these indicated during or following the meeting that they would prefer to sell to the Commonwealth, thereby ensuring their licences are retired, rather than sell to an active irrigator. These people are committed to contributing to the goals of the Basin Plan, rather than opposed to these goals by favouring progressive increases in extractions.
- Comment was made at the meeting that if inactive licences are accumulated in NSW, transferred to a property in Queensland from which all licences have previously been sold to the Commonwealth, and activated, them irrigators from the Lower Balonne will not stay in the process of working towards achieving the Basin Plan.
- A paper was tabled at the Brewarrina Meeting flagging the need to address "ownership" and "responsibility for management" of "natural flows" in our river system. If this is not addressed the low level "natural flows" can be expected to be extracted when "shandied" with environmental flow water.
- The meeting was advised that one person with inactive A Class water had recently sold their water for $1,500 per ML. In this case, there was no indication whether any trade occurred with any carry-over water that may have been held.
- It is understood that an offer to purchase inactive water has been made today (26th February 2015) at the following prices:
    - $1,500 per Ml for A Class
    - $700 per Ml for B Class
    - $20 per Ml for all of the A and B Class carry-over

- It understand that the vendor for this offer holds approximately:
    - 40 ML of A Class entitlement
    - 5.9 times entitlement of A Class carry-over
    - 340 B Class entitlement
    - 8.6 times B Class carry-over
    - Hence, whilst this person holds a total of about 380 ML of A and B Class entitlement, the total credit in their water account is in the order of 3450 Ml.

RAMIFICATIONS

- The ratio of carry-over to annual entitlement for this vendor is consistent with the estimate that if there are approx. 16 GL of inactive licence entitlements, then an estimate of 100 GL of carry-over being held by all the these inactive licence holders on the Barwon Darling is not unrealistic.
- If an active irrigator comes to understand that there may be 100 GL of carry-over A and B Class water available at a price of $20 per Ml, a $2m investment to acquire this 100 GL to allow the irrigator access to a large volume of low river flow water may be a very attractive investment, but would undermine any gains of Government buy-back unless stringent water shepherding is introduced and active "Government ownership" of "natural flows" is initiated (It appears that an active irrigator may have already seen this opportunity).
- The recent decision allowing A Class water to be able to be extracted using a B Class Pump, under river flow conditions (which may have been even below A Class commence to pump thresholds) has potentially created a precedent of significantly increasing the value of A Class water, both annual entitlement and carry-over. It can also be expected to rapidly become accepted standard practice.
- There is a history of very aggressive accumulation of licence entitlements on the Barwon Darling by no more than two operators.
- The Commonwealth Environmental Water Holder has not been a significant player in the water market on this river system, and is rapidly being left behind, and squeezed out of the market.
- Without intervention, the benefits aimed to be achieved through the Basin Plan, including protection of environmental water purchased in upstream tributaries, and addressing the critical key environmental assets associated with low flows in the Barwon Darling, will never be achievable.
- The majority water licence holder on the Barwon Darling is reported to have recently purchased an established irrigation property on the Intersecting Streams in Queensland. This property is understood to have previously sold all their water licences to the Commonwealth Environmental Water Holder. Should irrigation become reactivated on this property through accumulation of licences that are currently inactive, the outcomes of the Basin Plan will be further compromised, and NBAC has been advised that Lower Balonne irrigators are unlikely to stay with the reform process.
- The beneficial evidence of buyback from the tributaries to the Barwon Darling are highly likely to be totally lost if:

    - Low flow licences (current inactive A and B Class) are activated and accumulated by a small number of large active irrigators.
    - Inactive licences on the Intersecting Streams are allowed be accumulated and activated by a small number of irrigators.
    - Low flow licences are routinely allowed be extracted by large capacity pumps.
- Several contradictions, or paradoxes appear evident through recent events, including:
    - In an attempt to gain critical flow needs for the Broken Hill water supply, an embargo was recently announced on many licences on some, but not all, tributaries to the Barwon Darling, and on B and C Class licences in the Barwon Darling, yet whilst this embargo was in place approval was understood to have been granted for A Class water to be extracted from below A Class pumping threshold using a B Class pump for one cotton crop at Brewarrina.
    - The Commonwealth Government and Officials have been committed to progress the Basin Plan aimed at "re-balancing" water usage between environment, production and urban usage, whereas the State Government does not appear to be showing any commitment to such goals.
        - The Commonwealth has spent millions of dollars to achieve this "re-balancing", whereas the State appears to be promoting and supporting increased extractions and simultaneously committing millions of dollars to secure Broken Hill's water supply through other strategies, despite Broken Hill having a progressively declining population and presumed decreasing water demand.
- **In summary,**
    - **There has been very rapid and aggressive change of dynamics in the Intersecting Streams and Barwon Darling over the last few years, with a focus on increasing access to all possible water flows**
    - **NBAC warned the Commonwealth of risks if inactive licences on the Intersecting Streams and Barwon Darling are not retired by Commonwealth acquisition, and offered a straight forward mechanism for this**
    - **There is now clear and present danger to the Basin Plan processes and goals across the Northern Basin.**

SUGGESTED ACTIONS

- Members of the Commonwealth attempt to verify from official sources many of the statements made in this report.
- Members of the Commonwealth initiate actions as deemed appropriate as a consequence of this report.

27th February 2015

NORTHERN BASIN ADVISORY COMMITTEE
MEMBERS REPORT ON MEMBER ISSUES

Report by NBAC member Geoff Wise as consequence of participating in Environmental Science Working Group (ESWG) meeting on 15/02/16 and Environmental Science Technical Advisory Group (ESTAG) meeting on 16/02/16.

Background

- MDBA staff held an interactive briefing session with all members of the NBAC ESWG on 15th Feb 2016 to discuss the recently completed Science Reports
- Geoff Wise represented NBAC at the ESTAG meeting on 16/02/16 that focused on discussing the MDBA initial thinking towards the environmental outcomes as a consequence of the Science Reports.

Critical Concerns expressed by Geoff Wise

1. There are grave concerns that the use of long term average flows for the highly variable ephemeral river systems in the Northern Basin as the basis for determining a suitable SDL for the Northern Basin will not achieve any effective changes to targeted environmental outcomes.

2. There are grave concerns that any effective changes to targeted environmental outcomes can not be achieved without complementary changes to ancillary administrative considerations including:
    a. Shepherding of environmental water from any Water Sharing Plan Region to downstream Water Sharing Plan Regions
    b. Total integration of overland flow and water harvesting management
    c. Consideration of the implications of amendments to water extraction rules introduced through the Cap Strategy in 2007 and into the Barwon Darling Water Sharing Plan one month before the Basin Plan was delivered, which allow for:
        i. Unlimited progressive accumulation of water in "water accounts", and
        ii. Use of any sized pump to extract water irrespective of licence classification.

3. Release of any alternate scenario models for potential options for variation to the SDL in the Northern Basin must be considered from a communication and potential reactionary perspective.

Critically Important Recommendations by Geoff Wise

1. As a matter of urgency, the MDBA engage the services of an expert Statistician, preferably who has had no previous experience with water management, to provide advice to the MDBA of the statistical accuracy or otherwise of the way MDBA analyses the long term data held by MDBA to formulate water management policies across the highly variable ephemeral river systems in the Northern Basin.
    a. This must consider variabilities of individual flows, not annual flows.
    b. This must consider intervals between flows.
    c. This must consider whether it is statistically sound to consider that any gross variation to extactions may have direct responses to outcomes.

2a. MDBA urgently review the need to introduce shepherding of environmental water as it passes between Water Sharing Plan regions, and in the absence of this, review all modelling of anticipated outcomes for environmental targets, in the knowledge that environmental flows are currently not protected from extractions once they pass into a new Water Sharing Plan Region.

2b. No alternate scenario options should be taken to the wider public without having considered the implications of overland flow and water harvesting management, or alternatively, any scenario options being made publically available should identify qualifying statements that further options may be needed to incorporate the implications of overland flow and water harvesting management.

2c. MDBA must develop a clear appreciation of the consequences of the changes introduced associated with the Barwon Darling Cap Strategy and Water Sharing Plan that may impact on many of the modelling assumptions currently being used by the MDBA.

3 As a matter of urgency, MDBA develop an additional scenario for establishment of a revised SDL for the Northern Basin, which offsets any considered reduction of SDL attributed to the Condamine Balonne (ie from 100GL local reduction to 60GL local reduction) with simultaneous deletion of the "Northern Basin Shared Reduction" of 143 GL, and the Shared Reduction replacement being distributing according to the originally proposed default for distribution of the 143 GL Shared Reduction.

   a. Such action may alleviate a degree of anticipated inter-valley reaction to any considered changes.

Refer to Attachments of Analysis of data of Barwon Darling Flows and of personal opinion and communication by Geoff Wise

Geoff Wise

18st February 2016.

ANALYSIS OF DATA OF BARWON DARLING FLOWS

KEY POINTS OVER THE 72 YEAR PERIOD 1944 T0 2015

47% of total flow was recorded during 5% of total months
1% of total flow was recorded during 12% of consecutive months

For the 12% of consecutive months (8.33 years) of low flows, the 5% of high flow months artificially increased the "long term annual average" for these each of these 8.33 years by over 400%

Over the 50 years from 1944 to 1993 the river recorded zero flow for 0.5% of months (3 months)

Over the 22 years from 1994 to 2015, the river recorded zero flow for 7% of months (18 months), with the longest consecutive period being 6 months of zero flow.

The figures used in these comments have captured 10 of the larger flow events over the 72 years period.

The intervals between these 10 larger flow events include:

Intervals over 12 years	2
Intervals 7 to 12 years	2
Intervals 5 to 7 years	2
Intervals under 5 years	3

PERSONAL OPINION BY GEOFF WISE

Scenario Testing of Sensitivity of Options for possible change to the SBL limit for the Northern Basin

- On 16th February three options were presented to the ESTAG, being 415 GL, 350 GL, and the current position of 390 GL
- Advice was provided that there is very little difference in sensitivity between these three options.
- Opinions by Geoff Wise
    - I am not surprised by the relative small differences in sensitivity, based on my concern that use of long term averaging as a foundation for modelling is statistically flawed for such a highly variable set of data.
    - I suspect that if similar scenarios were similarly modelled for even wider variations, such as 300 GL or 450 GL, there may be similarly small variation in sensitivity.
    - Consideration of some of the examples of variability in the following communication my highlight my reasons for concern for how data is analysed.

COMMUNICATION BY GEOFF WISE

Geoff Wise publically communicated the following in 2012.

"On 5th March 2012 the flow of the Darling River at Bourke ***peaked at 13.81 metres****, with nearly 240,000 ML per day flowing past Bourke. This peak* ***lapped the bottom of the wharf deck*** *(covered the top step) and* ***lapped the bottom of the horizontal trusses of the Old North Bourke Bridge.***

It was the ***6th largest*** *flow (at Bourke) in white man history, behind 1864, 1890, 1976, 1974 and 1950.*

This equates roughly to:

- *240,000 Olympic swimming pools* ***daily***
- *2.6 Olympic swimming pools* ***per second***
- *Annual Bourke Town water Supply in* ***15 minutes***

- *Annual flow (at Bourke) for* ***whole*** *of 2002 in* ***7 hours***
- *Annual flow (at Bourke) for* ***whole*** *of 2006 in* ***7 hours***

- ***2 days*** *flow equals the cumulative total flow (at Bourke) for the* ***four years*** *of 2002, 03, 06 and 07.*
- ***13 days*** *at this flow rate equals the cumulative total flow (at Bourke) for the* ***eight consecutive years*** *from 2002 to 2009 inclusive.*

- *Total maximum annual allowable water licence* ***extractions by all irrigators and towns*** *for the whole of the Barwon Darling system from Mungundi (on the Queensland border) to Menindee* ***in 21 hours***

- ***2 days*** *flow equals annual evaporation from Menindee Lakes*
- ***4 days*** *flow equals Annual evaporation from Lower Lakes at mouth of the Murray*

- ***2 days*** *at this flow rate would fill Sydney harbour*
- ***9 days*** *at this flow rate would fill the total storage capacity of Warragamba Dam."*

160314 Northern Basin

CONTEXT

The Northern Basin of the Murray Darling Basin, unlike the Southern Basin component, has seen significant growth in dam constructions, water extraction rates, excessive water extractions, water reforms and restrictions, cotton and other cropping development and industry productivity efficiency improvements all within a single human lifetime.
These changes have created winners and losers at individual, industry, urban and local community levels during a period when there has been a consistent trend across regional Australia of negative population growth and decreasing opportunities for unskilled labour.
All these social, productivity and economic dynamics within only several decades have particularly impacted on both aboriginal people and on environmental resources.

The Northern Basin is further differentiated from the Southern Basin by the high and unpredictable variability of naturally ephemeral flowing watercourses across most of the Northern Basin.
The natural environment, and indeed first generation Australians, adapted to this variability over tens of thousands of years.
However, over the last two centuries, second generation Australians have attempted to harness these rivers, wherever possible attempting to convert them into reliable and regular flowing systems to sustain urban communities and productive uses.
Ironically, the Basin Plan is now also attempting to harness these systems to create more sustainability of the environment.
The desired demands for optimising each of social, economic and environmental outcomes are indeed in direct competition.
In 20011 I quoted that *"we now have a little over two hundred years of white man experimentation, so we are more able to identify what works and what does not. This is the process of learning and progression, building on our experiences, intellectual knowledge and progressive changes in values."* We must not shy away from this.

Some of the northern tributaries have been regulated by construction of dams during the same several decade period, resulting in downstream river reaches being managed as regulated water systems.
However, large sections of the Northern Basin remain as unregulated river systems, fundamentally dependent on natural flow conditions.
Policy and management tools available in regulated systems are significantly limited in the unregulated systems.

The unregulated Barwon Darling river system becomes the drainage system linking the northern tributaries, whether regulated or unregulated, to the Southern Basin. Henry Lawson's description of the Darling River being both a muddy gutter and a second Missisippi remains apt, as do other descriptions such as being "the artery of the outback".

The large Northern Basin, being two thirds of the MDB (when including the Lower Darling reach), including multiple individual catchment tributaries (water makers), which ultimately feed into the Barwon Darling River System (water taker), highlights the difficulties in clearly identifying the key environmental assets needing to be sustained, but emphasises the importance of "connectedness" and responsible maintenance of flow variability.

Effective intervention to flow regimes in these systems, whether for extraction for urban or productive uses or for environmental support is dependent on a wide variety of complementary strategies being applied in association with individual flow event management. Reliance solely on establishment of a Sustainable Diversion Limit is an extremely blunt and relatively ineffective tool.

We must accept there are many other factors consistently at play that will continue to negatively and positively influence social and economic futures at individual, industry and community levels.

With this background (context), the introduction of the Basin Plan in 2012 is a timely, if not belated, holistic necessity which recognises the importance of strategic actions to ensure the longer term sustainability of our country's natural environment, and indeed on confidence for production, with minimal direct negative impacts on social and economic sustainability.

WHAT NBAC HAS ACHIEVED

NBAC has advocated that:

- One size does not fit all; we must have multiple tools applied complementarily to influence outcomes.
    - Hence the recommendations of a range of strategies in "the tool box", and the need for adaptive management.
- The "learnt skills" acquired by people living and working in the Basin are invaluable resources that must be harnessed.
    - Hence the establishment of the Lower Balonne Working Group.
- Better understanding of what is at risk, and the current status of what is at risk, is essential before development of strategies for change.
    - Hence socio-economic studies have been undertaken in a small number of communities most likely to be at risk.
    - Hence environmental science studies have been undertaken within the Condamine Balonne and Barwon Darling systems due to the identified local and shared reductions attributed respectively within the Basin Plan to these two systems.
- Applying Southern Basin knowledge, assumptions, evaluation techniques, models and policies to the Northern Basin are not necessarily appropriate.
    - Hence the need for targeted intervention, such as:
        - New infrastructure
        - Selective buy-back
        - Adaptive "management" of State Water policies
        - Water shepherding

        - Use of "different tools from the toolbox".
- Greatest attention should be given to the communities perceived to be most at risk of reforms through implementation of the Basin Plan.
    - Hence the majority of visits and communications by NBAC and by the MDBA have been to only a small proportion of the Northern Basin. Most reports, meeting minutes, etc from the NBAC are invariably referring to these "at risk" urban and industry areas.
    - Through silence, the NBAC has effectively acknowledged that there are large areas of the Northern Basin where there is minimal if any perceived "risk" which may be attributed to the Basin Plan for either individuals or urban communities.
    - Similarly, it should be recognised that there are some individuals and communities who assume that the Basin Plan provides them with degrees of certainty.
        - For example, two irrigators have purchased over two thirds of all water licence volume on the Barwon Darling River system since the announcement of the Basin Plan, with access to full knowledge of the Plan and the opportunities it creates for them.
- There is a large diversity of interests within each community, and indeed across the whole of the Northern Basin, despite the total population being relatively small and sparse.
    - Hence there has become a recognised need to communicate individually to these various categories of interests, rather than assuming the "loudest voices" represent all interests within any community.

MY PHILOSOPHICAL GOAL FOR THE MURRAY DARLING BASIN

In 1998 I gave an address at the Western Division Shires Association Annual Conference. I shared the following opinion, although for this purpose I have replaced the words I used previously "*then the Western Division of NSW*" with "*then the Murray Darling Basin*":

"If we can reconcile our attitudes to our environment, including our natural resources, climate, and sociological state, if we can accept a role of steward and partner, and depart from the role of conqueror or self interest, if we can recognize the view that man and nature are inseparable parts of a unified whole – and that production and ecology are mutual components of nature – then the Murray Darling Basin will continue to be a leading example of responsible environmental balance,(unmatched by the rapidly expanding urban spread, where our city based colleagues live in largely artificial, unsustainable, highly modified environments which were once also environmental havens)".

Geoff Wise

UNDERSTANDING THE UNREGULATED DARLING RIVER CATCHMENT

WHY USE OF MODELLING EXTRACTIONS FOR ANNUAL COMPLIANCE IS INAPPROPRIATE

The Science of Data

Observed verses Modelled Diversions

- The differences between observed diversions and retrospectively modelled diversions varies widely.
  - *As examples, in 4 consecutive years the differences compared to observed extractions were:*
    +59%, + 85%, -33% and -27%.
  - *The average difference is approximately 24%.*

- Over 14 consecutive years, the cumulative difference between Observed less Modelled, is a deficit of 54GL, whereas licence holders believed they have a carry-over credit of 768 GL.

