INLAND RIVERS NETWORK

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NSW Parliament Legislative Council
General Purpose Standing Committee No. 5

14 August 2016

SUBMISSION

Inquiry into the augmentation of water supply for rural and regional New South Wales

Introduction

The Inland Rivers Network (IRN) is a coalition of environment groups and individuals concerned about the degradation of the rivers, wetlands and groundwaters of the Murray-Darling Basin. It has been advocating for the conservation of rivers, wetlands and groundwater in the Murray-Darling Basin since 1991.

Member groups include the Australian Conservation Foundation; the Nature Conservation Council of NSW; the National Parks Association of NSW; Friends of the Earth; Central West Environment Council; the Coast and Wetlands Society and the Wilderness Society, Sydney.

IRN welcomes the opportunity to participate in the NSW Government Inquiry into water management in NSW.

Our members have been actively involved in the water reform process since its inception through the Council of Australian Governments (COAG) in 1994.

The recognition that our waterways were under severe stress from over-extraction caused a number of significant changes in NSW water management. These include the CAP on extraction from inland water sources, the passing of the Water Management Act 2000 that recognised the environmental needs of rivers and water dependent ecosystems and the making of Water Sharing Plans to deliver environmental outcomes.

At the same time water licences were separated from the land and a trading market was established.

The Commonwealth Water Act 2007 recognised that further water reform was needed in the Murray-Darling Basin to ensure a sustainable working river system that will provide support for future generations. This resulted in the gazettal of the Basin Plan in 2012.

IRN has major concerns about the NSW Government's engagement in the implementation of the Basin Plan and subsequent decisions that have hindered or set back the recent gains of the water reform process.

The supply of good quality water for rural and regional NSW depends entirely on effective and efficient water management systems. The supply of water in NSW is finite and totally reliant on highly variable rainfall patterns.

The current over-extraction of water from river systems includes the inappropriate scale and number of large instream water storages and weirs. These large dams and weirs have caused significant changes to the health of river systems including loss of native fish passage, cold water pollution, de-oxygenation, capture of nutrients and changes in natural flow variation.

The development of large water intensive industries such as mining and coal seam gas extraction in inland NSW directly competes with water availability for towns and irrigation industries.

The proper management of unregulated river flows through extraction limits and appropriate cease-to-pump rules is important to protect the rights of downstream water users including the riverine environment.

The maintenance of river health to provide good water quality for town water supply, recreational amenity and tourism, and self-sustaining ecosystem function is critical for long-term economic, social and environmental viability in inland NSW.

IRN members have been actively involved in the decision-making processes associated with the management of both State and Commonwealth owned environmental water portfolios.

This submission will address a number of the Inquiry Terms of Reference.

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We request an invitation to present as a witness to Inquiry Hearings.

SUBMISSION

1a) investigate the requirement for a water equation (demand and supply out to the middle of this century) for rural and regional New South Wales

IRN considers it critical for the NSW Government to conduct a full and comprehensive analysis of all sources of inflow and recharge into NSW streams and groundwater systems, the allocation of extraction licences from these water bodies and the current and historic volumes of extractive use, particularly during very dry times when water demand is at its greatest. This analysis should also include the volume of basic rights, harvestable rights and capture of overland flows on floodplains.

Over-allocation of extractive water licences in the past has triggered the need for reform of water management in NSW.

Growth of urban populations and development of water intensive industries such as large mining operations into the middle of this century must be considered in the context of total water supply limitations.

The purpose of Water Sharing Plans was to identify extraction limits that provided water for the maintenance of healthy water sources across the state. Any increase in water supply and usage to one extractive user (eg rural and regional towns) will lessen water availability for other users (eg irrigated agriculture).

The water trading market has allowed new water users to competitively purchase water licences from within the extractive limits to undertake their operations. The aim of the water trading market was for water to go to the most valuable use.

This has been demonstrated in the Hunter Valley were coal mining operations and power stations now own the bulk of available water licences. Trading activity in the Hunter River system has pushed the value of water to above $4,000 per megalitre (ML). This has caused major competition with agricultural water use.

In 2007 when the Millenium Drought was at its height in the Hunter Region, irrigators including the dairy industry had nil allocation, the town of Singleton was on severe water restrictions and two years of supply to Bayswater Power Station was held in Glenbawn Dam. The available water supply could not equitably serve all demand in the region.

The proposed expansion of gold mining in Central West NSW needs to be carefully considered in terms of competition with other water users. In this region water scarcity during the Millenium Drought caused existing gold mining operations at Cadia Mine to run out of water. This triggered the purchase of a greater number of groundwater licences, the loss of downstream water supply to agricultural users and extensive negotiation with Local Governments in the region for access to effluent.

During the same intensive drought period the Mt Piper power station at Lithgow also ran out of water.

The predicted increase in climate variability in NSW, particularly longer and more intensive drought sequences caused by changing global climatic conditions, needs to be factored into the analysis of water availability and demand into the middle of the century.

Amendments to the Water Management Act in 2014 have required water models, used to determine water availability from storages in regulated river systems, to ignore the Millenium Drought and use previous historic drought records to calculate annual allocations.

This has increased water availability for general security licence holders at the expense of high security and town water supply licences. The next extended period of drought will demonstrate similar or greater water shortages than those experienced during the severest drought on record.

Analysis of water demand and supply to the middle of the century must be based on water use and availability during extended periods of drought. This is the period of time when demand is at its greatest across all users.

