EDOs of Australia

Submission responding to the Productivity Commission's Draft Report into National Water Reform

31 October 2017

EDOs of Australia (formerly ANEDO, the Australian Network of Environmental Defender's Offices) consists of eight independently constituted and managed community legal centres located across the States and Territories.

Each EDO is dedicated to protecting the environment in the public interest. EDOs:

- provide legal representation and advice,
- take an active role in environmental law reform and policy formulation, and
- offer a significant education program designed to facilitate public participation in environmental decision making.

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Introduction

EDOs of Australia (**EDOA**) welcomes the opportunity to comment on the Productivity Commission's Draft Report into National Water Reform (**Draft Report**). The comments contained in this submission are intended to build on those included in our submission to the Productivity Commission dated 05 May 2017.

EDOA is a network of community legal centres specialising in public interest environmental law. We have many years' experience engaging with water law and policy processes at both State and Commonwealth levels. We also have extensive experience advising a broad range of clients on the *Water Act 2007* (Cth), Basin Plan and State legislation and policies. Our work often draws on advice from experts on our technical advisory panel, as well as landholders and irrigators with considerable experience in managing their properties in a variable climate.

EDOA wishes to congratulate the Productivity Commission on the comprehensiveness of its Draft Report. We hope that our input will provide the Commission with additional, relevant material which will in turn assist it to finalise its report by the end of 2017. To that end, this submission will focus on the following seven matters:

1. Threats to environmental water
2. Access to information
3. Compliance and enforcement
4. Water markets and trade
5. Climate change (including assignment of risk)
6. Extractive industries
7. Aboriginal water ownership and management

Recommendations

Threats to environmental water

1. Water resource plans must include rules to protect environmental water.
2. PPMs must be properly implemented in all relevant valleys, including the Barwon-Darling River.
3. The *Water Act 2007* must be amended to:
    a. require all proposed purchases of entitlements by the Commonwealth to be subject to a minimum four weeks public consultation period;
    b. require all proposed subsidies for on-farm efficiency works to be subject to a minimum four weeks public consultation period;
    c. require the consultation process to include documentation explaining how the subsidy/purchase is value-for-money and furthers the objects and substantive provisions of the *Water Act 2007* and Basin Plan;
    d. require the Commonwealth Environmental Water Holder (**CEWH**) to have a concurrence role in relation to purchases of entitlements;
    e. require all water saved to be transferred to the Commonwealth at market rate;
    f. prohibit investment in on-farm efficiency upgrades that reduce return flows;
    g. require final contracts to be published online (noting that the public interest in favour of disclosure outweighs commercial or privacy concerns).
    h. introduce strict auditing and monitoring provisions to ensure Commonwealth subsidies for on-farm efficiency works is being spent lawfully and water is actually being saved.
4. Monitoring (including with the use of remote sensing technology) of existing on-farm irrigation must be undertaken to understand the actual impact of these capital works on consumption and to adjust future recovery accordingly.
5. Audits must be undertaken to understand current on-farm storage capacity. This information must then be used to that water resource plans include rules to properly protect environmental water and downstream users.

6. Planned environmental water must be protected as per cl. 10.28 of the Basin Plan. In the interests of transparency, the MDBA must explain how it will ensure that this occurs for each water resource plan. All relevant data should be made available upon request so that the community has confidence that this water will be protected under the Basin Plan.
7. Complementary measures must be clearly identified as complementary only, not as a 'substitute' for environmental flows.

Access to information

8. Licensing, works approval and water account information must be made available in free, publicly available registers to deter non-compliance and restore the community's trust in the management of water resources in all jurisdictions. We note that this is consistent with recommendations made by Mr Ken Matthews AO in his Interim Report.[1]
9. See recommendation 3 with respect to closed-tender purchases.
10. See recommendation 3 with respect to on-farm efficiency upgrades.
11. Cap reporting for the last five years must be completed and published as soon as possible. Note that draft reports must be subject to proper, independent peer-review by objective, non-conflicted experts.
12. Water agencies must ensure all levels of public servants and officers adhere to a clear code of conduct and code of ethics (in particular the requirement that civil servants be non-partisan). This requires genuinely balanced consultation with all stakeholders.