Error bands in input data

Modelling differences to measured extractions

- Up to 24% variations

Gauge conversion errors

- Up to 30% for low flows
- Up to 100% for high flows

Meter errors

- Up to 30%

Conclusion

Poor Data analysed gives
Bad Information leads to
Bad Conclusions results in
Bad Policy

- **ABOUT MODELLING**
  - An annual retrospective estimate of water which may have been extracted under 1993/94 levels of development
    - 1993/94 baseline data depended on data with wide variations
    - Annual estimates depends on data with wide variations
    -
- **WHAT HAS CHANGED in 19 YEARS SINCE 1993/94?**
  - New developments in Queensland
  - Raising commence to pump thresh-holds
  - 2006 Heads of Agreement from 523 GL to 173 GL
  - New metres
  - Annual entitlements reduced to 143 GL
  - Model corrected from 173 GL to 198 GL
  - Model still to consider corrections for new metres
  - 2012 Water Sharing Plan
  - 2012 Basin Plan

- THE CHANGES PROVIDE THE NEW BASE LINE, SO ATTEMPTS AT RETROSPECTIVE COMPARISONS TO 1993/94 ARE NOT WARRANTED.

A POSITIVE EXAMPLE IN USE OF MODELLING

- 2012 Findings by NOW and MDBA in understanding Water Shepherding
  - *35% water in Barwon River feeds environment before Menindee*
  - *35% water reaching Menindee feeds environment before reaching Murray River*
- Hence 58% water in Barwon feeds environment of NSW Barwon Darling River system
  - *This 58% has historically been called "transmission loss" & never attributed as environmental benefit*
- Of the remaining 42% in the Barwon River
  - *Some to extractions in NSW, Vic & SA*
  - *Remainder to Murray River environment and Murray Mouth*

A NEGATIVE EXAMPLE RELATING TO USE OF MODELLING

- In March 2013, NSW Office of Water advised that markers at Menindee were resurveyed and levels corrected, resulting in an apparent increase in water level and volume of approximately 5%.
  - *This data correction equated to approximately 50 GL of additional "environmental" water at that point in time.*
  - *This correction cannot be effectively retrospectively adjusted for modelling.*
  - Since 1997/98, continuous retrospective modelling of extractions has been regularly occurring, backdated to an interim notional baseline set for 1993/94 (19 years ago).

- *14 years of modelled data based on available data sources has concluded that 54 GL cumulative excess extractions have occurred.*
- *Questions must be asked whether the reliability of data and the work involved justifies the conclusions.*

RECOMMENDATIONS

NBAC RECOMMENDATION 1

NBAC recommends to MDBA that action be initiated to discuss with the Independent Audit Group the limitations in the use of modelling for annual compliance audits for the Darling River System, using the Unregulated Barwon Darling System as an example.

NBAC RECOMMENDATION 2

NBAC recommends to MDBA to seriously consider the ability of key stakeholders (Government Agencies) in being able to maintain current reliable data sets to allow good science to be undertaken, and to take appropriate strategic actions if poor data sets are inevitable.

NBAC RECOMMENDATION 3

NBAC recommends that MDBA critically analyse policies, procedures, practices and language used and make appropriate changes which may progressively empower and engage stakeholders in achieving the objectives of the Basin Plan.

160611 **INFORMATION AND IMPLICATIONS RELATING TO BARWON DARLING**

On 9th June Northern Basin Advisory Committee (NBAC) Chair Mal Peters rang me seeking clarification on the volume of C Class licenced water in the Barwon Darling (BD) which has the potential to be converted to B Class before 30th June 2017. My response was that from my understanding, the total of the licences listed in Schedule 7 of the BD Water Sharing Plan (WSP) of about 25 GL can potentially be converted, theoretically at ML for ML.

OTHER INFORMATION I THAT HAS COME TO MY ATTENTION OVER THE LAST 8 DAYS WHICH I SHOULD HAVE ALSO SHARED INCLUDE:

- It is probable that any of the above water that does get converted may effectively be **converted at greater than ML for ML.** ie the licence holder ending with more B Class than should occur.
- The volume of **A Class licences** may have **increased by 45%** between 2006 and 2012
    - Some of this may be explained by concessional conversions that may have occurred during this period. If so, it appears that volumes changed through the **concessional conversion** process may have inappropriately subsequently accumulated a **9% additional bonus.**
- I appears that **one A Class Licence has, does and can continue to annually extract 215% greater volume of water than the combined total annual extractions by all A class** licences during the period up to implementation of Cap.
    - This can be extracted by any number of any sized pumps and accumulated into storage, compared to the pre Cap criteria of limited sized pumps extracted directly to crops over the duration of the year and total length of the BD.
- The Technical Advisory Group to NSW associated with the development of the WSP strongly recommended the application of **Individual Daily Extraction Limits (IDEL) and Total Daily Extraction Limits (TDEL).** Whilst these are included within the WSP, they **have not been put into effect.**
    - *The background paper to the WSP states: ".. expect they will be in place within the first few years of this plan's term".*
- A representative for the **largest licence holder** on the BD has recently been **seeking to acquire A Class Account Water** on behalf of the licence holder at $50 per ML.
    - If there are 40 to 50 GL of A Class water held by non-irrigators, the opportunities for this person to accumulate large volumes are significant.
- A senior member from NSW DPI has recently stated that **NSW has no interest in Water Shepherding.**
- Table 18 of the Background Document to the WSP states:
    - ***"Amendments to access rules*** *(in the WSP):*
        - ***must not substantially alter long term diversions under A, B and C Class access***
        - ***must take into account any socio-economic impacts"***
- In the immediate future there may be an announcement of a "mega" **million dollar project to secure the town water supply for Broken Hill**, yet post Menindee Storage construction and pre expansion of irrigation extractions

upstream it is understood that this water supply was relatively secure despite a larger population and with more active mining operation.

COMMENTS

- For nearing as long as I have been a member of the NBAC I have been highlighting the significance of water policies in relation to achievement of triple bottom line outcomes, and equally importantly on the potential for such policies to impede any ability for the Basin Plan to deliver improved environmental outcomes for the BD.
    - I have expected that the MDBA would have taken adequate initiatives to thoroughly understand both the historic background and the BD policies and the environmental consequences of the current WSP.
    - The only feedback I have been given, on more than one occasion, is "it will all be fixed by Cap"; to which I have continually disagreed.
    - In the absence of any evident initiatives, I have felt compelled to seek out some of this detail and pass it on to the MDBA. For examples:
        - Number and makeup of licence holders, such as only two people plus the Commonwealth potentially holding 80% of all licence volume.
        - Volumes of account water held
        - Application of rules such as concessional conversion, 300% annual extraction opportunities, etc
        - The new information I have shared in this memo.
    - I have consistently advised that I believe that my information may be incorrect, but I would expect that the implications of my information are sufficiently significant that the MDBA would follow it up to establish the correct data, and advise me if what I have provided is either irrelevant or inaccurate.
- Presumably the best available science was used by NSW during the decade of water reform leading up to and including Cap, with any additional new science used by NSW in the lead-up to the WSP.
    - The NSW documentation strongly and consistently states that low flows in the BD must be protected from extractions.
        - Reliability of low flows is paramount.
    - Presumably this same best available science was used by the MDBA in the development of the Basin Plan, resulting in the decision that to achieve the Basin Plan an additional 6 GL of local reduction plus 143 GL of shared reduction for the Barwon Darling is necessary.
        - Presumably this was to increase the reliability of low flows above the heights of those being protected by the water policies applicable at the time the Basin Plan was being developed ie pre WSP. The Basin Plan presumably also considered other flow heights.
- We now have additional new science provided through the recent studies commissioned by the MDBA.
    - From these I have not observed any new information to suggest that there should be any reduction to the reliability of low flows.
- In practice, I contend that the current WSP has taken the protection of low flows back to pre 1998 rules and policies, and that the Basin Plan has no effective ability to compensate for this.
- I have consistently contended that there is no defendable argument for a "shared reduction" whilst ever Commonwealth Water from any tributary to the BD can be accessed by licence holders in the BD.

- This has become even more exaggerated with the more generous access changes introduced through the WSP.

- I have also commented that "Water Shepherding" is the worst possible option to protect environmental water, but the only option if no attempt is made to address the WSP.
- I believe that in relation to delivery of environmental outcomes for the BD, there are numerous contradictions between information in both the Background Document and the WSP, compared to what the WSP is effectively achieving.
  - I consider it should be prudent for the MDBA to question the State on any such issues that the MDBA consider may impinge on the ability of the MDBA to deliver its desired outcomes through the Basin Plan.
- Protection of low flows must be considered in relation to:
  - Town Water Supplies (note my speculation about a new scheme to secure water for Broken Hill),
  - Stock and Domestic supplies,
  - Water quality (I recall that the arguments for both Cap and for the Basin Plan included references to the largest ever Blue Green Algae outbreak, and to salinity)
  - Environmental factors such as those for which recent studies have been undertaken.
- I have given advice that understanding the implications of the WSP was potentially of greater significance in the review of the Northern Basin than any of the Environmental studies commissioned by the MDBA.
- I have chosen to offer my advice and express my opinions only to the MDBA over the duration of my involvement on the NBAC, but my fear is that without radical and urgent consideration of many of the points I have raised, there is every expectation that the Basin Plan will totally fail in delivering any environmental reliability or security for the Barwon Darling Environment.
  - Conversely, a combination of the BD WSP plus the opportunities for increased inflows to the BD created by the Basin Plan (Environmental water) has significantly enhanced two irrigators who have only effectively entered this river system **because of** the WSP and the Basin Plan.
- I will not be proud of my achievement if my predictions come to fruition.
  - Whilst I have been loyal to the MDBA, I am at a point of considering bringing all this information I have established outside of the information provided by virtue of my membership on NBAC to the attention of outside interests, such as Environmental Organisations.
- It is not too late for the MDBA to explore these matters with the thoroughness I believe they deserve.

RECOMMENDATIONS.

As a matter of urgency, the MDBA should:

1. **Through engagement of appropriate support, establish all the implications created by the Barwon Darling Water Sharing Plan which potentially impact both on:**
   a. **exposure to increased extractions of low flows, and**
   b. **the ability of the Basin Plan to achieve the environmental targets sought through a reviewed Northern Basin Plan**
2. **Engage with NSW Agency personnel seeking them to explain or justify any changes created by the WSP which the MDBA considers may have reduced the protection of low flows with consequent increased exposure for environmental flows, town water supplies, stock and domestic access and water quality.**

3. **Share the findings from the first recommendation with appropriate people including environmental organisations, individual environmentalists, environmental scientists and Environmental Departments, in a similar way that the findings of the Environmental Science studies were shared with water extractor groups who were allowed to critique the studies.**
4. **Keep NBAC informed of actions**
5. **Provide a response to me by Friday 17th June indicating what actions, if any, the MDBA proposes to take as a consequence of this memo.**

Footnote 1:
On 6th June, whilst attempting to understand some of these issues, I compiled the following list of potential ramifications, some of which are duplicates of points above: There are several ramifications from this:

- What evaluation of Town Water supplies and environmental impacts have been undertaken, or should be undertaken, by either the State Government or MDBA?
- How can any environmental targets proposed by the MDBA for this river system be influenced by any Basin Plan strategies, including determination of an appropriate SDL?
- What evaluation of managing Commonwealth held Environmental Water impacts have been undertaken, or should be undertaken, by either the State Government, CEWH or MDBA?
- Can or should shepherding have any effective role?
- Is there anything to be gained by attempting to consider Linked Demand Time Series whilst these opportunities remain for large volumes of low flows to be extracted from the Barwon Darling?
- Has or should any review of the BD WSP be undertaken in relation to these implications or to accreditation?
- What are any benefits of carrying out modelling for low flows in this river system unless the full implications of the changes brought about by Policy shifts are fully understood?
- I do not currently have data relating to the cumulative increases that have occurred to date through implementation of the CCA provisions for A and B Class up to the time the BDWSP was printed in October 2012. However, my interpretation of Schedule 7 of this plan is that there may only be 215 ML of A Class water still eligible for conversion prior to end June 2017. However, there still remains 25 GL eligible for conversion from C Class to B Class. Using the Bourke river gauge as an example, this represents an opportunity for a further 25 GL to be extracted daily at a minimum commence to pump flow threshold of 1250 ML/day, rather than 11,000 ML/day. How might environmental implications of this possibility be assessed?

Footnote 2:
I intended to make more enquiries regarding some of what I have included in this memo before distributing, but I advise all recipients that over the last eight days my Mother's health has changed significantly and as a consequence I may not be available for any meetings, telephone conversations or email responses for an indefinite period, effective immediately. Hence my decision to share this immediately.

Geoff Wise

160721 **DARLING RIVER AT RISK or A DEAD DARLING**

During the Northern Basin Advisory Committee (NBAC) meeting on 12th and 13th July 2016 Geoff Wise presented further interpretations of information of concern relating to the Barwon Darling.

- **The 2012 Barwon Darling Water Sharing Plan (BD WSP) has increased the security of access to low flows (both at A Class and B Class levels) for broad acre irrigators, irrespective of Cap constraints.**
  - The percentage of total Barwon Darling Cap volume of annual access entitlement for A Class has changed from 2.4% to 5.3%, and the equivalent changes for B Class are from 73.4% to 83.5%, whereas C Class has decreased from 24.2% to 11.2%.
- **The BD WSP has provided opportunities for huge and unpredictable volumes of A Class water (30 GL without trade, or 74 GL with trade whilst ever available in accounts) to be extracted annually over short periods of time under A Class pumping conditions, compared to a history of use of approximately 20 ml/day (4.6 GL/year) of A Class that were extracted relatively evenly extracted throughout the year.**
  - **Similarly, up to 393 GL of B Class could potentially be available for extractions annually without trade, or up to 617 GL with trade.**
  - Storage capacities would become the limiting factor regarding volumes extracted.
  - Some cotton growers have been enlarging their storages since 2012.
- **To understand the potential impacts of these changes, there is a need to understand and predict Irrigator Behaviour.**
  - Once an irrigator starts to draw down water from storage at the commencement of a new cotton season, every opportunity to "top up" the storage will be taken until the storage is filled at the end of the cotton season. Hence the most likely time that extractions will occur during low flows will be during summer and autumn periods. Once any storage is full after the end of the cotton season, there is unlikely to be the same demands on extraction throughout the winter period, unless a winter crop is planted.
  - **Thus access to large volumes of low flow events will be summer seasonal, which coincidently is the season of greatest risk for Algae outbreaks and greatest necessity for Basic Rights access.**
- **Section 46(16) of the BD WSP describes circumstances allowing the Minister to reduce maximum daily volume limits for B and C Class Licences, but not for A Class.**
  - **Hence this massive shift in licence class from C and B Class to A Class remains immune from this authority of the Minister.**
- **These changes are in defiance of the Scientific Report by Thoms et al 1996 that flows below the 60th percentile (**1820 ML/day flow at Bourke**) should be protected.**

- A Class commence to pump threshold at Bourke is 350 Ml/day, and B Class is 1250 Ml/day.

- **These changes have inevitably decreased the security of Basic Rights (Town Water supplies, Stock and Domestic access), water quality and environmental considerations for the entire length of the Darling River below Bourke (Bourke roughly coincides with the most downstream large irrigation property).**
  - **The entire river community associated with the Unregulated Darling downstream of Bourke ("Lower Darling Unregulated Community"), and the entire river community associated with the Regulated section of the Darling from Menindee downstream ("Lower Darling Regulated Community") will inevitably be negatively impacted.**
  - **These two communities include but are not limited to towns and villages, riparian landowners, stock and domestic licencees, Aboriginal families tied to these countries, fisherpeople and tourists.**
  - **No social or economic evaluations have been undertaken for these communities by either NSW or the MDBA.**
  - **Very limited engagement has taken place with these two communities throughout the Basin Plan process.**
- **Without regular "top ups" to Menindee Lakes, there is an increased probability that the basic rights flows downstream of Menindee will also be significantly compromised.**
- **These changes are contradictory to the Vision and Objectives of the BD WSP, and to the reference in the Background Document to the BD WSP, 8.4, which states "*Amendments to access rules must not substantially alter long term diversions under A, B and C Class access licences.*"**
- **These changes significantly impact on any ability of water purchased by the Commonwealth from tributaries to the Barwon Darling remaining as environmental flows once in the Barwon Darling.**
  - **Hence these changes openly challenge the concept of the Basin Plan specifying a "Shared Reduction" for the Barwon Darling".**
- **I defy any ability to effectively model the consequences of these changes, knowing that licence holders have so many opportunities to "manipulate" any low flow event in any number of different ways.**
- **Theoretically, all these changes are "within Cap" when roughly described, using long term averaging to allow extraction volumes to balance out with Cap determination.**
  - **However, it is highly probable that use of these changes will be compliant with any rigorous Cap audit.**
  - **Further, the changes appear to be in contradiction to the following direct extract from the Background Document to the BD WSP, Clause 5.2.1:**

"5.2.1 Murray-Darling Basin Cap management

Water diversions from rivers in NSW progressively increased throughout the last century, but most rapidly in the 1980s. Growth in water diversions:

- *takes more water away from the river and may threaten its environmental health*
- *reduces water available to other legitimate businesses thus increasing competition and the potential for inequitable access*
- *reduces flows from upstream river systems into downstream systems.*

In 1994, the Murray-Darling Basin Ministerial Council (MDBMC) undertook an assessment of water diversions across the basin. This found that the levels of diversions at that time were placing stress on both the environmental health of our river systems and the reliability of supply to water users; and that diversions were continuing to increase. In response, the MDBMC introduced a diversion limit – the Cap – in 1995.

The definition of Cap for each of the basin states and territories is formalised in Schedule E of the Murray-Darling Basin Agreement. In NSW, the Cap is defined as the average yearly volume of water that would have been diverted under 1993-94 levels of development and management rules."