Limitations on water supply must be clearly recognised. New large dams do not create more water. They redistribute the shares by shifting water away from downstream users, aquifer recharge, end of system flows and wetlands.

Dams increase water loss through evaporation and dead water at the bottom of the storage below offtake levels.

The connectivity between stream flow and ground water systems must be better researched and understood. The impact of increased extraction and water usage from surface water can have a detrimental impact on water users relying on groundwater, including groundwater dependent ecosystems.

IRN considers it critical for the NSW Government to thoroughly investigate the demand and supply of water out to the middle of this century for rural and regional NSW based on existing allocation and useage.

1b) 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

IRN has had significant input to consultation on a number of projects developed to augment water supply for NSW.

These include the construction of the pipeline from the Upper Macquarie River to the city of Orange, the development of macro water sharing plans on unregulated river and groundwater systems and various upgrades of dams on inland river systems.

The pipeline to Orange has been a very expensive use of tax-payers money with very little capacity for application during times of severe water shortage. The increased extraction of inflows to Burrendong Dam has implications for downstream water users including the internationally significant Macquarie Marshes.

The pipeline was constructed prior to the augmentation of the Suma Park Dam in Orange and the implementation of previous storm water harvesting approvals. Meanwhile Orange Council has been providing up to 10ML/day of effluent water to Cadia Mine for no charge over many years.

The management of Orange town water supply has been ad hoc and very poorly planned. IRN sites this example as a lesson for future consideration of schemes for water supply augmentation. Many options are available before resorting to major infrastructure projects that do not improve security of water supply or provide value for money.

For reasons previously outlined, IRN does not support a proposed new dam on the Belubula River. The geology of the site with large significant karst systems, including the important Cliefden Caves and Canomodine karst, is unsuitable for a large water impoundment.

The environmental, social and economic costs include loss of natural downstream flows and fish passage, inundation of highly productive agricultural land, loss of riparian vegetation and native fauna habitat, possible inundation of karst systems, loss of basic rights for downstream water users, particularly stock and domestic users in the lower Lachlan and loss of natural inflows into significant end of system wetlands on the Lachlan River that provide habitat for migratory bird species protected under various international agreements.

The Belubula Dam proposal has significant risk to the environment and tax-payers of NSW.

The issue of who will pay for new water storages in NSW has not been addressed. If the purpose of the Belubula Dam is to service increased water demand for new gold mining proposals in the region this should be identified upfront and the proponents should bear the burden of the assessment costs.

This project is still in the feasibility assessment stage at tax-payers' expense. IRN considers that a full independent cost benefit analysis needs to be undertaken to identify the all environmental and social costs, as well as the cost of the dam construction and maintenance with a clear outline of who will be benefiting and paying for this project.

IRN considers it imperative to conduct the investigation into demand and water supply in rural and regional New South Wales as outlined above. This will provide information to better understand that demand for water cannot continue to grow without serious consideration of improved efficiencies in supply and use.

The application of scarce water resources through the highly inefficient practice of flood irrigation of cotton and rice crops on inland major river systems must be addressed.

Water savings needs to be the key focus of future water augmentation schemes in rural and regional NSW.

This includes comprehensive water recycling of all town water usage, mandatory inclusion of water tanks on all housing, commercial and public buildings, the promotion of low demand parks and gardens and efficient irrigation and watering systems.

Thorough investigation of wasteful water usage practices including leaking pipes and inefficient water delivery systems, such as open irrigation channels, should be the key focus of Government to assist in the augmentation of water supply into the middle of the century.

Many of these activities occur during periods of extreme water shortages, only to be relaxed when seasons return to higher rainfall periods. A consistent approach to water use efficiencies during wet periods will ensure better water storage in existing infrastructure to meet demand during times of drought.

The development of large new water intensive industries and secure urban supply for growing populations will only be possible in inland NSW if existing intensive industry practices, such as flood irrigation, change to more efficient water use.

1c) 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

IRN submitted a substantial submission to the Inquiry into the adequacy of water storages in NSW. (see Attachment A). We note the Standing Committee on State Development recommendations and have reviewed the NSW Government's response.

We wish to submit the following feedback on a number of the recommendations and responses:

Recommendation 1: *That the NSW Government clearly communicate to stakeholders the purpose of all major water storages in New South Wales.*

While the NSW Govt supports this recommendation, it has failed to provide clear communication about the purpose of the proposed new water storage on the Belubula River.

Recommendation 3: *That the NSW Government and local councils continue to support and promote demand management practices and urban water conservation measures such as stormwater harvesting and recycling waste water*.

The NSW Govt supports this recommendation and describes the requirement for local council water utilities to develop Integrated Water Cycle Management Strategies under the *NSW Best Practice Management of Water Supply and Sewerage Framework.* This is to ensure that long-term community planning includes water management.

However, the recent Regional Plans developed by the NSW Department of Environment and Planning had very little information about water use, supply and

management. The Draft Central West and Orana Regional Plan states that '*Water resource management is an issue that is external to land use planning'*.[1]

IRN considers this to be a major failing in integrated planning by the NSW Govt.

A full report on the progress of local council water utilities in achieving Integrated Water Cycle Management Strategies should be a key recommendation of this Inquiry.

