Submission No 147

INQUIRY INTO RATIONALE FOR, AND IMPACTS OF, NEW DAMS AND OTHER WATER INFRASTRUCTURE IN NSW

Organisation: Slattery & Johnson

Date Received: 13 October 2020

Submission into the Portfolio Committee No. 7 – Planning and Environment inquiry: Rationale for, and impacts of, new dams and other water infrastructure in NSW

Thank you for the opportunity to make a submission into the inquiry into the rationale for, and impacts of, new dams and other water infrastructure in NSW.

Slattery & Johnson are a consultancy specialising in water policy and management in the Murray-Darling Basin. Our clients include the Lachlan Floodplains and Wetlands group.

We understand the Portfolio Committee No.7 - Planning and Environment is conducting an inquiry into the rationale for, and impacts of, new dam and mass water storage projects proposed by WaterNSW including Wyangala, Mole River and Dungowan Dam projects, the Macquarie River reregulating storage project and the Western Weirs project, particularly:

a) the need for the projects, including the historical allocation of water and consideration of other options for ensuring water security in inland regions,
b) the economic rationale and business case of each of the projects, including funding, projected revenue, and the allocation and pricing of water from the projects,
c) the environmental, cultural, social and economic impacts of the projects, including their impact on any national or state water agreements, or international environmental obligations,
d) the impacts of climate change on inland waterways, including future projections, and the role of dams and other mass water storage projects in ensuring security of water supply for social, economic and environmental outcomes
e) water infrastructure technologies that may promote enhanced environmental outcomes, and
f) any other related matter.

This submission relates to the Wyangala dam expansion in relation to the;

a) need for the project,
b) economic rationale,
c) environmental, cultural, social and economic impacts, and
f) any other related matter.

The Wyangala dam expansion proposes to raise the wall height by 10 metres and increase the storage capacity by 650 gigalitres from 1,217 gigalitres to 1,867 gigalitres. The modelled average yield is 21.02 gigalitres.[1]

[1] Department of Agriculture, Water and the Environment. 2020. *EPBC Act Referral: 2020/8653 Wyangala Dam Wall Raising.* Canberra: Australian Government.,

The project is estimated to cost $650 million, which is funded equally between the Commonwealth and the New South Wales government.[2]

Need for the project

The need for the project has not been justified by the NSW or Commonwealth Governments on any grounds, and alternate policy or infrastructure options have not been adequately assessed. In particular, the need for the project has not been demonstrated based on consideration of;

- frequency of filling,
- improvement to reliability,
- impact on groundwater, or
- other options

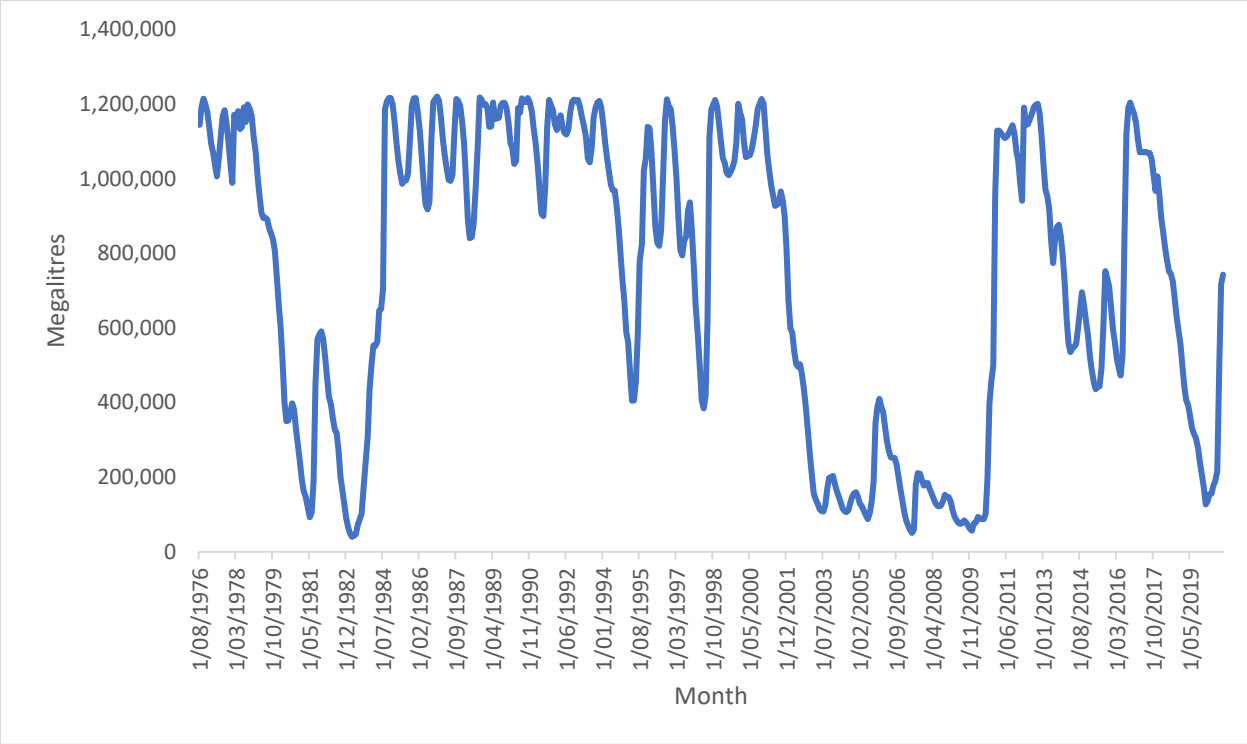
http://epbcnotices.environment.gov.au/_entity/annotation/249e66ea-039b-ea11-a236-005056842ad1/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1599634141900

