

**Submission  
No 78**

## **INQUIRY INTO ADEQUACY OF WATER STORAGES IN NSW**

**Organisation:** Inland River Networks

**Date received:** 15/08/2012

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I N L A N D  
R I V E R S  
N E T W O R K

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The Director  
Standing Committee on State Development  
Parliament House  
Macquarie St  
Sydney NSW 2000

Wednesday 12 August 2012

Dear Sir,

**Inquiry into the adequacy of water storages in NSW**

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. IRN 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.

Please find attached a submission to the Standing Committee on State Development Inquiry in the adequacy of water storages in NSW.

IRN wishes to present to the public hearing on Monday 20 August and would appreciate the opportunity to do so.

Yours sincerely

Bev Smiles

President

INLAND RIVERS NETWORK  
*Working for river and wetland health since 1991*  
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## **SUBMISSION**

**Standing Committee on State Development**

**Inquiry into the adequacy of water storages in NSW**

**August 2012**

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Level 2, 5 Wilson St Newtown 2042  
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## **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.<sup>1</sup> (App A) This led to the National Water Initiative<sup>2</sup> 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*’<sup>3</sup> 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.

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.

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<sup>1</sup> THE COUNCIL OF AUSTRALIAN GOVERNMENTS’ WATER REFORM FRAMEWORK  
<http://www.environment.gov.au/water/australia/coag/index.html>

<sup>2</sup> <http://www.environment.gov.au/water/australia/nwi/index.html>

<sup>3</sup> NSW 2021 Making NSW Number One p43

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]<sup>4</sup>

‘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.’<sup>5</sup>

### 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.

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

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<sup>4</sup> Lake, P.S (2006) ‘Victoria’s Stream’s and Rivers: Their Condition and the Degrading Forces- Parliamentary Science Briefing’ Speaking Notes- 20 July, 2006

<sup>5</sup> Joyce, S (2011) ‘Dams – The Advantages and Disadvantages’ Environment, Health and Safety Online <http://www.ehso.com/ehshome/energydams.htm>

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.<sup>6</sup> 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<sup>7</sup>.

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.’*

<sup>6</sup> National Water Commission (2011) <http://www.nwc.gov.au/availability/use/agricultural>

<sup>7</sup> Council of Australian Governments (2008) <http://www.environment.gov.au/water/policy-programs/urban-reform/index.html>



*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**

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."<sup>8</sup>*

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<sup>9</sup>.

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*)<sup>10</sup>

<sup>8</sup> <http://www.abc.net.au/news/2012-06-06/inquiry-to-consider-more-dams-for-nsw/4055018>

<sup>9</sup> <http://www.statewater.com.au/current+projects/Dam+safety+upgrades/Keepit+upgrade>

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:

*'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.

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<sup>10</sup> [http://www.unep.org/dams/WCD/report/WCD\\_DAMS%20report.pdf](http://www.unep.org/dams/WCD/report/WCD_DAMS%20report.pdf)

- 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