Submission No 110

INQUIRY INTO WATER AUGMENTATION

Organisation: Namoi Water

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Namoi Water

Submission to the Inquiry into the augmentation of water supply for rural and regional NSW
2017

Photo : Lake Keepit

Namoi Water : Supporting sustainable water use in the Namoi Catchment and representing water users in the Peel, Upper and Lower Namoi Catchment Area

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Background

Namoi Water appreciates the opportunity to make a submission to this Inquiry. Our Members support the development and growth of sustainable irrigated agriculture through a commitment to the ongoing management of our working rivers to ensure sustainable water use for the future of our communities for the long term.

The Committee's Terms of Reference are:

That Portfolio Committee No. 5 – Industry and Transport inquire into and report on the performance or effectiveness of the NSW government agencies that are responsible for the augmentation of water supply for rural and regional New South Wales, and in particular:

a) investigate the requirement for a water equation (demand and supply out to the middle of this century) for rural and regional New South Wales

b) examine the suitability of existing New South Wales water storages and any future schemes for augmentation of water supply for New South Wales, including the potential for aquifer recharge

c) review the NSW Government's response to the recommendations of the June 2013 report by the Standing Committee on State Development on the adequacy of water storages in New South Wales

d) examine the 50 year flood history in New South Wales, particularly in northern coastal New South Wales, including the financial and human cost

e) examine technologies available to mitigate flood damage, including diversion systems, and the scope of infrastructure needed to support water augmentation, by diversion, for rural and regional New South Wales

f) examine social, economic and environmental aspects of water management practices in New South Wales and international jurisdictions, including the following case studies: i. Broken Hill town water supply/Menindee Lakes system ii. South Western NSW water management practices iii. North Western NSW water management practices

g) the efficiency and sustainability of environmental water being managed by different State and Federal Government departments and agencies

h) the management, appropriateness, efficiency and reporting of:

i. inter-valley transfers ii. conveyance and loss water iii. carryover iv. the management and reporting of the water market, and i) any other related matter. 2. That the committee report by 27 October 2017.

Namoi Water would like to propose some principles to be considered by the committee as fundamental to the process of reviewing water management both now and into the future.

- Water planning and management must include funding and adequate assessment against proposed targets
- Regional data sets, (rather than desktop/surrogate) information must be ustilised in planning for future water management.
- Methodologies for water planning and management are not always a one size fits all approach
- Communities and water users need certainty that government intervention during planning period will be minimal (as per current provisions)
- Continued water reform processes impact negatively on regional communities, Government must recognize the fatigue in rural communities resulting from water reform

The following recommendations from the adequacy of water storages inquiry should be prioritised

- Recommendation 8 : That the NSW Government review the environmental flow allocations for all valleys in NSW and make representations to the Commonwealth Government for it to review the environmental flow allocations for NSW Valleys in relation to the MDBA Basin Plan
- Recommendation 10/11: That NSW Government fund and implement Computer Aided River Management and water metering project across NSW.
- Recommendation 18 : That the NSW Government establish an integrated water management taskforce comprised of representatives of each key water user groups and government with the following roles
    - To drive innovation in responsible water conservation, use and management and
    - To build collaborative relationships and promote the sharing of knowledge and expertise between and within water user groups in NSW
- That the NSW government commit to investing in water efficiency research and development, to inform an integrated, best practice approach to water management and to further advances in this area.

a) investigate the requirement for a water equation (demand and supply out to the middle of this century) for rural and regional New South Wales

Key to this inquiries questions are the availability of data and capacity to analyze this information for planning purposes. What are NSW rural and regional water needs in the short, medium and long term? This assessment of risks should include risks from climate variability and other shocks/stressors that may influence water availability and use into the next millennium. Information from the previous inquiry into adequacy of water storages informs this question and current policy directions being implemented by department have been provided in the government response. A key deliverable to this are the Regional Water Strategies.

The 1994 COAG agreement defined a cap on the level of water use in the Murray Darling Basin, based on modeled levels of development i.e.: irrigation infrastructure that was in place at the time of the agreement now forms the base of all limits on water available for use. This is referred to as the 93/94 CAP on diversions, it is this agreement combined with the Murray Darling Basin Plan that provides a constraint on NSW's ability to use and develop any additional water resources and infrastructure to provide for water security within the MD basin plan.

Australia currently uses 6% of our available water resources, compared to a world average of 9%. Whilst this is reflective of a conservative approach to water management, it is an important understanding in terms of how we manage our water use based on our semi-arid environment and is also reflective of our reliance on groundwater. How this equation stands up under changing population dynamics, variability in climate sequences, increasing pressure on regional water supplies and new management regimes for environmental water is unknown. Australia has in the past led the world in our focus on managing water sustainably, this approach included a holistic approach, including all aspects impacting on water management using integrated Natural Resource Management (NRM) principles.

Catchment management authorities implemented this integrated approach, underpinned by regional research and implementation led by farmers, the program was a breakthrough process improving regional outcomes. The Namoi CMA identified key themes, under each theme targets were developed to understand thresholds and indicators to measure improvement or decline. These themes; biodiversity, water, land use, people and communities represented the integrated nature of catchment management and therefore successful water management. These are critical in framing the broader questions that should be assessed as part of this review process. The basin plan is a clear example of singular focused legislation that fails to address the key issues in coordinated manner and will likely result in poor and unmeasurable outcomes.

The regional approach of catchment management enables understandings to be captured regarding key issues impacting both surface and groundwater and allows for local knowledge and local solutions to be utilized. The Namoi CMA catchment action plan identified assets and set targets for their condition and thresholds that potentially result in impacts that the asset could not be expected to recover from.

Funding this level of assessment allows for regional expertise, data collection, analysis and investigation of options to manage natural resources for improved outcomes. This example could also be said to hold true of the earlier water departments structure i.e.: Department of Natural Resources, again it included a regional management structure, locally based, collecting data and using local knowledge in the analysis, managing towards regional/state targets.

The reduction of regional management structures, local data collection and monitoring, limits the ability of government to plan for our water future. The current restructure of DPI Water has seen significant shift in technical capacity and policy and planning expertise, this has come at the critical juncture of the Murray Darling Basin Plan negotiations. The current staff are under resourced and faced with a plethora of challenges as the impacts and complexity of the basin plan implementation is now realised. This issue of resourcing and retaining expertise must be addressed before NSW can successfully move forward with reviews of current 10 year water sharing plans, and prior to the development of new Water Resource Plans under the Basin Plan.

Stakeholders have raised the negative impacts of the current internal reform several times with government, fundamentally the timing and extent of the reform is effecting the ability of the agency to address issues associated with water planning and management. This is in no way a reflection of the current staff/management but the resources to undertake the aims of this review and current workloads is untenable. Finalising the transformation process in transferring services from DPI Water to Water NSW has also impeded the focus and time available to staff to review these types of issues.

There is no doubt a water equation is necessary to determine demand and supply into the future- however it remains, the capacity to undertake this assessment at present is limited. The above issues will impact on the ability of any current agency staff to provide an informed response. Fundamentally the focus is now either on the Basin Plan or Transformation. The expertise and connectedness of staff with the capacity to undertake this exercise is possibly now spread across two agencies rather than one. NSW agencies have previously reported on this issue separating Urban and Regional Water supplies as part of the planning process.

Water supply and demand equation : Regional water planning units are recommended as key to this equation having relevance and using local knowledge to best effect. The committee and government should consider what is the most appropriate planning period, how have previous water equations and scenarios been assessed against actual predictions? What are the size of resources available, are the current methodologies determining management of the resource being accurately calculated and over what period? What is the population growth estimates ie: Namoi 2030 report does not extend far enough out, has government undertaken longer term population estimates out to 2050 and 2100?

We would expect regional urban needs the calculation of per megalitre/per capita/per day would be estimated and then run over the projected population numbers within current planning models. How are different industries likely to develop or decline over the period, what trends can be used from current regional socio economic studies?

In terms of water availability the current Integrated Qualitative Quantitative Model (IQQM) that is used for regulated surface water takes current development, behavior, climate and creates a whole water balance projection. This type of information is useful as a ***planning model***, however history has shown us that use of the **I**mpossible to **Q**uery or **Q**uantify **m**odels (farmers version IQQM) relative to the real world can have level of uncertainty and often these models when assessed against actual use can result in variation. Their usefulness as a planning model should used for it's intended purpose, rather than as the MDBA have attempted to use the model outside it's capacity.

Groundwater models likewise are reliant on the conceptual models to hold true and given the relative newness of groundwater modelling and some of the new technology now available, the previous model constructs are now being challenged as a result of better information. For example sustainable yield has yet to be assessed as a fit for purpose methodology in all catchments situations, current interconnectivity assumptions should also be reviewed based on new water age testing and water quality tracer's being measured.