Compliance and enforcement

13. A Commonwealth **judicial inquiry** is necessary to properly understand the extent of possible non-compliance, misconduct and corruption in relation to the management of Basin water resources.
14. EDOA supports the recommendations made by Ken Matthews AO in his recently published Interim Report 'Independent Investigation into NSW water management and compliance.'
15. Modern, functioning, tamper-proof meters must be rolled out across Australia. Telemetry must be universally applied and access to the resulting data made available to the community.
16. Technology – including remote sensing – can and must be used to track consumptive use. This information must in turn be used by the appropriate compliance and enforcement unit(s).
17. Government agencies must be properly funded to ensure that they have a state-of-the-art, properly resourced compliance and investigations units.

Water markets and trade

18. Trade restrictions that are required to protect the hydrological and ecological integrity of water resources should be maintained and/or introduced where necessary.
19. Trade restrictions that are required to protect equitable water sharing (in particular protection of stock and domestic use) should be maintained and/or introduced where necessary.
20. The ACCC should investigate whether it is necessary to extend anti-competition laws to entitlement holders for the purposes of maintaining sustainable and equitable water sharing arrangements.

[1] Ken Matthews AO, *Interim Report, Independent investigation into NSW water management and compliance*, 8 September 2017.

Climate change (including assignment of risk)

21. Risk to water users and the environment can only be mitigated if the future, likely impacts of climate change are properly provided for in legislation.
22. Risk assignment provisions should not reward governments for failing to take adequate measures now to manage water resources on the basis of best-available information regarding future, likely climate change.

Extractive industries

23. Entitlements should be held for all extractions, including incidental take.
24. In order to improve the accuracy of calculations regarding incidental take, consents for mining developments should include a requirement that ongoing monitoring and iterative modelling being undertaken with a view to informing future licensing requirements.
25. Greater integration of land use planning and water management frameworks are required to ensure that overall development does not exceed the capacity of water resources and ecosystems within a catchment. This requires proper strategic planning and the imposition of an overall limit on mining development within a given catchment.

Aboriginal water ownership and management

26. Water Plans should explicitly provide for water to be set aside and protected in order to ensure that Aboriginal objectives can be met – not just identified. Jurisdictions should work with Aboriginal people to determine the best options for achieving this goal.
27. Aboriginal people have the right to own and manage water for a range of purposes, not just designated 'cultural' or 'economic' purposes.
28. Funding is required to enable Aboriginal communities to purchase held water.
29. Governance arrangements (as provided for in the *Water Act 2007*, for example) must ensure Aboriginal representation on boards and committees.

1. Threats to environmental water

A core element of the National Water Initiative (**NWI**) is an acknowledgement of the need to 'return all systems to environmentally sustainable levels of extraction.'[2] In the chapter entitled 'Environmental Management', the Draft Report discusses progress against this objective, justifiably noting that [a]ll jurisdictions except Western Australia have legally recognised the environment's share of water through planning arrangements. Provisions of water for the environment are made in all water plans.' It goes on to note that in certain areas, in particular the 'highly-regulated parts of the Murray-Darling Basin, governments also provide environmental flows by way of entitlements with the same rights and conditions as those of consumptive users…Substantial entitlements are now actively managed for environmental benefit.'[3]

Notwithstanding the existence of these provisions, EDOA is concerned that sustainable management of Australia's water resources – even in States with extensive water planning frameworks and limits on extractions – is being undermined by the factors set out in subsections (a) – (g), below.[4]

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[2] National Water Initiative, paragraph 5.

[3] Draft Report, p. 127.

[4] While the focus is on the Murray-Darling Basin (**MDB**), some of these issues are relevant in other jurisdictions (in particular the lack of statutory protection for environmental flows and growth in on-farm storage).

a) Lack of protection

The benefits of the water recovered to date have been undermined by insufficient protection of environmental flows. Water sharing plans generally do not include rules to protect environmental water as it flows through the system. Indeed, environmental flows may trigger 'commence-to-pump' rules, thereby resulting in legal extraction of this water. This is evidenced by frequent references to possible or actual legal extraction of environmental water by the CEWH in their Portfolio Management Plans for each valley.[5]

We are particularly concerned that the MDBA's interpretation of certain clauses in the Basin Plan will dissuade Basin States from including rules to protect environmental water in their water resource plans.[6] We not only have serious doubts about the legal accuracy of this interpretation, but about the consequences for the Commonwealth's environmental water.

