Submission No 101

INQUIRY INTO ADEQUACY OF WATER STORAGES IN NSW

Organisation: Australian Water Association (AWA)

Date received: 3/09/2012

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The Director
Standing Committee on State Development
Parliament House
Macquarie St
Sydney NSW 2000
August 31st, 2012

Dear Sir/Madam

The Australian Water Association (AWA) is pleased to provide this submission to the Legislative Council Standing Committee on State Development's *Inquiry to Examine the Adequacy of Water Storages in NSW*.

AWA is Australia's leading membership association for water professionals and organisations. Independent and not for profit AWA plays an important role in supporting the Australian water sector in the delivery of effective and sustainable water management practices. We work with water professionals to provide professional development and networking opportunities and we promote the water industry's interests through the delivery of evidence-based Position Papers, submissions and other activities as input to the development of sustainable water management policies.

This submission has been compiled by the NSW Branch of AWA, and is endorsed by the Association. Our critical points include:

- That an integrated approach to water supply security should be pursued in favour of approaches that rely on only single sources of supply. In developing such strategies, all options should be considered on a triple bottom line basis
- That the practice of some governments of arbitrarily banning particular water supply options should cease. Pre-emptive exclusion of any supply options – such as new dams, water trading, recycling and others – promotes inefficiency and may lead to selection of options that are not sustainable
- That climate change is very likely to have a significant impact on the capacity and operation of existing storages. Investment should be made in modelling these impacts and adapting to them
- In line with the 1994 COAG Water Reform Agreement and the National Water Initiative, governments should avoid subsidising infrastructure unless there are clear and transparent reasons for doing so
- There may be opportunities to develop new or expanded storages in rural areas where this construction can be undertaken in a sustainable manner to enable increased storage of waters for use in dry times without exceeding allocation caps in place in the Murray Darling and other catchments.

A number of subsidiary recommendations are also included.

As AWA has advocated for an integrated approach to water supply planning, I have attached a copy of an unpublished AWA Position Paper on Urban Water Efficiency in which the case is made for continued investment in demand management as part of a suite of water security options. This Position Paper will be released shortly. I would be grateful if the Standing Committee would not make this document publicly available until AWA has had a chance to do so in a few weeks.

Should members of the Standing Committee or its staff have any questions about our submission or the points we have raised, we invite you to contact AWA's National Manager, Programs and Policy, Andrew Speers at aspeers@awa.asn.au or on (02) 9467 8426. Mr Speers or AWA Branch representatives would be happy to present formally to the Standing Committee if required.

Yours sincerely

Tom Mollenkopf
Chief Executive
Australian Water Association

AUSTRALIAN WATER ASSOCIATION

Submission to the

NSW Legislative Council's Standing Committee on State Development

Inquiry to Examine the Adequacy of Water Storages in NSW

Inquiry's Terms of Reference

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

Australia's climate is characterised by highly variable rainfall and river flows. To provide secure water supplies for agricultural, urban and industrial purposes numerous dams and weirs have been constructed, some of which are very large. Australia stores more water per capita than almost any other nation. Most of this construction took place in the 1960s to the 1990s.

Several factors having the potential to erode water security have emerged since, including:

- Recognition that the construction of diversions has reduced downstream flows compromising the integrity of ecosystems dependent on those flows and by extension, the income of people and businesses dependent upon the maintenance of environmental quality. This economic loss relates to a reduction in water quality, reduction in fish stocks, bank deterioration and slumping, land salinity, diminution in the attractiveness of some areas to tourists and other factors.

  Provisions are now being made to return minimum natural flows to rivers and creeks downstream of storage dams. This is an important development and is strongly supported by AWA. However, while it is AWA's view that provision for environmental flows should be an element of management practice for all storages in NSW, environmental releases may reduce the amount of water available for consumptive uses.

- The impacts of climate change. Whether or not one accepts that climate change is human-induced its impacts are evident. Critical among these is a reduction of inflow to storages, and more frequent intense rainfall events. Addressing the issues associated with climate change is one of the greatest challenges confronting the water industry. Infrastructure to store water has been designed based historical records that are likely not to be accurate into the future. While Figure 1 and Figure 2, below are derived from data from Perth and Melbourne respectively, it is likely that similar data could be

compiled for NSW. Both of these graphs show a step change in inflows to water storages.