Recommendation 7: *That the NSW Government review the environmental flow allocations for all valleys in New South Wales and make representations to the Commonwealth Government for it to review the environmental flow allocations for New South Wales valleys in relation to the Murray Darling Basin Plan.*

The NSW Govt notes this recommendation without giving it support.

IRN considers that current environmental flow allocations from inland valleys in NSW are inadequate for long term sustainable river, groundwater and wetland health. The Basin Plan is the result of a series of negotiated compromises that fails to meet its overall objectives. The implementation of the Basin Plan has seen the largest tax-payer investment in natural resource management in Australia's history. A significant percentage of this investment has gone to private industry.

Recommendation 8: *That the NSW Government amend the principles of the Water Management Act 2000 to ensure that the commercial water supply for towns and utilities and high security needs in regulated rivers are prioritised above environmental needs*

The NSW Govt does not support this recommendation and provides positive support for the current water sharing principles and flexibility within the *Water Management Act 2000.*

However, subsequent amendments to the Act in 2014 have resulted in less security for high security licence holders and possibly town water supply in regulated river systems. The amendment allows for water modellers and managers to ignore the impacts of the Millenium Drought when making annual allocation announcements.

This provides greater access to general security licence holders at the expense of high security in the decision-making for long-term drought security. This amendment also has implications for security of town water supply.

Recommendation 10: *That the NSW Government fund and implement the Computer Aided River Management system across all New South Wales river systems.*

The NSW Govt supports this in principle but has done nothing to implement the project. Large water extractions from unregulated river systems are not currently metered. The NSW Govt has no control over compliance with unregulated water licence conditions.

[1] Draft Central West and Orana Regional Plan Direction 3.4 p 61

The impact of unmeasured water extraction on downstream water users, including towns, stock and domestic users, basic rights and environmental assets is a major issue for water management in NSW.

It is imperative that all surface water and groundwater extraction in NSW is adequately metered and regulated for compliance with water sharing plan rules and extractive entitlements.

Metering is an important consideration for long-term water security in rural and regional NSW and should be a key recommendation of this Inquiry.

Recommendation 15: *That the NSW Government investigate the potential of strategically placed en-route storages to extend water use and provide flexibility in water delivery in some river systems, particularly in the Murray Darling Basin.*

While the NSW Govt gives this in principle support, IRN strongly opposes the construction of re-regulating infrastructure in downstream regulated river systems.

We note that the NSW Govt identifies the issue of public benefit and cost. The restriction of fish passage, loss of natural flows from downstream tributaries and capture of environmental flow releases from major storages are major environmental costs that need to be considered.

Recommendation 16: *That the NSW Government commit to continuing an integrated water management and conservation policy, and that it foster responsible use of water in urban, industrial and agricultural settings.*

This is supported by the NSW Govt. However, as outlined above, it is a critical consideration for this Inquiry to have a full report on the implementation of the Integrated Water Cycle Management Strategies across NSW.

Recommendation 17: *That the NSW Government ensure that new storage proposals are comprehensively assessed in terms of costs, benefits, storage efficiency, geological suitability of the site, environmental considerations, community expectations and other factors as appropriate*.

The NSW Govt supports this recommendation and has undertaken that for a new dam proposal to be viable, it must provide a net public benefit, be cost effective and be in an environmentally suitable location.

IRN considers that the Belubula River dam proposal does not meet this criteria and that tax-payers money is being wasted by pursuing a detailed feasibility study.

Recommendation 18: *That the NSW Government establish an Integrated Water Management Taskforce comprised of representatives of each of the 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 across New South Wales.*

The NSW Govt response is to note this recommendation without giving it support.

IRN fully supports this approach as the environment is a key water user in NSW. An Integrated Water Management Taskforce would build on the knowledge and expertise acquired in previous river management committees and in environmental water advisory groups.

This recommendation should be reiterated in the findings of this Inquiry.

Recommendation 19: *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.*

The NSW Govt supports this recommendation and outlines a number of key initiatives being undertaken in this field. However, IRN notes there has been significant restructure of Govt agencies since that time and a substantial loss of corporate knowledge and expertise.

A full report of the outcomes of the programs and initiatives described would be useful information to assist this Inquiry's deliberations.

1f) 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

The proposed pipeline from the Murray River to supply Broken Hill town water will have a significant impact on current Inter Government Agreements on water sharing arrangements between New South Wales, Victoria and South Australia.

IRN does not support this development proposal because it circumvents the opportunities to improve water policy in the Barwon-Darling River system to reinstate a fair share of water for downstream towns, cultural uses and values, stock and domestic users and the riverine environment.

Current NSW water policy favours large irrigation activities near Bourke and further upstream.

The Barwon-Darling Water Sharing Plan gazetted in 2012 made significant changes to water management rules that enabled a major increase in extraction, mainly for large flood-irrigated cotton operations.

These rule changes included:

- The access threshold for extracting water from the Barwon-Darling has been significantly reduced (from 11,000ML/day to 1,200ML/day).
- Permitted pump size limits have increased from 150mm to 900mm.
- "A" class water can now be stored, rather than pumped directly onto crops as

was previously the case.
- "B" and "C" class water can now convert to "A" class with no loss of entitlement – ie 1:1 – and in some cases greater than 1:1
- Continuous accounting and carryover provisions up to 300% are now in permitted.

This means that 1 year in 3, the river can be pumped dry with a high risk that low flows won't even reach Bourke.