Similarly, we are concerned by correspondence received from the MDBA in which they have indicated that shepherding is not a 'prerequisite policy measure' (**PPM**)[7] and to that extent does not need to be implemented in the Barwon-Darling River as part of the proposed Menindee Lakes Scheme supply measure. This would in effect reduce protection for environmental flows, and is in our view legally questionable. Advice prepared by EDO NSW on this issue can be made available to the Committee, subject to our client providing consent.

While it is often argued that 'cap protects the environment', such an approach fails to take into account the fact that species and ecosystems do not function on the basis of long-term annual averages. Accordingly, event-by-event management is at times required to generate actual environmental outcomes (for example bird and fish breeding events) and to protect water quality. This means that rules must be in place to prevent environmental water from being pumped as it flows through the system. This is particularly important as the CEWH's water has been purchased with public money to fulfil the obligations outlined in the *Water Act 2007* (which includes Australia's obligations under a number of environmental treaties, including the Ramsar Convention and the Convention on Biological Diversity).

b) Security level of entitlements purchased by the Commonwealth

A significant percentage of the Commonwealth's portfolio of entitlements is low reliability water, which effectively means it will not be delivered during drier periods (for example when storages have insufficient volumes to service lower reliability users). This water is particularly vulnerable to the impacts of climate change which means its availability will diminish over time.

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[5] See for example: '*Commonwealth Environmental Water Portfolio Management Plan: Macquarie River Valley 2016–17*, Commonwealth of Australia, 2016', p. 31; '*Commonwealth Environmental Water Portfolio Management Plan: Gwydir Valley 2016–17*, Commonwealth of Australia, 2016', p. 10; '*Commonwealth Environmental Water Portfolio Management Plan: Border Rivers 2016–17*, Commonwealth of Australia, 2016', pp. 25, 26.

[6] Clauses 6.13 and 6.14. See Basin Plan Water Resource Plan Requirements- Position Statement 1H – Potential Reliability Changes. Available online: https://www.mdba.gov.au/sites/default/files/pubs/WRP-Position-Statement-1H-Changing-reliability_0.pdf

[7] Basin Plan, cl. 7.15. We can provide the Commission with a copy of this correspondence if required.

Further to this point, we have been unable to find any analysis by the Commonwealth as to whether the $2.27 billion dollars' worth of water it has purchased[8] will actually be available under different climatic scenarios, and if so to what extent. Nor have we found any analysis as to how its portfolio of entitlements will be used to maintain the ecological character of the Basin's 16 Ramsar listed wetlands, particularly in a changing climate.

This is concerning for a number of reasons. First, it is not consistent with a scientifically rigorous, risk-based approach to water management. Second, the Commonwealth's portfolio of water may be incapable of discharging Australia's international obligations, particularly under the Ramsar Convention on Wetlands. Third, it appears that $2.27 billion dollars of taxpayer money has been spent without a detailed analysis of the medium to longer-term environmental and social value of this expenditure, and whether it is capable of meeting the requirements of the *Water Act 2007* and Basin Plan. If this analysis has been undertaken by the Commonwealth, we would welcome its publication.

c) Recent closed-tender purchases of entitlements by the Commonwealth

The Commonwealth's procurement information system, Austender, indicates that the Department of Agriculture and Water Resources (**DAWR**) has spent $182, 352, 078 year-to-date on closed-tender purchases of entitlements from five entities.[9] While EDOA is not alleging any unlawful conduct on the part of the vendors, we are concerned about these purchases for the following reasons.

First, the community is only notified of these purchases after a contract has been entered into between the vendor and Commonwealth. In other words, no public consultation is undertaken (and nor is it required to be undertaken by law).

Second, the DAWR does not – and is not required by law – to explain how proposed purchases will further the objectives of the *Water Act 2007* and Basin Plan, and whether they are strategically the best use of taxpayer money.

Third, the security level of the entitlements purchased is not readily available, which makes it difficult for the community to assess their environmental and social value. However, title searches indicate that the $81,999,888 purchase of entitlements from Tandou Ltd was predominantly for general security water[10] and that this water was purchased at well above market rate.[11] While there are circumstances in which paying above-market rate may be justified (for example where the environmental and social benefits are significant and indisputable), the lack of transparency around this particular purchase (and the fact that it was for low/medium reliability water) has prompted a number of our clients to question its overall value-for-money. Similar questions have been raised about some of other purchases referred to above.

