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AUSTRALIA

NSW Department of Planning, Industry and Environment

Regional Water Strategies

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Dear Sir/Madam

This is a submission to the NSW Government in relation to the Draft Regional Water Strategy for the Lachlan Catchment from staff of the Centre for Applied Water Science at the University of Canberra.

The Centre for Applied Water Science (CAWS) is a research centre at the University of Canberra that generates knowledge that contributes to the improved management of freshwater systems. Our Centre supports a portfolio of research activity that contributes to policy development and management decision-making across south eastern Australia.

The University of Canberra has a long association with the Lachlan Catchment and this submission is prepared by CAWS staff who have undertaken substantial monitoring and research activities in the mid and lower catchment. Our team have monitored and evaluated the outcomes of environmental water use in the mid and lower Lachlan river system on behalf of the Commonwealth Environmental Water Holder since 2014. We have also conducted a range of research activities that build our understanding of the way the floodplain and wetland ecosystems respond to water.

We consider that the development of a Regional Water Strategy that puts a broad range of options on the table is a necessary step in the future management of water resources. It is an important part of the frank conversations with the community that are a necessary part of the water planning process.

### ***Our concerns***

The draft strategy presents a high level and broad approach to achieving the objectives of affordable improvements in water security, access to water, Aboriginal water rights and the environment. We have numerous concerns with the options presented and note significant knowledge gaps that need to be filled to facilitate informed decisions.

### *Managing for all Lachlan stakeholders*

There are a wide range of options presented, the majority of which are focused on improving access to water and improving water security for towns and industries in the mid and upper catchment. There is a need to explicitly consider the needs of *all* of the communities of the Lachlan Catchment.

There is mention of 'inter-regional connections' and 'potentially enabling a connection to Orange'. The objectives are to support the communities of the Lachlan catchment and we are aware that there are major concerns among Lachlan landholders that this wording in the Draft Regional Water Strategy is the precursor to diverting water from the Lachlan to an adjoining catchment (the Macquarie, where Orange is situated), to support the growth of a very large regional city. Flows in the Lachlan river system are already highly variable, with water security for local communities a priority of the Regional Water Strategy. Diverting water to another catchment would be to the detriment of those who live in the Lachlan Catchment, as well as increased risk of degradation of the ecological condition of the Lachlan catchment.

### *Understanding the full range of consequences for the options.*

There is a need to clearly understand and explain to the community the full range of spatially explicit benefits and disbenefits of each of the options presented. The ones that raise the greatest concerns for our team are described below, along with our commentary on the explanations that need to be made to all stakeholders.

#### Lower Lachlan Efficiency Measures – piping water to landholders along the main distributary creeks (Muggabah, Merrimajeel, Merrowie, Booberoi, Willandra Creeks).

These creeks support landholders with stock and domestic licenses, with little, if any, irrigation. Flows in the creeks have been significantly affected by regulation, which is leading to geomorphic changes (siltation and vegetation encroachment) and it is becoming increasingly difficult to deliver water through them to environmental assets like Murrumbigil Swamp, Lake Merrimajeel, and Lake Tarwong. Piping is only going to worsen these effects and have a detrimental effect on these assets – which are highly valued by the locals and are of national significance for water bird populations. Further reducing regular flows in these distributary creeks will mean that flood flows will also tend to find new pathways (as it often does in large flat deltaic environments). There would need to be a significant body of work involving floodplain geomorphologists to understand the environmental consequences of further reducing flows in these distributary creeks and what this may potentially mean for important feeding grounds for colonial nesting waterbirds when/if they breed.

Piping water for landholders seems at first to be attractive but history has shown that it does not always generate the benefits the landholders were expecting. For example, the landholders who have water entitlements downstream of Barrenbox Swamp in the Murrumbidgee Catchment were sold a piped irrigation scheme with water savings returned to ‘the environment’. In return for the piping of their system, the landholders benefited from improved efficiency but the “saved” environmental water is not used in their area and instead is combined with the broader Murrumbidgee environmental water portfolio to meet objectives elsewhere. The landholders are now observing trees that were previously supported by an inefficient irrigation scheme dying and now feel ripped off because their environment is suffering. We contend that it is important that future piping options clearly explain the spatially explicit benefits/disbenefits to all members of the community.

Separation of Lake Cargelligo into three lakes to reduce evaporation losses and improve operational effectiveness.