Namoi Water asserts that alternatives to Sustainable yield such as managed aquifer recharge (using water based on rainfall inputs), adjusting water availability determined on review of recovery of groundwater pressure based on predictions/climate should be assessed in terms of current water sharing plans for some highly connected groundwater regions.

b) examine the suitability of existing New South Wales water storages and any future schemes for augmentation of water supply for New South Wales, including the potential for aquifer recharge

Fundamental to this question are principles relating to cost sharing and current government policy of full cost recovery. Many current water storages were built under different government policy positions and therefore were not constructed with the intention of the infrastructure being based on the current full cost recovery model. For example Chaffey dam was never intended for full cost recovery, hence the current impact of pricing under this principle results in water use being impacted as some agricultural enterprises cannot deliver returns to offset the $54 per megalitre usage charges. Lower Namoi licence holders pay the second highest charges in the NSW MDB, as a result of the decision to build Split Rock Dam – this second structure results in significant cost burden without the ensuing water reliability to generate value to licence holders.

There are a number of areas where additional water storage infrastructure could either be built new or augmented i.e.: Dungowan dam, however the limitations of the basin plan are such that this additional storage can only be accessed under current extraction limits. In this particular scenario it is likely that Tamworth Regional council would need to transfer part of their licence allocation from Chaffey to Dungowan to utlise water from an augmented structure. This would result in negative impact in Chaffey dam costs.

The current policy settings all but prevent dam construction – and even augmentation is fraught with difficulty. The question remains can we achieve more with our existing infrastructure? The northern storages run with less than 5% over delivery on water orders, this is due to dam wall debiting. Using this rule in managing extraction it prevents water being ordered and not extracted because the users account is immediately debited.

Using water more efficiently i.e.: reducing delivery losses is an area for exploration in long run systems such as the Namoi (21-28 day delivery to users). There is potential for efficiency in water deliver being either piped/channeled/stored in weirs. The issue of savings versus productivity should be clarified for example of the Darling Anabranch is not something any regulated valley would seek to repeat. In this case the water was piped to deliver savings in delivery losses, however the water is still sent through the Anabranch to deliver ecological benefits and the resulting new licence issued to the Commonwealth impacts on existing licence holders reliability.

The issue of fish passage also requires review, currently a state wide review of fish passage is underway and we request a high level of stakeholder engagement and feedback. For example the position of 90% fish passage being the benchmark should be further investigated. Current infrastructure requirements are cost prohibitive, for example Namoi irrigators and NSW Government paid over $9 million dollars for the recently completed Mollee Weir fish passage.

Aquifer reinjection is currently not supported by Namoi Water as a process to dispose of poor quality CSG waste water. Reinjection should only be considered where the geology is suitable (requires very unique geological structure and there is low probability of this being available in the Namoi) and fundamentally there must be detailed information regarding interconnectivity. Generally speaking reinjection is not proposed within the geological units available to extractive industries in the Namoi. The Aquifer interference policy was developed to provide guidance on assessment processes and we contend to date there is no data or geological structure to support reinjection in the Namoi.

Aquifer recharge studies have been conducted over the last decade, much of this in western NSW and currently NSW Government will assess proposed projects against the Aquifer interference policy. Consideration of this as a feasible option requires local impact assessments and consideration of third party impacts as well as full cost benefit analysis.

Aquifer recharge management is a separate proposal that would see highly connected surface and groundwater systems managed with more responsiveness that the current sustainable yield methodology offers. This has been outlined to NSW Government as part of the review of the Water Sharing plan in particular for Zone 1 in the Upper Namoi that received a 95% cutback in their groundwater entitlements.

c) review the NSW Government's response to the recommendations of the June 2013 report by the Standing Committee on State Development on the adequacy of water storages in New South Wales

The NSW Government submission to this inquiry provides details on current policy settings, stakeholders look forward to seeing the results of the Regional water strategies that are currently being prepared. Namoi Water has a particular interest in the Hunter region regional water plan particularly as extractive industries rapidly expand across our catchment and future supply and demand requires strategic planning and risk assessment tools to be developed as mining and CSG projects are considered to ensure the Namoi does not become the next Hunter.

The Namoi CMA cumulative risk assessment tool was developed for this purpose to allow all data sets to be incorporated into a framework to allow for objective assessment of cumulative impacts on water resources. We would strongly encourage government to consider using this tool as an appropriate method to assess future mining and gas development, utilising the Namoi Water study and current DPI Water datasets.

Recommendation 8 : That the NSW Government review the environmental flow allocations for all valleys in NSW and make representations to the Commonwealth Government for it to review the environmental flow allocations for NSW Valleys in relation to the MDBA Basin Plan.

NSW Government response ; *Environmental flow provisions in NSW existing WSP were developed in consultation with local communities.*

Namoi Water notes that whilst this may be the case for many WSP's the final decisions on planned environmental water in the Namoi was made by an Interagency regional panel after the community engagement process.

Environmental water provisions in NSW WSP in the basin will be reviewed as part of the development of Water Resource Plans. It has recently been announced that a review of translucent flow rules will be undertaken by DPI Water to determine whether the intended environmental outcomes can be achieved with a more flexible approach.

Namoi Water notes the NSW Government has actively pursued with the MDBA the process for review/clarification of the provisions in the Basin Plan for the protection of planned environmental water. Fixing environmental water rules as at 2012 WSP is fraught with risk to both NSW stakeholders and government agencies. The ability to adjust planning processes based on new knowledge and research is essential, flexibility in managing water needs is critical. Namoi Water looks forward to seeing formal positon statements from DPI Water in the near future on the NSW governments approach to the implementation of the Basin Plan and a response the MDBA position statements now publicly available.

An example of the impacts of planned environmental water is provided below.
The supplementary flow sharing rules established in 2004 in the Namoi WSP were based on minimal data and assumptions about pre-spring pulse benefits to Native Fish. The sites where impacts were noted are downstream of two weirs Mollee/Gunidgera that did not have functional fish passage infrastructure in place (European fish passage was in place).

The interagency regional panel changed the community agreed supplementary flow sharing rules and the Plan became a Ministers Plan. The assessment of reliability impacts presented to the Minister did not include any socio economic impacts resulting from the restriction to the timing of access. Namoi water licence holders strongly objected to the change at the time of plan gazettal and consistently advocated for review by NSW Governments.

Following fish studies undertaken in the Namoi and Gwydir there appeared no confirmed linkage between these flows and native fish outcomes, stakeholders requested a review of the modelling and clarity from fisheries regarding flow requirements for Native Fish. DPI Water provided the modeling which determined that flow requirements for native fish are met under 50:50 sharing. On this basis the NSW Government implemented a trial change to the supplementary sharing rule, coinciding with an increase to native fish research and monitoring to determine the impacts of pre spring pulses for Native fish in the Namoi system. This is a positive example but needs the matching process for approval under the basin plan.

Recommendation 10/11 : That NSW Government fund and implement Computer Aided River Management and water metering project across NSW.

Namoi Water notes that the northern basin rejected the metering business case on the basis that it was an unsound project, the savings did not exist and the project would have resulted in a negative third party impact on licence holders. We appreciate NSW Government recognized the limitations of the project in the northern context and support that the funding has been redirected into onfarm modernization projects.

The continued cost increases in state owned meters through pricing determinations proves our point that the project would be inefficient and expensive and suggests our initial concerns are justified that the savings from the pattern approved meters is unlikely to result in a practical outcome.

CARM as a concept is recognized as a progression in technology available to manage regulated rivers, however northern rivers run with less than 5% over delivery – the value of CARM is primarily for the Commonwealth in accurately determining the use of their water at any point in time and to assist in measuring environmental outcomes. Therefore on user pays principle it should be fully funded by the commonwealth.

Recommendation 18 : That the NSW Government establish an integrated water management taskforce comprised of representatives of each key water user groups and government with the following roles

- To drive innovation in responsible water conservation, use and management and
- To build collaborative relationships and promote the sharing of knowledge and expertise between and within water user groups in NSW
- That the NSW government commit to investing in water efficiency research and development, to inform an integrated, best practice approach to water management and to further advances in this area

Namoi Water fully supports this recommendation and encourages DPI Water to implement this this recommendation, we have actively sought NSWIC engage with DPI to progress this matter urgently prior to the development of Water Resource Plans. We strongly encourage the committee to recommend this action is implemented immediately, with the significant restructure and transformation there is an opportunity for this taskforce to provide significant value.

f) examine social, economic and environmental aspects of water management practices in New South Wales and international jurisdictions, including the following case studies:
i. Broken Hill town water supply/Menindee Lakes system ii. South Western NSW water management practices iii. North Western NSW water management practices

Namoi Water support the NSW Government decision to augment Broken Hills water supply with a pipeline. Namoi Water supports the removal of the absolute reliance of Broken Hill on surface water storage in Menindee lakes to supply the urban needs. All Barwon Darling communities should have access to safe and reliable critical human need water supplies. Attached to this submission is the Review undertaken by Calibre Consultancy for our initial basin plan submission in 2012, it is a good summary of an over studied site.