- **In summary, whilst the Basin Plan is aimed at creating a balance across the entire Basin, the NSW BD WSP has effectively created significant local impacts within the Barwon Darling, by increasing the security and regularity of access for extractions by irrigators, in volumes of extraction opportunities and potentially in seasonality of extractions.**
  - **Whilst we are aware of the natural variability of flows, the additional impacts of Northern Basin Wide extractions have potentially reduced the Darling River to being at environmental risk in approximately 30% of years.**
  - **The additional impacts created by the NSW BD WSP are anticipated to have a massive compounding impact on low flows during the periods when environmental flows are most vulnerable.**
  - **Unless the NSW BD WSP is radically reviewed, our future societies may be looking at a "Dead Darling", from Bourke to the Murray, with the occasional drowning by irregular large flood events. The influences of the Basin Plan within this section of the Darling River will be inconsequential, other than in increasing the securing of flows to irrigators through their access to environmental water acquired by the Commonwealth within tributaries to the Barwon Darling system.**
  - **There is an opportunity within the NSW BD WSP for the NSW Minister to introduce Individual and Total Daily Extraction Limits. Such action should have a significant impact on addressing some of the issues raised above. The Minister has not exercised this authority.**

Geoff Wise
Written on 21st July 2016

160729 PERSONAL SUBMISSION

G WISE

I regret that I am unable to accept an invitation from NBAC Chair Mal Peters to attend a meeting with the MDB Authority on 2nd August 2016. This invitation was extended to me in my capacity as Chair, Environmental Science Working Group.

I seek an opportunity to make this personal submission for consideration by the Authority. It complements previous reports I have provided.

SUBMISSION

A fundamental justification for the Northern Basin Review (NBR) was because there was a scarcity of relevant science across the Northern Basin. Hence the recent scientific studies undertaken by the MDBA. However, from an NBAC perspective, there is no transparency regarding consideration of pre-existing science.

1996 Science regarding critical flow management in Barwon Darling.

No transparency has been provided to NBAC whether the assessments by a panel of independent scientists (Thoms et al 1996) was used by the MDBA in developing the Basin Plan 2012.

If this scientific assessment was considered credible science and used by the MDBA in developing the Basin Plan, does the MDBA currently consider it remains credible science in contributing to the NBR?

If so, how is it being incorporated into current interpretation of science relative to the changing water extraction policies pre and post 2012? It is apparent that modelling is not yet available to reflect the rule changes for the Barwon Darling introduced by NSW in October 2012.

If not considered currently credible, what is the justification if this is a change of opinion?

2011 Science regarding Tributaries of Influence for Darling System.

Effective management of Environmental Water

A primary goal of the Basin Plan is understood to be to enhance environmental outcomes with minimal impacts on economic or social outcomes. However, there is no tangible evidence that Commonwealth environment water will or can be managed to achieve specified environmental outcomes. Without clarification and confidence that environmental water can be managed, particularly as it passes out of any tributary into the Barwon Darling System, the conclusions regarding achievement of outcomes must be questioned. Rules, monitoring and compliance all must come in to play, yet there is no tangible evidence that these strategies will be effectively implemented.

Incorporation of Floodplain Diversions

I am yet to be convinced that adequate understanding and consideration has been given to floodplain diversions, and their contributions to either water extractions and subsequent economic productivity, or to impacts on environmental outcomes. Hence I have no confidence that either existing floodplain extractions, or any suggested variation to floodplain extractions, can become incorporated into recommendations which have to be made in the immediate future. There remain

unexplained linkages between overbank verses in bank flows which may have significant implications.

Interpretation and Incorporation of Science

An over-riding aspect of environmental science is not so much the science itself, but more importantly how the science becomes interpreted and incorporated into the information processes used by the MDBA to develop ultimate recommendations.

In this regard, questions must be raised including:

- Whether modelling is the most appropriate tool?
- Whether modelling can provide reliable outputs from which to make recommendations?
- When modelling is used, are correct data assumptions being used?

From a personal perspective, I remain unconvinced that modelling is a reliable tool for making decisions and recommendations where there is such extremely variable and unpredictable data inputs, compounded by ever changing externalities such as:

- variable growth in extractions throughout the period from about 1970's to early 2000's
- State water policy changes as recently as 2012
- Inadequate monitoring and compliance.

NBAC Terms of Reference Clause (e) "Any other matters relating to the Basin Plan's implementation by the MDBA

Political Advice.

Whilst I am loath to enter into this arena, I would feel I have not fulfilled my responsibilities if I do not share the following advice:

- From the broadest public perspective, a major catalyst for the introduction of the Basin Plan was the widely publicised massive expansion in development of the Cubbie Enterprise in the late 1990's and maybe even early 2000's, being after the Commonwealth Government had signalled a cap in any growth in use effective 1995. I acknowledge that the Queensland Government may have allowed this to be legal, but clear signals had been given at the time by the Commonwealth Government, endorsed by the Murray Darling Basin Ministerial Council.
  To the best of my knowledge, Cubbie remains the single largest extractor of water from any property across the Northern Basin, but I understand it has not made a single contribution the SDL reduction. There should be a political imperativeon behalf of the broadest public perspective for Cubbie to be making a significant contribution to the SDL reduction.

- Without evidence of effective management of environmental water to achieve identified environmental outcomes, making any decision to vary the "default" SDL reduction is a far greater risk than making a recommendation to maintain the default position. If an alternate to the "default position" is recommended, I do not have confidence that the MDBA has credible information to defend the recommendation for change at this stage.

Geoff Wise

29/07/2016

160821 REPORT from MDBA MEETINGS
BOURKE, BREWARRINA, WALGETT
10th to 12th August 2016
Geoff Wise

AVAILABILITY OF UPDATED INFORMATION

Throughout the presentations the MDBA used data and information extracted from data relevant to their understanding of NSW State rules as applicable in 2009. This appeared convenient for constituents who attended with a pro-irrigation interest, yet frustrating for constituents who are objective or are not necessarily pro-irrigation.

Whilst it was acknowledged that further work is being undertaken, there was not any strong message provided that the 2012 Barwon Darling Water Sharing Plan may have significantly changed the data and subsequent assessments.

NBAC has previously been advised that updated modelling would be available by now, allowing NBAC to make considerations based on up to date information.

There is now a situation that all community people who participated in the meetings along the Barwon Darling will be aggrieved because they have not been provided with up to date information. A similar situation applies to many other stakeholders, most notably those from environmental organisations. Similarly, NBAC is not in any position to provide soundly based advice without relevant information.

Recommendations:

- ***As a matter of urgency, modelling and other relevant analysis for the Barwon Darling incorporating the impacts of the 2012 Water Sharing Plan be completed and widely shared.***
- ***This analysis to include predictions of flows and flow management to the lower reaches of the Unregulated Darling River if maximum summer flows at Bourke are restricted by extractions to a flow rate of 350 ML per day.***
- ***This analysis must also include consideration of the report by a panel of independent scientists in 1996 (Thoms et al).***
- ***NBAC consider the revised information prior to any final recommendations being made by NBAC.***

IMPACTS OF STATE BASED DECISIONS

The graph shown at recent meetings demonstrating how flows at Bourke have been impacted by development (Y axis: % change since development cf X axis: Bourke flows per day in ML) provides a simple explanation of the impacts of development on flows at Bourke.

This graph effectively demonstrates why there was a need for the Cap decision in 1995, and for the Basin Plan in 2012. It is also fundamental in underwriting the

foundation to changes that have occurred on triple bottom line (TBL) parameters.

Recommendations:

- ***This graph should be expanded to include two additional scenarios relevant to our understanding of TBL impacts and future decision making for the review of the SDL. The additions required are:***
    - ***Add a modelled flow based on 1995 levels of development in both NSW and Queensland; ie the date the Commonwealth decided and Ministerial Council endorsed the Cap on any further development.***
    - ***Add a modelled flow based on opportunities for extraction through the 2012 Barwon Darling Water Sharing Plan.***
- ***The amended Graph be shared with NBAC, and be used as a key reference in any decision making for the Northern Basin Review.***

CO-ORDINATED FLOWS

Whilst the concept of co-ordination of flows has merit, the practicality of achieving any effective outcomes for Basic Rights or Environmental benefits in the Unregulated Barwon Darling or Lower Balonne is strongly questioned. Reasons include:

- Only practical supply sources are those where there is direct and unimpeded flows from a storage dam to the unregulated system.
- These dams must have adequate environmental water in storage that is able to be released at short notice.
- The river system between the storage dam and the unregulated river must be adequately wet.
- Timeframes must be adequate to allow for:
    - decision time plus
    - implementation time plus
    - delivery to endpoint time.
- Extraction rules in the immediate regulated system and in the downstream unregulated system must ensure any environmental water released is protected from extraction to achieve the desired objective.

Recommendations:

- ***"Co-ordinated flow management" should not be included within options for consideration of the revised Northern Basin SDL.***
- ***Co-ordinated flow management should be included within the toolkit (Complementary Measures) of options available to be used in specific opportunist circumstances outside of any consideration of SDL's.***
    - ***An example of potential use of co-ordinate flow management is within a regulated system, such as allowing an environmental release to piggy-back on an extraction release to deliver an environmental objective at an end of the regulated system wetland.***
- ***It is understood that the Barwon Darling Water Sharing Plan includes a clause providing the State Minister the authority to embargo extractions of B and C Class licences to deliver water to downstream town water utilities, basic landholder rights, blue green algae suppression and specified fish passage management. However, the***

same power is not given to the Minister to embargo A Class extractions. Hence within the Barwon Darling, there is no opportunity to protect environmental flows within a low flow Barwon Darling.

- ***This highlights that with willing support from State Departments, changes to State rules can play a powerful role within toolkits.***

WILCANNIA CONSIDERATIONS

During the meetings questions were asked from the floor whether any consultation has occurred at Wilcannia. A response was given that a meeting has been held at Wilcannia recently.

However, there is no evidence that a number of critically important considerations have been given to this lower reach of the Darling River. These include:

- No socio-economic study has been undertaken at Wilcannia as has occurred in "irrigation dependent" communities.
  - No community is more "irrigation dependent" than Wilcannia, as it is entirely dependent on the impacts of all Northern Basin irrigation extractions.
- Wilcannia has a far greater population that two of the communities being referenced for their dependency in irrigation and the potential impacts of reduction in SDL's within these communities, viz Collarenebri and Dirranbandi.
- Wilcannia is at the mercy of numerous factors, including historic extractions across the entire Northern Basin, SDL decisions, Barwon Darling Water Sharing Plan, and ability for environmental flows to be protected from extractions, as well as natural flow variability, soakage and evaporation.

Recommendations:

- ***Socio-economic consideration be given to Wilcannia in all decision making relating to the Northern Basin Review.***
- ***Advocacy be given for a new weir with incorporation of a fish ladder to be constructed at Wilcannia.***

SOCIO-ECONOMIC and ENVIRONMENTAL CONSIDERATIONS

A message I received during the meetings was that the greatest water related impacts on environmental, social and economic outcomes for communities along the Barwon Darling has been the exponential growth in extractions in Queensland since the Commonwealth and majority of Ministerial Council agreed to the 1995 Cap on extractions decision. References were given that voluntary removal of water licences from two single properties at Collarenebri and Louth respectively had local socio-economic impacts.

Industry efficiency decisions such as introduction of genetically modified cotton and round bale machinery, or bulk purchase of fuel from non-local suppliers appears to be accepted as a normal socio-economic right for those in the industry, yet "Government" efficiency measures appear to be criticised.

Whilst there has not yet been any assessment of the impacts of the 2012 Barwon Darling Water Sharing Plan, there remains a strong possibility that this will have significant impacts on environmental and socio economic (particularly redistribution within licence holders) outcomes.

Recommendations:

Whilst the socio-economic studies undertaken to date provide invaluable information, the outputs alone must not be considered as the entire information on which to judge socio-economic indicators.

ELEPHANTS IN THE ROOM STILL TRUMPETTING

There remain several critically important considerations remaining ineffectively addressed at least for the unregulated Barwon Darling and Lower Balonne river systems, and in some cases for the whole Northern Basin. These include:

- ***Queensland growth in extractions since everyone was put on notice in 1995***
- ***NSW change to water extraction access in 2012***
- ***No evidence of practical delivery or shepherding of environmental water once it enters a different Water Sharing Plan region,***
- ***No evidence of any effective compliance***
- ***No evidence of willing cooperation by Northern Basin States.***
- ***Difficulties in "selling" the definitions or descriptions of environmental, social, economic or cultural parameters.***

Geoff Wise
21st August 2016

161018 DARLING RIVER FLOWS AT WILCANNIA and BOURKE

BACKGROUND

The first three of 10 Objectives of the Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012 are stated to:

a) protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources
b) protect, preserve, maintain and enhance the Aboriginal, cultural and heritage values of these water sources
c) protect basic landholder rights.

There is always an expectation that Town Water Supplies needs are a higher priority that other extractive uses.

The following analysis of publically available data allows the reader to form their own conclusions on the effectiveness of:

- the Commonwealth Government's decision to implement a Cap on growth in irrigation extractions across the entire Murray Darling Basin, effective from July 1994, and
- on the effectiveness of the State Government in complying with the objectives of the 2012 Barwon Darling Water Sharing Plan.

Upstream extractions from the Northern Basin of the Murray Darling System continued to expand in Queensland for a number of years after the Commonwealth announced a Cap limiting further diversions across the entire Murray Darling Basin, effective from 1993/4 levels of development. This decision was made in recognition that the levels of diversion at the time were placing stress on both the environmental health of the river systems and the reliability of water supply to water users.

In NSW, there has been no effective growth in extractions of water from the Barwon Darling since 1993/4. During the period of development of Cap, which was finally announced in 2006, there was progressive increase in commence to pump thresholds for licences held by broad-acre irrigators with off river storages, in recognition of the historic declining health of the river system. Similar changes were not considered necessary for the large number of small volume A Class licences, able to be activated at the lowest specified flow levels, only able to be pumped though small diameter pumps, and invariably pumped directly to a permanent planting, such as grapes, citrus, jojoba or lucerne, as their impacts on the overall river system were considered comparatively negligible.

IRRIGATION EXTRACTION CHANGES INTRODUCED IN BARWON DARLING WATER SHARING PLAN, (BD WSP) OCTOBER 2012.

In 2012 NSW introduced a new Water Sharing Plan for the Barwon Darling that significantly changed the past access and usage patterns.

The main changes were:

- Removal of a pump size restriction from each class of licence
- Introduction of opportunity for 300% of Access Entitlement being extracted each year.
    - In particular, this impacts on A Class Access, as at the baseline period there would have been minimal variation in annual extraction of A Class volumes.
- Introduction of unlimited carry-over provisions
- Introduction of water tradings
- Application of concessional conversions
- No implementation of Clauses 51 or 52 of the WSP relating to Total and Individual Daily Extraction Limits.

The effective consequence is that the security of access by broad-acre licence holders to lower flows using large pumps has been significantly increased, with a subsequent outcome anticipated to impact significantly on low flows in the river, particularly in the entire length of the Darling River downstream of Bourke.

Specific consequences include:

- The BD WSP has significantly changed the use of A Class licences
    - *from* historic "drought proofing" licences held by all riparian properties, plus a small number of small permanent planting owners and one large permanent planting irrigator,
    - *to* extensive annual cropping irrigators seeking higher security water access.

- The BD WSP appears to have increased the security of access to low flows (both at A Class and B Class levels) for broad acre irrigators, irrespective of Cap constraints.
    - The percentage of total Cap volume of annual access entitlement for A Class has changed from 2.3% to 5.3%, and the equivalent changes for B Class are from 73.5% to 83.5%, whereas C Class has decreased from 24.2% to 11.2%.
- The BD WSP has provided opportunities for huge and unpredictable volumes of A Class water (30 GL without trade, or 74 GL with trade whilst ever available in accounts) to be extracted annually under A Class pumping conditions, compared to a history of use of approximately 20 to 25 ML/day of A Class extractions.
    - Similarly, up to 393 GL of B Class could potentially be available for extractions annually without trade, or up to 617 GL with trade.
    - Storage capacities would become the limiting factor regarding volumes extracted.
- These actions now allowable within the BD SWP appear contradictory to the Vision and Objectives of the BD WSP.

- The significance of these changes is not yet being reflected in daily flow records in the lower Darling.

- The significance of the Darling River being the sole and fundamental connection between the north and south of the Murray Darling Basin requires consideration.

- The significance of the substantial anecdotal evidence indicating that the degree of social unrest amongst the Aboriginal population in Wilcannia is inversely proportional to the volume of local daily flows in the Darling River requires consideration.

ANALYSIS OF FLOWS AT WILCANNIA

The following is analysis of monthly flow records at Wilcannia over the last 96 years of data.
This data has been divided into the 74 years pre July 1994 and the 22 years post July 1994.
This coincides with the reference date adopted by the Commonwealth for introduction of a water diversion limit, called Cap, limiting average yearly volume of water that would have been diverted under 1993/4 levels of development and management rules.

41% of all financial (water) years since 1994 have recorded a zero flow at Wilcannia for at least month,

- compared to only **8% years before 1994**

13.3% of months since 1994 recorded less than 30 ML/month total flow (ie less than an average of 1ML/day total flow), including all the months of zero flow,

- compared to only **1.7% of months before 1994.**

11.4% of months since 1994 recorded total monthly flow volumes in the range of 31 ML to 1000 ML/month (ie daily average in range of 1ML to 33.3ML/day)

- compared to only **1.9% of months before 1994.**

24.6% of months since 1994 recorded total monthly flow volumes less than 1000 ML/month (ie daily average less than 33.3 ML/day)

- compared to only **3.7% of months before 1994.**

Since 1994,

- **17.3% of all months between October and February inclusive have recorded zero flows**
- **24.5% of all months between September and January inclusive have recorded monthly flows in the range of 1 ML/Month to 1000 ML/month.** These are the months most likely to be impacted by upstream increased A Class access to low flows following the extraction rule changes introduced **in**

the 2012 Water Sharing Plan, and hence most likely to reflect the possibility of increased months of zero or near zero flows at Wilcannia into the future.