[2]NSW Government. 2019. *Billion dollar investmnent in NSW dams.* Sydney: NSW Government., https://www.pm.gov.au/media/billion-dollar-investment-nsw-dams

Frequency of filling

Figure 1 shows the historic volume in Wyangala Dam since its construction in the 1970s.

Figure 1: Volumes stored in Wyangala Dam



Source: (WaterNSW 2020), https://realtimedata.waternsw.com.au/

Figure 1 shows that the dam has often not been full since it was constructed. For example, it did not fill for four significant periods, between 1978 and 1985, 2000 and 2011, 2012 and 2016 and from 2016 until the present, with shorter periods when the dam was not full in the 1990s.

Figure 2 below shows the frequency of volumes stored in Wyangala.

Figure 2: Wyangala dam – the frequency of volumes stored

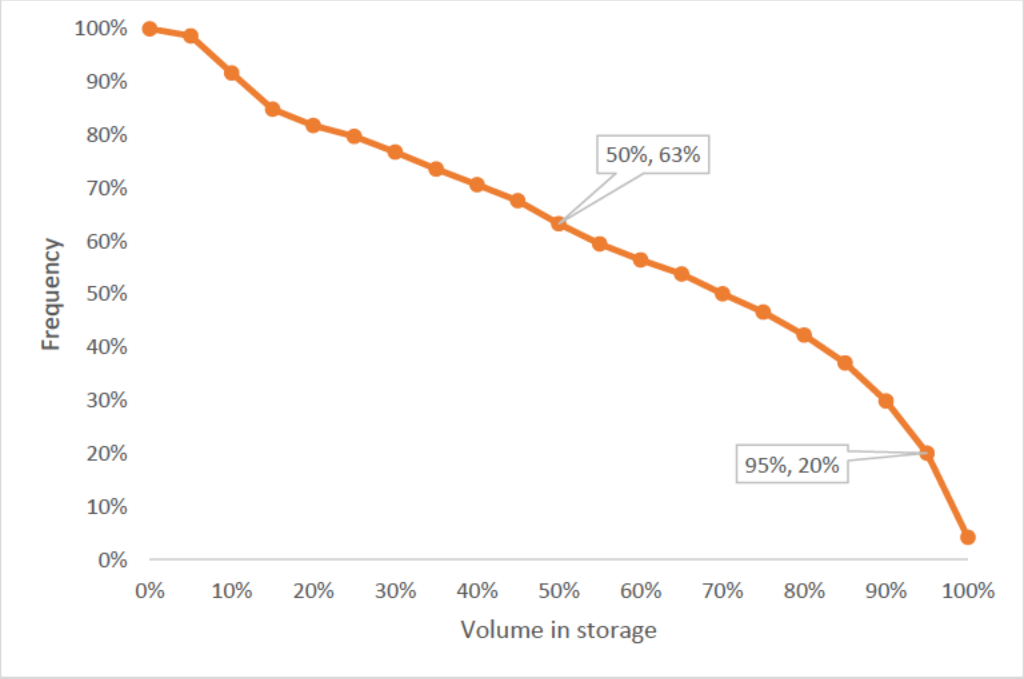
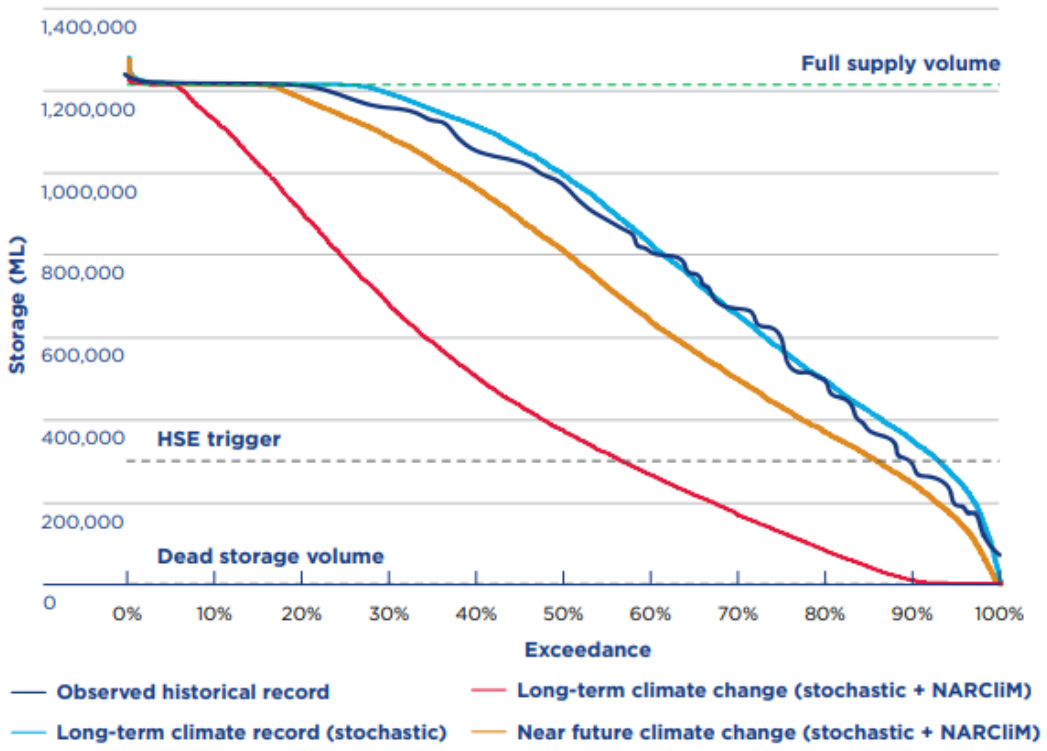