Supplementary embargoes have been applied at various times in the last two decades at times of critical need for Broken Hill. The most recent example in 2015 resulted in embargoed access on unregulated and supplementary water costing northern rural communities over $60 million in lost production. There is minimal evidence to suggest that embargos on small flows in northern NSW result in inflows into Menindee Lakes. The last embargo effectively covered evaporative losses for one month, but did not substantially change the outcome of water resource availability for the community but came at a significant cost to upstream communities.

The management and operation of Menindee Lakes directly impacts on irrigators around the Lakes, upstream and downstream, any amendments or finalized business case for the restructure of Menindee Lakes should include assessment of impacts for all parties. This information should be provided to all stakeholders and we look forward to DPI Water providing further information on this important project.

Namoi Water does not support the use of embargoes to sure up supplies for entitlement types. The impacts resulting from the infrastructure projects such as the Anabranch pipeline and issuing of Commonwealth licences and MDBA management of the lakes on the Lower Darling High security licences holders is recognized. The adequacy of planning frameworks must be reviewed and addressed by their own use provisions, if they are consistently not meeting their own demands.

g) the efficiency and sustainability of environmental water being managed by different State and Federal Government departments and agencies

Namoi Water questions the continued role of the MDBA in Basin Plan implementation and recommend that a review of roles and responsibilities is considered by all Basin governments to reduce the burden on communities and genuinely engage in local management.

Effectively the current Water Resource Plans will be a doubling of environmental review by OEH and MDBA and we seek reduction in the process of accreditation which to date has been an area of frustration for both stakeholders and departmental staff.

We remain unconvinced that the MDBA should be involved in Basin-wide environmental water planning at a five-year or annual interval when the Commonwealth Environmental Water Holder and Basin states are responsible for implementation over a 10-year period.

h) the management, appropriateness, efficiency and reporting of:
i. inter-valley transfers ;
Namoi Water rejects the current inter-valley transfer known as the Peel Trade Trial. The transfer of temporary entitlement or dealings that trade water from the Peel to the Namoi impact negatively on Namoi licence holders. This water is delivered out of Keepit and Split Rock AWD and the last trade of 3800 megalitres resulted in a negative 1.5% AWD needing to be made up in the delivery loss account. This trial primarily aimed at improving Peel pricing through increased water sales, does not materially impact on Peel pricing. Namoi Water notes this was a trial arrangement that has not been assessed and has passed the initial period of the trial. This is an example of changes to Water Sharing Plans mid term that impacts on existing licence holders reliability and access without proper assessment and consultation occurring prior to the changes being made.

ii. conveyance and loss water
All delivery loss water has been modelled on the current diversions, and irrigator behavior any as a result of the potential implementation of shepherding or PPM's would incur additional losses if water was shifted to the end of the system for environmental purposes. The loss account was not designed to provide for this volume of water to be delivered to the end of system and whilst the Commonwealth argue that any licence holder could shift their licence through transfer, the practicality of an irrigator undertaking this action is extremely unlikely due to the impact of bulk water transfer impacts. The delivery of water during drier climatic periods in the Namoi can be at times unpredictable, the river system losses to groundwater and the overall antecedent conditions have often resulted in delivery of water even when using bulk water transfer, not reaching the intended delivery target. This is not a function of the operator, but our ability to measure losses within the system is limited. Namoi Water has highlighted to the Commonwealth the level of third party impact from the implementation of shepherding instream makes the delivery to the end of system unsustainable in northern systems.

iii. carryover

Lower Namoi licences operate on a continuous accounting system that functions well, combined with dam wall debiting. The issue of carry over and it's impact on existing licence holders would need to be assessed for third party impacts.

iv. the management and reporting of the water market, and

Current water market management and reporting is functional, the timeframes for water trades and coordination between DPI Water and Water NSW is mostly efficient, however cases exist whereby timeframes have caused issue for entitlement holders. More flexibility in water trade products has been explored by DPI Water and implementation of 10 year temporary trading is a good example of development of products to suit the market needs.

i) any other related matter

Review of the following matters should be considered;

- Fish passage infrastructure costs and requirements should be reviewed and stakeholders are engaged regarding implementation/interpretation of the Fisheries Act requirements
- User government cost shares and continued increases in the regulated asset base resulting in water costs continuing to rise unsustainably.
- Recognition of reform fatigue within Basin communities – we have invested heavily in research and modelling for the basin plan without any real engagement by the MDBA of the technical issues raised by local communities (refer Namoi Water submission on Northern Basin Review amendment – copy available). The motion moved at the Wee Waa and Gunnedah MDBA meetings has not been actioned despite lack of data from the Namoi. Ecological outcomes of the basin plan at a valley level have not been substantiated or has consultation been adequate on a technical level for instream catchments.
- Monitoring and Evaluation of the basin plan and review of the ecological targets must be **undertaken by NSW** to ensure review outcomes are positive for regional communities.
- Continued research and development activities that enhance agricultural productivity
- Complementary measures must be implemented to ensure environmental outcomes
- Coordinated Natural Resource management research and project funding is improved
- IPART process for determinations of water pricing should be thoroughly investigated, attached is Namoi Water's submission which we draw attention to the approach used by IPART that we consider to be highly dysfunctional from the consultation and hearing process through to the use of consultancy reviews being inadequate to inform regulatory recommendations, to the actual compliance by agencies such as Water NSW with the pricing determination. There is little transparency of the information being assessed by IPART and inadequate review in terms of costs relative to services.

ENDS.

NAMOI WATER

Supporting Sustainable Water Use

Mr Scott Chapman
Water Pricing IPART
Level 15
2-24 Rawson Place
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NSW 2000

Via electronic Mail

Dear Scott,

I am writing to you on behalf of Namoi Water regarding the pricing review for rural bulk water services for 1 July 2017 for Water NSW. Pricing determinations are one of the most single frustrating issues that we undertake on behalf of our membership. We have on numerous occasions asked IPART to review the engagement process, the hearing and panel discussions in the formal format do not allow for detailed discussions to occur. To this end we did not attend the Sydney hearing as the ability to engage in a meaningful way is extremely limited in this process. It ends up being a trial of Water NSW by statements/questions, limited information is provided to satisfy any parties in attendance as a process of genuine engagement. IPART is provided in numerous submissions from stakeholder's key issues that customers have a need for additional information or concerns. It is this information that provides a platform for the review process along with IPARTs own priorities for investigation. Namoi Water notes the draft determination does not provide any additional information for stakeholder's, rather the review is outsourced to consultants that do not have IPART's experience or expertise in understanding the areas of concern for a regulator.

Our primary concern is that the regulatory role is limited in its application as a result of this process and the outcome of the numerous pricing reviews has resulted in only minor adjustment to Water NSW's proposal. Customers cannot reconcile the detailed effort required to review the determination and provide evidence of impacts with the final reviews outcome. We make this point with all due respect to the effort that is undertaken by the IPART team in their investigations – however it is the process that is used by the regulator as a model for detailed investigation, engagement and decision making that requires in our view urgent review.

Water NSW is a monopoly service provider, we acknowledge current management is seeking to operate the business as a corporate entity under the banner of Australia's largest water supplier and give effect to effective delivery of customer and business objectives that are value for money. However it remains there is no choice for a customer to choose who delivers their water, this is a function of the assets being currently government owned. Continuation of pricing outcomes in this setting results in an increasing value of the regulated asset base value, which is now one of the most substantial impacts on pricing.

NAMOI WATER

Supporting Sustainable Water Use

Given the recent restructure in the merger with Sydney Catchment Authority, and transfer of functions from DPI Water as well as the ongoing uncertainty around the Water Charge Rules review by ACCC. The space of water pricing has become increasingly congested. Water NSW are supported in their recognition of the limits around resourcing for a number of significant issues such as user/government cost shares, legacy assets and choice in levels of service.

Please find attached the comments from Namoi Water as the peak organisation representing Water Licence holders in the Namoi Catchment area.

Regards

Jon-Maree Baker
Executive Officer

Key issues raised in our previous submission included;

- Review and comparison of actual revenue and costs to allow IPART and customers to assess Water NSW's financial risk and supply vulnerability.
- Detail of operational expenditure increases for water delivery and other operations dam safety compliance and customer support and compliance. The capital expenditure for maintaining capability approach was also requested with a level of detail to be provided.
- Gunidgera Weir upgrade costs were initially omitted and an additional "offset project" was included and we requested the offset not be approved for funding.
- The existing tariff structure of 40:60 fixed variable split was supported by customers.
- Customers rejected the volatility allowance, supported continuation of the unders and overs mechanism
- Our submission did not support the efficiency carryover mechanism and requested further consultation for this to be considered in future determinations

Pricing outcome IPART Review draft

- **Review and comparison of actual revenue and costs to allow IPART and customers to assess Water NSW's financial risk and supply vulnerability.**

Not supplied in IPART determination nor in any consultancy reports, although Aither's report did contain some Profit and Loss information however it was redacted. We continue to encourage IPART to assess this information as part of the pricing review and ultimately stakeholders should be provided with this as part of reporting obligations at the end of each pricing determination period.