As a result of climate uncertainty, it is difficult to comment on the capacity of existing water storages into the future. The capacity of a dam is not just an expression of its size, but how frequently it is likely to receive inflow, downstream environmental flow requirements, evaporation rates, demand and other factors. Volumes of surface flows are, however, the key determinant and if these decline the capacity of existing storages to meet agricultural, urban, industrial and environmental needs will be called into question. It will be critical that there be regular review and updating of the likely secure yield potential of existing dams to incorporate the latest information available from global climate models. The NSW Government's Climate Steering Committee Group and NSW Office of Water are doing valuable work in this regard and this should be maintained.

The *volume* of water available is not the only determinant of the water industry's capacity to meet the needs of users and the environment. It is critical that water quality be adequate to meet needs and that infrastructure (including dams and distribution systems and, in some instances, water treatment facilities) be adequate and be maintained. Climate change impacts are not limited to reduced dam inflows. Other impacts may include:

- An increase in the frequency of bushfires which can have significant impact on water quality and on water yield (Bushfires may lead to significant quantities of ash being deposited in stored waters, and catchment areas that have been burnt may erode and will likely produce less runoff as bush re-establishes itself. Such impacts may last decades.); and
- Damage to assets through ground movement from soil drying and flash flooding.

Figure 1 – Trends in Total Annual Stream Inflow in Perth Storage Dams (1911-2008)

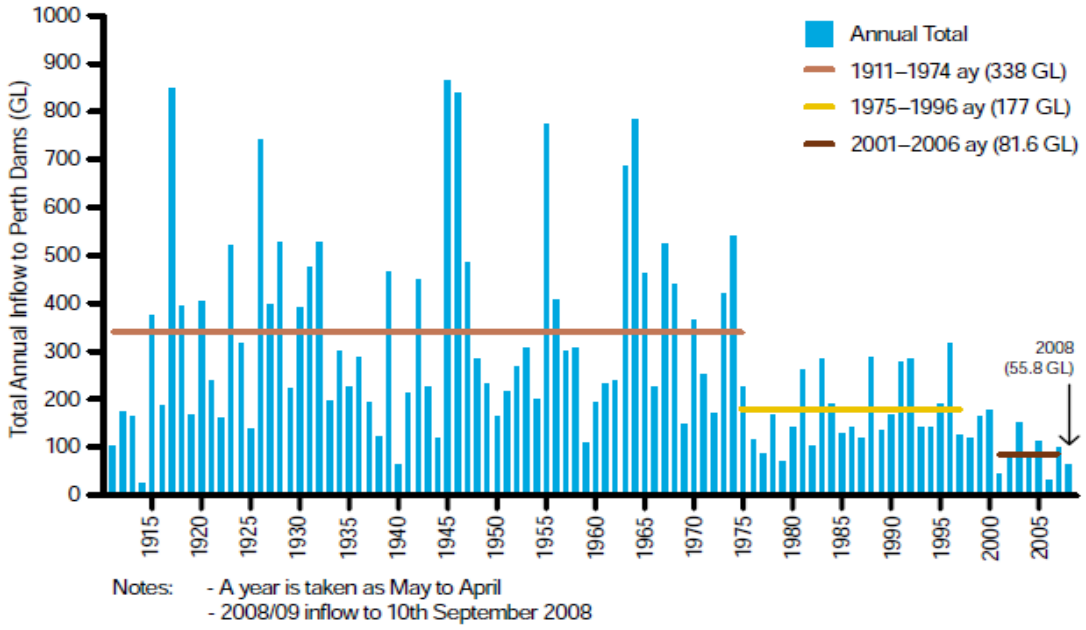
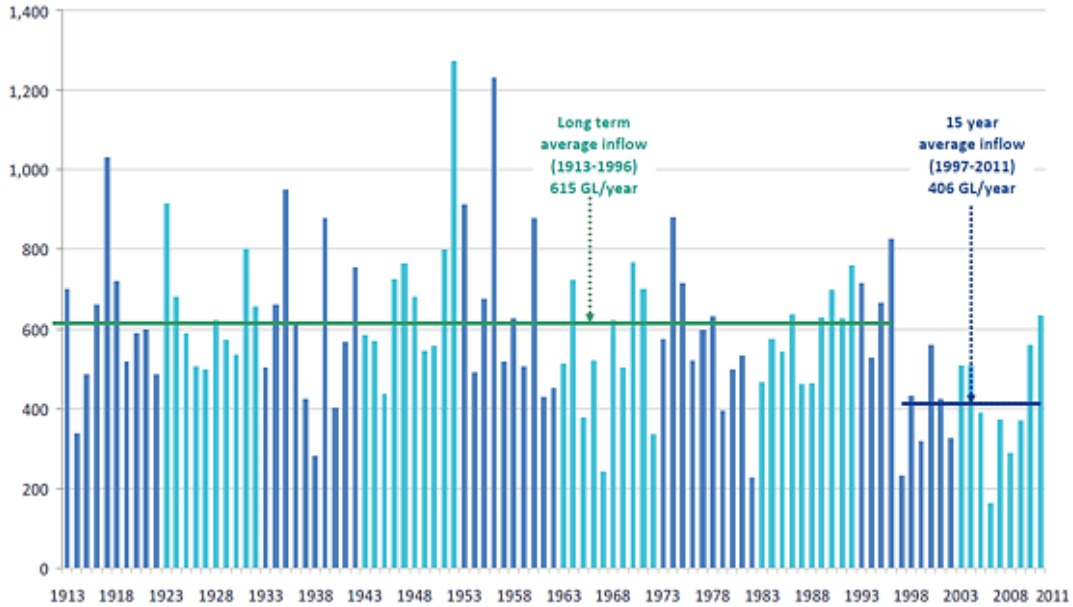