Monthly Frequency of Zero Flows at Wilcannia

	Since 1994	Before 1994
Jan	**13.6%**	**5.4%**
Feb	**22.7%**	**5.4%**
Mar	**9.1%**	**0**
Apr	4.5%	0
May	4.5%	0
June	4.5%	0
July	4.5%	0
Aug	0.0%	0
Sept	0.0%	0
Oct	4.5%	1.4%
Nov	**18.2%**	**2.7%**
Dec	**27.3%**	**2.7%**

SOME BOURKE STATISTICS

Other data is from analysis of 67 years of annual flow data at Bourke from 1944 to 2014. Fours years of data during the period are not available.

Analysis of 67 years of Calendar Year Total Volumes of Flow 1944 t0 2014 (4 years missing data)

- 10% of years accounted for 44% total volume
- **13% of years accounted for over 50% total volume**
- 20% of years accounted for 61% total volume
- **50% of years accounted for 11% total volume**
- **33% of years accounted for less than 5% total volume**

CONCLUSIONS

Conclusions can be drawn from this that the Commonwealth's interventions into water policy through introduction of both the 1995 Cap on diversion limits and the 2012 Basin Plan have had no effective outcomes in redressing the fundamental concerns created by State Government policies and plans. Conversely, neither Queensland nor NSW Governments have demonstrated total commitments to the Commonwealth water reform agendas.

The stated goals of addressing over-stressed environmental river health and enhancing reliability to the highest priority rights water users, being town water supplies and stock and domestic access, have been lost for the lower Darling River.

It appears that the Commonwealth and State Governments focus their considerations regarding "reliability" as pertaining to the reliability for irrigation licence holders as higher priority than for basic rights or for the environment.

The social considerations for the large Aboriginal communities at Wilcannia and downstream locations including Menindee, have been totally ignored in the water policy debate.

It is not unrealistic to conclude that as the full effects of the 2012 Barwon Darling Water Sharing Plan come into play, the Darling River downstream of Bourke may change from a dying river to a dead river, occasionally resurrected by intermittent and unpredictable large flows.

APPENDICES

Appendix A describes the summary detail behind analyses of the monthly river flow volumes at Wilcannia.

Appendix B describes significant aspects of NSW water licence policy changes over the last two decades.

- The Background Document makes several references to the historic insignificant contributions of these A Class extractions compared to the total impacts of extractions.
- The A class extractions would have been used to water directly from the river to permanent plantings, and as such would have had very little variation in annual average extractions.
- If it is assumed that extractions of A Class only occurred on 232 days of the year, the average daily extraction for these days would have been 20 ML/day. If it is assumed that extractions of A Class occurred on only half the days of the year, the average daily extraction for these days would have been 25 ML/day.

- These extractions would have been expected to occur irrespective of daily flow rate, ranging from zero daily flow to very high flow rates. (Refer to BD WSP Background document (B Doc) clause 6.2.5.2.4 re "not withstanding access" for flow extractions less than threshold. Licence holders with only an A Class licence could not attribute an extraction to a flow in B Class or C Class threshold conditions.

161018 DARLING RIVER FLOW TOTALS AT WILCANNIA

BACKGROUND

NSW Monthly river flow totals are routinely supplied on a public record, accessible at http://realtimedata.water.nsw.gov.au/water.stm.

By Googling this site, access to a specific river gauge location can be achieved by clicking on the relevant site on the Map, and then clicking on to "Prepared Outputs" and then click "Period of Record Daily Flow Summary Report"

For Wilcannia, there are numerous gaps in monthly flow records prior to July 1920. For example, only half of the months from mid 1918 to mid 1920 have data. Hence the following analysis commenced from July 1920, whilst acknowedging that the preceeding period experienced protracted low flows in the Darling River.

The following data analysis is divided between pre and post July 1994. This coincides with the reference date adopted by the Commonwealth for introduction of a water diversion limit, called Cap, limiting average yearly volume of water that would have been diverted under 1993/4 levels of development and management rules. Despite this limit, the Queensland irrigation industry continued to expand massively for a number of years.

	JULY 1920 TO JUNE 1994		**JULY 1994 to MAY 2016**	
	NUMBER OF YEARS	**% OF YEARS**	**NUMBER OF YEARS**	**% OF YEARS**
# Financial Years	74		22	

# Financial Years recording any Month with Zero Flow	**6**	**8.0%**	**9**	**41.0%**

	NUMBER OF MONTHS	**% OF YEARS**	**NUMBER OF MONTHS**	**% OF YEARS**
Total Months	888		264	
Months with No recorded Data	16		0	
TOTAL MONTHS WITH RECORDED DATA	872	100.0%	264	100.0%
# Months with Zero Flows	13	1.5%	26	9.8%
# Months with Flow Range 1 to 30 ML (Daily average of 1 ML)	2	0.2%	9	3.4%
TOTAL MONTHS WITH MONTHLY TOTAL LESS THAN 30ML (less than average daily flow rate of 1 ML)	**15**	**1.7%**	**35**	**13.3%**
# Months with Monthly Total Range of 31 to 100 ML (Daily average of 1 to 3.3ML)	5	0.5%	11	4.2%
# Months with Monthly Total Range of 101 to 1000 ML (Daily average of 3.3 to 33.3ML)	10	1.1%	19	7.2%

TOTAL MONTHS WITH MONTHLY TOTALS IN RANGE 31 ML to 1000ML (Daily average in range of 1ML to 33.3ML/day	**15**	**1.7%**	**30**	**11.4%**
TOTAL MONTHS with MONTHLY TOTALS LESS THAN 1000ML (Average Daily flows of less than 33.3ML/day)	**30**	**3.4%**	**65**	**24.6%**
TOTAL MONTHS BETWEEN SEPTEMBER and FEBRUARY INCLUSIVE with FLOW TOTALS between 1 ML/MONTH and 1000 ML/MONTH			27	10.2%

161018 Appendix B

DESCRIBING SIGNIFICANT ASPECTS OF NSW WATER LICENCE POLICY CHANGES in the BARWON DARLING RIVER SYSTEM OVER THE LAST TWO DECADES.

Irrigation licences on the Barwon Darling River system upstream of Menindee Lakes are classified into three classes, A, B and C.

"A Class" licences have historically been referred to as "drought proofing licences" held by most property owners who have land fronting the river. Each has been a licence for a very small volume of water, able to be activated at the lowest specified flow levels, only able to be pumped though a small diameter pump, and invariably pumped directly to a permanent planting, such as grapes, citrus, jojoba or lucerne. During the ten years from 1995/6 to 2004/5, when these small licences were held by over 100 people, the average annual volume of water extracted using A class licences was 4,638 ML. This effectively translates to approximately 20 to 25 ML/day extracted over the half to two thirds of the hotter days of each year.

B and C Class licences have historically been held and used by irrigators with primary interests in broad-acre annual cotton cropping, relying on off-river storages to accumulate water from higher specified commence to pump limits. During the ten years from 1995/6 to 2004/5, the average annual volume of water extracted using B and C class licences was approximately 191,000ML.

These "history of use" figures for all classes of water were used in the development of Cap for the Barwon Darling, and the distribution of "Cap shares" amongst all licence holders.

During the protracted iterative process for development of Cap on the Barwon Darling River, the NSW Government commissioned an expert panel of independent scientists (Thoms et al 1996) to conduct assessments on the Barwon-Darling River for evidence of habitat degradation throughout the system.

In recognition of the declining river health of the major irrigation rivers in NSW (including the Barwon- Darling), the NSW Cabinet on 19 August 1997 endorsed recommendations from the then Minister for Land and Water Conservation and Minister for the Environment that would see environmental flow rules applied to each of these systems.

The Scientific Panel recommended that flows equal to or less than ten percent of river channel capacity were essential to maintain the river environment. Estimates based on cross sectional area and flow data indicate that this equates to flow in the 50th to 60th percentile range of flows throughout the river. Therefore, it was proposed to increase pumping thresholds to the 60 percentile for B class and the 50 percentile for C class licences, thus meeting this requirement while preserving the distinction between these classes of licence.

In 1998, based on this scientific report, the majority of members of the River Management Committee, including representatives from the major broad-acre irrigation enterprises, recommended to the Minister that commence to pump limits for B and C Class licences be increased to reflect the need for environmental flow rules on the Barwon- Darling.

An example of the recommendations was to increase pumping thresholds for B Class licences at Bourke from 390ML/day to 1150 ML/day. The Minister endorsed these recommendations commencing in the 1998/99 water year. Subsequently, in the 2000/01 water year, further minor adjustments were made. For example, the B Class threshold for Bourke was increased to 1250 ML/day.

These rules were continued for many years, and incorporated with the introduction of Cap for the Barwon Darling, announced in 2006 and implemented from July 2007.

In October 2012, the NSW Government introduced a new Water Sharing Plan for the Barwon Darling.

Key changes included:

- Abolishing pump sizes for each licence class, effectively allowing broad-acre irrigators to access A Class water from the low flow commence to pump thresholds.
- Accepting that there were then approximately 10,000 ML of A Class access entitlement.
- Allowing unused account water to be carried over in water accounts indefinitely.
- Allowing all licences to be able to extract up to 300% of annual access entitlement each year, subject to having adequate volumes of account water. Thus, without considering water trading, up to 30,000 ML water can now be extracted each year at A Class flow conditions.
- Introducing opportunities for water trading, and allowing all traded water to be extracted in the year traded, additional to the 30,000 ML mentioned above, with the only constraint being the commence to pump threshold.
- Providing the Minister a right to introduce Individual Daily Extraction Limits on each licence, a right that has not yet been put into effect.

NBAC BUSINESS PAPER

ACHIEVING SUSTAINABILITY of the DARLING RIVER DOWNSTREAM of BOURKE

CONTEXT

During the four years I have been a member of the Northern Basin Advisory Committee I have found it necessary to understand the realities and contexts within which future water policies and management arrangements may operate to deliver desired outcomes for the Basin Plan.

Critical initial steps for effective advising and planning for the future are to understand what "we" are dealing with, where "we" have come from, both in river flow outcomes and in historic policy influences, and understanding where "we" are currently at for river flows and policy influences.

This paper provides my analyses of these contexts.

To understand river flows in the Barwon Darling, I have accessed historic public records of monthly flows at Bourke and Wilcannia, as these downstream reference points provide for a pragmatic understanding of the environmental sustainability of the Barwon Darling System.

Three experiences over the last year, all initiated by broad-scale irrigators on the Barwon Darling, have made me realise I must, and every member of NBAC and MDBA must, gain personal understandings of the implications for the Basin Plan of the Barwon Darling Water Sharing Plan 2012. These experiences were:

- In spring of 2015 I received a message indirectly from an irrigator querying why a fellow irrigator on the Barwon-Darling could be pumping water from the river, but the complainant could not legally pump. On enquiry from a Water Licencing Officer I was told that the extractions were legal.

- On 3rd November 2015 I was present with the Chair, MDBA, a MDBA Board Member and others, on a Bourke property when the owner advised us that he currently had a significant volume of water in storage pumped under A Class conditions from a recent small flow.

  This volume intrigued me as I recollected that the extraction volume quoted was in the order of 250% of the 10-year average annual History of Use volume of all A Class water extracted by all A Class licence holders along the entire length of the Barwon Darling throughout the period from 1995/6 to 2004/5. It was this average annual History of Use data that lead to the distribution of Licence Shares within the Cap decision of 2006.

- At the June 2016 meeting of the Western Lands Advisory Council, which I normally Chair but for which I was an apology, an agenda item was raised by an irrigator for our Council to discuss the non-irrigation implications

of the Barwon Darling Water Sharing Plan particularly for water use downstream of Bourke.

Throughout 2016, I have openly exchanged with staff from both Commonwealth and State agencies, allowing me to acquire the best available information and understanding of these issues. I have progressively shared my interpretations with Board members and staff of MDBA, with senior staff in NSW Department of Primary Industries Water Division, with members of the Northern Basin Advisory Committee, with members of the Western Lands Advisory Council, and with other people who have been in attendance at Northern Basin Advisory Committee meetings and various working group meetings.

This report contains information previously shared plus additional data analyses that I have progressively "researched". Hence I am now combining all of my relevant "research" into this single paper.

There is no data or interpretations in the attached report gained through my membership of either of the Advisory Committees referenced. I have consistently requested that what I have presented be peer reviewed by the recipients, and if I have made any errors in what I have presented I will appreciate corrections.

I am now sharing this as a Business Paper to the last meeting of the Northern Basin Advisory Committee, copied to Mr Neil Andrew, AO, Chair, and Philip Glyde, CEO, MDBA respectively,

In view of the observations I have made which relate to the NSW Barwon Darling Water Sharing Plan, I am sharing this paper directly with Hon. Niall Blair MLC, Minister for Primary Industries and Minister for Lands and Water, and Gavin Hanlon, Deputy Director General, Water, Department of Primary Industries.

Because there is an imminent announcement of the recommendations relating to the Review of the Northern Basin I am also sharing this with Local Members covering the Northern Basin in NSW, Mark Coulton, MP, Member for Parkes and Hon. Kevin Humphries MP, Member for Barwon. I will also be sharing it with people in the other groups referenced above.

ANALYSES OF RIVER FLOWS

SOME BOURKE RIVER FLOW STATISTICS

This information is derived from analysis of 67 years of publically available annual (calendar year) flow data at Bourke from 1944 to 2014. Fours years of data during the period are not available.
Flow conditions at Bourke provide indications of flow conditions for the remainder of the Darling River downstream of Bourke.

- **50% of years accounted for 11% total volume**
- **13% of years accounted for over 50% total volume**
- **33% of years accounted for less than 5% total volume**

ANALYSIS OF FLOWS AT WILCANNIA

Wilcannia reflects the cumulative impacts of all extractions upstream across the entire Northern Basin. Hence analysis of publically available monthly flow records at Wilcannia over the last 96 years of data provides an opportunity to consider the possible impacts of extractive developments, plus providing a context for potential influences of new policies.
The data has been divided into the 74 years pre July 1994 and the 22 years from July 1994 to May 2016. There were dry years during both periods.

July 1994 coincides with the reference date adopted by the Commonwealth for introduction of a Cap to limit water diversions to the average yearly volume of water that would have been diverted under 1993/4 levels of development and management rules.

41% of all financial (water) years since 1994 have recorded a zero flow at Wilcannia for at least month,

- compared to only **8% years before 1994**

13.3% of months since 1994 recorded less than 30 ML/month total flow (ie less than an average of 1ML/day total flow), including all the months of zero flow,

- compared to only **1.7% of months before 1994.**

11.4% of months since 1994 recorded total monthly flow volumes in the range of 31 ML to 1000 ML/month (ie daily average in range of 1ML to 33.3ML/day)

- compared to only **1.9% of months before 1994.**

24.6% of months since 1994 recorded total monthly flow volumes less than 1,000 ML/month (ie daily average less than 33.3 ML/day)

- compared to only **3.7% of months before 1994.**

Since 1994,

- **17.3% of all months between October and February inclusive have recorded zero flows,** compared to **3.2%** before 1994.
- **24.5% of all months between September and January inclusive have recorded monthly flows in the range of 1 ML/Month to 1000 ML/month. These are the months most likely to be impacted by upstream increased A Class access to low flows** following the extraction rule changes introduced in the 2012 Barwon Darling Water Sharing Plan, and hence most likely to reflect the possibility of increased months of zero or near zero flows at Wilcannia into the future.

Monthly Frequency of Zero Flows at Wilcannia

	Since 1994	Before 1994
Jan	**13.6%**	**5.4%**
Feb	**22.7%**	**5.4%**
Mar	**9.1%**	**0**
Apr	4.5%	0
May	4.5%	0
June	4.5%	0
July	4.5%	0
Aug	0.0%	0
Sept	0.0%	0
Oct	4.5%	1.4%
Nov	**18.2%**	**2.7%**
Dec	**27.3%**	**2.7%**

Monthly Frequency of Wilcannia flows less than 1,000ML/Month
(ie less than average daily flow of 33.3 ML/day)

	Since 1994	Before 1994
Jan	**22.7%**	**8.1%**
Feb	**27.3%**	**6.8%**
Mar	9.1%	0
Apr	**13.6%**	0
May	**13.6%**	2.7%
June	**18.2%**	1.4%
July	**13.6%**	0.0%
Aug	**13.6%**	1.4%
Sept	**31.8%**	4.1%
Oct	**40.9%**	4.1%
Nov	**45.5%**	**6.8%**
Dec	**45.5%**	**8.1%**

POLICY CONSIDERATIONS

There is a general understanding that because of progressive increases in extractions, the Murray Darling Basin was considered unsustainable, and as a consequence:

- The Cap was introduced in 1995 to limit further growth in extractions
- The Water Act was introduced in 2007 to facilitate both the development of a Basin Plan and greater cooperation and coordination between Basin States and the Commonwealth in managing the Murray Darling Basin.
- The Basin Plan was introduced in 2012 to reduce the levels of extraction to a sustainable diversion limit.

COMMONWEALTH CAP 1995

In 1995, the Commonwealth announced a Cap limiting further diversions across the entire Murray Darling Basin (MDB), effective from 1993/4 levels of development. This decision was made in recognition that the levels of diversion at the time were placing stress on both the environmental health of the river systems and the reliability of water supply to water users.

Nevertheless, extractions continued to expand in Queensland for a number of years. This was based on Queensland's argument that it had allowed very little water resource development in its Murray Darling Basin catchments and that it had a right to "catch up".

During the extended period of development of Cap for the Barwon Darling in NSW, which was determined in 2006, there were progressive increases in commence to pump thresholds for licences held by broad-acre irrigators with off river storages (B and C Class licences), in response to the recommendations by a panel of Independent Scientists and the historic declining health of the river system, and generally supported by representatives of broad-acre irrigators.

As referenced in the Background Document to the BD WSP, similar changes to pumping thresholds were not considered necessary in 2006 for the large number of small volume A Class licences, able to be activated at the lowest specified flow levels, only able to be pumped through small diameter pumps, and invariably pumped directly to a permanent planting, such as grapes, citrus, jojoba or lucerne, as their impacts on the overall river system were considered comparatively negligible.

- During the ten years from 1995/6 to 2004/5, when these small licences were held by over 100 people, the average annual volume of water extracted using A class licences was assessed as 4,638 ML (less than 5 GL). This effectively translates to approximately 20 to 25 ML/day if extracted over the half to two thirds of the hotter days of each year.

At the time, NSW clearly recognised that whilst Cap is a gross long term average total of all licence classes, averaging the gross total effectively masks the impacts of low flow extractions.