- **Detail of operational expenditure increases for water delivery and other operations, dam safety compliance and customer support and compliance. The capital expenditure for maintaining capability approach was also requested with some level of detail.**

Aither in their report noted the logic of providing flexibility to undertake expenditure based on needs, which may change during a determination period however the approach by Water NSW appears to compromise both transparency around proposed spending and the accuracy of estimation and forecasting.

The previous approach of valley level approval of projects and upgrades to resources provided a level of transparency and discipline to provide defined projects, pricing options and timing of work for the valley level and within the broader program of work for the organisation. The inclusion in the pricing determination of capital works that do not proceed has an impact on customer pricing within the determination period.

Namoi Water asserts the function of valley CSC consultation/approval of expenditure and projects provides a level of accountability for Water NSW to ensure prudent and efficient expenditure of the capital program. It is critical there is transparency around the validation of the assessment process for renewal and replacement of assets. The current process removes transparency around costings and therefore customer confidence in the expenditure program.

Aither and therefore IPART's calculation for the the 25% reduction in renewals capital funding is still questioned by Namoi customers. Given there is no detail on the assessment of the valley costs available to customers, other than the Aither reported examples there is limited ability to assess capital expenditure proposed due to the removal of the previous approval process from the CSC's.

As the majority of the funding increase for augmenting capacity is justified as corporate systems and IT expenditure, it is critical to customers to have a level of transparency provided including provision of a detailed business case. This information has not been provided to either the CSC at valley level or the Chairs forum to our knowledge.

The southern metering program is an example of overspend on capital and under estimation of IT requirement (albeit initially Commonwealth funded) used in the business case to justify the "efficiency" of telemetered metering technology. The final report on the business case (cost benefit analysis) for the Metering trial has to date not been provided to northern valleys as evidence to suggest an efficiency gain from telemetry and pattern approved meters. We note that Water NSW proposes to reduce meter reading to save costs based on FTE position reductions, yet there is no indication of the additional IT costs required and other substantial IT upgrades needed for this efficiency to be realised. The cost benefit analysis for telemetered metering has not been provided to customers contrary to Aither report on Page 106. ***We support the concept of self-read metering when combined with lead sealing (or similar) of meters by Water NSW in the compliance check meter read***.

How much of the new augmenting capability from corporate systems and IT is associated with using technology such as Computer Aided River Management to manage regulated delivery in real time? The costs are spread over all valleys, customers are unable to review if these are prudent or efficient for their valley. It is our assertion there is no accountability for the uplift in augmenting capability expenditure due to a lack of detailed information.

For example Northern systems with dam wall debiting, run with considerably less surplus delivery, current river operations run within 3-5% over water orders. There is no business case for the substantial increases proposed against the current systems operational efficiency in the northern valleys. Namoi Water reiterates the level of transparency in provision of detailed businesses cases and costings is being eroded over time and spread across all valleys costings in changes to cost categories. Further to this point we will not support a dumbing down of the customer service committee role in providing review and advice for the business direction on these types of issues. This appears to be a function of the larger organisation structure resulting from merger/transformation that comes with an efficiency, but also disadvantage to rural customers in accountability and transparency.

- **Gunidgera Weir upgrade costs were initially omitted and an additional "offset project" was included and Namoi customers requested the offset not be approved for funding.**

For the record, on page 61 of the IPART determination we note Namoi Valley Irrigations Association does not exist.

The Aither report noted the reduction in the regulatory environmental category which is consistent with Water NSW's current position to hold off on the implementation of capital expenditure for fish passage projects until such time as the state wide review of fish ways is complete. We seek to correct IPART – Aither cannot possibly determine that Namoi customers paying for Walgett Weir Fish passage is prudent nor efficient. As a consultant without all the information on the issue they can only comment on the costings of the option presented. Aither would not have been sufficiently informed regarding the issue of cross valley subsidisation or the difference between a regulated valley and unregulated valley pricing determination process.

IPART in the determination fails to acknowledge the expenditure in the Unregulated Barwon Darling and additional cost impact on customers in the Regulated Namoi system as a result of the transfer of the existing Gunidgera Fish passage obligation to a lower "offset" structure at Walgett Weir has a number of third party impacts including increasing the Namoi Regulated Asset base value.

The Walgett Weir serves no benefit to the delivery or storage of water for regulated Namoi customers (emphasis added).

We reject the assertion by IPART this is deemed acceptable under the impactor pays principle (those that create the need to incur the cost should pay the costs) – fundamentally a regulated Namoi customer does not incur a need in the Barwon Darling River and Walgett Weir and therefore should not pay for assets in downstream unregulated catchments that do not provide benefit for water storage or delivery to Namoi customers.

We challenge IPART that the Impactor pays principle is met using this offset approach transferred over two catchments and water sources, otherwise we would have a strong case for postage stamp pricing. It is our view this approach does not meet the National Water Initiative pricing *principle (iv) give effect to the principle of user-pays and achieve pricing transparency in respect of water storage and delivery in irrigation systems and cost recovery for water planning and management.*

Namoi customers acknowledge the effort undertaken by Water NSW to proceed with an alternative cost effective option for current gold plated fish passage infrastructure, however Water NSW have also acknowledged that the costings were not provided to customers for this option prior to the determination and highlights the risks that Aither noted in their report regarding asset renewal and maintenance process lack of transparency and costing being available.

The Keepit upgrade triggered fish passage obligations which were offset against proposed fish passage at Mollee, Gunidgera and Weeta Weirs. To date $10 million has been spent on installing a fish way at Mollee Weir and removing Weeta weir. We reject the costing of $9 million for Gunidgera Weir as a gold plated option that should be reviewed in conjunction with NSW Government's current review of Fish Passage as part of a broader state wide review. This review may inform different options and funding requirements for the remaining obligation on Gunidgera weir.

In regard to the 2017-2021 pricing determination, we request as a priority the upgrade of Gunidgera Weir is funded as a fundamental action to improve delivery and access of water in the Gunidgera Pian system. In this regard we have requested from Water NSW the detailed costing associated with this particular project, however in principle support is provided for the upgrade of the Weir estimated as $200 000 and a potential fish passage offset within the Namoi system triggered as a result of this upgrade relative to this cost. We understand the downstream works associated with the project may result in additional expenditure of $580 000 of works, this work is also supported for inclusion in this pricing determination however we seek understanding of the need for these associated works to trigger any obligations under section 218 of the fisheries act.

As a matter of priority and pending the outcome of the state wide review of fish passage we remain committed to ensuring Gunidgera weir provides adequate fish passage whilst being developed as a capital expenditure project that results in the most cost effective outcome. There is potential for Gunidgera fish passage to be funded as a complimentary measure (despite differences in advice from state agencies), we note the deferral of this obligation allows for the longer timeframe for this decision to be finalised between the Commonwealth and State Governments.

- **The existing tariff structure of 40:60 fixed variable split was supported by customers.**

We are pleased to see the continuation of the 40:60 fixed variable split for Namoi customers, however we disagree with the IPART view that the 80:20 tariff structure better reflects Water NSW's cost structure. Unless IPART can provide a full P/L report to customers (copy of sections redacted from Aither report) then there is no transparency around this statement. Functionally revenue is received in licence fees, trades, meter charges, fixed charges etc. up front prior to service delivery, usage charges are variable based on water availability a function of the storages reliability and climate. The current tariff structure of 40:60 is supported by all northern valleys and in particular Namoi customers.

For Peel customers the 80:20 fixed variable pricing provides a substantial benefit to general security customers, with small impact on Tamworth Regional Council. Given the business benefit to the council from the economic activity associated with general security water use, this tariff structure would suit residents/rate payers as a practical solution to the current pricing issues experienced in the Peel associated with Chaffey Dam costs being accounted for under full cost recovery methodology. Functionally if this option is rejected by TRC the negative impacts on the Peel continue and some form of Customer Service Obligation arrangement will need to be negotiated as the current pricing has substantial negative impacts on usage.

On this issue **Namoi customers reject any concept of merged infrastructure and therefore pricing between the Peel and Namoi valleys.** The negative social and economic impacts and management of infrastructure would have significant negative impacts on Namoi customers. We continue to urge IPART to resolve the Peel pricing in the Peel, as one Peel customer stated "the Peel already has a broken leg, don't give the Namoi one too".

- **Customers rejected the volatility allowance, supported continuation of the unders and overs mechanism**

The IPART decision to provide a volatility allowance is rejected by Namoi customers and we would expect the majority of water licence holders.

IPART have not justified their view on why the Under's and Over's mechanism is to be discontinued due to the view it does not mitigate revenue volatility risk – how then does a charge that adjusts each year enabling Water NSW to recover its notional revenue not fulfil this role of mitigating volatility? The UOM adjusts based on the actual circumstance experienced in terms of revenue rather than an inflated price based on the regulatory determination period. It does provide prices that move – that is the nature of the resource, however it is a transparent mechanism supported by customers. IPART provided two lines in the determination without justification or evidence as to the decision being made and it's implications.