Lake Cargelligo has a notable fish community and supports breeding populations of bony herring, Australian smelt, un-specked hardyhead, flathead gudgeon and small gudgeons of the genus *Hypseleotris* (Kerezszy 2005; 2020). Juvenile Murray cod and yellowbelly have also been sampled within the Lake, as have endangered species such as silver perch and freshwater catfish (Kerezszy 2005; 2020). This in turn supports waterbirds, turtles and rakali. Separation of Lake Cargelligo may result in increased fragmentation, reduced available habitat, and changed productivity dynamics (along with other impacts) which may lead to a decline in these fish populations and if (as Kerezszy postulates) it is a major nursery-ground for the river, this will have significant implications for the fish community more broadly in the catchment. We contend that before such options are implemented there would need to be considerable work done on the environmental consequences.

Upgrade of existing weirs and installation of a new weir between Hillston and Booligal to improve operational flexibility and enable ‘surplus’ flows to be captured.

The river is already substantially fragmented by a network of weirs and levees which are likely major contributors to the very poor fish condition in the river system. The mechanisms for the fish community degradation associated with weirs is based on barriers to fish passage (which leads to population fragmentation) and changing of flowing water habitats to still water habitats, which interferes with natural spawning cues and a change in the fish community. Any upgrades must take into consideration the need for fish passage and the maintenance of flowing water habitats crucial for health native fish communities. Further, ‘surplus’ flows or tributary inflows in the lower river system provide important variability in a section of the river which has been severely impacted by upstream regulation. Variable water levels are linked to a

wide range of environmental outcomes including stream productivity, habitat enhancement and water quality maintenance. The environmental outcomes of this would need to be carefully weighed up.

### A reliance on the Wyangala Dam raising project

Critical high flow components such as large freshes and overbank flows in the Lachlan river system have already been considerably reduced in magnitude, frequency and interannual variability as a result of current flow regulation. The vast majority of the floodplain of the lower Lachlan, including regionally and nationally significant wetlands now only get inundated during natural (not from environmental water) large flood events, such as we saw in late 2016. While environmental water has contributed to replacing some of the small and medium flows that have been removed by flow regulation, such as small freshes, environmental water has not contributed to replacing any of the larger flows (such as large freshes and overbanks). These larger flow events are essential to inundate the lower Lachlan's river red gum and black box woodland swamps, and off-channel terminal wetlands (such as Lake Tarwong and Lake Bullogal) which are defining features of the lower Lachlan. Increasing the capacity of Wyangala Dam will be at the direct expense of the floodplains of the lower Lachlan. Flow events which are needed to maintain these flood dependent communities will be reduced or removed leading to further degradation.

Also, the impact of flow regulation is further increased during and following dry periods, with flows generally held until the water supplies have been topped-up. This increases the duration of dry periods, amplifies drought conditions, and reduces flow variability. Therefore, increasing the dam level impacts both the opportunity for unregulated spillover events during very wet years but also the holding capacity during and following very dry periods.

The full range of costs associated with increasing the capacity of Wyangala Dam do not appear to be taken into consideration and need to be further explored to meet the objective of choosing affordable infrastructure solutions.

### *Omissions*

Our team also have some concerns about the conclusions that are drawn from the hydrologic modelling and climate change projections. The river is currently operated under a set of rules which have a certain risk associated with them and are based on data from pre 2005. Some of the driest periods on record have occurred in the catchment post 2005. An additional option is to consider reviewing and revising the operational rules that will be implemented and if a changed risk profile would result in greater water security for communities.

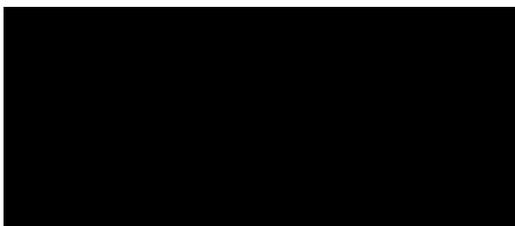
### *Our 'thumbs up'*

We also note that there are many positive options presented within the strategy that are worth of further consideration. We particularly commend the authors of the draft strategy for the options that improve the recognition of Aboriginal people's water rights, interests and access to water. Within these options there are actions that are important steps in supporting Aboriginal communities to have an active voice in the management of water within their catchment. We encourage the NSW Government to prioritize these options and to build upon them to ensure that the Aboriginal voice in water management is strengthened.

We also encourage the development of public/private partnerships in the management of water and were particularly attracted by the options of improving the management of wetlands on private lands. Floodplains and their associated wetlands are some of the most threatened ecological communities in the world. The Lachlan Catchment is home to hundreds of thousands of hectares of wetlands, many of which are important habitat for waterbirds. There are significant advantages in public/private partnerships to maintain and enhance environmental assets within the catchment.

We would welcome the opportunity to discuss all or any of the points raised in our submission.

Yours sincerely,



On behalf of:



Centre for Applied Water Science | Faculty of Science and Technology

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