The NSW water management operating rules at the time recognised that for the benefit of all "users", including irrigators, town water supplies, stock and domestic users, water quality management and the environment, there was a requirement for active flow event management, rather than relying on plans based on long term averages and modelling.

BARWON DARLING WATER SHARING PLAN OCTOBER 2012

In October 2012 NSW introduced a new Water Sharing Plan for the Barwon Darling.

Five of the 10 Objectives of the NSW Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources (BD WSP) are stated to:

- *"protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources*
- *protect, preserve, maintain and enhance the Aboriginal, cultural and heritage values of these water sources*
- *protect basic landholder rights*
- *contribute to the maintenance of water quality, and*
- *contribute to the environmental and other public benefit outcomes identified under the National Water Initiative".*

Legislation acknowledges that Town Water Supply needs are a higher priority that other extractive uses.

The Performance Indicators in the BD WSP state:

> *"The following indicators are to be used to measure the success of the strategies to reach the objectives of this Plan:*
> *(a) change in low flow regime,*
> *(b) change in moderate to high flow regime,*
> *(c) change in surface water and groundwater extraction relative to the long-term average annual extraction limits,*
> *(d) change in local water utility access,*
> *(e) change in the ecological value of key water sources and their dependent ecosystems,*
> *(f) the extent to which domestic and stock rights and native title rights requirements have been met,*
> *(g) the extent to which local water utility requirements have been met,*
> *(h) the change in economic benefits derived from water extraction and use, and*
> *(i) the extent of recognition of spiritual, social and customary values of water to Aboriginal people."*

IRRIGATION EXTRACTION CHANGES INTRODUCED IN BARWON DARLING WATER SHARING PLAN, (BD WSP) OCTOBER 2012.

The Water Sharing Plan for the Barwon Darling significantly changed the past access and usage patterns and also the flow event management strategy.

The main changes were:

- Removal of a pump size restriction from each class of licence
- Introduction of opportunity for 300% of Access Entitlement being extracted each year.
- Introduction of unlimited carry-over provisions
- Introduction of water tradings
- Application of concessional conversions
- Removing the authority of the Minister to "embargo" access to A Class licences
- No implementation of Clauses 51 or 52 of the WSP that provides the Minister an opportunity to introduce Total and Individual Daily Extraction Limits on licences.
- No attempt to use Clause 84 (c) to include rules for shepherding of environmental water
- As stated in the BD WSP, Clauses 46 (15) and (16), in association with Section 324 of the Water Management Act, provide the Minister with authority to restrict or prohibit extracting of B and C class water, but not A Class, to protect flows needed to meet Basic Landholder Rights.
- Clause 46 (16), read in association with the listed footnotes, specifies a flow of 390 ML/day at Bourke is the required minimum flow that should be protected to meet basic landholder rights requirements along the Barwon-Darling River. However, in contradiction, large volumes of A Class licences can be extracted at Bourke at 350 ML/day, without any stated ability for the Minister to intervene.

Specific consequences include:

- The BD WSP has significantly changed the use of A Class licences:
    - *from* historic "drought proofing" licences held by all riparian properties, plus a small number of small permanent planting owners and one large permanent planting irrigator,
    - *to* extensive annual cropping irrigators seeking higher security water access.
- The BD WSP has increased the reliability and security of access to low flows (both at A Class and B Class levels) for broad acre irrigators, irrespective of Cap constraints.
    - The percentage of total Cap volume of annual access entitlement for A Class has effectively increased from 2.3% to 5.3%, and the equivalent increases for B Class are from 73.5% to 83.5%, whereas C Class has decreased from 24.2% to 11.2%.
- The BD WSP has provided opportunities for huge and unpredictable volumes of A Class water (30 GL without trade, or approximately 70 GL

with trade whilst ever available in accounts) to be extracted annually under A Class pumping conditions, compared to a annual average history of use of less than 5 GL of A Class extractions.
    - Similarly, up to 393 GL of B Class can potentially be available for extractions annually without trade, or up to over 600 GL with trade, compared to a ten year average annual history of use (1995/6 to 2004/5) of 144 GL.
    - Storage capacities will become the limiting factor regarding volumes extracted.
- Security of stipulated minimum low flow requirements for basic landholder rights has been significantly compromised. (Clause 46 (16)).
- Environmental Water acquired by the Commonwealth from all the tributaries to the Barwon Darling effectively loses its environmental status once it enters the Barwon or Darling Rivers, and becomes accessible for extraction subject to flow pumping thresholds.
- Two family businesses have recently "moved into the valley" and currently hold at least two thirds of the entire licence volume for the entire Barwon Darling. The Commonwealth holds approximately 12% of licence volume.
- The actions now allowable within the BD WSP appear contradictory to the Vision, Objectives and Performance Indicators of the BD WSP.
- **The significance of these changes is not yet being reflected in daily flow records in the lower Darling from Bourke to the Murray River.**
- The significance of the Darling River being the sole and fundamental connection between the north and south of the Murray Darling Basin requires consideration, including potential implications for reliability of access for licence holders on the Regulated Lower Darling River and in the Murray River.
- There is substantial evidence that when there are good flows in the river at Wilcannia there is less social unrest amongst the Aboriginal population.

BASIN PLAN NOVEMBER 2012

The following is a direct extract from the MDBA website:

"What's in the Basin Plan?
The Basin Plan is a coordinated approach to water management across the Murray-Darling Basin's 4 states (South Australia, Victoria, New South Wales and Queensland) and the Australian Capital Territory.
The Basin Plan was developed as a requirement of the Water Act 2007 (Cwlth) and is a significant step in the ongoing process of managing the Basin's water for the benefit of all its users and the environment.
At its heart, the Basin Plan determines the amount of water that can be extracted or taken annually from the Basin for consumptive use (urban, industrial and agricultural). The volume determined is called the long-term average sustainable diversion limit, or a volume of extraction that will not have a negative impact on the natural environments and the functions of the rivers, waterways, groundwater and wetlands of the Basin.
However, the Basin Plan is much more comprehensive than just determining a limit on water use. The Plan contains specific plans and frameworks to ensure:
- *good quality water is delivered to people, businesses and the environment*
- *environmental water is used effectively*
- *state governments are committed to the Plan*

- *communities always have access to drinking water*
- *water trade is efficient and fair*
- *implementation of the Plan is monitored and evaluated".*

WORLD'S LARGEST BLUE GREEN ALGAE OUTBREAK

The 1,000 Km long Blue Green Algae outbreak in the Barwon Darling in October/November 1991 has been frequently referenced as a need for enhanced environmental outcomes both by the Commonwealth through Cap of 1993/4 and the Basin Plan 2012, and by NSW through the 1992 Interim Unregulated Flow Management Plan for the North West Flow and the 2012 Barwon Darling WSP.

During October and November 1991, the average daily flows were:

	Bourke	Wilcannia
• **October**	293 ML/day	460 Ml/day
• **November**	219 ML/day	184 ML/day.

The Background Document to the BD WSP states, under "Algal Suppression", 6.1.1.2

> *"Some restriction to supplementary access in the major tributaries and/or to B and C class access on the Barwon-Darling, prior to three months of below algal suppression flows at Wilcannia may be required to allow for the time it takes for flow to travel from the tributaries to the lower Barwon-Darling."*

The BD WSP provides the ability of broad-scale irrigators to rapidly extract A Class water above a threshold of 350 ML/day at Bourke, with the Minister having no specified authority to embargo such extractions. The Minister's authority to embargo for B Class flows at Bourke is restricted to thresholds above 1,250 ML/day.

Hence, should a repeat of the 1991 algal outbreak occur, the BD WSP provides little ability to contribute to any algal prevention or suppression.
Prior to the 2012 BD WSP, the Minister had authority to create effective embargoes of all flows.
Whilst-ever environmental flows or embargoed flows from the tributaries are not protected from extraction in the Barwon Darling, the Basin Plan also provides little ability to contribute to any algal prevention or suppression.

DISCUSSION

The comparative flow records at Wilcannia:

- **Provide no confidence** that the Commonwealth decision to introduce a cap on growth in diversions from 1994/5 had any effect in limiting stress on either the environmental health of the Barwon Darling river systems or the reliability of water supply to all the system's water users
- **Provide no confidence** that the NSW Water Sharing Plan 2012 or the Basin Plan 2012 will deliver on several of their own respective objectives
- **Provide no confidence** that the Basin Plan can return the river health to anywhere near pre 1994 conditions.

There has been a widely acknowledged recognition the flow variability is the unique feature of the Northern Basin. Consequences are:

- We must acknowledge that whilst Cap is a gross long term average total of all licence classes, averaging the gross total volumes effectively masks the impacts of low flow extractions.
    - A Sustainable Diversion Limit has similar limitations.
- Effective water management operating rules depend on active flow event management for efficient beneficial outcomes for all "users", including irrigators, town water supplies, stock and domestic users, water quality management and the environment.
- Modelling has significant limitations, particularly for extremes of low and high flows.

The effective consequences of the Barwon Darling Water Sharing Plan 2012 are expected that:

- The reliability and security of access by a few broad-acre licence holders to lower flows using large pumps has been significantly increased
- A few broad-acre licence holders in the Barwon Darling have increased opportunities to extract environmental water and water embargoed by the State entering the Barwon Darling from tributaries
- Increased extractions of low flows and of environmental water from tributaries will impact significantly on low flows in the river, particularly in the entire length of the Darling River downstream of Bourke
- The reliability and security will be decreased for many people entitled to Basic Landholder Rights, Town Water Supplies, and Aboriginal, Cultural and Heritage values, plus water quality, environmental and public benefit outcomes
- The NSW Government gave notice before the release of the WSP that "*it is expected that they (*Individual Daily Extraction Limits) *will be in place within the first few years of this (BD WSP) plan's term.* "
    - Therefore NSW should still be in a strong position to initiate their introduction, which would significantly rebalance the above points.

From my perspective as a community member:

- The changes introduced through the Barwon Darling Water Sharing Plan in October 2012 appear totally antagonistic to the plans and framework of the Basin Plan introduced one month later. This implies little coordination or cooperation between the two parties, and a consequence that the objectives of both plans are unlikely to be achieved.
- The reliability of water extraction for productive uses appears to be treated as sacrosanct, whereas reliability of water for basic landholder rights, all town water supplies, Aboriginal cultural considerations or the environment are consequential.
- I will await with intrigue to witness effective improvements to consistent river flows at Wilcannia as a measure of the effectiveness of taxpayer investments into the Basin Plan.

RECOMMENDATIONS

1. **MDBA engage in serious negotiations with NSW seeking that Clauses 51 and 52 of the Barwon Darling Water Sharing Plan 2012 relating to Individual Daily Extraction Limits be implemented as soon as possible, as foreshadowed by the State.**

2. **MDBA engage in serious negotiations with NSW to develop a workable process for environmental water to be used effectively *(Basin Plan objective)* for its defined purpose (*Water Act Definition: environmental watering means the delivery or use of environmental water to achieve environmental outcomes)* once it enters the Barwon Darling system from any tributary.**

2. **MDBA work with all appropriate agencies and organisations to develop appropriate "toolkit strategies"**
    a. **to ensure environmental water is used effectively in the Barwon Darling for its defined purpose and**
    b. **to minimise drawdown of low flows from the Barwon Darling River.**

3. **MDBA immediately develop and implement monitoring and evaluation strategies based on individual flow events in the Barwon Darling to assess the consequences of the Barwon Darling Water Sharing Plan and the Basin Plan relative to the defined objectives of each plan.**

4. **MDBA immediately develop a strategy to identify recommendations to NSW relevant to the foreshadowed review of the Barwon Darling Water Sharing Plan.**

5. **MDBA engage and communicate on an ongoing basis with two communities downstream of Bourke which each have direct associations with water management decisions in the Northern Basin.**
    a. **These are the composite community from immediately downstream of Bourke to Menindee, and the composite community from Menindee to Wentworth.**

6. **MDBA initiate actions to ensure effective monitoring and evaluation and adaptive management is carried out relating to Water Plans of the Basin States.**

7. **The data analysis I have provided in this report be peer reviewed for accuracy, and the peer review be made public.**

Geoff Wise 12th November 2016

161129 CHANGES IN RELIABILITY OF FLOWS IN DARLING RIVER AT WILCANNIA

There has been up to a 1,000% DROP IN RELIABILITY of river flows at Wilcannia over the last nearly quarter century *(22 years)* ***compared to the previous three quarters of a century*** *(74 years).*

- ***Over one quarter*** (27%) ***of all Decembers now experience zero flows***
  > ***1,000% decrease in reliability***

- ***Nearly half*** *(44%)* ***of all Octobers, Novembers and Decembers experience zero or very low flows***
  (less than average daily flow of 33.3 ML/day or 1,000ML/month)
  > ***800% decrease in reliability***

- ***13.6% of all months of the year experience virtually zero flows***
  (less than an average of 1 ML/day total flow or 30 ML/month)
  > ***800% decrease in reliability***

- ***A quarter*** *(24.6%)* ***of all months of the year experience zero to low flows***
  (less than 33 ML/day or 1,000ML/month)
  > ***720% decrease in reliability***

- ***The river has stopped flowing completely for 20%*** *(20.5%)* ***of all months between November and February***
  > ***550% decrease in reliability***

- ***The river has stopped flowing completely for at least one month in nearly half*** (45.4%) ***of all years***
  > ***480% decrease in reliability***

This compared the periods before and after the Commonwealth Government introduced a Cap to limit any further growth in extractions in recognition of the declining health of the river systems in the Murray Darling Basin.

Despite this decision being agreed to at a State Ministerial Council meeting, Queensland chose not to introduce the decision for a number of years after 1995, and allowed massive growth in extractions particularly in the Condamine Balonne region.

Through a long consultation process, the NSW Government introduced a cap on growth in extractions, consistent with the Commonwealth's decision, retrospective to 1993/94 estimated levels of extraction, effective from July 2007.

Whether you believe this decrease in reliability is influenced by climate change, climatic variability, changed dry-land farming practices or irrigation extractions, the facts are that the reliability of low river flows at Wilcannia have decreased massively since the united agreement by the Commonwealth and all Basin Plan State Governments that the levels of diversion at the time were placing stress on

both the environmental health of the river systems and the reliability of water supply to water users.

In 2012 the NSW Government introduced further changes through the Barwon Darling Water Sharing Plan. These changes effectively gave cotton irrigators access to low flow licences with the ability to annually extract up to 650% of the long term annual average usage when the users of these licences were a small number of people with permanent plantings and graziers aimed at drought proofing their properties. **The significance of these 2012 changes in allowing access to significant extra volumes from low flows in the river are not yet being reflected in daily flow records in the lower Darling from Bourke to the Murray River.**

All Commonwealth and State legislation including the Barwon Darling Water Sharing Plan have words to recognise that town water supplies, other domestic access requirements and livestock access requirements are of higher priority that access for irrigation or other productive uses.

Five of the 10 Objectives of the NSW Water Sharing Plan for the Barwon-Darling are stated to:

- *"protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources*
- *protect, preserve, maintain and enhance the Aboriginal, cultural and heritage values of these water sources*
- *protect basic landholder rights*
- *contribute to the maintenance of water quality, and*
- *contribute to the environmental and other public benefit outcomes identified under the National Water Initiative".*

Despite these words, the reliability of low flows at Wilcannia appear to be on a continual downslide, with direct negative impacts on the identified highest priority objectives of the Water Act and relevant Plans.

The ability of the multi billion dollar Basin Plan to create any tangible turn-around to these long periods of zero and low flow conditions in the "Artery of the Outback" which historically connected Queensland to Victoria and South Australia must be strongly questioned.

Badger Bates, a member of the Barkinjie People, the River People of the Darling, states that if the river dies, the people and their cultures die. Is this a goal we should be aspiring to, not only for Aboriginal People, but for all people associated directly or indirectly with the Murray Darling Basin?

Background to the data source and data analysis is available separately.

Geoff Wise 29th November 2016

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19th February 2017
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SUBMISSION in RESPONSE to the NORTHERN BASIN REVIEW of the MURRAY DARLING BASIN PLAN

SUBMISSION OVERVIEW

The focus of this submission relates particularly to the two Unregulated River sections of the Northern Basin downstream of the major regulated tributaries, viz Barwon Darling and NSW Intersecting Streams. These are the two sections of the Northern Basin most adversely influenced by the proposed change from a 390 GL to a 320 GL reduction target.

In preparing this submission, I have considered whether the recommendations made in the Northern Basin Review effectively address and support the stated aims of the Basin Plan and the legislation driving these aims.

I have also considered whether the toolkit elements associated with the proposed reduced water recovery target of 320 GL will be guaranteed to be delivered and whether the combined outcomes of 320 GL plus toolkit will be equivalent to the original 390 GL reduction target.

My conclusions are that neither the Queensland Governments nor the NSW Governments have demonstrated guaranteed partnerships and support for the aims of Commonwealth led water reform over the last two decades to achieve sustainability for either environmental outcomes or security for communities.

- Following the Inter-Government agreement for an introduction of a limit on growth in extractions, the Queensland Government of the period chose to ignore this agreement for approximately a decade.
    - This lack of action by Queensland has been a major contributor to the need for the Basin Plan, particularly in the Northern Basin.
    - I make no further reference to this in this submission.
- Associated with the planning and implementation of the Basin Plan, and for half a decade since, the NSW Government has not demonstrated any genuine commitment or cooperation to the aims and objectives of the Basin Plan and associated Commonwealth legislation.
    - Unless the NSW Government agrees to both commit totally to managing of environmental water across all river systems and to revert river flow event management in the Barwon Darling River system to being equivalent to the outcomes which were in place prior to October 2012, being the period when the Basin Plan was being developed, I have no confidence that the Basin Plan, in any form, is likely to make any significant difference in achieving the most significant aims of the multi billion dollar regional reform program across the Northern Basin.

Through my total lack of confidence in commitments of State Governments to the overall aims of Commonwealth led water reform to achieve overall sustainability, my conclusion is that the review has not provided any credible or defendable argument to reduce the proposed Northern Basin recovery target from 390 GL to 320 GL, irrespective of the inclusion of a toolkit or the socio-economic consequences of a couple of communities.