Figure 2 shows that Wyangala has been more than half full two-thirds of the time (50% volume at a frequency of 63%), and nearly full one-fifth of the time (95% volume, 20% of the time), since it was constructed.

Given these figures, the additional capacity ('airspace') after the expansion will also be underutilised much of the time.

In its' Draft Lachlan Regional Water Strategy the NSW Department of Planning, Industry and Environment (DPIE) has modelled the storage behaviour of Wyangala dam based on the long-term climate record and future climate projections, shown in Figure 3 below.

Figure 3: Wyangala dam storage behavior



Source: (NSW Government 2020), https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/324514/draft-rws-lachlan.pdf

Figure 3 shows how Wyangala is predicted to behave based on modelling that includes climate change. The dam is expected to have less inflows, be full less often and have lower volumes than experienced historically. This is forecast to worsen in the long-term.[3] This is an argument against the expansion.

No material improvement in reliability

WaterNSW has identified a key benefit of raising Wyangala Dam as:

[3] NSW Government. 2020. *Draft Regional Water Strategy: Lachlan Strategy.* Sydney: NSW Department of Planning, Industry and Environment., https://www.industry.nsw.gov.au/water/plans-programs/regional-water-strategies/public-exhibition/lachlan

> *A significant improvement in drought resilience, water security, flood attenuation and water reliability for the Lachlan Valley.*[4]

This is not supported by any evidence.

DPIE claims that its hydrological modelling shows that the expansion will yield an annual average return of 21.05 gigalitres.[5]

We wrote to DPIE in July 2020 and asked for a copy of the hydrological modelling. The DPIE Program Delivery Director – Dams, replied:

> *Hydrological Modelling: This work is currently being developed and will inform the final business case. It is not yet available but will become available within the next couple of months (est. late October at this time).*[6]

In the absence of publicly available hydrological modelling, an estimate of the improvement in the reliability of General Security licences can be made by adding the additional yield (21.05 gigalitres) to existing reliability. The NSW Department of Industry and Environment states that the reliability of General Security licences in the Lachlan is 56.2%.[7]

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[4]WaterNSW. 2020. *Wyangala Dam Wall Raising Project.* Sydney: WaterNSW.
—. 2020. *Wyangala Storage.* 9 October. Accessed October 9, 2020. https://realtimedata.waternsw.com.au/. https://www.waternsw.com.au/__data/assets/pdf_file/0006/156768/Wyangala-FAQs.pdf

[5]Department of Agriculture, Water and the Environment. 2020. *EPBC Act Referral: 2020/8653 Wyangala Dam Wall Raising.* Canberra: Australian Government. http://epbcnotices.environment.gov.au/_entity/annotation/249e66ea-039b-ea11-a236-005056842ad1/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1599634141900

[6]Fisher, Alex, Email to Maryanne Slattery. 2020. *Program Delivery Director - Dams* (26 July).

[7]NSW Department of Industry. 2018. *Water Reform Technical Report: Derivation of LTDLE factors in NSW.* Technical report, Sydney: NSW Government. https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/162181/techncial-paper-derivation-technical-factors-nsw.pdf

Table *1* below shows the improvement in reliability from the proposed expansion.

Table 1: Improvement in reliability from Wyangala dam expansion

(1) General security shares	592,847[8]
(2) Existing reliability	56.2%
(3) Existing volumetric yield of general security shares (1) * (2)	333,180
(4) Additional yield	21,020
(5) Proposed new volumetric yield (3) + (4)	354,200
(6) Proposed new reliability (5) / (1)	59.7%
(7) Improved reliability (6) – (2)	3.5%

As shown in

[8]NSW Department of Infrastructure, Planning and Natural Resources. 2004. *A guide to the Water Sharing PLan for the Lachlan Regulated River Water Source.* Guide, Sydney: NSW. http://www.water.nsw.gov.au/__data/assets/pdf_file/0020/548003/lachlan-reg-guide.pdf

Table *1*, the current general security water shares of 592,847 megalitres yield an annual average of 333,180 megalitres based on reliability of 56.2%. The expansion will create an additional annual average of 21,020 megalitres, making the new volumetric yield 354,200 megalitres, or 59.7% reliability. That is, the expansion will only improve reliability by 3.5%.