In short, while EDOA considers 'buybacks' preferable to water recovery via efficiency upgrades, the Commonwealth should only be purchasing entitlements where it can demonstrate that: the purchased water will result in measurable environmental and social benefits (with reference to the *Water Act 2007* and Basin Plan); is strategically the best use of taxpayer money; and represents overall value-for-money.

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[8] Based on figures provided to the Senate Regional and Rural Affairs and Transport Committee during Senate Estimates on 26 May 2017. Specifically, as of that date $2.36 billion was contacted and $2.27 billion had been spent.

[9] The information downloaded directly from Austender in relation to these purchases can be provided to the Commission upon request.

[10] Of the 21,781ML purchased, 19,361ML was general security water.

[11] Average prices paid for permanent water transfers in the Lower Darling are available on the NSW Water Register.

d) On-farm efficiency upgrades and return flows

With a legislated 1,500 GL/year cap on the outright purchase of entitlements, the emphasis is now on recovering water through on-farm efficiency works. $1.77 billion dollars has been set aside for this purpose under Part 2AA of the *Water Act 2007*. We further understand that as of late 2016, $3.44 billion had been spent on both on and off-farm infrastructure projects.[12] However, best-available evidence suggests that on-farm irrigation upgrades are likely to increase (rather than reduce) consumptive use primarily due to reduced return flows and increased production.[13]

To that end, we have found no evidence that monitoring or auditing is being undertaken to ensure that:

- irrigation upgrades are actually resulting in additional environmental flows and reduced consumption;
- the money provided to the irrigator is being used to construct the works stipulated in the contract;
- the irrigation upgrades being undertaken are cost effective (or that the costing is indeed accurate).

It is deeply concerning that one of the core planks of the Commonwealth's water recovery program is not only fundamentally flawed, but is lacking in any sort of appropriate oversight. A number of our clients have expressed concerns that in the absence of the necessary checks and balances, public money may be misused at the expense of the environment and other users in the Basin. This is a serious issue that must be urgently addressed.

e) Growth in on-farm storages

We understand that there has been significant growth in on-farm storages in certain catchments, notably the Barwon-Darling. Relevantly, neither the *Water Management Act 2000* (NSW) nor the Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012 (**BD WSP**) include provisions restricting growth in storages. This, together with the absence of daily extraction limits for individual licences, means that licence holders can pump and store large volumes of water, including low flow or 'A Class' water.

We further note that formal audits have not been undertaken by the appropriate State or Commonwealth agencies to first, obtain accurate, up-to-date data regarding this growth and second, to use this data to inform the setting rules to protect environmental water (and to ensure cap compliance). Failure to remedy this omission is likely to result in perverse environmental and social outcomes in some areas, and potential breaches of the *Water Act 2007* and Basin Plan.

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[12] Letter from Prime Minister Turnbull to the South Australian Premier, Jay Weatherill. Dated 29 November 2016.

[13] Qureshi, M. E., K. Schwabe, J. Connor, and M. Kirby (2010), Environmental water incentive policy and return flows, *Water Resour. Res*., 46, W04517, doi:10.1029/2008WR007445; Grafton, R. Quentin, Water Reform and Planning the Murray-Darling Basin, Australia, *Water Economics and Policy*, Vol. 3, No. 3 (2016) 1702001;Adamson, David, Loch, Adam, Possible negative feedbacks from 'gold-plating' irrigation infrastructure, *Agricultural Water Management* 145 (2014); Perry, Chris, *Does improved irrigation technology save water? A review of the evidence. Discussion paper on irrigation and sustainable water resource management in the Near East and North Africa,* Food and Agriculture Organization of the United Nations, May 2017, pp. 13-14 (on Australia).

f) Planned environmental water

While the Basin Plan states that there must be 'no net reduction' to the level of protection provided to planned environmental water under water resource plans,[14] documents obtained from the Murray-Darling Basin Authority (**MDBA**) under the *Freedom of Information Act 1982* (Cth) (**FOI Act**) indicate that this water may be vulnerable to rule changes.[15] As most environmental water is planned, it is imperative that effective safeguards are in place to guarantee its protection, including independent scrutiny of compliance with cl. 10.28. This is particularly true given the susceptibility of planned environmental water to the impacts of climate change, as discussed in Section 5 of this submission.

g) Complementary measures as 'offsets'

EDOA notes the Productivity Commissions comments regarding the use of complementary waterway management methods to improve environmental outcomes.[16] While these methods are indeed necessary (to manage pests, for example), we are concerned by calls from certain stakeholders to substitute so-called 'complementary measures' for environmental flows. As there is no credible evidence base to support this approach, we would request that the Productivity Commission distinguish between necessary management actions and complementary measures as 'offsets'.