These rule changes have had a devastating impact on the condition of the Darling River downstream from Bourke and dramatically reduced inflows to Menindee Lakes.

Another poor decision in northern Barwon-Darling tributaries, such as the Gwydir and Macquarie Rivers, is the approval of all existing floodplain harvesting structures regardless of their environmental impact and removal of flood water benefits from downstream users including floodplain graziers and town water supply.

The proposal to establish a new property right by issuing tradeable floodplain harvesting licenses is adding further complexity to the management of water in Basin catchments in NSW. The legitimisation of the capture of 'free water' from floodplain flows is another example of poor regard to social and environmental values and fair share of water availability for downstream water users, including towns on the Darling River.

The capture of flood flows that would have naturally entered the Barwon- Darling is a further reduction in water availability downstream and flows to Menindee Lakes.

Another compounding factor is the lack of protection of environmental water in the Barwon-Darling system.

The Commonwealth and NSW governments entered into a Memorandum of Understanding (MOU) regarding the development of a water shepherding framework in 2010. In response to the MOU, the NSW Office of Water developed the 'Proposed Arrangements for Shepherding Water in NSW' (Proposed Shepherding Framework). It is arguable that the Proposed Shepherding Framework (which has not been formally finalised) does not reflect the terms of the MOU.

By placing undue emphasis on so-called 'third party impacts' there are no cease-to-pump rules in the Proposed Shepherding Framework that protect environmental flows from extraction.

The shepherding rules, in fact, increase water availability for extractive users who have not reached their water allocation for the year. This is providing 'third-party benefits' at the expense of the riverine environment and tax-payers who have purchased environmental water licenses.

The health of the Barwon-Darling system and provision of town water supply from Menindee Lakes could be better managed if water management policy in NSW reinstated fair water sharing rules including protection of environmental flows.

Two individuals now hold nearly 70% of water entitlements in the Barwon-Darling with a right to extract up to 300% of entitlement in any year.

ii. South Western NSW water management practices

As the above information indicates the management of water in South Western NSW is impacted by water policy and behaviour in upstream catchments.

The complexity of rules and agreements between NSW, Victoria and South Australia in relation to water sharing in the Murray River system need to be closely considered.

The original purpose of the Basin Plan was to review these complexities and consider the management of water across the entire system.

State jurisdictions have hindered this outcome with NSW being the greatest problem. NSW controls 56% of all water in the Murray-Darling Basin and therefore has a major role to play in ensuring fair outcomes for all water users.

The amendments the Water Management Act in 2014 have favoured general security license holders by deliberately ignoring the impacts of the Millenium Drought as the drought of record in most inland catchments. This will have major implications for determination of annual water allocations and drought security.

The importance of inland town water supply is reliant not only on volume of available water but is also highly dependent on maintaining good water quality. Increases in salinity and blue-green algal blooms incur significant expense to the treatment of drinking water quality

The recognition of the economic and social outcomes of providing cultural water use and protecting water dependent cultural values is growing. These values are particularly significant in inland communities with a large Aboriginal population.

The economic and social values of the amenity of healthy rivers including freshwater angling and tourism cannot be ignored.

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

Members of IRN have been closely engaged in the decision-making processes involved in the efficient and sustainable use of environmental water managed by different State and Federal Government departments and agencies.

There are a number of environmental water portfolios being managed in each inland river system. These include:

- Planned environmental water managed by DPI Water. This is provided by water sharing plans and managed under those rules. This can include ‘translucent’ environmental water that is released from water storages under inflow triggers and ‘active’ environmental water that is held in storages and released to provide specific outcomes such as a native fish breeding event.

- NSW held environmental water managed by OEH. This is a range of different water licenses purchased by the NSW Govt to complement and improve on environmental outcomes provided by planned environmental water. This water particularly targeted Ramsar listed wetlands and migratory bird habitat protected under various international treaties
- Commonwealth held water managed by the Commonwealth Environmental Water Holder (CEWH) under the Commonwealth Environmental Water Office. This portfolio consists of a range of different water license types aimed at achieving the volume of water identified in the Basin Plan for environmental benefit.

The Murray-Darling Basin Authority (MDBA) has a role in implementing the Basin Plan and overseeing the management of environmental watering outcomes.

All jurisdictions and environmental water managers develop annual and long-term watering plans that dovetail the use of all sources of environmental water. There is a rigorous process of monitoring, evaluation and reporting of outcomes of environmental water delivery

The development of Water Resource Plans under the Basin Plan will co-ordinate the efficient and sustainable management of environmental water.

The current approach in NSW that is working very well is the establishment of Environmental Water Advisory Groups (EWAGs). These are managed by OEH and include representatives from all bodies with environmental water portfolios and members from local communities.

The local representatives include irrigator groups, Local Land Services, environmental groups and downstream water users.

The development of annual environmental plans considers the volume of water available to the environment across all portfolios in the catchment as a single volume.

Decisions are made based on current antecedent conditions, outcomes of previous environmental watering, availability of water, climatic scenarios and the frequency and duration of watering requirements for a suite of values including vegetation and fish recruitment and maintenance of existing water dependent ecosystems.

These decisions are based on local knowledge and expertise, scientific research, analysis of past outcomes and condition of the targeted environmental values.

With all responsible agencies and local people working together on EWAGS, the best possible environmental outcomes are achieved based on best available information and availability of water within the constraints of the rules and river infrastructure.

The application of adaptive management is critical for best environmental outcomes.