Namoi Customers are substantially impacted by IPARTs decision to pay the UOM back in one pricing determination with interest – which is contrary to the IPART concern the mechanism causes price shocks. IPART are now party to a significant price shock for Namoi customers – UOM was developed for a long term tool and this resumption of the current balance has a significant impact on pricing.

Water NSW revenue volatility is highly questionable, there is a high level of fixed cost income that is received by the organisation. Due to the lack of reporting on the actual revenue and costs by Water NSW and allowed by IPART, when combined with continual reporting/reference to allowed versus

recovered the issue of financial stability is clouded. Further we note that despite the misleading claim of a shortfall in revenue, the facts are that Water NSW has generated a net profit from its operations despite the dry climate period in the last determination. The Risk Transfer Product proposed by Water NSW proposes to mimic an 80:20 fixed variable structure, customers reject this premise and despite IPART's view that Water NSW could undertake self-insurance this will ultimately increase in subsequent pricing determinations.

We fully expect to see a creep in price of this "efficient service to customers" as self-insurance becomes a function of the pricing determination or Water NSW shifts this service to a third party provider. In effect a penalty is now applied based on the demand forecasting model using a 20 year rolling average that IPART approved in its previous determination due to this second volatility allowance measure.

If we are to seek real costs and efficiency, Namoi Water would reconsider our view on the RTP if as stated the insurance remains self-insurance and transparency is provided along with a change to the forecast consumption modelling back to the IQQM modelling of Long Run Average, providing a better estimate for valleys with lower reliability. For example Namoi Data from 1993-2013 suggests the General Security average usage is 119 379 megs, this compared to the Water NSW forecast of 164 800 megs appears a considerable difference in the model period averaging results from IPART of 58% reliability versus 46% based on our figures.

- **Our submission did not support the efficiency carryover mechanism and requested further consultation for this to be considered in future determinations**

We note IPART intends to establish and efficiency carry over mechanism and apply it for the Water NSW 2021 pricing review. Namoi customers question the purpose of this decision given its delayed implementation and lack of detailed information in the IPART report. The value of the incentive is questioned in terms of evidence to suggest the mechanism is required.

However we do see value in IPART considering an efficiency assessment in its annual pricing review to capture the progressive efficiency savings from Water reform processes and transfer of functions. We are pleased to see acknowledgment of the ECM will not apply to capital expenditure particularly given Gunidgera weir has been deferred for two pricing determinations is an example of the complexity and additional risk to customers.

ENDS.

6 MENINDEE LAKES - POTENTIAL WORKS FOR WATER SAVINGS

6.1 The Menindee Lakes Storage Scheme

The Menindee Lakes is a series of natural lakes within the Travellers lakes system with a surface area of approximately 45,000 hectares when full. In the 1950s and 1960s the NSW government constructed the Menindee Lakes water storage scheme, by connecting the natural ephemeral lakes and the Darling River by a series of weirs, regulators, channels and levees. As outlined in Bewsher (2012) the key purpose was to:

1. provide secure water supply to Broken Hill;
2. provide water for irrigation and farm supplies in the lower Darling River;
3. meet stock and domestic water requirements along the Great Darling Anabranch; and
4. supplement the River Murray System, including the supply to South Australia.

The Menindee Lakes water storage system essentially consists of 4 major lakes and covers 453 square kilometres. It holds 1,730 GL when full and can be surcharged to 2,050 GL during floods. (NSW Office of Water).

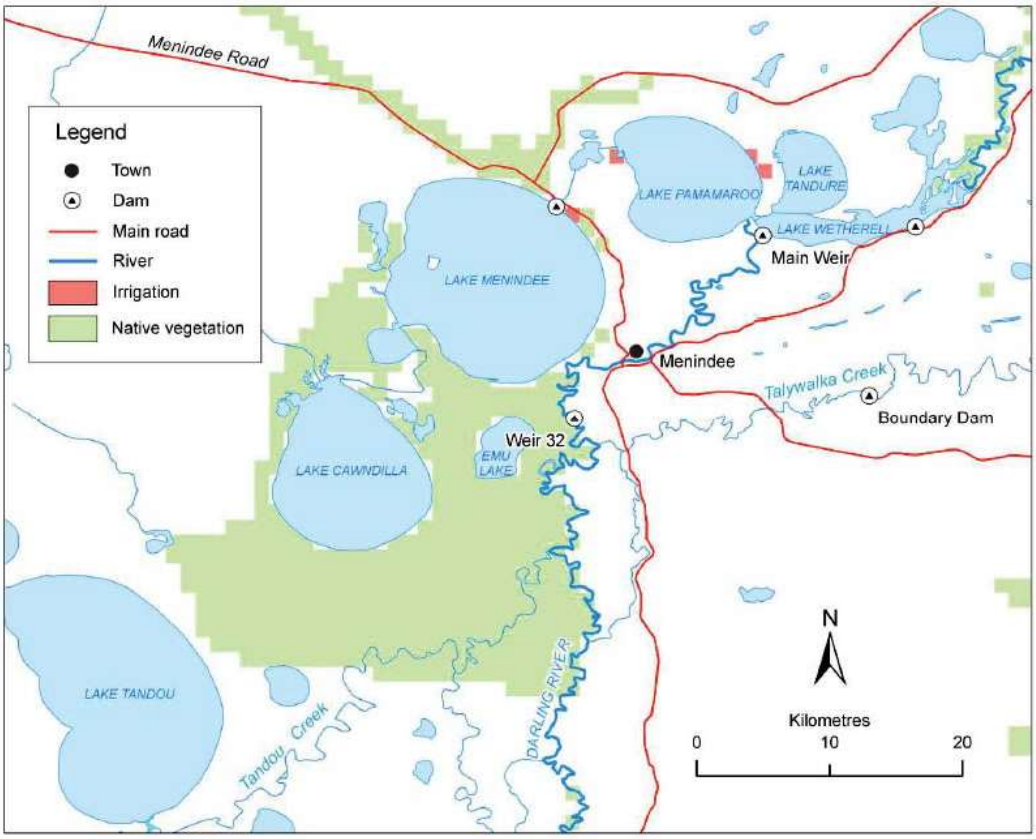

Figure 6.1: The Menindee Lakes System in Western NSW. (Source: Bewsher 2012)

The long-term evaporation from the lakes is about 430 GL per year. If the lakes were full for an entire year evaporation may consume over 600 GL with their current configuration and management.

The Menindee Lakes Storage is leased to the MDBA and its management is prescribed by the Murray-Darling Basin Agreement. The management of the lakes is at the direction of the MDBA while the lakes store more than 480 GL, at which volume control passes to NSW and does not revert to MDBA until the storages increase to 640 GL (480/640 rule). While the storages are under the control of NSW the water stored and inflows can be used exclusively by NSW to meet its requirements. This NSW storage "reserve" was intended to enable NSW to meet its demands during severe drought periods. It included supply to Broken Hill, environmental requirements, irrigation in the Lower Darling and water supply to the Great Darling Anabranch. In recent years, while the lakes are controlled by the MDBA, apart from meeting the requirements of NSW in the Lower Darling, water is released to meet the combined needs of NSW, Victoria and South Australia within the Murray Basin. This would primarily be meeting the flow entitlement of South Australia. While not contained in the agreement, an additional release commitment, called the Additional Dilution Flow, authorised by the Murray-Darling Basin Ministerial Council, is made when the lakes contain more than 1,300 GL (and the upper MDBA storages store more than 2000 GL). The purpose of this release is to reduce salinity levels primarily within South Australia.

It should also be noted that the original reasoning of the difference between 640 and 480 GL thresholds for jurisdiction management change was to avoid the situation when the lakes were refilling after being below 480 GL that there would not be a continuous reversion of management from one jurisdiction to the other, if the volume fluctuated about 480 GL. This would allow the efficient use of Lake Pamamaroo when the capacity of Lake Wetherell was exceeded. The use of a single threshold, as suggested in the CSIRO Report (185/185) may be a counterproductive simplification.

A chronology of events, policy decisions and investigations relating to Menindee Lakes is provided in Appendix A.

6.2 Summary of Investigations to achieve water savings

As outlined in the Chronology included in Appendix A, there have been a number of investigations undertaken on the Menindee Lakes System to identify practical, cost-effective and environmentally responsible means of reducing evaporation in the Menindee Lakes System. These have involved a mix of structural options (i.e. changes to existing infrastructure) and non-structural options (i.e. changes to water management operations).

A summary the major investigations undertaken since 1998 is outlined below with a summary of the key options considered in each of the investigations dating back to the 1950's provided in Table 6.1, including a summary of the impacts.