Figure 2 – Water flowing into Melbourne's main water supply reservoirs (annual totals)



The Committee's Term of Reference (a) could be read to refer only to the capacity of existing dams to provide for consumptive uses. However, a number of dams in NSW also provide for flood mitigation or are designed to discharge flood waters safely, mitigating downstream impacts or ensuring the infrastructure's integrity. Climate change modelling also indicates,

however, that there may be more extreme flooding events. The capacity of existing structures to store or mitigate these events may also be undermined by changes in rainfall patterns as a result of climate change.

The long term security of the State's water resources to meet agricultural, urban, industrial and environmental needs must be a priority for the State Government. Five categories of action are essential:

- An integrated approach to supply security must be taken. In this regard, an inquiry into the adequacy of storage infrastructure is too narrow a brief, notwithstanding that valuable information may be obtained. Rather, public policy should be directed to ensuring that approaches are taken that focus on overall supply security, not just the security of supplies from surface water storages. These policies should foster a long-term planning approach, not just short-term responsiveness.
- Complementing this long-term integrated water security approach should be a commitment to making available approvals that enable utilities to respond rapidly to looming water supply shortages when they emerge. For example, it should be possible for options for increases in water supply to be agreed to now, and approvals obtained that can be actioned rapidly when needed. Option contracts that facilitate urban-rural trades in water should also be allowed.
- In determining which options to invest in, rigorous triple bottom line analysis must be carried out and no option ruled out until this analysis is complete. Investment in increasing water supply could be directed to dams, desalination plants, recycling of water, use of stormwater and other approaches, the viability or which will vary from location to location[1].
- Investment in demand management strategies should be maintained or increased, and pursued not only in times of water shortage but whenever they are viable on economic, social or environmental grounds. As with supply side options, demand management options can extend water supplies, enhancing supply security. Thus, demand management policies should be considered equally with supply side options. This is a view held strongly by AWA and is the subject of a soon to be released *Position Paper*. A preliminary copy of this *Position Paper* is attached for the information of members of the Standing Committee.
- Investment in water supply infrastructure must be maintained or increased to ensure that supply capacity is not eroded in the face of increased demand (say, arising from

[1] The 1994 COAG Water Reform Agreement stipulated that users should pay for the water they consume and that cross subsidies – where they need to be maintained for social equity purposes - should be transparent. AWA strongly supports these principles. In arguing for the maintenance of investment in supply and distribution infrastructure, AWA is not proposing that this infrastructure

population growth) or climate change. This investment should be directed to maintaining water supply security and the integrity of distribution systems lest system losses undermine efforts to secure supply.