AIM OF BASIN PLAN

MDBA states *"The aim of the Basin Plan is to ensure that water is shared between all users, including the environment, in a sustainable way. It does this by managing the basin as one system. This will enable the river systems to continue to support communities and industries in the long term as they adapt to changes, including a changing climate."*

Hence the Northern Basin Review recommendations, which propose an amendment from the 2012 recovery target, must keep this aim clearly in focus.

SUPPORTING DOCUMENTATION

The first four following sections relate directly to the stated aim of the basin plan, followed by ten other relevant considerations.

I accept that there is a degree of repetition in the following points. This simply acknowledged the integrated nature of the key elements in this submission.

Five attachments are included, with Attachment E listing my personal credentials for making this submission.

1. "WATER SHARED BETWEEN ALL USERS"

- Through the period of the Northern Basin Review, considerations of all users in the Intersecting Streams and Barwon Darling have not been adequately engaged or considered.
- The focus of all the review and consultation has narrowed down to irrigators and irrigation communities verses a small number of specific environmental sites. The rights of irrigators have become sacrosanct at the expense of other individual water users.
- **Higher priority water users, including Aboriginal culture and heritage, town water supplies (TWS), basic landholder rights and the broader environment have received minimal consideration for water sharing by comparison to irrigators.**
- The Hydrological Modelling Report for the Northern Basin states:
    - *"The modelling has included coordinated delivery as an option because the MBDA believe that many of these challenges can be overcome (at least partially) as flow predictive capacity continues to advance. Also important would be the need to modify existing operational practices to allow for downstream water delivery. These changes would need to recognise that downstream delivery could only occur under a specific set of prevailing resource availability and climatic conditions. They would also need to*

include an element of environmental flow protection within the tributary catchment, while guarding against impacts to other users in the system. Striking this balance would require significant work and engagement with interested parties."

- **The phrase *"while guarding against impacts to other users in the system"* strongly implies "guarding against impacts on irrigators", and yet the changes created by the BD WSP has consistently ignored impacts on non-irrigator water users.**
- There has been a consistent theme through the period of the Northern Basin Review that "third party impacts" means "the plan cannot cause any third party impact on any irrigation licence", irrespective of potential third party impacts on non-irrigator water users.
  - **This is clearly a double standard, resulting in an ineffectiveness of water being shared between all users.**

- **The fact that the NSW Government has announced a $500 million pipeline development from the Murray River to provide town water supply to Broken Hill effectively acknowledges the failure of water reform in the Northern Basin to ensure water is shared between all users.**
  - Once this pipeline is constructed, the historic need to ensure water flows down the Darling to Menindee for the Broken Hill TWS will be unnecessary.
  - As a consequence the indirect small benefit currently available for town water supplies to communities of Louth, Tilpa, Wilcannia and Menindee, and for basic landholder rights for approximately 1,000 Km river miles of the Darling River will be further neglected.

2. "WATER SHARED IN A SUSTAINABLE WAY"

- The total river environment, including natural and human resources and parameters, but excluding licenced extractions for productive use, must be more sustainable with greater rather than lesser extractions.
- In highly variable flowing rivers, application of extraction rules through Water Sharing Plans (WSP's) and Water Resource Plans similarly have significant influences on the sustainability or otherwise of a total river environment.
  - **Experience over the last four years is that in NSW, the application of the Barwon Darling WSP (BD WSP) has consistently favoured irrigation extractions at the expense of all other water users.**
  - **This provides no confidence that this attitude is likely to change in any foreseeable future.**
- Attachment D provides examples of how water extracted for irrigation has historically changed sharing of water in a sustainable way.

3. "MANAGING THE BASIN AS ONE SYSTEM"

- The Northern Basin Review has been focused on development of trade-offs between extractive uses verses key environmental sites within the northern tributaries and Darling River downstream to the end of the irrigation area, with little overall consideration downstream of Bourke.

- The MDBA has acknowledged that irrigation development has halved the pre development volume of most flows at Bourke below approximately 50,000 ML/day.
- Attachment A, titled *"Changes In Reliability Of Flows In Darling River At Wilcannia"* further highlights the impacts of extractions on low flows in the mid-Darling region.
- There is no credible evidence that the proposed reduced water recovery target will either influence the above statistics, or have as great an influence on impacting on the above data as the original 390 GL reduction target.
- **Hence the logical conclusion is that into the future, the Basin will effectively be composed of two separate systems (north and south) occasionally connected during short and intermittent large flood events in the Northern Basin.**
    - This should not be an acceptable outcome for a goal of "Managing the basin as one system".

3. "ENABLE THE RIVER SYSTEMS TO CONTINUE TO SUPPORT COMMUNITIES AND INDUSTRIES IN THE LONG TERM"

- Communities along the mid Darling from Bourke to Menindee have never been effectively defined, understood or engaged, and hence all their needs and aspirations have not been identified or included.
    - These communities include but are not limited to Aboriginal people aligned to the river, village people, graziers, fisher people, and tourists.
    - They have been occasionally included for MDBA messages to be shared with them, but rarely for genuine two way engagement.
- Communities along the entire length of the Unregulated Intersecting Streams and Barwon Darling have suffered historic diverse impacts from many causes, with the significant reduction on flows due to irrigation extraction over the last four or five decades being a major component.
- Whilst irrigation dependent communities have been well-researched and supported, communities and individuals dependent on grazing, tourism and fishing have been neither researched nor similarly supported.
- As an indication of the apparent neglect of the section of the Darling River from Bourke to Menindee, a river length of approximately 1,000 Km, and the communities within this section, this region was not even shown on the map printed in "Basin Plan Amendments Northern Basin Review" document.
    - What more powerful message to demonstrate to these communities whether they have been included or excluded?
- **Hence there is no credible evidence that a reduced water recovery target will support these communities to the same degree as a higher recovery target in either the short or long term.**

4. "HARNESSING A RESOURCE" RATHER THAN "MANAGING THE NATURAL ATTRIBUTES"

- For highly variable flowing Unregulated Rivers, it is a total misconception that imposing three constraints, namely a Sustainable Diversion Limit, a Cap to limit long term average extractions and commence to pump extraction limits will

collectively satisfy all requirements for the environment and for Aboriginal Cultural and Heritage, town water supplies and basic landholder rights.

- The NSW Government has regularly argued that the Cap plus commence to pump thresholds are adequate tools to secure the needs of non-extractive water users.
    - If this were the case, there would be no need for any other rules within the Water Sharing Plans. Truly a false argument.
- Reliance on the three constraints may have some relevance in a regulated river system, which effectively allows for the water resource to be "harnessed" for the pre-determined downstream uses.
- However, **in a highly variable unregulated river system, the essential elements relate to "managing the natural attributes" through individual flow event management.**
    - This is the very reason successful irrigators have constructed off river storages.
    - Similarly, it is essential that flow event management tools are necessary for managing the natural attributes and basic rights entitlements.
- This difference is fundamental to the degree that policy development and planning can rely on long term modelling.
    - Whilst long term modelling may have significant value for assessing the "harnessing of the resource", its value for "managing the natural attributes" must consistently be questioned.
- **Regrettably, modelling has been the primary tool used in comparing the different recovery target options. Not surprisingly, all options provided relatively similar environmental outcomes in the unregulated systems. This is not necessarily the fault of the model, but rather that excessive reliance on modelling was the wrong tool to use.**

6. SPECIFIC FLOW INDICATORS

- In the unregulated northern rivers, the importance of all the flow indicators cannot be over-estimated. Examples include flow intervals, durations, frequency, variability of frequency, volumes, longitudinal connectivity, etc.
- Attachment B provided by the MDBA graphically demonstrates the impacts on these indicators when comparing "without development conditions" with "baseline conditions" at Bourke.
    - A similar graph, shown in Figure 4 in the Basin Plan Review report, but over a different time period, shows an equally telling story.
    - Most noticeable, the impacts on loss of longitudinal connectivity and increased flow intervals through development up to 2009 are highly pronounced.
    - With this degree of impacts at Bourke, it stands to reason that it is further exacerbated progressively downstream.
    - Attachment A highlights this lack of longitudinal connectivity and increased interval frequencies between larger flows at Wilcannia.
- **Flow intervals are of critical importance for many sustainability goals, including environmental attributes, town water supplies and grazing properties dependent on stock and domestic access.**
- **Longitudinal connectivity is critically important in securing connectivity between the Northern and Southern Basins.**

- This connectivity is important for a number of reasons, with fish sustainability being one example.

- Without guaranteed protection of environmental water, irrespective of the water recovery target, the sustainability of these non-extractive water uses will continue to be challenged, particularly through impacts on flow intervals and longitudinal connectivity.
- **Even with protection of environmental water, the proposed reduced water recovery target logically must adversely impact to a greater extent on sustainability goals, through the negative impacts on all the specific flow indicators, compared to a 390 GL recovery target.**

7. USE OF BEST AVAILABLE SCIENCE

- A primary reason for the Northern Basin Review was because there was considered to be insufficient "science" available to make a definitive recommendation on the appropriate water recovery target.
- As a consequence, environmental science and socio-economic studies have been undertaken during the last four years, presumably to complement already available "science". The environmental science studies were focused on specific aspects (fish, waterholes, etc) and were undertaken by separate groups of scientists.
- It appears that the holistic scientific assessments report by Thoms et al (1996), "*Scientific Panel Assessment of Environmental Flows for the Barwon Darling*", which was strongly referenced by NSW in the "*Water Sharing Plan for the Barwon- Darling Unregulated and Alluvial Water Sources Background document (2012)*" (Background Doc) was given little consideration or ignored in the final Basin Plan Review recommendation process.
    - *The report states: "The objectives of the this study were to assess the in-stream ecosystem, determine its flow requirements and thereby provide a basis for interim flow rules. This information was required for the Interim North-West Unregulated Flow Management Plan and subsequent management developments".*
    - As stated in the recently released MDBA Modelling Report:
        - *"The models (used for the majority of the report) do not include the Interim Unregulated Flow Management Plan for the North West".*
        - *"There was not sufficient time to incorporate the (late arrival update) model in the framework and fully assess the flow and diversion changes resulting from these updates".*
        - Some consideration was given to these very late during the review process, but the degree of rigor appears inadequate.
- Thoms et al (1996) reference document makes clear recommendations for protection of low flows in the Barwon Darling.
    - For examples, it recommends that there should be no abstraction of water for irrigation purposes below a flow of 500ML/day at Bourke, and pumping thresholds for B Class pumps (24 inch pumps) should be increased to 1820 ML/day.
    - In response to these recommendations, the Barwon Darling Water Sharing Plan has effectively allowed 24 inch pumps to extract large volumes of water from any flows at Bourke of at least 350 ML/day.

- There were no references in the environmental science research studies that stated that the conclusions by Thoms et al 1996 were wrong.
    - Hence it can only be concluded that the MDBA commissioned environmental studies were relying on Thoms et al 1996 previous assessment, and adding to it; not replacing it.
- Most if not all of the "science" used to advise the review was based on 2009 water sharing arrangements that were in-place in June 2009.
    - For examples, this includes Baseline Scenarios and the Environmental Science studies commissioned by MDBA during the review period.
    - Hence these have not given consideration to the significant changes to water sharing arrangements introduced through the BD WSP in 2012. The impacts of these changes on low flows in the Barwon Darling deserve serious consideration before conclusions are drawn based on either ignorance or assumptions.
- **If key aspects of all available science have not been considered through the review process, any recommendations to vary the Reduction Target must be questioned.**

8. APPLYING THE "COMMON SENSE" TEST

- Excessive reliance on theory for such highly variable flow patterns does not "make common sense", yet recommendations have been drawn without regard to "the common sense test".
- Theoretical examples that should be thoroughly questioned include:
    - Reliance on long term average modelling rather than consideration of event flows and management
    - Reliance on the multiple number of hypothetical strategies stated in Item *"9.3 Downstream Deliverability Conclusions"* within the Northern Basin Hydrological Report to achieve downstream flow management and outcomes in the Barwon Darling.
    - Reliance on commence to pump thresholds to prevent excessive extractions and thereby protect downstream needs
    - Reliance on having State authorities committed to the vision and objectives of the Basin Plan
    - Reliance on external authorities (States or their delegates) to ensure provision of ongoing accurate data, monitoring, evaluation and compliance.
    - Reliance on any toolkit strategies that have not been fleshed out for the unregulated rivers as an adequate justification to reduce the reduction target by 18%.

9. STARTING POINT for the BASIN PLAN

- Confusion amongst different community interest groups regarding "the starting point for the Basin Plan" has been problematic and never clearly addressed throughout the process, resulting in contentions, confusions, and questioning of findings.
- Intergenerational Aboriginal considerations have been effectively overlooked.

- Examples of where there has been lack of clarity of the "starting point" of the issues intended to be included or addressed are:
    - The initiatives of cotton growing irrigators to sell water licences to the Commonwealth from Toorale Station, Bourke in 2008, Buttabone Station, Warren in 2010 and Collymongle Station, Collarenebri in January 2012 have been included within the aggregate towards reduction target, and presumably into the 2009 Baseline Scenario data, including in relation to the sale of Toorale in 2008 (one year before the Baseline).
        - The socio-economic impacts of these sales have received detailed studies that have been fed in the review process.
    - Bourke and Warren Councils have recently been granted a combined total of $2 million of Commonwealth funds to offset some of the socio-economic consequences of buyback, most of which occurred before the Basin Plan in 2012.
    - By contrast, the changes created by NSW through the Barwon Darling Water Sharing Plan (BDWSP) in October 2012, one month before the Basin Plan was released, have not been effectively included in any of the flow modelling on which the Review Recommendations have been made.
    - No consideration has been given to understand if there have been any adverse impacts to downstream water users, including the environment, from the BDWSP.
- Reliability of the Fish Study and its recommendations commissioned by the MDBA must be questioned knowing that this study relied upon 2009 data and policies, without consideration of changes created by the Barwon Darling Water Sharing Plan.
    - Presumably these recent studies assumed the policies applicable in 2009 were still in place.
    - The policies applicable in 2009 were based on considerations given to the 1996 Document by Thoms et al *"Scientific Panel Assessment of Environmental Flows for the Barwon-Darling River"*.
    - These studies also depended on long term average flows, and appeared to give no recognition to the apparent changes of pre verses post 1994 flows as analysed for Wilcannia.
- **This small number of examples highlights a lack of consistency and transparency in the review process, with a logical conclusion that findings and conclusions may be biased or skewed.**

10. MODELLING

- In the Barwon Darling section of the recently released MDBA Modelling report, the following statements are made:
    - *"In-stream minimum flows are protected from extraction by specifying flow thresholds for each class licence in different river reaches".*
    - *"The models do not include the Interim Unregulated Flow Management Plan for the North West."*
    - *"The model used for the Northern Basin Review was unchanged from the Basin Plan development version. This model represents 2007/08 level of development and incorporates cap accounting rules of July 2007. NSW have recently finalised an updated model representing the water sharing rules of the interim water sharing plan. This model was available*

relatively late in the Northern Basin Review process, hence there was not sufficient time to incorporate the model in the framework and fully assess the flow and diversion changes resulting from these updates.
As a result, the MDBA version of the model does not include the embargo on diversions of Class B and C licences, and also does not include the water sharing rules of interim WSP, such as limiting take to 300% limit in any water year. Although the updated model was not used as part of the Northern Basin Review, a comparison of two versions of the model indicated only small differences in long term average flow values and environmental flows along the system and confirmed that the use of the water sharing plan model would not have impacted the key findings from the Northern Basin Review modelling.
Community consultation conducted as part of the Northern Basin Review has emphasised the social and cultural importance of low flows through the Barwon–Darling.
Work by the MDBA suggests that rule changes in recent years may have reduced the protection of low flows, but this reduction will not be reflected in the Northern Basin Review modelling results. *The Authority have therefore recommended (as part of the 'toolkit') improvements to state water management arrangements to safeguard low flows across the North (MDBA 2016)."*

- Section 9.3 of the Hydrological Modelling Report provides absolutely no confidence that sustainable flows can be created in the Barwon Darling.
    - Platitudes such as:
        - *"They (changes) would also need to include an element of environmental flow protection within the tributary catchment, while guarding against impacts to other users in the system. Striking this balance would require significant work and engagement with interested parties.*
          Moving towards (to) more coordinated approach to Northern Basin operations would therefore require a significant investment."
        - *"Further work is required to assess the costs and benefits associated with coordinated watering, but it is estimated that a full realisation in the Northern Basin would requires years, possibly decades, to be achieved"*

      give absolutely no confidence regarding achievement of a desirable goal.

- MDBA staff have frequently advised that modelling of low flows in the unregulated river systems in the Northern Basin is not reliable.

- **The above quotes and information provide no confidence that the conclusions drawn from the modelling in relation to low flows, and the consequences of low flows, including longitudinal connectivity and flow intervals can be credible or defendable, and therefore no confidence in the recommendation for a reduced reduction target.**

- The examples of what are not included in the MDBA version quoted above could be more enlightening if they also included reference to the removal of pump size limits, as demonstrated in Point 13 of this submission.
- The MDBA's recommendation regarding *"improvements to state water management arrangements to safeguard low flows across the North"* must be strengthened to specify the degree to which these improvements must be made, and that the MDBA must use its authority to force the necessary actions in this recommendation so they apply irrespective of the ultimate reduction target.
    - ***"Improvements to state water management arrangements to safeguard low flows across the North"* should not been considered an optional tool within the toolkit, particularly in consideration of protection of environmental water within a low flowing unregulated river.**
      Rather, it should be guaranteed as an essential lever hard-wired into the machinery of both the water sharing plan/water resource plan and to the Basin Plan.

11. CURRENT TOOLKIT

- The key element in the toolkit relates to protection of environmental water.
    - This should be "a given", not "an option", irrespective of the quantum of recovery target.

- The Basin Plan contains specific plans and frameworks to ensure six clear objectives, two of which are that:
    - *"environmental water is used effectively" and*
    - *"state governments are committed to the Plan"*

- The Water Act 2007 Definition states*: "environmental watering means the delivery or use of environmental water to achieve environmental outcomes".*

- Under current State Water Sharing Plan rules, environmental water looses its environmental water status once it enters a different water sharing plan area. Hence it is not managed in accordance with its defined purpose.