IRN considers that the current arrangements in NSW are working successfully and that OEH has the best expertise to be the lead agency in managing held environmental water in NSW.

RECOMMENDATIONS:

1. That the Inquiry seek a report on the water balance in NSW including demand and supply and current water entitlements from all water sourced.

2. That the Inquiry seek a full report on the progress of local council water utilities in achieving Integrated Water Cycle Management Strategies

3. That the Inquiry reiterate Recommendation 10 of the Standing Committee on State Development to implement metering across all water extractions in NSW.

4. That the Inquiry reiterate Recommendation 18 of the Standing Committee on State Development to establish an Integrated Water Management Taskforce.

5. That the Inquiry seek a full report on all research and development programs aimed at informing and advancing best practice approach to water management in NSW

6. That the Inquiry seek the appropriate policy changes to re-introduce balanced water sharing rules in the Barwon-Darling system.

ATTACHMENT A

SUBMISSION

Standing Committee on State Development
Inquiry into the adequacy of water storages in NSW

August 2012

Introduction:

Inland Rivers Network (IRN) has been advocating for the conservation of rivers, wetlands and groundwater in the Murray-Darling Basin since 1991. IRN has participated in a range of NSW and Federal Government processes and policy development since that time.

IRN recognises that the NSW Government, under Coalition Premier John Fahey, undertook to reform water management in NSW through the 1994 Council of Australian Governments (COAG) Agreement.[2] (App A) This led to the National Water Initiative[3] in 2004 in which governments agreed to deal with over-allocated or stressed river systems.

The NSW Government State Plan, NSW 2021, has a target under Goal 22 '*Protect Our Natural Environment'*[4] to:

> '**Protect rivers, wetlands and coastal environments**
> • Improve the environmental health of wetlands and catchments through actively managing water for the environment by 2021'

IRN supports this important goal and hopes to work with Government towards its achievement.

IRN activities have included participation in: water reform River Management Committees to develop Water Sharing Plans under the Water Management Act 2000, the NSW Weirs Review, management of floodplain harvesting and decision making relating to delivery of environmental flows.

IRN appreciates the opportunity to provide input into the consideration of the adequacy of water storages in NSW. IRN wishes to raise a number of key issues in relation to the storage and management of water in inland NSW.

The construction of large instream water impoundments in inland NSW, commencing with Burrinjuck Dam on the Murrumbidgee River in 1928, has caused significant impacts on the ecological function and integrity of inland river systems.

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[2] THE COUNCIL OF AUSTRALIAN GOVERNMENTS' WATER REFORM FRAMEWORK http://www.environment.gov.au/water/australia/coag/index.html
[3] http://www.environment.gov.au/water/australia/nwi/index.html
[4] NSW 2021 Making NSW Number One p43

The regulation of the major river systems in inland NSW has caused the loss of natural flow sequences and volumes of flow, change in seasonality of flows, impacts on water quality both instorage and instream and loss of connectivity to floodplains and groundwater systems. The reduction of wetlands, water dependent vegetation communities and wildlife populations has been a major negative outcome from the impoundment of large volumes of river water across the state.

There are currently 15 large capacity dams on inland river systems in NSW with the capacity to capture 12, 759, 156 ML.

These storages have been constructed in areas of the state with a high average rainfall and capture the natural floodwaters that originally flowed onto the western floodplains where average rainfall is low.

The environmental impacts of large dams are well known and well documented in a wide range of international, national and Murray-Darling Basin studies.

The social and economic impacts of large dams are also well understood with challenges to water sharing and equity for downstream communities and industries developed around natural flood sequences.

The management of water delivery and constraints, costs to broader community and issues associated with maintenance, dam safety and mitigation of environmental impacts are major challenges for State Water Corporation.

IRN does not support the consideration of constructing new large water storages in NSW. Improved management of efficient water use including the cessation of wasteful flood irrigation practices is a more cost effective approach.

The NSW Government has participated through COAG and the Ministerial Council in the development of a Murray Darling Basin Plan under the federal *Water Act 2007.* Constraints within the Basin river systems have been recognised as a key factor in delivering environmental flows.
The NSW Government will not be able to meet commitments under a Basin Plan or the goals of the State Plan, NSW 2021, if it invests in the construction of major new constraints to river flows.

This submission will respond to each of the terms of reference and provide information to support the case that the current level of water storage in NSW is adequate, has caused significant environmental degradation, has negative social impacts and is expensive to maintain. More cost effective systems of improved water use efficiencies are the most sustainable approach to water use in NSW.

TERMS OF REFERENCE:

a) the capacity of existing water storages to meet agricultural, urban, industrial and environmental needs.

1. **Environmental impacts**:

Large water storages in NSW inland river systems have caused major changes to the ecological function and health of rivers and floodplain environments.

When the timing, frequency and magnitude of flooding events are altered, the ecosystem suffers because animal, fish, plant and invertebrate species have evolved to respond to such events for their long term survival.