An improvement to reliability by 3.5% or 21.05 gigalitres is not significant and is well within the modelled margin of error. The Lachlan Valley Cap model has a standard error of 45 gigalitres and a mean error of 15 gigalitres.[9]

The NSW Government has forecast a significant decline in the reliability of General Security water licences in the Lachlan valley, which more than reverse the small improvement the expansion would achieve:

> *Given the variability in the climate, general security users in the Lachlan could experience a 1% decrease in their average water availability based on the long-term paleoclimate records, a 4% decrease under short-term climate projections and a 60% decrease under long-term climate change projections.* [10]

Exploring other options

If there was a robust assessment of alternative policy or infrastructure options before the Wyangala dam expansion was announced, it was not canvassed publicly.

The Wyangala dam expansion was included in WaterNSW's 20-year infrastructure options study (Options Study), completed in 2018.[11]

The Options Study stated that it was not an adequate process to decide the Wyangala Dam expansion, and instead it promised further investigation:

> *This document is not an investment plan because it does not address core government major investment processes. Most of the options identified in this strategy will need to be studied in more detail and will require major Business Case review before investment decisions can be made.* [12]

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[9] Brewsher. 2013. *Barwon-Darling Valley Independent Audit of Cap Model.* Canberra: Murray-Darling Basin Authority., Obtained under MDBA Freedom of Information request 88 (2018), https://www.mdba.gov.au/about-us/accountability-reporting/freedom-information/foi-disclosure-log

[10] NSW Government. 2020. *Draft Regional Water Strategy: Lachlan Strategy.* Sydney: NSW Department of Planning, Industry and Environment., https://www.industry.nsw.gov.au/water/plans-programs/regional-water-strategies/public-exhibition/lachlan

[11] WaterNSW. 2018. *20 Year Infrastructure Options Study Rural Valleys.* Sydney: WaterNSW.
—. 2020, https://www.waternsw.com.au/__data/assets/pdf_file/0019/132616/20-Year-Infrastructure-Options-Study-June-2018.pdf

[12] WaterNSW. 2018. *20 Year Infrastructure Options Study Rural Valleys.* Sydney: WaterNSW.

To avoid any doubt, the Options Study was not a feasibility study, nor an infrastructure plan:

> *This study is not a capital works plan. It identifies potential options which, if consider* (sic) *appropriate can be progress* (sic) *to the business cases* (sic) *for WaterNSW and Government consideration through formal review…From there Government may consider progressing such projects to completion.* [13]

The Options Study set out a process to decide project options, which included confirmation of customers long-term needs and a detailed business case before an investment decision was made by customers and the government:

> *The first step is to confirm customers' Level-of-Service (LOS) issues and priorities. This will be followed by assessing whether the options identified will address the LOS needs or whether new solutions will need to be developed. At this stage, further investigations are subject to being provided and WaterNSW will prepare a detailed business case to examine technical, economic and financial aspects for investment consideration by customers or government.* [14]

This process did not happen, as the expansion was announced prior to a business case being made public, and possibly prepared, or the confirmation of customer long-term priorities.

The economic rationale

The Commonwealth and NSW Ministers have announced the expansion will cost $650 million. If the expansion remains on budget, for a 21.05 yield, that is $30,900,000 per gigalitre. Market prices in the Lachlan valley are around $1,189,000/gigalitre, or approximately one-thirtieth of the cost of the expansion.[15]

Despite claims by politicians that the expansion will create an economic stimulus,[16] no information about economic stimulus has been made public.

—. 2020, https://www.waternsw.com.au/__data/assets/pdf_file/0019/132616/20-Year-Infrastructure-Options-Study-June-2018.pdf

[13] WaterNSW. 2018. *20 Year Infrastructure Options Study Rural Valleys.* Sydney: WaterNSW.

—. 2020, https://www.waternsw.com.au/__data/assets/pdf_file/0019/132616/20-Year-Infrastructure-Options-Study-June-2018.pdf

[14] WaterNSW. 2018. *20 Year Infrastructure Options Study Rural Valleys.* Sydney: WaterNSW.

—. 2020, https://www.waternsw.com.au/__data/assets/pdf_file/0019/132616/20-Year-Infrastructure-Options-Study-June-2018.pdf

[15] NSW Department of Planning, Industry and Environment. 2020. *Trade dashboard.* 30 September. Accessed October 6, 2020. https://www.industry.nsw.gov.au/water/licensing-trade/trade/dashboard.

[16] Benns, Matthew. 2020. *Wyangala Dam wall raising project to create hundreds of jobs.* Newspaper article, Sydney: THe Daily Telegraph.

The economic rationale has not been made, as the business case has not been made publicly available.