6.2.1 1998 Menindee Lakes Storages - Structural Options Feasibility Study, Stage 1 (DPWS)

A draft management plan was prepared by the Department of Land and Water Conservation and the Menindee Lakes Advisory Committee in 1998.

In December 1998 the NSW Department of Public Works and Services (DPWS) released a preliminary report that included basic designs and costings for 10 structural options aimed at improving the operational efficiency of the scheme. These options formed the basis for the Menindee Lakes. A number of the poorer structural options were eliminated on the basis of

unacceptable environmental or cultural heritage impacts with the design of the remaining options further refined to improve their cost-effectiveness.

6.2.2 2002 Menindee Lakes Structural Options Feasibility Study - Supplement 1

In March 2002, the NSW DPWS provided NSW State Water with a preliminary design and costings for the Cawndilla Lake Alternative Option. This Option 11 – Cawndilla Lake New Open Type Regulator and channel to Darling River was an alternative option to that referred to in their previous 1998 report.

6.2.3 2002 Menindee Lakes Structural Options Feasibility Study, Supplement 2

In July 2002, the NSW DPWS provided NSW State Water with preliminary design and indicative cost estimates for a revised option to replace Option 1 (DPWS 1998).

6.2.4 Menindee Lakes Ecological Sustainable Development Project

The Menindee Lakes Ecological Sustainable Development (ESD) Project was initiated to address the significant information shortfall identified in the draft management plan prepared in 1998. The project was funded by the Natural Heritage Trust with an overall budget of $2.6M. The objectives of the ESD project were to:

- identify and quantify the existing operational impacts;
- identify the impacts/benefits of new structures or alternative water management practices;
- ensure stakeholder input and support;
- refine the 1998 Draft Management Plan for Menindee Lakes; and
- develop a comprehensive database of information as an aid for future decision making.

In 2002, the Menindee Lakes Ecological Sustainable Development Project identified that relatively minor efficiency improvements, of approximately 10 GL per year could be achieved through structural works costing around $30million.

6.2.5 Darling River Water Savings Project

The Darling River Water Savings Project commenced in 2007, to identify opportunities for substantial water savings in the Darling River System, including the Menindee Lakes. This project, which was jointly funded by the NSW and the Commonwealth Governments, focused on achieving water savings based on an integrated approach of structural works, river and storage operating strategies and water market activities. Key objectives included;

- To improve the overall flexibility in river and water storage management to better meet the needs of water users and the environment.
- To protect the environment and riverine ecology.
- To protect water quality and water security for water users.

- To contribute to economic development in the region.

Part A of the project, completed in 2007 by Maunsell in association with Webb McKeown & Associates and Hassall & Associates, identified 6 potential structural works options and included the option of more rapid drawdown of the volume in the Lakes when under NSW control, coupled with an alternative water supply. The 6 options were identified but not tested in Part A.

Part B of the project commenced in 2008 and was completed in 2010 by Sinclair Knight Merz (SKM) in association with GHD Hassall and Rob Learmonth. Part B considered the 6 options identified in Part A. It was also identified that substantial savings could be generated by either storing less water, by reducing the use of Lake Menindee and/or Cawndilla, and/or more rapid draw down of the volumes in the Menindee Lakes when they would have been in NSW control. A set of 6 options were presented for further consideration by Government. All options included a cost for an alternative water supply for Broken Hill, assuming that the need for an alternate water supply would be the same for all options.

6.2.6 Menindee Lakes MOU

In July 2010, the Australian and NSW Governments entered into a Memorandum of Understanding (MOU) to guide the implementation of the Australian Government's 2007 commitment to a Menindee Lakes project and for the cooperative investigation and subsequent implementation of key water reform initiatives in NSW, including improved security of Broken Hill's water supply, protecting local environment and heritage and changes to the Menindee Lakes operational arrangements. This agreement followed on from the completion of the Darling River Water Savings Project Part B.

However, in June 2011, NSW advised that it considered the MOU had ceased to have effect and there were no conclusion as to the final recommended changes or inter government agreement as to any proposals that may be implemented, or the associated funding.

6.2.7 Darling Water Savings: Options for Environmental Filling

The Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) commissioned CSIRO to manage and report on the hydrological modelling required by the MOU. This hydrological modelling was overseen by the Hydrological Modelling Working Group (HMWG), a technical group established by the Menindee Lakes Project Joint Steering Committee. A final report was delivered in 2010 and further work was subsequently undertaken to supplement the HMWG report with a report submitted to the Menindee Lakes Joint Steering Committee in December 2010. The Committee recommended further work should be carried out explore changes in operation rules that would have a positive impact on identified indicators and investigate the potential for maintaining the Lake Wetherell floodplain vegetation by reducing the frequency of surcharging the lake. This further work was undertaken by CSIRO and presented in the report released May 2011 – "*Darling Water Savings: Options for Environmental Filling, No Impacts, Version 2*".

The most recent study by CSIRO described above is a recent development designed to minimise impacts. However it is uncertain if the results have been independently assessed and verified.

ription	Savings (GL/yr)	Cost	Comments
Lakes and other Lakes at nearby Broken Hill			
nvestigation of the application of cetyl alcohol films to the water surface. nvestigation of the application of polystyrene beads	Estimate of savings not calculated.	N/A	These investigations did not identify practical and environmentally acceptable means of reducing evaporation.
ent –Proposals Under Investigation			
Accelerated low-level drawdown of lakes Menindee and Cawndilla – install pumps and cuttings. Access to dead storage. Hydraulic separation of Lakes Menindee and Cawndilla nstallation of block banks on the Lake Wetherell floodplain. Altering the storage distribution within the Lakes using alternative operating procedures. ncreased releases from the Lakes to the Darling River to control algae and maintain fish habitat.	Estimate of savings not calculated.	N/A	• Need to increase regulator capacities to allow more rapid evacuation of Menindee and Cawndilla. • Allow Menindee and Cawndilla to be held at different levels. • Temporarily blocking off the smaller lakes connected to the Lake Wetherell floodplain during low to moderate filling of W losses. • At first glance, the changing of operational procedures to determine the optimum storage distribution for a given total vo trivial exercise. However, the procedure is complicated by the gravity conveyance system between the Lakes, lack of kno and other operational constraints. • The magnitude, duration and effectiveness of algal flushing flows is dependent on the location of the bloom in the River. • A revised computer model of the Lakes and the Lower Darling was utilised.
Study, Stage 1 (DPWS)			
Cawndilla-Menindee regulator & temporary block bank The purpose of a block bank between Menindee and Cawndilla is to exclude water from Lake Cawndilla (which it normally enters via Cawndilla Creek) until Lake Menindee is completely full, thus reducing the evaporation area during that period. Three possibilities for final release of water into Lake Cawndilla have been considered. Open-type structures as well as conduit-type structures to provide for 5000ML/D and 12000ML/D were sketched and costed.	Estimate of Savings not calculated.	$4.5M to $7.5M	• The temporary block bank option which would be breached when Menindee was filled was considered not acceptable as uncontrolled breach would be environmentally unacceptable. • A further variant suggested provision of a 10,000ML/D discharge capacity by siphons over the top of the embankment. T pursued as the concept was subject to settlement problems. • Principal Environmental Benefits - Lake Cawndilla would remain drier for longer and more frequently, resulting in increas fauna and protection of Spectacle Lake and Eurobilli Lake and associated woodlands • Principal Environmental Costs - significant construction impacts, increased height of Lake Menindee would eliminate fring permanent flooding of Lake Speculation, and an increase in foreshore erosion; potential increase in salinisation.
Enlarge Lake Menindee outlet to Darling River. The purpose of this option is to provide sufficient outlet capacity to singularly supply the maximum flows of the Darling River, with overflow into the Anabranch. This will permit a much quicker emptying of Lake Menindee (as well as Lake Cawndilla if they are interconnected).	Estimate of Savings not calculated.	$3.9M to $4.1M	• Two structures were investigated, sketched and costed – a deep seated conduit type structure with a total maximum dis type structure. • There are two locations for this option, the existing outlet and Little Menindee Creek nearby. • Principal Environmental Benefits – Speculation Lake would be more ephemeral: reduction in the potential for salinisation delivery of e-flows. • Principal Environmental Costs – Construction impacts; localised erosion; erosion of banks of Lake Menindee; rapid empty vegetation.
Excavate channel in the lake-bed of Lake Menindee. The purpose of this option is to drain the dead storage from the lowest portion of the lake and cater for the enlargement of the outlet proposed in Option 2 above.	Estimate of Savings not calculated.	$9.1M	• The proposed channel joining the lowest part of Lake Menindee is required to return the outlet to its original capacity and in Option 2 above. • Channel should avoid the possibility of a fish kill by providing an escape channel to the outlet regulator and hence to the • This option is perceived to have no impact on terrestrial flora and fauna. However, the local biota would benefit indirectly for better environmental management of other (secondary and tertiary) storage-bodies.
Cawndilla-Menindee regulator Increase Cawndilla outlet and channel	Estimate of Savings not	$6.1M to $61.6M	• Both conduit-type and open-type regulators were costed. • Three discharge options were considered – 12,000ML/D, 5,000ML/D and the existing capacity of 2,000ML/D (with the inc