Rivers are connected in 3 ways:

- Upstream and downstream connectivity: this is connectivity from the headwater to the floodplain. This connectivity is needed for the movement of nutrients, food and animals along the river. Major disruptions to this connectivity are dams and barriers
- Lateral connectivity: this is the connectivity between the river and the floodplain. This connectivity is important because rivers are able to gain food and nutrients and allows for vital breeding processes to occur. Levees, barriers and lack of flow reduce connectivity and damage the river and biodiversity.
- Vertical connectivity: this is connectivity between surface water and groundwater. Over extraction is major threat to surface-groundwater connectivity [Lake; 2006][5]

'Dams change the chemical, physical, and biological processes of river ecosystems. They alter free-flowing systems by reducing river levels, blocking the flow of nutrients, changing water temperature and oxygen levels, and impeding or preventing fish and wildlife migration.'[6]

1.1 Seasonality of water delivery

The capture of snowmelt and high rainfall events in large water storages prevents the movement of natural flow volumes through river systems in the season in which they occur. Early spring inflows, autumn and winter events are generally stored for summer use.

The release of water from large storages to deliver irrigation orders in the hotter, drier summer climate has significantly altered the natural flow regimes of rivers and interfered with breeding cycles of native plants and animals.

1.2 Loss of natural flow regime

Large water storages capture the top of drought breaking flood waters, thus preventing downstream wetlands, billabongs and other floodplain ecosystems from receiving the full benefit of climatic change from dry to wet.

The river systems often suffer prolonged and unnatural drought sequences.

Large storages tend to capture all the medium flows. The variability of natural flows and benefits provided are lost to riverine ecology.

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[5] Lake, P.S (2006) 'Victoria's Stream's and Rivers: Their Condition and the Degrading Forces- Parliamentary Science Briefing' Speaking Notes- 20 July, 2006

[6] Joyce, S (2011) 'Dams – The Advantages and Disadvantages' Environment, Health and Safety Online http://www.ehso.com/ehshome/energydams.htm

The release of water from large storages in the form of constant base flows to provide basic rights and stock and domestic supplies are unseasonal and remove the natural drying sequences that occur in unregulated river systems.

1.3 Water quality impacts

Large water storages have a major impact on water quality both within the storage and downstream.

1.3.1 **Cold water pollution** is caused by the release of water from the bottom of the storage. Changes to water temperature in rivers impacts on fish habitat eg more than 100 km Macquarie River downstream of Burrendong Dam is impacted by thermal pollution. This has an influence on threatened fish populations such as silver perch.

1.3.2 **Deoxygenation** of water is caused by the trapping of nutrient-laden sediments behind the dam. This reduces the storage volume and increases the cycle of eutrophication or oxygen depletion. This results in increased plant and algal growth, bacterial decomposition that consumes oxygen and release of phosphorous that nourishes further algal growth. Deoxygenated or 'dead' water releases from water storages have a major impact on downstream ecosystems and fish habitat.

1.3.3 **Blue green algal blooms** are caused by high levels of nutrients and surface water temperature in water storages. Water released from dams can seed downstream river reaches with blue green algae outbreaks eg releases from Windamere Dam on the Cudgegong River. Although this dam has a variable off-take the blue green algal blooms can be so deep that cold water has to be released to manage downstream toxic algal pollution. The Glennies Creek Dam built in the same period also has major problems with blue green algae, as does Seaham Weir on the Williams River in the Hunter. Any new water storages are likely to produce toxic blue green algae blooms. These have major health impacts on humans, livestock and wildlife coming into contact or consuming polluted water.

1.3.4 Salinity levels in water storages can increase through the capture of first flow flushes from dryland salinity affected areas. Irrigation activities are known to increase water tables and salinity levels in catchment areas. This is particularly known to happen with irrigation in arid areas.

1.4 Changes to river channels

The regulation of rivers through capturing of flood events and the unnatural releases from large water storages has caused major changes to riverine geomorphology. The release of high flows in dry times and sudden drops in river height has caused bank slumping.

This increases erosion and turbidity and changes the stability of river channels.

1.5 Degradation of water dependent vegetation and fauna populations

The long-term impacts of changes to river function and health has caused a loss of species that have evolved around the variability of flow heights, volumes and velocities. Changes have occurred to floodplain habitats such as wetlands, billabongs and ephemeral lakes. These provide breeding and feeding grounds for a large number of birds, reptiles, amphibians, fish and plant species. The loss or degradation of these areas has caused a significant drop in population and extent of native water dependent species.

Any additional large water storages in inland NSW will cause a further decline in natural river flows.

Natural flows in rivers allow for:

- Fish, bird and plant survival by providing an essential breeding and feeding habitat
- Woodland and aquatic plant growth
- The connectedness of river channels with floodplains, wetlands and other freshwater areas for food and nutrient cycling
- Riparian vegetation survival that depends on the groundwater that surrounds rivers and streams
- The survival of the ecologies of estuaries that depend on the flows of freshwater streams and aquifers.
- Renewal of groundwater reserves

The current level of water storage in NSW has caused significant environmental damage. A range of significant water reforms have been instigated to address these problems. The consideration of increasing the impacts of water storage is not a sustainable option.

2. Agricultural use:

The agricultural industry is the largest user of water in Australia. In 2008/09 agriculture accounted for 54% of total water consumed.[7] Cotton growing was the largest user of water in the agricultural industry for that year.

The cotton and rice industries need to move away from wasteful flood irrigation to more efficient water use through drip or subsurface irrigation. This will improve drought management and long term security for production. It will also remove the pressure from the current level of water storage in inland NSW and leave more water for other purposes.

The capacity of existing water storage in NSW is adequate to meet agricultural needs.

3. Urban Use:

Urban water use should be managed through the National Urban Water Planning Principles as agreed to through COAG in 2008[8].