We wrote to DPIE in July 2020 and asked for a copy of the Business Case and Feasibility Study. The DPIE Program Delivery Director – Dams, replied:

> *Business Case: WaterNSW are currently developing the Final Business Case for The Wyangala Dam Wall Raising Project and are scheduling to have it completed for the INSW Infrastructure Investment assurance Framework by mid-2021. The previous studies informing the Government's announcement of the project include the WaterNSW 20 Year Infrastructure Options Study, Rural Valleys (June 2018) and the Lachlan Valley Water Security Study, which I understand will be published by DPIE in the coming weeks as part of the public consultation period for the Regional Water Strategy for the Lachlan.* [17]

The Commonwealth government has announced it would pay for half of the expansion in October 2019.[18] Initially the Commonwealth contribution would be 50% through a grant from the Department of Infrastructure and 50% from a loan from the Regional Investment Corporation (RIC).[19]

Documents returned under a Freedom of Information request from the RIC, show that as at 30 June 2020;

- the NSW government did not want the loan on its balance sheet, and instead wanted the loan to be with WaterNSW,
- RIC was seeking legal advice over several months relating to making the loan with WaterNSW,
- the loan was not approved,
- there was no concept design, cost-benefit analysis or business case provided to RIC, and
- RIC rated the probability of making the loan at five per cent. This is probably because it gave the proposal an eligibility score of only one out of six.[20]

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https://www.dailytelegraph.com.au/news/nsw/wyangala-dam-wall-raising-project-to-create-hundreds-of-jobs/news-story/099d3d0ed2122ee2e695256a4b415942

[17] Fisher, Alex, Email to Maryanne Slattery. 2020. *Program Delivery Director - Dams* (26 July).

[18] Guardian staff and agencies. 2019. *NSW to get new dam as part of $1bn drought emergency boost.* Sydney: The Guardian. https://www.theguardian.com/australia-news/2019/oct/13/nsw-to-get-a-new-dam-as-part-of-1bn-drought-emergency-boost

[19] NSW Government. 2019. *Billion dollar investmnent in NSW dams.* Sydney: NSW Government.,https://www.nsw.gov.au/media-releases/billion-dollar-investment-nsw-dams

[20] Regional Investment Corporation. 2020. *Disclosure Log.* 24 August . Accessed September 11, 2020. https://www.ric.gov.au/about/reporting/freedom-of-information/disclosure-log., https://www.ric.gov.au/about/reporting/freedom-of-information/disclosure-log

It seems that at 30 June 2020, RIC was not in a position to approve the loan in a manner consistent with its funding guidelines The Commonwealth has since announced its contribution will all be via a grant, with no loan component.[21]

Cost recovery

All Australian Governments are signatories to the National Water Initiative (NWI). Under the NWI, governments have adopted the principle of user-pays in respect of water storage and delivery in irrigation systems.[22]

The 20-year option study said that customers will be advised of cost recovery options to inform their priorities:

> *There are a number of ways in which a new dam can be funded….The likely impact of the proposed options on the price of water, as well as possible funding options, will be determined and presented to customers to aid their choice as to which options to support.*

If the governments implement full cost recovery, General Security water holders will have to pay for the expansion.

Economic and environmental outcomes

It is well documented that the regulation of rivers through infrastructure damages the environment:

> *Regulation of rivers in the Basin has caused long-term changes in geomorphological and ecological processes downstream of dams, including erosion, depressed water temperature, removal of fish breeding habitat, reduced supply of organic material and nutrients to the rivers, declining water quality, loss or degradation of wetlands in lakes Alexandrina and Albert, and more recently the exposure of acid sulfate soils.*
> *River regulation and extraction of water have also had damaging effects on waterbird populations.*

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[21] Brinsden, Colin. 2020. *Budget provides additional money for dams.* Newcastle: Newcastle Herald. https://www.newcastleherald.com.au/story/6932677/budget-provides-additional-money-for-dams/?cs=7

[22] Natural Resource Management Ministerial Council. 2010. *National Water Initiative Pricing Principles.* Canberra: Department of Agriculture, Water and the Environment., https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/water/national-water-initiative-pricing-principles.pdf

> *Changes to the seasonal flow regimes have affected fish breeding, and constant low flows reduce ecosystem productivity by removing the high- and low-flow cues to trigger and sustain historical breeding cycles.*[23]

The impact of existing regulation in the Lachlan was identified as part of the rationale for the Murray-Darling Basin Plan:

> *In the Booligal Wetlands on the Lachlan River, the decline in river red gums has coincided with increasing impacts of river regulation and diversions, which have increased the duration of low flows and reduced the frequency of large floods to the region by 50% compared with natural conditions.* [24]

The Murray-Darling Basin Plan sets a Sustainable Diversion Limit (SDL) based on an Environmentally Sustainable Level of Take (ESLT). The SDL was based on environmental flow indicators, deemed to be proxies for environmental outcomes. That is, if the environmental flow indicators were met, then the outcomes envisaged under the ESLT should be met. Achieving the environmental flow indicators are therefore fundamental to the SDL and the Basin Plan.