- NSW Government introduced new access provisions to allow irrigators increased access to low flows in the Barwon Darling Water Sharing Plan (BD WSP) effective from October 2012, one month prior to the release of the Basin Plan, and the NSW Government has shown no genuine commitment to effect a clause within the BD WSP which may effectively achieve the necessary protection of environmental water.
    - **Hence, for the last four years there is no evidence that environmental water has been used effectively, or in accordance with its legally defined purpose, or that the NSW Government is committed to the Basin Plan.**
    - With this history, neither the MDBA nor any person in the street should have any confidence for future change to address these breaches of the objectives.

12. RECOMMENDED ELEMENTS IN ANY FUTURE TOOLKIT FOR THE UNREGULATED RIVER SYSTEMS IN THE NORTHERN BASIN

For any future toolkit for the Unregulated Intersecting Streams and Barwon Darling, irrespective of the recovery target, new tools should include:

- **Offer of buyback of licences from the Intersecting Streams and the Barwon Darling at announced fixed prices equivalent to a developed licence price.**
    - The reason for this is to pre-empt activation of these licences either in the Intersecting Streams, in the Barwon Darling or in tributaries in NSW or Queensland through changed trading arrangements.
- **For every dollar spent on water buyback, from anywhere across the Northern Basin, provide the Local Council with a matching grant equivalent to the value of the buyback.**
    - The purpose of this is to allow the Local Council to use the grant to offset the assumed negative impacts of the buyback on the socio-economics of the local community.
    - The reactions from Bourke and Walgett Councils to the recent $2 million grants received collectively exemplifies the benefit of this strategy, most significantly if it is simultaneously with the buyback.
    - Local Councils and communities will become active co-operators and participants in the Basin plan process, rather than antagonistic.
    - It is understood that this action would result in a lesser commitment of taxpayer funds per unit of recovered water, with the benefits spread across a whole Local Council region, compared to the current investments of taxpayer funds to water efficiency programs which may only provide "third party" benefits to a small sector of employment.
    - This "tool" could be applied across the whole of the Northern basin.

- **Amending current policy to allow the Commonwealth to purchase and potentially trade Account Water held in licences in the Barwon Darling, purchased at announced prices for each class of water.**

- **Essential implementation of the Clause in the BD WSP relating to introduction of Individual Daily Extraction Limits on all licences at the rate applicable in 2012 prior to the commencement of the BD WSP.**
  Alternatively:
    - Lift the commence to pump threshold for all A Class licences using any pump of greater diameter than 150 mm to be the same threshold as for B Class Licences, or
    - Use Clause 63(1)(d) to compulsorily convert all A Class licences that use pumps of diameter greater than 150mm to B Class licences.
- **Explore opportunities for temporary trade of environmental water for extraction purposes under pre-determined conditions.**

- **Ensure that all community engagement actions relating to the Barwon Darling are inclusive of all water users, and not just of the narrow membership of Barwon Darling Water.**
    - Further, because Barwon Darling Water are understood to have no memberships in the Intersecting Streams they should not be involved in engagements relating to the Intersecting Streams.

- **Construction of a "dam" at Wilcannia to replace the current weir, with an incorporated fish ladder and also ability to release low level flows downstream when the river has ceased to flow.**
    - This should have an increased storage capacity compared to the current weir, with the increased volume offsetting to a small extent the reduction of minimum volumes needing to be stored in Menindee Lakes to secure future Broken Hill town water supply.
    - The purposes of this action are to:
        - Address Wilcannia town water supply security (as has occurred at Broken Hill through a different strategy),
        - Contribute to Aboriginal culture and heritage, and
        - Contribute to improved longitudinal connectivity that will assist basic landholder rights and environmental flows from Wilcannia to Menindee.

13. BARWON DARLING EXTRACTIONS CHANGES AT A GLANCE

- Attachment C shows one site of pumps at Bourke owned by the company who hold at least 40% of all A Class Licences on the Barwon Darling River.
    - This site is solely used as an example of the impacts of change when the BD WSP was introduced in October 2012.
- The true effects of change depend on consideration of the cumulative impacts by all licence holders, particularly as virtually all will be seeking access to the same flows at the same time.

- The pumps in Attachment C are believed to be:
    - Two 6 inch (150 mm) diameter pumps, which historically (prior to the introduction of the BD WSP in 2012) were used for A Class extractions, but could also be used for B and C Class extraction.
    - Eleven 24 inch (600 mm or larger) diameter pumps, which historically were used for B and C Class extractions but could not be used for A Class extraction.
- The NSW Department "rated extraction volume" for each of these pump sizes are:
    - 6 inch diameter pumps 5 Ml/day
    - 24 inch diameter pumps 80 Ml/day.

- **Historically (before October 2012)** at this pump site, the maximum total daily extraction for each group of pump sizes was therefore:
    - **Total A Class water able to be extracted 10 Ml/day**
    - Total B Class water able to be extracted 890 Ml/day.
- **Since October 2012** At this pump site, the maximum total daily extraction for each group of pump sizes was therefore:
    - **Total A Class water able to be extracted 890 Ml/day**
    - Total B Class water able to be extracted 890 Ml/day

- Historically, A Class extractions at this site could drop the river volume at Bourke by 10 Ml/day.
    - For example, drop from 360 Ml/day to 350 Ml/day.

- Since October 2012, A Class extractions at this site can drop the river volume at Bourke by 890 Ml/day.
    - Hence any flow below 1240 Ml/day can legally be dropped to 350 Ml/day.

- Both before and since October 2012, B Class extractions at this site have been able to drop the river volume at Bourke by 890 Ml/day.
    - For example, any flow below 2240 Ml/day can legally be dropped to 1250 Ml/day.

- **Combining the cumulative effects of A plus B Class extraction rules since October 2012, this pump site alone can effectively drop a daily flow at Bourke by 890 Ml to a minimum legal limit of 350 Ml/day. This creates total vulnerability of all flows in the range of 2240 Ml/day to 350 Ml/day.**

- As referenced in the *Water Sharing Plan for the Barwon- Darling Unregulated and Alluvial Water Sources Background document (2012)* (Background Doc), a further recommendation by Thoms et al (1996) was that *"pumping thresholds should be increased to the 60 percentile for B Class licences".* This equated to **no extractions of B Class water at Bourke below 1820Ml/day. A further recommendation was that there should be no pumping at all for any irrigation below a flow of 500 ML/day at Bourke.**
    - **The current extraction threshold capabilities are far below these recommendations.**

- On 3rd November 2015 the owner of this pump site told the Chair and at least one other Board member of the MDBA, plus other people, including me, that he had recently pumped 12 GL water from a low A Class flow event, using this pump site.
    - This demonstrates the power of significance of the above- mentioned changes, without consideration of either the additional opportunity for this irrigator to extract all traded water at the appropriate commence to pump thresholds, or the added impacts of extractions of all irrigators at other sites.
    - If the extraction of this 12 GL occurred at an estimated average rate of 500 Ml/day, the extraction period would have been 24 days.
    - By comparison, prior to the BD WSP in 2012, 24 days extraction of A Class water at 10 Ml/day would have resulted in 240 Ml, or **2% of what occurred in 2015 over a short period** (maybe one month) **during an extended period of low flows.**

- On 17th January **2017**, I received a phone call in relation to a proposal by NSW Government/Department to change the BD WSP to allow unlimited water trading for the Barwon Darling.
    - If this proceeds, it significantly increases the opportunities for total concentration of any or all classes of water licences to any single or localised location along the entire Barwon Darling system, thereby accentuating the ability of the above extraction rates to be repeated almost consistently from year to year.
- **The above scenarios are what the Review report admits has not been effectively considered. It also highlights the lack of commitment by the State Government to the Basin Plan.**

14. BD WSP STRATEGICALLY

- In response to a personal request for advice on what should be in the MDBA's work plan for the Northern Basin Review, on **9th February 2013** I recommended that the policy influences of the Barwon Darling Water Sharing Plan introduced five months earlier (October 2012) should be evaluated as a component of the MDBA work plan to achieve effective outcomes from the Northern Basin Review.
- I believe a great opportunity was lost by the MDBA in not taking any initiative four years ago to consider these policy influences, and in addressing actions as may have been appropriate at the time.
    - For example, had the MDBA determined that the introduction of Individual Daily Extraction Limits on each licence may have been critical to the success of the Basin Plan, particularly for shepherding of environmental water, the MDBA may have been successful in working with the State Government to effect this implementation, to achieve mutually beneficial outcomes.
- For highly variable flowing unregulated river systems, water sharing plans and their successors are the most powerful tools to assist in management of individual flow events.
    - Such flow event management is paramount if consideration is to be given to all water users, including the environment, and to long-term sustainability of holistic river systems.
- I firmly believe that the water sharing plans and their successors are absolutely fundamental to the sustainability or otherwise of our inland rivers, and to the success or failure of the Basin Plan across the Northern Basin.
- Unless there is a radical change in the commitment by the NSW Government to river sustainability and fairness between all water users as expressed through NSW water sharing plans and their successors, I remain concerned that future societies will be witnessing a "dead Darling", and a similarly disastrous Lower Balonne "floodplain", occasionally resurrected by intermittent large floods. This will be irrespective of the Basin Plan, or lack of a Basin Plan.
    - **Unless this commitment and necessary associated action by the NSW Government occurs across the Northern Basin, the Basin Plan will potentially be judged as having given:**
        - **increased security of tenure and licence value to water licence holders**
        - **increased security of access to licence holders**
        - **increased asset value to licence holders who have participated in the efficiency measures option**
        - **potential long term employment losses on those properties where the efficiency measures option has been used**
        - **environmental gains in most tributaries and to some extent to Narran Lakes, and**
        - **an effectively dead Darling River**

all at a massive cost to taxpayers through potentially the greatest structural adjustment program ever held in rural Australia.

- **An anticipated legacy will be a need for a future water reform program in the Northern Basin again attempting *to" ensure that water is shared between all users, including the environment, in a sustainable way".***

- I will not be proud of such an outcome.

Geoff Wise

I understand this submission may be placed on the public record.

FIVE ATTACHMENTS FOLLOW

Attachment A

CHANGES IN RELIABILITY OF FLOWS IN DARLING RIVER AT WILCANNIA

There has been up to a 1,000% DROP IN RELIABILITY of river flows at Wilcannia over the last nearly quarter century *(22 years)* ***compared to the previous three quarters of a century*** *(74 years).*

- ***Over one quarter*** (27%) ***of all Decembers now experience zero flows***
  > ***1,000% decrease in reliability***

- ***Nearly half*** *(44%)* ***of all Octobers, Novembers and Decembers experience zero or very low flows***
  (less than average daily flow of 33.3 ML/day or 1,000ML/month)
  > ***800% decrease in reliability***

- ***13.6% of all months of the year experience virtually zero flows***
  (less than an average of 1 ML/day total flow or 30 ML/month)
  > ***800% decrease in reliability***

- ***A quarter*** *(24.6%)* ***of all months of the year experience zero to low flows***
  (less than 33 ML/day or 1,000ML/month)
  > ***720% decrease in reliability***

- ***The river has stopped flowing completely for 20%*** *(20.5%)* ***of all months between November and February***
  > ***550% decrease in reliability***

- ***The river has stopped flowing completely for at least one month in nearly half*** (45.4%) ***of all years***
  > ***480% decrease in reliability***

This compared the periods before and after the Commonwealth Government introduced a Cap to limit any further growth in extractions in recognition of the declining health of the river systems in the Murray Darling Basin.

Despite this decision being agreed to at a State Ministerial Council meeting, Queensland chose not to introduce the decision for a number of years after 1995, and allowed massive growth in extractions particularly in the Condamine Balonne region.

Through a long consultation process, the NSW Government introduced a cap on growth in extractions, consistent with the Commonwealth's decision, retrospective to 1993/94 estimated levels of extraction, effective from July 2007.

Whether you believe this decrease in reliability is influenced by climate change, climatic variability, changed dry-land farming practices or irrigation extractions, the facts are that the reliability of low river flows at Wilcannia have decreased massively since the united agreement by the Commonwealth and all Basin Plan State Governments that the levels of diversion at the time were placing stress on both the environmental health of the river systems and the reliability of water supply to water users.

In 2012 the NSW Government introduced further changes through the Barwon Darling Water Sharing Plan. These changes effectively gave cotton irrigators access to low flow licences with the ability to annually extract up to 650% of the long term annual average usage when the users of these licences were a small number of people with permanent plantings and graziers aimed at drought proofing their properties. **The significance of these 2012 changes in allowing access to significant extra volumes from low flows in the river are not yet being reflected in daily flow records in the lower Darling from Bourke to the Murray River.**

All Commonwealth and State legislation including the Barwon Darling Water Sharing Plan have words to recognise that town water supplies, other domestic access requirements and livestock access requirements are of higher priority that access for irrigation or other productive uses.

Five of the 10 Objectives of the NSW Water Sharing Plan for the Barwon-Darling are stated to:

- *"protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources*
- *protect, preserve, maintain and enhance the Aboriginal, cultural and heritage values of these water sources*
- *protect basic landholder rights*
- *contribute to the maintenance of water quality, and*
- *contribute to the environmental and other public benefit outcomes identified under the National Water Initiative".*

Despite these words, the reliability of low flows at Wilcannia appear to be on a continual downslide, with direct negative impacts on the identified highest priority objectives of the Water Act and relevant Plans.

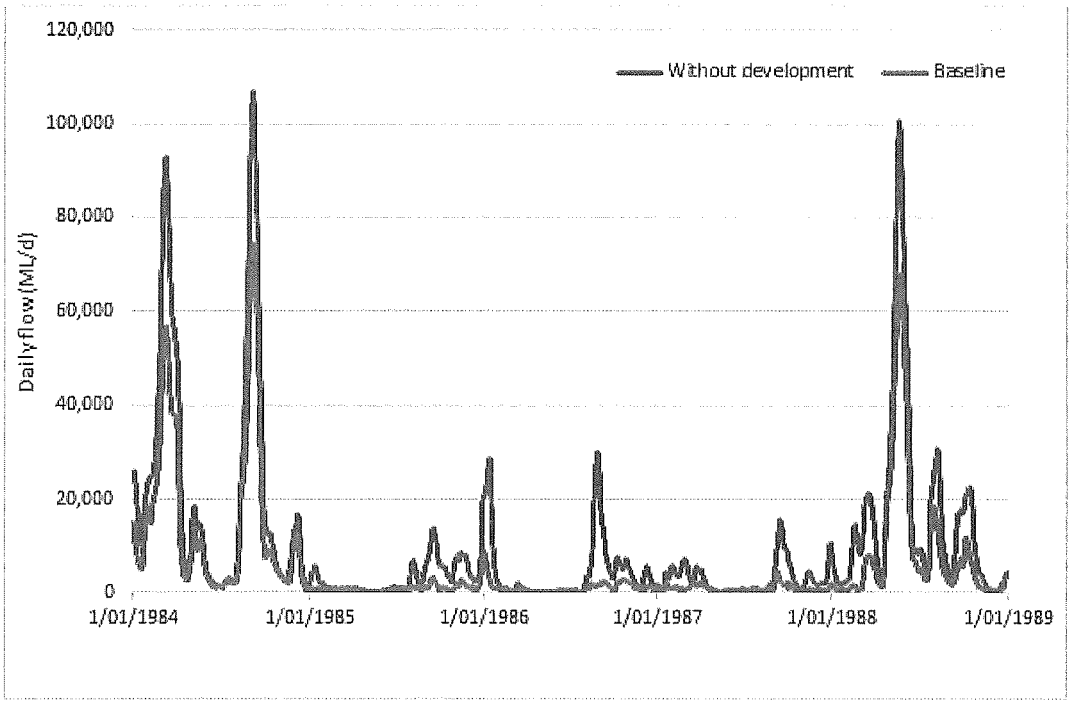
The ability of the multi billion dollar Basin Plan to create any tangible turn-around to these long periods of zero and low flow conditions in the "Artery of the Outback" which historically connected Queensland to Victoria and South Australia must be strongly questioned.

Badger Bates, a member of the Barkinjie People, the River People of the Darling, states that if the river dies, the people and their cultures die. Is this a goal we should be aspiring to, not only for Aboriginal People, but for all people associated directly or indirectly with the Murray Darling Basin?

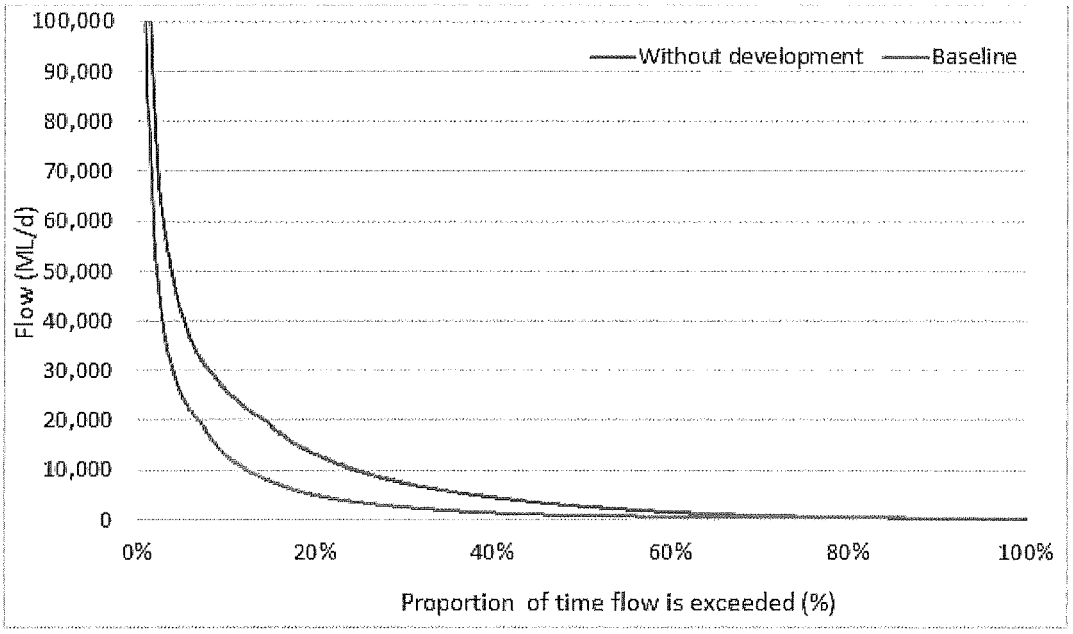
Background to the data source and data analysis is available separately.