[7] National Water Commission (2011) http://www.nwc.gov.au/availability/use/agricultural

These include:
Principle 4. Manage water in the urban context on a whole-of-water-cycle basis.

'The management of potable water supplies should be integrated with other aspects of the urban water cycle, including stormwater management, wastewater treatment and re-use, groundwater management and the protection of public and waterway health'.

Principle 5. Consider the full portfolio of water supply and demand options.

'Selection of options for the portfolio should be made through a robust and transparent comparison of all demand and supply options, examining the social, environmental and economic costs and benefits and taking into account the specific water system characteristics'.

Principle 6. Develop and manage urban water supplies within sustainable limits.

'Ensuring the ongoing protection of the environment and waterway health is an integral part of urban water planning. Natural water sources for all water supplies, such as surface and groundwater supplies, should only be developed within the limits of sustainable levels of extraction for watercourses and aquifers.

Sustainable levels of extraction should be established through publicly available water plans prepared at a catchment and / or basin scale for all water use, including environmental requirements. In determining the sustainable extraction levels, regard should be had to the inter-relationships of different water sources.

To ensure sustainability, extraction levels should also be monitored over time and periodically re-assessed to reflect changes in scientific knowledge and climate variability.'

A continued and unmanaged growth in urban water use in inland NSW is unsustainable and can only occur if agricultural demand is lessened through the use of more efficient water applications to irrigated crops.

The capacity of existing water storage in NSW is adequate to meet urban needs.

4. **Industrial Use**

All industrial water use should be required to purchase water licenses from existing allocations. The use of urban water supply for industry causes an inequitable change in water sharing arrangements.

Current water storage levels in NSW are adequate to meet industry needs.

5. **Environmental needs**

[8] Council of Australian Governments (2008) http://www.environment.gov.au/water/policy-programs/urban-reform/index.html

The storage of environmental water in NSW dams is important to help mitigate the decline in river health from over-allocation of water and associated stress.

The planned and adaptive environmental water shares in Water Sharing Plans gazetted under the Water Management Act 2000 are required under water reform agreements to reinstate the loss of some of the natural flow regimes.

Water purchased to increase the reinstatement of environmental flows in river systems is a critical addition to environmental water in water sharing plans.

Further improvements for river health can be gained through:

- The protection and restoration of natural tributary flows
- Improved water sharing rules
- Removal of constraints eg weirs identified in review
- Better management of existing planned environmental water (9,000GL)

b) models for determining water requirements for the agricultural, urban, industrial and environmental sectors,

IRN wishes to raise the following issues relating to the Integrated Quantity and Quality Model (IQQM) which is the key tool for managing water sharing arrangements and determining water allocations:

1. Increased investment in improved water modelling
2. The need to address variability rather than long-term averaging
3. Availability of models for independent peer reviews
4. Improved accountability and transparency relating to model inputs and interpretations.
5. Public availability of updated models based on new drought of record data
6. Ground truthing of agricultural use inputs in models

c) storage management practices to optimise water supply to the agricultural, urban, industrial and environmental sectors,

1. **Water allocation announcement** criteria needs to change – currently based on inflows not on long-term conservative water use for drought security

The current management of allocations based on automatic increases related to dam inflows does not allow for long-term drought security planning. Climate change is predicted to increase the severity of drought impacts, as experienced in the millennium drought.

More conservative management of water allocation announcements will provide improved long term security of water supply. Managing storages such as Burrendong Dam on a 2 year drought cycle has caused a high risk water management culture that threatens water security during times of prolonged drought.

The function of water sharing plans needs to be managed more conservatively than currently practised by both State Water Corporation and NSW Office of Water.

2. **Constraints** and water sharing priorities of outlet capacity

Decision – making relating to delivery of water orders when demand is greater than outlet valve capacity needs to be managed through a transparent priority hierarchy.

3. **Water quality** of releases

The conflict between releasing cold water and water seeded with blue green algae needs to be carefully managed so that poor quality water is not delivered from water storages into downstream riverine environments.

Allowing large water storages to be emptied down to dead water levels has serious implications on downstream river health.

d) proposals for the construction and/or augmentation of water storages in NSW with regard to storage efficiency, engineering feasibility, safety, community support and cost benefit,

1. IRN does not support the construction of new large water storages, reregulating structures, weirs or the augmentation of existing structures.

The implementation of improved water use efficiencies throughout the inland river system should be the first priority of the NSW Government. This includes a structural adjustment away from flood irrigation practices.

2. Taxpayers still subsidise the use and management of water storages in NSW

While IPART has made considerable changes to the cost sharing arrangements for the management of large water storages in NSW, the cost of constructing new large water storages will be funded by the taxpayers of NSW.

A full costs benefits analysis of the environmental and social impacts of large new water storages, including loss of agricultural land and areas of high conservation value need to be costed into any proposal.

3. David Harriss, NSW Water Commissioner was quoted on ABC radio news in early June, when the Inquiry into adequacy of NSW water storages was announced:

New South Wales Water Commissioner David Harriss told ABC News while the Office of Water is not discounting new dams, their real benefits need to be considered.
"If you go back through the recent drought, the last time, prior to the last couple of years, those major dams in New South Wales spilt was in 2000 and they didn't spill against until 2010," he said.
"That meant that every bit of inflow was captured by the existing storages.