	(GL/yr)		
			east of Cawndilla Channel.
Pump Lake Menindee to Lake Pamamaroo. The purpose of this option is to allow transfer of water from Menindee to Pamamaroo when the level in the latter lake is higher. Two pumping options were considered – 5,000ML/D (10 pumps) and 1,000ML/D (2 pumps)	Estimate of Savings not calculated.	$3.3M to $8.9M	• Limited consideration given to the generation of hydro-electric power. • Principal Environmental Benefits - the provision of two-way transfer of water increases the management options; reduce of salinisation. • Principal Environmental Costs - loss of woodland communities that fringe Lake Pamamaroo; substantial construction imp
Cawndilla-Menindee regulator and pump Cawndilla to Menindee. This option is to consider methods of returning large volumes of water to Lake Menindee from Lake Cawndilla when it has been filled by excess released from Lake Menindee by the block bank/regulator systems described in Option 1. This option considers the addition of pumps at the Menindee-Cawndilla block bank (possibly mobile pumps from Option 5).	Estimate of Savings not calculated.	$7.8M to $12.9M (additional cost of pumping installation and cost of pumps)	• This process will allow quicker emptying of Lake Cawndilla and thus reduce the evaporation area. • An alternative supply to the Anabranch may be required if Lake Cawndilla is dry more often after the regulator is installe • Lake Cawndilla can only be drained to the 'cease to flow' level of the inter-connecting Cawndilla Creek system, leaving a the lake. • Principal Environmental Benefits – • Principal Environmental Costs -
Anabranch Options – Pipeline, Pumps on Darling River, Weir on Darling River. The purpose of the pipeline option is to replace replenishment flows down the Anabranch with a piped supply for stock and domestic purposes, thus eliminating the current transmission losses.	Estimate of Savings not calculated.	$40M to $80M (Pipeline) $2.9M (pumps) $1.7M (Weir)	• At that time, replenishment flows were up to 50,000 ML/annum (depending on availability from Lake Cawndilla) with tra 95%. • Option 7 (pipeline) provides for a capacity of 5,000 ML/annum, supplied over 100 days. • Principal Environmental Benefits – would allow the Anabranch to dry out completely and follow more natural drying/wett terrestrial flora and fauna; lower water-table levels along the Anabranch. • Principal Environmental Costs - significant construction impacts; disturbance to riparian vegetation; potential for the frag
Foreshore Protection for Menindee, Cawndilla and Pamamaroo. This option is intended to raise the storage levels in Lakes Menindee, Cawndilla and Pamamaroo to original design levels, thus creating additional storage and yield of water.	Estimate of Savings not calculated.	$17.2M	• Permanent protection measures being considered include tipped rock revetment, gabion revetment and mortar filled nylo • Principal Environmental Benefits – decreased levels of erosion; potential for reducing the duration/extent of flooding of e newly-created revetments. • Principal Environmental Costs - substantial construction impacts; likelihood of higher water-table levels surrounding Lake Pamamaroo, with associated problems such as increased salinity; increased height of Lake Menindee would eliminate frir permanent flooding of Lake Speculation, and increased foreshore erosion(of unprotected areas).
Channel and pumping to Lake Cawndilla outlet regulator; or Channel from Menindee to Cawndilla (cost prohibitive – eliminated).	Estimate of Savings not calculated.	$1.7M	• The purpose of this option is to drain the 'dead storage' from the lowest portion of Lake Cawndilla and avoid its loss thro • The proposal consists of a 4km channel with a 9m basewidth. • Principal Environmental Benefit – complete or near-complete drying of Lake Cawndilla would mimic natural conditions (d return lake to more ephemeral state. • Principal Environmental Costs - water-level in Lake Cawndilla would probably drop too quickly to benefit vegetation comr drought.
Regulators on ephemeral lakes adjoining Lake Wetherell The embankments required to close off the lakes are extensive in both length (possibly up to 2 to 3km) and height(maximum 9.7m, 5.5m and 5m respectively). The regulators are large structures with maximum discharges of 4,700ML/D, 1,600ML/D and 1,470ML/D. The purpose of this option is to avoid the filling of the ephemeral lakes, because of their large evaporative area, until all other storages are full, and thereby allow more natural wetting and drying cycles and heights.	Estimate of Savings not calculated.	$7.1M (Tandure) $1.3M (Bijijie) $1.5M (Balaka)	• Proposals have been developed for the three largest ephemeral lakes (Lakes Tandure, Bijijie and Balaka). • Principal Environmental Benefit - creation of a system that better mimics the natural cycle of wetting and drying • Principal Environmental Cost - substantial construction impacts, such as roading, bulldozing and grading.

	(GL/yr)		
Water. The total length of channel is 12.4km including approximately 1.13km of drainage channel in the lake bed;			
Study, Supplement 2 (DPWS)			
This option replaced Option 1 above (DPWS 1998) This report develops a revised Option 1, which is comprised of three sub-options, namely: - ▪ Option 1A - A new fixed crest rockfill weir; ▪ Option 1B - A retrofitted open type regulator with vertical lift gates; and ▪ Option 1C - A retrofitted open type regulator with tilting gates. This option only includes the provision of a cost estimate for the purpose of comparison with Option 1B.	Estimate of Savings not calculated.	$4.75M (Weir) $5.22M (Regulator with Lift Gates) $5.99M (Regulator with Tilting Gates)	• Additional issues that needed to be considered included - the flow capacity of the regulator is to be maximised; freeboar minimum ; no new levees are permitted to be constructed; a fish passage structure to be included in the cost estimates. • A Revised Option 1 may impact on the local environment - potential for disturbance of aboriginal artefacts and heritage s the natural flow between the two lakes and associated impact on flora and fauna; and modification of established storag potential for an increase or decrease in water flows to downstream creeks and rivers with possible consequent water qua
Provide a preliminary design and an indicative cost estimate for the emoval of the existing Menindee Lake outlet conduit type regulator and eplace it with an open type regulator of increased capacity. This option replaced Option 2 above (DPWS 1998) Revised Option 2, comprises two sub-options: ▪ Option 2A - A new open type regulator with a capacity of 10,000ML/day; ▪ Option 2B - A replacement conduit type regulator that is similar to the existing structure and maintains the current capacity of 5000ML/day.	Estimate of Savings not calculated.	$8.74M to $8.88M	• The outlet will be located in the same position as the current structure to minimise environmental and cultural heritage i • The regulator includes the provision of a fish passage structure in the cost estimate. • A Revised Option 2 may impact on the local environment- potential for disturbance of aboriginal artefacts and heritage si quantity of lake water into lower Menindee Creek and subsequently into the Darling River with possible impacts on water stability and flora and fauna.
This option is related to but did not replace Option 4 above (DPWS 1998) Provision of additional order of costings to address revised design equirements from those previously used in Option 4, namely: - revised oute to utilise the existing Penellco channel; widening of the Penellco channel; flow in the Penellco channel in each direction; make allowance for flood passage; provide adequately for fish passage; Two options were considered, 12A - 2000ML/D capacity system and 12B - 6000ML/D capacity system.	Estimate of Savings not calculated	$33.74M (Option 12A) $94M (Option 12B)	• Option 12A retains existing Cawndilla Regulator. • Option 12 may impact on the local environment - potential for disturbance of aboriginal artefacts and heritage sites; exte Option 12B, including the removal of trees, channel widening, the disposal of spoil and the removal of snags; modificatio Tandou Creek; the need to avoid channel water from entering the wetlands located immediately to the east of and channel; possible consequent water quality and flora and fauna impacts.
stainable Development Project			
ctural Works including; Improving the outlet capacity of Lake Menindee to the Darling River Installation of a small block bank regulator between Lake Menindee and Lake Cawndilla to retain small and medium inflows in Lake Menindee; and, Pumping the residual pool of Lake Menindee to Lake Pamamaroo	10 GL	$30M	• An Environmental Impact Statement (EIS) was completed for these works in 2005. However no further progress has bee
locate this study			