Recommendations:

- ***That adequate environmental flows be progressively restored to the State's river systems.***
- ***That the work undertaken by the NSW Government's Climate Steering Committee Group and NSW Office of Water should be continued to ensure the long term safety and yield capacity of existing water storages to meet agricultural, urban, industrial and environmental needs is understood.***
- ***That investment be made in long-term planning and that regulatory approvals be granted as exercisable 'options' enabling rapid responses to be made in the face of reduced supply security. Options for urban-rural water trading should also be allowed[2].***
- ***That investment in supply infrastructure not be subsidised by governments, unless there are valid social, economic or environment to do so, and any cross-subsidies are explicit and transparent.***
- ***That extraordinary dividend payments not be extracted from utilities and that artificial price caps not be imposed. Both of these approaches inhibit utilities' capacity to invest in both asset renewals and new infrastructure***

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

Climatic events are becoming more extreme, and we need to have infrastructure, technology and skilled people to cope with future conditions.

A new report from the Water Services Association of Australia (WSAA) – Occasional Paper 27 *"Climate Change Adaptation and the Australian Urban Water Industry"* – released in March 2012 supports this view and includes recommendations for urgent federal and state/territory government action. This report suggests that modelling, monitoring and

[2] Note that AWA is not proposing that such regulatory approvals should be grated in perpetuity. Rather, they should be reviewed periodically to ensure the infrastructure for which they were granted remains the best option under the circumstances, taking into account new technologies and emerging scientific knowledge.

learning processes can build an inherent adaptive capacity within the water industry which will allow new approaches to evolve apace as different climate change effects unfold.

Similarly, innovative research and trials on catchment management techniques and new monitoring and response systems extending beyond traditional approaches will be needed. These should encompass the interrelationships between urban water and biophysical systems. They would represent the beginnings of more comprehensive, systems-based approaches to adaptation and the management of climate vulnerability.

Additionally, as referred to above, the secure yield potential of existing dams must be regularly reviewed to ensure it is current and in line with state of the art climate modelling. This work will produce information relevant to the flood mitigation potential of existing dams and their ability to pass floodwaters safely.

AWA also believes investment in modelling capacity in the following areas is highly desirable:

- Improved predictive modelling and real time decision support systems for water reservoirs to assist both the rural and urban water industries to manage the impacts of climate change on water quantity and quality. Further research work will be required, for example, on the concentrations and behaviour of certain pathogens, toxicants and pollutants under various climate change scenarios. Each of these has the potential to reduce drinking water quality.
- Monitoring and modelling of the impacts of innovative approaches to increasing the security of supply in the face of climate change. Maintaining the productivity of ground and surface waters while protecting the integrity of ecosystems dependent on them is a challenge for utilities. Reponses taken to date include groundwater replenishment (involving the injection of highly treated wastewater into aquifers for later recovery), greater use of deeper, confined groundwater aquifers (and less use of superficial aquifers) and catchment thinning (i.e. reducing plant cover) to increase runoff into dams. These approaches have produced significant benefits and should continue. Their efficiency and impact needs to be monitored and their potential modelled to ensure their sustainability.
- Monitoring and modelling of the impacts of increased frequency and severity of storms on infrastructure and on the impacts of infrastructure performance in the face of such events. The capacity of sewerage systems is, for example, a reflection of modelling to determine likely inflows in severe weather. Such weather may become more frequent and more extreme. Overflows from sewerage systems introduce shock loads of organic matter into rivers and creeks, fish deaths and bans on swimming being often the outcomes of such events. Better monitoring systems will need to investigated,

developed and implemented to manage these issues, to protect water quality, public amenity and the environment.

Recommendations:

- ***That the recommendations contained in WSAA's Occasional Paper 27*** **"Climate Change Adaption & the Australian Urban Water Industry"** ***be reviewed and implemented by appropriate state and local government agencies***
- ***That investment be made in the specific monitoring and modelling techniques referred to above***

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

Catchment management and storage management is a complex field. A wide range of factors affect the capacity of dam operators to meet the needs of users, including the environment. To provide just one example, dam operators may seek to increase yield through catchment thinning, but this needs to be balanced against the need to ensure that erosion does not occur and that water quality is maintained. In this submission AWA is not highlighting any one practice for particular attention. We would, however, stress that the responses taken need to be tailored to local conditions.