The Lachlan Long Term Water Plan states that the higher environmental flow targets rely on natural flows and they cannot be met by managing held environmental water because the volumes are inadequate.[25]

Meeting the environmental flow targets therefore relies mostly on flows that have not historically been captured in Wyangala. If the expansion goes ahead, it will capture more of those flows that would otherwise contribute to the environmental flow targets. That is, if the expansion goes ahead, the ESLT cannot be achieved unless more water is recovered in the Lachlan valley.

The NSW Government acknowledges that river regulation has caused the ecological health of the Lachlan as poor, even after the Basin Plan water recovery targets have been met:

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[23] Murray-Darling Basin Authority. 2011. *Guide to the Basin Plan.* Canberra: MDBA. https://www.mdba.gov.au/sites/default/files/archived/guide_pbp/Guide_to_the_Basin_Plan_Volume_1_web.pdf

[24] Murray-Darling Basin Authority. 2011. *Guide to the Basin Plan.* Canberra: MDBA. https://www.mdba.gov.au/sites/default/files/archived/guide_pbp/Guide_to_the_Basin_Plan_Volume_1_web.pdf

[25] Department of Planning, Industry and Environment. 2020. *Lachlan Long Term Water Plan, Part B: Lachlan Planning units.* Sydney: NSW Government.,https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-for-the-environment/long-term-water-plans/lachlan-long-term-water-plan-part-b-planning-units-200093.pdf

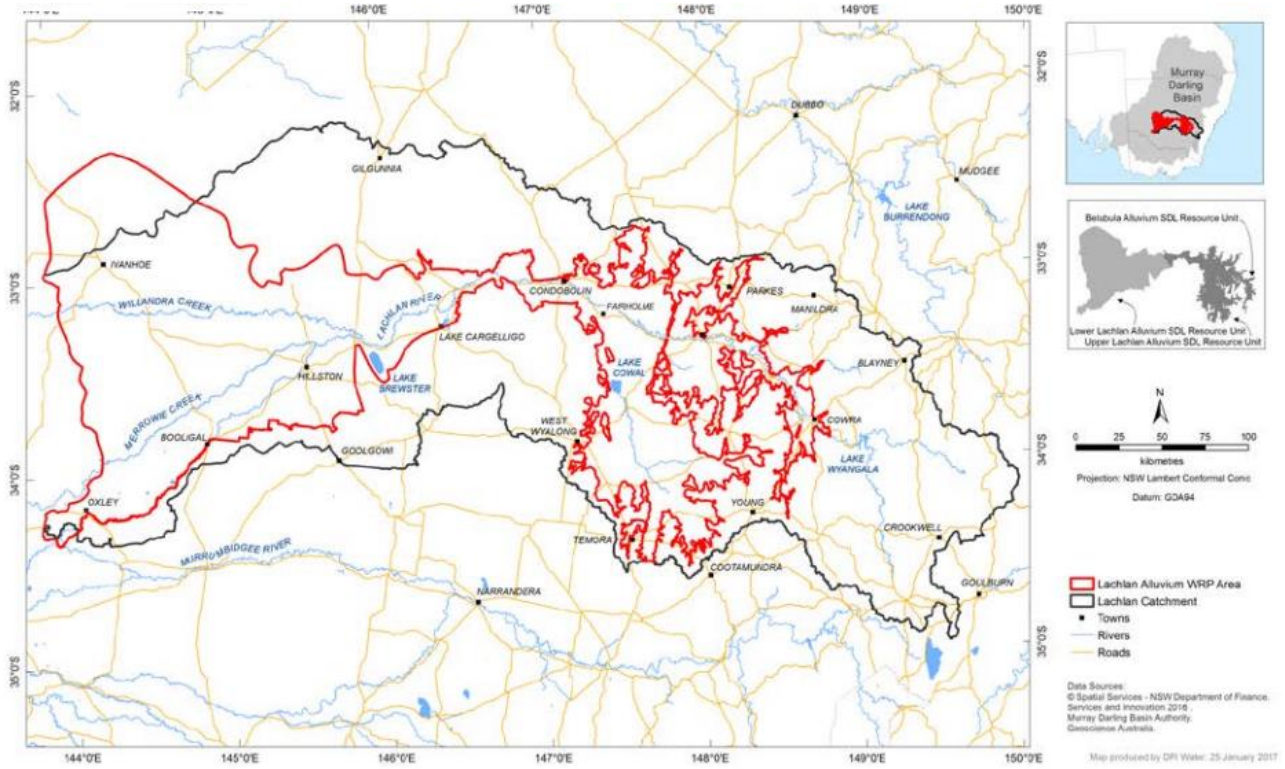
The existing infrastructure and regulation affect the ability to meet environmental outcomes and cause the overall ecological health of the Lachlan River to be poor. Also, the region's fish community remains in poor health and some species are under serious threat. [26]

Increasing the regulation of the Lachlan by expanding Wyangala will exacerbate this.

Impact on groundwater

The groundwater areas in the Lachlan valley are shown in Figure 4 below.

Figure 4: Lachlan Alluvium Water Resource Plan area



Source: (Department of Industry and Environment 2018), *https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/175979/Lachlan-alluvium-gw10-water-resource-plan.pdf*

Capturing more flows in an expanded Wyangala dam will result in less floods downstream, which in turn will reduce groundwater recharge.