	(GL/yr)		
Access to residual pools			other high security water users, costing between $85M and $400M • This option was eliminated in the Part B study due to high costs and concerns about sedimentation • Major local impacts - extended drying cycle in Lake Menindee; reduced availability of Lake Menindee for recreation; peri Strip; reduced use of Lake Menindee; disturbance to Kinchega National Park due to the construction of a new Cawndi River.
Levee and regulator separating Lake Menindee and Lake Cawndilla Increased Menindee outlet capacity Access to residual pools	59 GL*	$18M**	• * The actual saving are estimated to be lower as environmental filling was not considered in Part A modelling • ** Estimated cost is as at 2007 when report was completed. It was also estimated that structural works would be require other high security water users, costing between $85M and $400M. • Major local impacts - extended drying cycle in Lake Cawndilla; archaeological impacts at Menindee Outlet; archaeologica
Increased Menindee outlet capacity and new channel to Darling River, or, Increased Cawndilla outlet capacity and new channel to Darling River	180 GL*	$26M**	• * The actual saving are estimated to be lower as environmental filling was not considered in Part A modelling • ** Estimated cost is as at 2007 when report was completed. It was also estimated that structural works would be require other high security water users, costing between $85M and $400M. • Major local impacts - extended drying cycle in Lake Menindee; extended drying cycle in Lake Cawndilla; Extended perio Sunset Strip.
Partition Lake Menindee (NW-SE) Additional Menindee outlet regulator Access to residual pools	128 GL*	$97M**	• * The actual saving are estimated to be lower as environmental filling was not considered in Part A modelling • ** Estimated cost is as at 2007 when report was completed. It was also estimated that structural works would be require other high security water users, costing between $85M and $400M. • Major local impacts - extended drying cycle in the lower Lake Menindee cell; extended drying cycle in Lake Cawndilla; sig within Lake Menindee; potential disturbance to Kinchega National Park, depending on outlet works selected. • This option was eliminated in the Part B study due to prohibitive costs and poor quality soils
Partition Lake Menindee (NE-SW) Additional Menindee outlet regulator New Cawndilla outlet regulator Channel to Darling River Access to residual pools	60 GL*	$87M**	• * The actual saving are estimated to be lower as environmental filling was not considered in Part A modelling • ** Estimated cost is as at 2007 when report was completed. It was also estimated that structural works would be require other high security water users, costing between $85M and $400M. • Major local impacts - extended drying cycle in the lower Lake Menindee cell; significant archaeological impact archaeological impact within Lake Cawndilla; disturbance to Kinchega National Park due to the construction of a new Darling River. • This option was eliminated in the Part B study due to prohibitive costs and poor quality soils
New Cawndilla outlet regulator Channel to Darling River Access to residual pools	138 GL	$26M**	• ** Estimated cost is as at 2007 when report was completed. It was also estimated that structural works would be require other high security water users, costing between $85M and $400M • Major local impacts - significant archaeological impact within Lake Cawndilla; disturbance to Kinchega National Park Cawndilla outlet and channel to the Darling River.
- Part B (March 2010)			
Pamamaroo drainage channel Rapid drawdown to 150GL Alternate supply for Broken Hill	248	$32.9M*	• *Includes $31M for Alternative Broken Hill water supply. • Lakes Menindee and Lake Cawndilla are kept permanently dry, use of existing outlet structures plus minor engineering st to 150/100 GL rule. • Environmental Impacts - Conversion of Lakes Menindee and Cawndilla into dry land habitat (loss of wetlands). Significan riverine habitat downstream of lakes. • Significant impacts on Aboriginal community, particularly no water in Lake Menindee.

	(GL/yr)		
			once in every 5 to 7 years on average. • Environmental Impacts - Return to more ephemeral regime in Lake Menindee and Lake Cawndilla utilising assumed envir ecosystem in Lake Menindee and Lake Cawndilla. Improved riverine habitat downstream of lakes.
As per B2 plus increased outlet capacity of Menindee/Cawndilla (opt)	125	$101.9M*	• *Includes $31M for Alternative Broken Hill water supply. • Reduced operational use of Lake Menindee and Lake Cawndilla, environmental fill, considerable engineering works. 640/ rule. • The hydrologic modelling adopted an environmental filling pattern that would require either Lake Menindee and/or Lake once in every 5 to 7 years on average. • Environmental Impacts - Same as Scheme 2 with increased flexibility in managing water in Lake Menindee and Lake Caw
As per B2 plus Menindee/Cawndilla bank and regulator	61	$49.6M*	• *Includes $31M for Alternative Broken Hill water supply. • Reduced operational use of Lake Cawndilla. Some engineering works. 640/480 GL rule changed to 210/200 GL rule. • The hydrologic modelling adopted an environmental filling pattern that would require either Lake Menindee and/or Lake once in every 5 to 7 years on average. • Environmental Impacts - Return to more ephemeral regime in Lake Cawndilla utilising assumed environmental filling with unchanged; changed ecosystem in Cawndilla; improved riverine habitat downstream of the Lakes.
As per B4 plus increased outlet capacity for Menindee/Cawndilla (optional)	74	$101.9M*	• *Includes $31M for Alternative Broken Hill water supply. • Reduced operational use of Lake Cawndilla. Considerable engineering works. 640/480 GL rule changed to 210/200 GL ru • The hydrologic modelling adopted an environmental filling pattern that would require either Lake Menindee and/or Lake once in every 5 to 7 years on average. • Environmental Impacts - Same as Scheme 4 with increased flexibility in managing water in Lake Menindee and Lake Caw
As per B5 but no change to NSW draw down	34	$101.9M*	• *Includes $31M for Alternative Broken Hill water supply. • Reduced operational use of Lake Cawndilla. Considerable engineering works. 640/480 GL rule unchanged. • The hydrologic modelling adopted an environmental filling pattern that would require either Lake Menindee and/or Lake once in every 5 to 7 years on average. • Environmental Impacts - Same as Scheme 5.
governments agreed that any changes to the current operations must der 3 major issues: Provision of an agreed alternate secure water supply for Broken Hill No adverse impact on the water security of existing entitlement holders' downstream of Menindee No adverse impact on the environment.	N/A	N/A	In June 2011, the NSW Government terminated the agreement because the Commonwealth proposal did not meet the conditi found that: • the Broken Hill community opposed the groundwater supply due to cost and water quality issues. • the reliability of supply to users downstream of Menindee Lakes would have been affected in dry years. • two of the Menindee Lakes would have had to be shut down resulting in significant environmental and social impact
Environmental Filling (November – December 2010 CSIRO - Podger)			
closing off Lakes Menindee and Cawndilla and changing the 640/480 rule to a 150/100 rule (i.e. Option B1) mplementing the proposed environmental refilling rules for Lakes Menindee and Cawndilla and changing the 640/480 rule to a 210/200 rule (Option B2)	248 125	Costs as above for B1 and B2	• The Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) commissioned CSIRO to hydrological modelling required by the MOU. • This hydrological modelling was overseen by the Hydrological Modelling Working Group (HMWG), a technical group estab Project Joint Steering Committee.
CSIRO found that a combination of 10GL of General Security and 290GL of Supplementary Access licence and a 180/180 rule achieved the desired			• CSIRO recommended that options B1 and B2 be re-analysed to consider proposed limits on diversions and to determine rule thresholds and climate change scenarios on downstream users.

	(GL/yr)		
scenarios were compared against the agreed indicators and the impacts n drought and flood years were also evaluated. 150/150 Rule. Menindee outlet capacity increased to 14,400ML/D Latest model configuration.			• Water savings were partially consumed by downstream users and the remainder flowed to South Australia. • Minor downstream impacts were evident. • Note – the various filling patterns used by CSIRO differ from the environmental filling pattern used in the Part B Study. • Supplementary Report 1 submitted to Menindee Lakes Joint Steering Committee (MLJSC) on 3 December, 2010.
Environmental Filling, No Impacts, Version 1 (Dec 2010. CSIRO - Podger)			
185/185 Rule Lake Menindee outlet increased to 14,400ML/D Broken Hill water supply secured. Latest model configuration. Revised MDBA environmental filling rules.	175 (LTCE)		• Following review of the Supplementary Report 1, the MLJSC agreed that further work should be carried out to: – Explore changes in operation rules that would have a positive impact on all indicators, and – Investigate the potential for maintaining the Lake Wetherell floodplain vegetation by reducing the frequency of surc • Although there were a number of positive impacts there were also some very minor downstream impacts, including - NS allocations are 1% less; the percent of months that the combined storage volume of Lakes Wetherell and Pamamaroo ar 6 to 15%; the drawdown of Lakes Wetherell and Pamamaroo during dry periods is greater; percentage of years that flow below its entitlement under the Murray-Darling Basin Agreement is increased by 1%; 95%ile salinity at Morgan increases
Environmental Filling, No Impacts, Version 2 (May 2011. CSIRO - Podger)			
185/185 Rule Lake Menindee outlet increased to 14,400ML/D Broken Hill water supply secured. Latest model configuration. Revised MDBA environmental filling rules. Additional changes required to remove impacts.	174 (LTCE) across the lakes		• This report considers additional changes to the Version 1 report above, that would be required to ensure that the minor i compensated by other means. • To achieve 'removal' of impacts 28GL of NSW General Security Murray entitlements would need to be purchased and reti • The model predicted that there would be some very minor downstream salinity impacts. • The licence associated with these savings is 125.6 GL/y (LTCE) of extraction at Weir 32 at a maximum rate of 25,000 ML Weir 32 spills are above 1000 ML/D with a maximum annual limit of 347 GL. This is equivalent to a 101 GL/y (LTCE) lice