Geoff Wise 29th November 2016

Attachment B: **Daily Flows at Bourke**

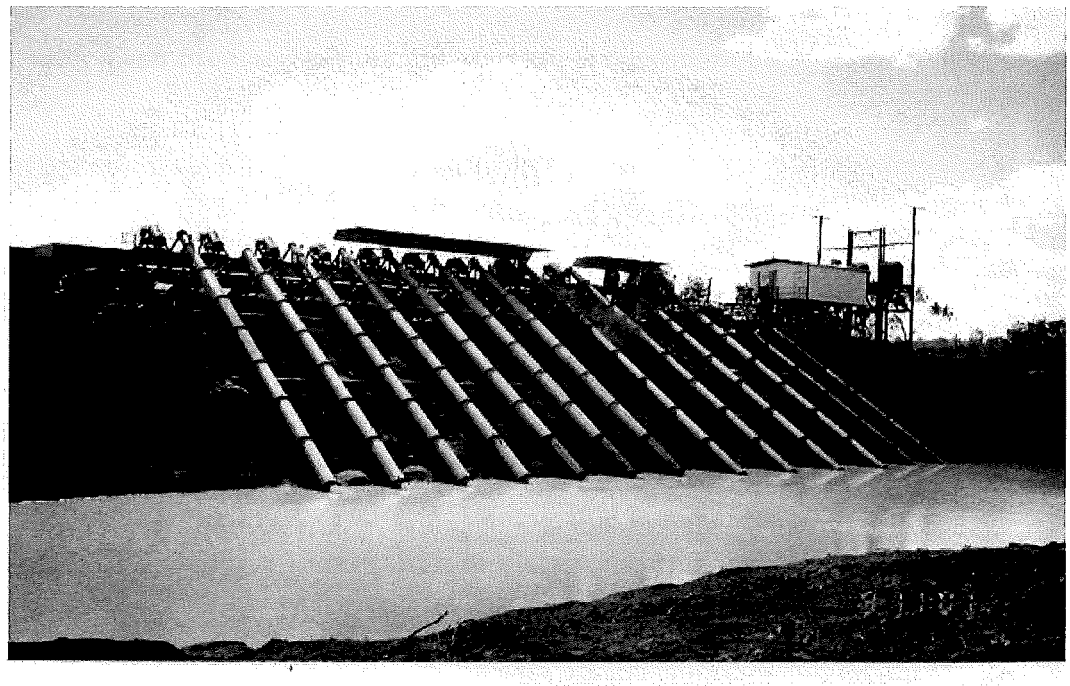


Daily flows at Bourke 1/01/1984 to 1/01/1989



Flow frequency curve of the Darling River at Bourke (without development conditions and baseline conditions), for the period from 1895 to 2009

Attachment C: **One Irrigation Pump Site at Bourke**



Attachment D: **Examples Of Irrigation Extraction Impacts On Water Sharing In A Sustainable Way in the Barwon Darling**

- Impacts of extractions means that the historic Darling River boat transport system could never be achievable today.
- The original water licences first issued, being small A Class licences for "drought-proofing grazing properties" can no longer be used for their original purpose.
- Basic Rights Landholders have been forced to review their stock carrying rates and business plans, as a consequence of increased regularity of zero and very low flows.
- Graziers historically dependent on the river system to serve as an effective property boundary have had to make compromised arrangements due to the increased regularity of zero and low flows.
- All small-scale irrigators have been squeezed out of the valley by a small number of large operators.
- Broken Hill has been forced to find an alternate source for their town water supply.
- Bourke Council has had to find an alternate source to back up their town water supply.
- Graziers in the Barwon Darling and Intersecting Streams have had to source alternate water supplies, if available, at great cost.
- The title "Floodplain graziers" has effectively lost its meaning.

Attachment E:

PERSONAL CREDENTIALS FOR MAKING THIS SUBMISSION

In making this submission, I acknowledge that I have had a privileged position of having been significantly involved through being a member of the Northern Basin Advisory Committee.

I make this submission as a committed citizen and taxpayer, with no conflict of interest or personal business association with the river systems in the Northern Basin, other than living in Dubbo and therefore dependent on the Macquarie River and local groundwater aquifers for my domestic water needs.

By contrast, I suspect that the majority of submissions will be from people or organisations that do have direct or perceived conflicts of interest.

I have been privileged to have experienced a lifetime career employed in State and Local Governments, and living and working with communities across the western half of NSW, associated with programs directly linked to quadruple bottom line experiences involving economic, environmental, social and cultural considerations.

Outside of my employment, I have been significantly involved:

- With Commonwealth and State regional development organisations for over a decade
- As a member of Charles Sturt University Council for 10 years
- As instigator of a highly successful Commonwealth, State and landholder $30 million Regional Partnership Program, and Chair of its Management Board for 10 years, and
- As a member of the Queensland-NSW Darling Matilda Sustainable Regions Advisory Committee for 3 years.

With this background, I confidently claim that I focus on constructive and objective progressive change and improvement for the long-term benefit of sustainable communities and their environments, particularly across western NSW.

170928 SUBMISSION TO SENATE INQUIRY INTO INTEGRITY OF THE WATER MARKET IN THE MURRAY-DARLING BASIN

Submission by Geoffrey Wise, 12 Avalon Place DUBBO 2830
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BACKGROUND

- I was a member of the Northern Basin Advisory Committee (NBAC) to the MDBA from 2012 until 2016. Through this role I was privileged to have both access and input to policy and operational details relating to the Northern Basin.
- In another role, I Chair a NSW Advisory Committee answerable directly to the NSW Minister responsible for Lands. For most of the last four years the various Ministers responsible for Lands have also been responsible for Water. In this role I have given advice regarding water matters directly to the NSW Minister
- My contributions to the Senate Inquiry are restricted solely to the Northern Basin, almost solely to the Barwon Darling River system, and focused on Terms of Reference "c," "d" and "f".
- My contributions are predominantly papers I have provided to the MDBA through my role on the NBAC, copies of some which are attached.

SUMMARY OF MAIN POINTS

1. **Lack of transparency in development of NSW Barwon Darling Water Sharing Plan 2012 (BDWSP).**
   - Both the BDWSP and the Basin Plan were developed simultaneously during 2012, with the BDWSP being released in October 2012, one month prior to the Basin Plan release.
   - There have been consistent rumours that a draft of the BDWSP was provided to the MDBA for acceptance, but the draft BDWSP was subsequently changed and not shared again with the MDBA. The degrees of change, if any, are not publically known.
   - If there is any truth in these rumours, it may be that through the development of the BDWSP the State potentially undermined the Murray Darling Basin Plan (TOR "c") even before the Basin Plan was released.

2. **Failed implementation of the NSW Barwon Darling Water Sharing Plan 2012 (BDWSP).**
   - The BDWSP created significant changes from previous rules, particularly by abolishing pump size limits for each Class of Licence and creation of a Clause allowing the Minister to introduce Individual Daily Extraction Limits (IDELs) on pumps to equate to the volumes previously able to be extracted by the smaller pumps.
   - There are repeated references in both the Background Document to the BDWSP, and within the BDWSP, that IDELs would be introduced as an alternative to the previous pump size limits.

- Successive State Ministers have not exercised this authority to introduce IDELs.
- The consequences of this have been that large pumps are now accessing low flows at 1600% greater rate of daily extraction than what was possible prior to October 2012.
- These low flows able to be extracted include Environmental Water acquired from the tributaries to the Barwon Darling (TOR "d").

3. **Contradiction between the Basin Plan having a "Shared Reduction Target for the Barwon Darling" and NSW Water Sharing Plan rules allowing Environmental Water acquired in the tributaries to the Barwon Darling to be able to be extracted for irrigation in the Barwon Darling.**
    - Of the original total Northern Basin reduction target of 390 GL, 143 GL was identified by the MDBA to be "Shared Reduction" from all tributaries and from the Barwon Darling, to deliver environmental outcomes for the Barwon Darling.
    - However, the NSW BDWSP allows irrigators to extract any water subject to the flows being above "commence to pump flow volume limits". Hence environmental water acquired by the Commonwealth in tributaries is not protected from extractions in the Barwon Darling.
    - The most common times environmental water is likely to reach the Barwon Darling, and is most needed for environmental purposes in the Barwon Darling are during periods of relatively low flows, which is also the most likely times that irrigators are desperate to extract water.
    - This combination of policies between the Commonwealth and State is an absolute oxymoron, paradox or fundamental flaw in policy consideration, undermining the Basin Plan (TOR "c"), impacting on Basin communities (other than irrigators) and the environment (TOR "d") and wasting of taxpayer money (TOR "e").
4. **Poor Governance arrangements**
    - Through the various Commonwealth and State legislation behind the management of the Murray Darling Basin, I submit that poor governance arrangements were established.
    - The only real tools available to the MDBA are an ability to recommend a Sustainable Diversion Limit, and the Authority's potential "powers of persuasion".
    - By contrast, States hold virtually all operational tools that are so essential for effective implementation of the Basin Plan and overall management of rivers, and therefore of outcomes. This includes most elements of your Senate Inquiry, including theft, corruption, breaches, corruption, compliance, measurement, monitoring, etc.
    - In February 2013, through my role on the Northern Basin Advisory Committee, I drew attention to the MDBA that for effective good governance, they need to give greater attention to their highest risks, such as the changes created in the 2012 BDWSP, and undertake a comprehensive risk assessment of both achieving a

desired outcome and untoward consequences. I have never been convinced that this advice was effectively heeded. (TOR "f").

5. Understanding the significance of flow variability in the Barwon Darling (TOR "f").

- The significance of flow variability in the Barwon Darling is best captured by the following three examples.

Example A. Some Bourke river flow Statistics

This information is derived from analysis of 67 years of publically available annual (calendar year) flow data at Bourke from 1944 to 2014. Fours years of data during the period are not available.
Flow conditions at Bourke provide indications of flow conditions for the remainder of the Darling River downstream of Bourke.

- 50% of years accounted for 11% total volume
- 13% of years accounted for over 50% total volume
- 33% of years accounted for less than 5% total volume

Example B. Changes in reliability of flows in Darling River at Wilcannia

There has been up to a 1,000% DROP IN RELIABILITY of river flows at Wilcannia over the last nearly quarter century (22 years) compared to the previous three quarters of a century (74 years).

- *Over one quarter* (27%) *of all Decembers now experience zero flows*
  > *1,000% decrease in reliability*

- *Nearly half (44%) of all Octobers, Novembers and Decembers experience zero or very low flows*
  (less than average daily flow of 33.3 ML/day or 1,000ML/month)
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- *13.6% of all months of the year experience virtually zero flows*
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- *A quarter (24.6%) of all months of the year experience zero to low flows*
  (less than 33 ML/day or 1,000ML/month)
  > *720% decrease in reliability*

- *The river has stopped flowing completely for 20% (20.5%) of all months between November and February*
  > *550% decrease in reliability*

- *The river has stopped flowing completely for at least one month in nearly*
  half (45.4%) *of all years*
  ➢ *480% decrease in reliability*

Example C. Comparison of Volumes of extraction for irrigation to Flows at Wilcannia

- Comparison of extractions to flows on an annual basis provides a totally different picture to comparing on long term averaging, because a few years of massive flows totally masks the effects of the many years of low to medium flows.
- Over the 12 years of accessible data, annual variations of extractions compared to annual flows at Wilcannia ranged between 143% and 5%, with a 12 years average of 15%.
- Frequent recent quotes by a number of politicians, journalists and irrigator representatives that extractions only account for 6% of total flows in the Barwon Darling are totally misleading, irrelevant, and poorly justified.
    - They are equivalent to me saying that if I stand with one foot in a bucket of dry ice at minus 26 degrees centigrade, and the other foot in a bucket of boiling water at 100 degrees, on average the temperature of 37 degrees is normal, so I should feel perfectly healthy.

ATTACHMENTS

Attachment 1. 160721 Darling River at Risk.

This attachment contains twelve conclusions, with one being that the combination of the current BDWSP and the Basin Plan can be predicted to create a "*Dead Darling, occasionally resurrected by a big flood*".

Attachment 2. 161129 Wlicannia Reliability

This attachment highlights and describes the implications of the decrease in reliability of low flows at Wilcannia, comparing the three quarters of a century of monthly flow records at Wilcannia prior to the Commonwealth Government announcement of a cap on extractions from the Murray Darling Basin, to the one quarter of a century of monthly flows since that announcement.

Attachment 3. 161213 Members Report

This attachment was my final report to the MDBA at the conclusion of the role of the Northern basin Advisory Committee. The report contains seven concluding recommendations to the MDBA.

Attachment 4. 170219 BP Submission

This is the report I submitted in relation to the review of the Basin Plan held in early 2017. My concluding response was:

- *Unless there is a radical change in the commitment by the NSW Government to river sustainability and fairness between all water users as expressed through NSW water sharing plans and their successors, I remain concerned that future societies will be witnessing a "dead Darling", and a similarly disastrous Lower Balonne "floodplain", occasionally resurrected by*

intermittent large floods. This will be irrespective of the Basin Plan, or lack of a Basin Plan.

- *Unless this commitment and necessary associated action by the NSW Government occurs across the Northern Basin, the Basin Plan will potentially be judged as having given:*
    - *increased security of tenure and licence value to water licence holders*
    - *increased security of access to licence holders*
    - *increased asset value to licence holders who have participated in the efficiency measures option*
    - *potential long term employment losses on those properties where the efficiency measures option has been used*
    - *environmental gains in most tributaries and to some extent to Narran Lakes, and*
    - *an effectively dead Darling River*

  all at a massive cost to taxpayers through potentially the greatest structural adjustment program ever held in rural Australia.

  - *An anticipated legacy will be a need for a future water reform program in the Northern Basin again attempting to "ensure that water is shared between all users, including the environment, in a sustainable way".*
- *I will not be proud of such an outcome.*

Attachment 5. 170821 Description of Extractions to Flows

This attachment describes the massive variability of comparisons between annual irrigation volumes of extraction compared to annual volumes of flow at Wilcannia. It highlights that if long term averaging is used for such comparisons, occasional large floods mask the impacts of extractions.

Attachment 6. 170826 Composite graphs

This attachment graphs the variability described in attachment 5.

I am willing to attest to this submission further if requested.

G A Wise BVSC MACVS Phone 0455 44 7900

COMPARISONS BETWEEN
IRRIGATION EXTRACTION RATES
and
END OF RIVER SYSTEM FLOW RATES
in the
UNREGULATED BARWON DARLING RIVER SYSTEM

The following compares annual irrigation extraction rates from the Unregulated Barwon Darling to annual flow rates recorded at Wilcannia. For this exercise, the river gauge at Wilcannia was used as the surrogate to represent the "end of system" for the Unregulated Barwon Darling River System.

Data relating to extraction rates for the 12 water years from 1997/8 to 2008/09 used for this analysis *was made available by NSW Water (or current title at the time) and presented to a meeting of Barwon Darling Water (or Mungindi Menindee Advisory Council) in about 2009 or 2010.*
Wilcannia flow rates were accessed from the publicly available NSW Water reference site of "realtime water data", and were used as an indicator of "end of system" flows within the Unregulated section of the Barwon Darling River system.

CONCLUSIONS

The graphic conclusions for the Unregulated Barwon Darling River system are:

- **The percentage of volumes of extractions compared to end of system flow volumes varies widely when assessed on an annual basis.**
  - Over a consecutive 12 years of records, the annual percentage of extractions compared to annual end of system flows ranged between 143% and 5%,
  - For this period, extractions were at least 44% greater than end of system flows for half of the years, and at least 23% greater than end of system flows for three quarters of the years.
- **The percentage of volumes of extractions compared to end of system flows when assessed on cumulative records over 12 years is massively influenced by occasional large flows (floods), resulting in an meaningless interpretation that extractions account for a very low proportion of total flows.**
  - Over the same consecutive 12 years of records, the cumulative percentage of extractions compared to end of system flows was 15%.
- **This reduced comparative value created by long term averaging bears no resemblance to the annual averaging or to reality.**
- **All water users, including irrigators, urban communities, basic rights users and the environmental attributes are dependent on individual flow events, not on long term averaged information which has no relevance.**
- **Government and Departmental planning and policies tend not to recognise the importance of individual flow event analysis in the Barwon Darling River system that is so critical to all water users.**
- **Commentators are doing themselves and their audiences a dis-service by quoting figures derived from long term averaging of data relating to a river system such as the the Barwon Darling with extremely high variability of flows and of water usage.**

ADDITIONAL ANALYSIS

In comparing 12 years of recorded extractions from the Barwon Darling to annual flows at Wilcannia for each of the same 12 water years from 1997/8 to 2008/09:

- One year had 143% greater extractions than end of system flows
- Five years had extractions between 72% and 44% of end of system flows
- Three years had extractions between 24% and 23% of end of system flows
- Three years had extractions between 10% and 5% of end of system flows
- Whilst the cumulative long term average of extractions compared to end of system flows was 15%,
    - The annual range was between 143% and 5%
    - The median was 34%, being midway between the two middle year percentages of 44% and 24%.

DISCUSSION

- Using very long term comparisons between cumulative recorded volumes of extraction from the Barwon Darling River to cumulative total end of system flows over many years or decades provides extremely skewed and misleading understanding of reality.
- A commonly quoted statement is that irrigators only use 6% of total flows in the Barwon Darling.
    - It is assumed that this figure has been derived by comparing the current total annual entitlement of all irrigation licences on the Barwon Darling to the historic long-term average volume of flows at Bourke, or to some similar comparison.
    - This long-term average includes a number of large volume flows during flood years, and also many decades of flow records prior to development of the large irrigation industries across the Northern Basin.
    - Whilst 6% may be the conclusion from such long-term cumulative comparisons, it bears no relationship to explaining any understanding of the river system, to flow management, or to development or application of water policy.

- The impacts of extractions on annual flows are most pronounced during periods of relatively low flows. However, percentages of annual extractions to annual end of system flows are not solely linked to very low flow years. Rather, they relate to opportunities for licence holders to legally extract flows according to pumping thresholds and other components of water policies relative to their requirements.

Compiled by Geoff Wise 28th November 2017.