[26] NSW Government. 2020. *Draft Regional Water Strategy: Lachlan Strategy.* Sydney: NSW Department of Planning, Industry and Environment. https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/324514/draft-rws-lachlan.pdf

> *Recharge components to the aquifers are from rainfall, rivers, flood and irrigation.*[27]

The draft Regional Watering Strategy for the Lachlan valley acknowledges that groundwater will become more important to the Lachlan valley:

> *Groundwater is likely to become an increasingly important water source for the Lachlan region in the future. During periods of drought with limited surface water availability, people with groundwater licences rely more on groundwater. This puts more pressure on groundwater sources that are already under stress. Less rainfall also affects how groundwater resources replenish and places further pressure on these resources. As groundwater is recharged from surface water and also provides base flow to the Lachlan River during periods of low flow, options that change the way surface water systems are operated will affect the security and reliability of groundwater supply.*[28]

Groundwater is already an important water source for towns and irrigation, contributing between 30 and 45% of the latter.[29] The expanded dam will put greater risks on irrigation and town supplies that rely on groundwater.

This is likely to impact groundwater dependent ecosystems. Figure 5 shows the groundwater dependent ecosystems rated as having high or very high ecological value and the Directory of Important Wetland Areas (DIWA) for the Lower Lachlan Alluvium.

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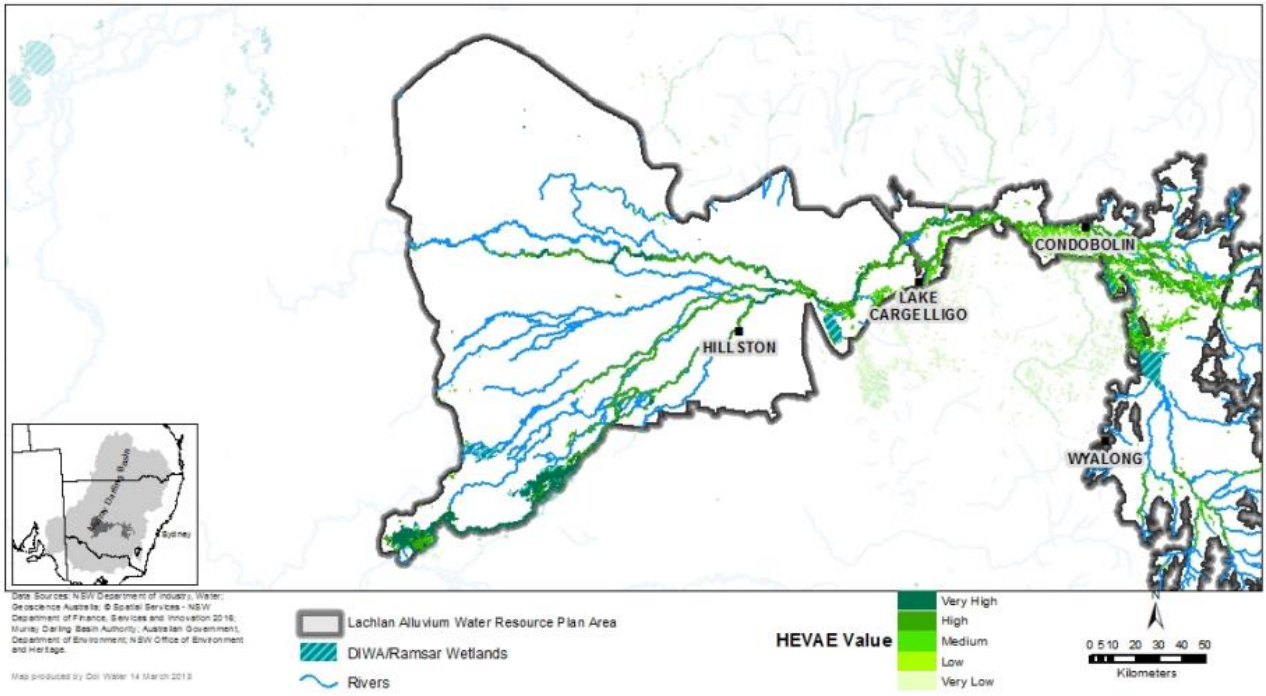
[27] Department of Primary Industry, Office of Water. 2012. *Upper Lachlan Groundwater Flow model.* Sydney: Department of Primary Industry, Office of Water. https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/153993/upper_lachlan_groundwater_flow_model_report.pdf

[28] NSW Government. 2020. *Draft Regional Water Strategy: Lachlan Strategy.* Sydney: NSW Department of Planning, Industry and Environment. https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/324514/draft-rws-lachlan.pdf

[29] CSIRO. 2008. *Water availability in the Lachlan: Summary of a report to the Australian Government from the CSIRO Murray-Darling basin Sustainable Yields Project.* Canberra: CSIRO. http://www.clw.csiro.au/publications/waterforahealthycountry/mdbsy/pdf/Lachlan-Snapshot.pdf

Figure 5: Groundwater dependent environmental assets within the Lower Lachlan Alluvium



Source: (Department of Industry and Environment 2018), https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/175979/Lachlan-alluvium-gw10-water-resource-plan.pdf