For instance, flows in rivers in inland NSW may frequently be naturally low given the wide variability of rainfall across years. The responsiveness of particular ecosystems to environmental watering events (i.e. the release of stored waters to meet environmental requirements) will be quite different to ecosystems in areas that more regularly receive rainfall. Similarly, rates of evaporation from large shallow dams will be markedly greater than narrower, deeper dams, a factor that will need to be carefully considered in planning for new or expanded storages. Further, water releases from deeper dams may be colder than would naturally be the case, which may impact ecosystems or species downstream.

Accordingly, AWA's recommendation is not that a specific action be taken, but that it be recognised that there are no 'one size fits all' options. The Committee should recognise this fact in its report. Its recommendations should be focussed on the objective of maximising yield taking all factors into account, rather than recommending specific actions that may not suit all circumstances.

Recommendation

- ***That the Committee encourage development of integrated approaches to water security, rather than reliance on a single option***

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

The population of NSW is expected to climb significantly in the future. This will reduce the volume of water stored per capita, decreasing the supply that can be made available during drought without emergency provisions (restrictions) being introduced. This has potential social, environmental and economic consequences for the State.

While acknowledging that the Standing Committee's inquiry is into the adequacy of storages, 'adequacy' is not a concept that can be addressed without the use of storages being placed into a wider context. That is, dams and other reservoirs do not exist in isolation. While their construction has been a priority in the past, their performance will become less certain in future in the face of climate change, and we are now more aware of their environmental and social impact (particularly the loss of productive farm land and the dislocation of communities) and the uncertainty that arises from climate change. These circumstances demand that a wider range of options be considered, including alternative storage options such as aquifer recharge, climate resilient options such as recycling and desalination, and non-structural solutions such as urban-rural water trades and demand management.

Each of these should be part of a suite of options employed. We should avoid relying on single option solutions and the options chosen should be tailored to local circumstances; one size does not fit all. Furthermore, policy bans introduced by various governments (such as limits on urban-rural water trading or on inter-basin trading) should be avoided. Each option should be considered on its merits on a triple bottom line basis. Dams and reservoirs should be part of the mix, but we should not start from the notion that the only way of increasing water availability is through construction of more water storages.

To provide a theoretical case study, consider a town and associated agricultural area served by a single dam. The ability of this facility to provide water security in the face of climate change may become less certainty in future, and the town's water demands may be increasing due to population growth. It may be possible to expand the capacity of the dam or build a new one, but there may be a risk that the return on such investment will be low or negative if the dam is rarely or never full. An alternative may be desalination if the facility is on the coast or recycling or aquifer storage and recovery but these may be energy intensive options. Nevertheless, a report by CSIRO has suggested that a small reduction in household water use may offset a significant proportion of energy used in supplying households, as part of the water conserved would normally be heated, consuming energy. This suggests that demand management strategies might also be part of the mix.

In as much as dams should not be considered in isolation, nor should their function, or the function of other supply infrastructure. There may be significant cost and functional

advantages to be had if synergies can be developed. For example, if it were possible for a dam to provide for both water supply and flood mitigation or if recycled water could be used to supplement water stored in dams the asset could be 'driven harder' producing greater value for the investment.

Notwithstanding the comments above urging an integrated response to issues of supply security, there may be a case for investing specifically in new or expanded storages, particularly in rural areas.

Members of the Standing Committee would, of course, be aware the limits places on extractions within the Murray Darling Basin as there has been a 'cap' in place since 1996. There is no opportunity, therefore, to increase diversions within the Basin. Furthermore, the proposed Basin Plan is likely to require a further reduction in diversions overall, and in particular sub-catchments. It remains possible, however, to store flood flows for later use where the capacity exists to do so.