"So you have got to ask yourself what benefit would those dams have been during those 10 years
"And the answer is limited because all that water was being captured anyway."[9]

4. Irrigation industry does not wish to pay for water storage management and maintenance when nil allocation available in drought conditions

The cost benefit analysis of large water storage management over time needs to be conducted including consideration of the main financial beneficiaries of the infrastructure.

5. Planning process for new infrastructure eg Keepit Dam augmentation

The cost of augmenting Keepit Dam has been estimated to be in excess of $100m to NSW taxpayer[10].

Upgrades have also been approved and undertaken for Chaffey Dam, to increase water supply to Tamworth region, as well as Burrendong Dam, Blowering Dam, Split Rock Dam, Copeton Dam, Hume Dam and Wyangala Dam.

While a number of these upgrades have related to dam safety requirements, the costs of maintenance and management of existing large water storages needs to be fully considered before any further taxpayer investment in new water related infrastructure is considered.

e) water storages and management practices in other Australian and international jurisdictions,

The World Commission on Dams (*Dams and Development: A New Framework for Decision-Making. The Report of the World Commission on Dams, 2000)*[11]

Brokered by the World Bank and the World Conservation Union (IUCN), the World Commission on Dams (WCD) was established in May 1998 in response to the escalating local and international controversies over large dams. It was mandated to:

- review the development effectiveness of large dams and assessed alternatives for water resources and energy development; and
- develop internationally acceptable criteria, guidelines and standards for the planning, design, appraisal, construction, operation, monitoring and decommissioning of dams.

The WCD identified various issues relating to dams and large water storages as outlined in the following quotes from the Executive Summary:

[9] http://www.abc.net.au/news/2012-06-06/inquiry-to-consider-more-dams-for-nsw/4055018
[10] http://www.statewater.com.au/current+projects/Dam+safety+upgrades/Keepit+upgrade
[11] http://www.unep.org/dams/WCD/report/WCD_DAMS%20report.pdf

'Dams fundamentally alter rivers and the use of a natural resource, frequently entailing a reallocation of benefits from local riparian users to new groups of beneficiaries at a regional or national level.'

'In too many cases an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment.'

'Lack of equity in the distribution of benefits has called into question the value of many dams in meeting water and energy development needs when compared with the alternatives.'

'The evidence of success and failure we present in this report provides the best rationale why the 'business as usual' scenario is neither a feasible nor a desirable option.'

'Demand management, reducing consumption,recycling and supply and endues efficiency measures all have significant potential to reduce pressure on water resources in all countries and regions of the world.'

f) any other matter relating to the adequacy of water storages in NSW.

1. **Economic costs**:

There are a number of economic costs relating to the environmental impacts of water storages on river systems:

1.1 **Commercial fishing industry** - both the freshwater and marine commercial fishing industries have been adversely affected by changes in flow regimes and river regulation practices caused by water impoundments in large dams. The loss of fish habitat, degradation of water quality and reduction of freshwater flows to estuary systems, particularly the mouth of the Murray River, has caused a reduction in fish breeding opportunities.

1.2 **Recreational fishing** – is a multi-million dollar industry in Australia. There has been significant activity amongst freshwater angling groups to improve native fish habitat and conduct projects to mitigate impacts from invasive fish species such as European Carp.
Introduced fish species have benefited from the alterations to river systems caused by large water storages. They compete with and prey on native fish species.

1.3 **Tourism** – camping, fishing, bird-watching, boating and swimming activities attract people to rivers and wetland systems in inland NSW. The health of river systems and management of water quality is an important factor in increasing the economic benefits of recreational activities on inland river systems.

1.4 **Community health** – there are significant costs associated with water filtration and water quality management particularly in relation to toxic blue green algae.

1.5 **Floodplain grazing industry** – communities on floodplains have experienced significant reduction in socio-economic benefits provided by natural vegetation growth generated by regular flooding regimes that are now captured by water storages and upstream extraction.

2. Floodplain management and flood mitigation

Flood mitigation augmentation in large dams creates a perverse incentive for floodplain development in downstream areas. These areas are nevertheless subject to drown out in extreme weather events causing major issues with insurance, rescue and community safety.

3. Climate Change

Any consideration of adequacy and management of water storages in NSW needs to take climate change predictions into account.

Increased variation in climate extremes such as severe droughts and large floods must be included in all deliberations relating to water management in NSW

Appendix A – COAG Agreement 1994

Environmental requirements are to be determined on the best scientific information available and will have regard to the inter-temporal and inter-spatial water needs required to maintain the health and viability of river systems and groundwater basins. The Council also agreed where significant future irrigation activity or dam construction is contemplated, that in addition to economic evaluations, assessments will be undertaken to ensure that the environmental requirements of river systems can be adequately met.

Attachment A

4. in relation to water allocation or entitlements

d) that the environmental requirements, wherever possible, will be determined on the best scientific information available and have regard to the inter-temporal and inter-spatial water needs required to maintain the health and viability of river systems and groundwater basins. In cases where river systems have been over allocated, or are deemed to be stressed, arrangements will be instituted and substantial progress made by 1998 to provide a better balance in water resource use including appropriate allocations to the environment in order to enhance/restore the health of river systems.

f) where significant future irrigation activity or dam construction is contemplated, appropriate assessments would be undertaken to, inter alia, allow natural resource managers to satisfy themselves that the environmental requirements of the river systems would be adequately met before any harvesting of the water resource occurs