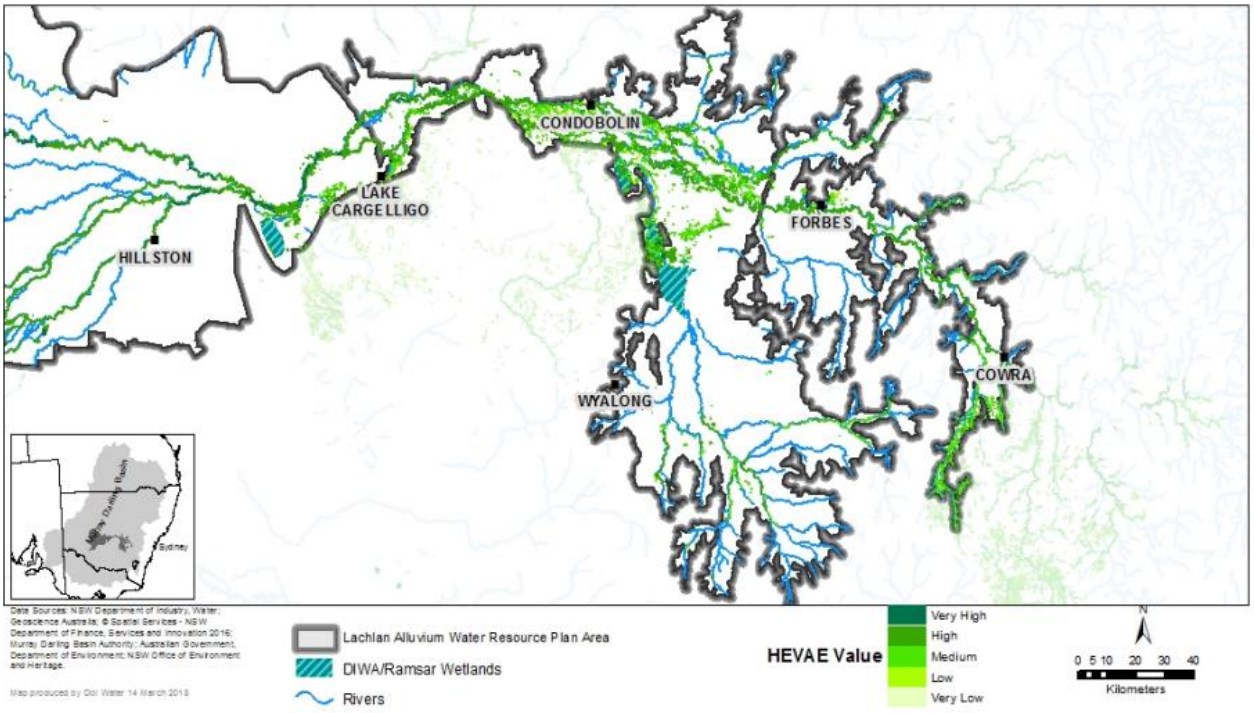
Key ecological assets in the Lower Lachlan Alluvium are;

- Lachlan swamp,
- Great Cumbung swamp,
- Lake Brewster,
- Booligal wetlands, and
- Patches of very high and high ecological value.[30]

Figure 6 below shows the groundwater dependent ecosystems rated as having high or very high ecological value and wetlands listed in the Directory of Important Wetland in Australia (DIWA) for the Upper Lachlan Alluvium.

[30] Department of Industry and Environment. 2018. *Lachlan Alluvium Water Resource* . Sydney: NSW Department of Industry.,https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/175979/Lachlan-alluvium-gw10-water-resource-plan.pdf

Figure 6: Groundwater dependent environmental assets within the Upper Lachlan Alluvium



Source: (Department of Industry and Environment 2018), https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/175979/Lachlan-alluvium-gw10-water-resource-plan.pdf

Key ecological assets in the Upper Lachlan Alluvium are;

- Merrowie Creek,
- Blakelys red gum-yellow box EEC,
- Lake Cowal wetlands, and
- Patches of very and high ecological vale. [31]

The key ecological values are eleven groundwater dependent woodland forests and wetlands including black box, lignum, river red gum, yellow box, three freshwater wetlands including canegrass swamps and cumbungi rushland wetlands. [32]

[31] Department of Industry and Environment. 2018. *Lachlan Alluvium Water Resource .* Sydney: NSW Department of Industry.,https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/175979/Lachlan-alluvium-gw10-water-resource-plan.pdf

[32] Department of Industry and Environment. 2018. *Lachlan Alluvium Water Resource .* Sydney: NSW Department of Industry.,https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/175979/Lachlan-alluvium-gw10-water-resource-plan.pdf

Other related matters

Whilst expanding the dam wall, there is likely to be a period of disruption to the operations of the existing dam. WaterNSW should clarify if disruptions are anticipated, and if so, the nature of the disruptions, and their duration.

Conclusion

The expansion of the Wyangala Dam has not been justified on economic, social or environmental grounds.

We are available to give evidence to the Committee on request.

Slattery & Johnson

Maryanne Slattery

Bill Johnson