Presently, the economic value of allowable use is severely constrained as existing infrastructure is not of sufficient capacity to effectively regulate supply over multiple dry seasons (i.e. to store water during flood times for use over a number of years of low rainfall). Increasing dam storage capacity, either through enlarging existing sites or new structures, would significantly increase the value of the water allowed to be extracted under the Basin Plan, by securing a larger proportion of the allowable extraction for later use.

New or enlarged dams could provide Sustainable Diversion Offsets (SDL) for the Murray Darling Basin Plan. For instance, additional water can be provided for the environment by replacing some of the very inefficient on-farm storages in the northern valleys, with more efficient deep dams in other areas. The associated evaporation savings can be allocated to the environment without reducing water security and economic activity.

The recently completed Lake Brewster Water Efficiency Project by State Water provides a good example of how well-planned infrastructure works are able to provide environmental benefits, water savings and local economic benefits without removing water from productive usage in Murray Darling Basin.

The Committee will note from earlier discussion that AWA strongly supports provision for environmental flows in any storage management plan. It may seem, therefore, that a suggestion that additional dams be built or existing dams expanded contradicts this argument. It is, however, AWA's view that each proposal should be assessed on its merits (with impact on environmental health being a key assessment criterion) and that there may be opportunity to store more water, more efficiency, without reducing environmental quality. Furthermore, the construction of off-creek storage dams (that is, reservoirs that do not regulate a river or creek but to which water may flow or be pumped when excess is available) may provide additional storage without the downstream impacts of on-river

storages. Stored waters may be used for consumptive purposes or to ensure that minimum environmental flows are maintained.

Recommendations:

- ***That an integrated approach to supply security be adopted***
- ***That the role of dams in the context of integrated water management strategies should be closely examine to identify opportunities to maximise their use***
- ***That limits imposed by governments on certain water security options be removed***
- ***That options to build new dams or expand existing infrastructure in rural areas be considered with the objective of increasing the opportunity to store flood flows across years to enhance supply security during drought, to supplement environmental flows or both.***

e) Water Storages and management practices in other Australian and international jurisdictions

As shown in Figures 1 and 2, above, there is evidence of a step change in flows to established dams in at least some of our major cities. In rural areas, persistent drought and clear evidence of over-allocation has led to the introduction of a range of water efficiency measures, including improved on-farm water management practices and repair of infrastructure. The most significant reform is, however, the introduction of water trading that allows the market to respond efficiently to relative water scarcity. In short, when water is scarce prices rise and there is a tendency for water to be allocated to the highest value crops. In turn, the capacity for irrigators to sell water rights temporarily or permanently enables irrigators to generate income during dry times or to exit the irrigation industry. The National Water Commission reports that the introduction of water trading has added significant value to the economy.

Water trading is a world leading initiative, as are many of the steps taken in Australia to improve water efficiency. These steps should be widened, and artificial restrictions on inter- or intra-basin trades removed.

That Australia has innovated does not suggest that we do not have much to learn from other jurisdictions. The critical lessons will, however, stem from reviews of initiatives to develop integrated approaches to water supply security and to modelling and adapting to the impacts of climate change.

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

At the start of this century urban Australia was almost completely dependent on surface runoff into the dams as the sole source of water. This is now recognised as a very high risk option in an era of climate change and the industry has made very significant investments in alternative supplies such as desalination and use of recycled water, to name two. These investments may have been warranted, but some options pursued are more energy intensive than traditional water supply systems. As stressed throughout this paper, a total water cycle approach should be taken to water planning and resource management.

In relation to drought-proofing NSW regional urban water supplies, the ongoing development of long term (+ 30 year) integrated water cycle management plans and drought management plans by the NSW Office of Water in partnership with local water utilities is strongly supported. This should include a strong focus upon drought preparedness and identify strategies for maintaining a secure water supply in times of drought.

A removal of any "policy bans", like those on urban/rural trading, limits on inter- and intra-basin trading, restrictions on the use of purified recycled water for drinking water and reluctance to build new dams would facilitate NSW's move to a water-secure future. Put briefly, the wider the range of options considered the more efficient, flexible and sustainable outcomes are likely to be.

Finally, the ongoing importance of NSW Dams Safety Committee's role in NSW should be recognised to ensure that there is appropriate regulatory review, guidance and oversight of the State's prescribed dams.

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