Recommendations:

1. Water resource plans must include rules to protect environmental water.
2. PPMs must be properly implemented in all relevant valleys, including the Barwon-Darling River.
3. The *Water Act 2007* must be amended to:
    a. require all proposed purchases of entitlements by the Commonwealth to be subject to a minimum four weeks public consultation period;
    b. require all proposed subsidies for on-farm efficiency works to be subject to a minimum four weeks public consultation period;
    c. require the consultation process to include documentation explaining how the subsidy/purchase is value-for-money and furthers the objects and substantive provisions of the *Water Act 2007* and Basin Plan;
    d. require the Commonwealth Environmental Water Holder (**CEWH**) to have a concurrence role in relation to purchases of entitlements;
    e. require all water saved to be transferred to the Commonwealth at market rate;
    f. prohibit investment in on-farm efficiency upgrades that reduce return flows;
    g. require final contracts to be published online (noting that the public interest in favour of disclosure outweighs commercial or privacy concerns).
    h. introduce strict auditing and monitoring provisions to ensure Commonwealth subsidies for on-farm efficiency works is being spent lawfully and water is actually being saved.
4. Monitoring (including with the use of remote sensing technology) of existing on-farm irrigation must be undertaken to understand the actual impact of these capital works on consumption and to adjust future recovery accordingly.
5. Audits must be undertaken to understand current on-farm storage capacity. This information must then be used to that water resource plans include rules to properly protect environmental water and downstream users.
6. Planned environmental water must be protected as per cl. 10.28 of the Basin Plan. In the interests of transparency, the MDBA must explain how it will ensure that this

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[14] Basin Plan, cl. 10.28.

[15] We obtained these documents on behalf of a client.

[16] Draft Report, pp. 134-5.

occurs for each water resource plan. All relevant data should be made available upon request so that the community has confidence that this water will be protected under the Basin Plan.

7. Complementary measures must be clearly identified as complementary only, not as a 'substitute' for environmental flows.

2. Access to information

Transparency is a cornerstone of good governance. It discourages non-compliance and builds community confidence in the rigour and efficacy of water management systems. Unfortunately, our analysis and experience acting for clients (particularly in the Murray-Darling Basin) reveals significant barriers to accessing water-related information. In addition to the matters outlined in our first submission to the Productivity Commission, we wish to provide comments regarding the matters set out in subsections (a) – (f), below.

a) Information about licensing and works

Our first submission to the Productivity Commission discussed barriers to accessing information regarding licences and associated works. We wish to add to those concerns by briefly highlighting deficiencies in Queensland which include:

- The absence of a publicly accessible (and free) water allocation register. The existing register can only be searched where the title reference for the allocation is known. As this information is not publicly available, the community is unable to use the register (unless they have the resources to engage a lawyer to do so – which excludes most people).
- The absence of a publicly available (and free) register of all approved works (pumps, storages, levees and so on). This in effect means that many of our clients do not know whether works on neighbouring properties are lawful or otherwise.
- The absence of universally mandatory metering laws (or appropriate measurement methods for overland flow). This in effect means that a significant percentage of extractions in Queensland are not measured. This 'data gap' constitutes a significant barrier to sustainable water management. It also raises serious questions about compliance.

b) Freedom of information

Based on our experience, water agencies are often reluctant to provide our clients with documents sought under freedom of information applications, even where there is a strong argument in favour of public disclosure.

This is particularly true in relation to documents sought by the Australian Conservation Foundation (**ACF)** regarding investigations undertaken by the MDBA which may have revealed lawful and possibly unlawful extraction of environmental water in the Barwon-Darling River between 2014 and 2016. To date, only a limited number of documents have been released, with the matter currently before the Commonwealth Information Commissioner. Failure to release this information in full risks further eroding public confidence in the agency charged with implementing water reform and ensuring sustainable management of one of our most important natural resources.[17]

Similarly, at a state level, EDO NSW has spent most of 2017 attempting to gain access to water account and usage data for specific licences.[18] EDO NSW's client on this

[17] We can provide the Commission with further details regarding this matter if required.

[18] EDO NSW is attempting to obtain this information from WaterNSW on behalf of its client, the ACF.

matter, the ACF, is seeking access to this information in order to clarify whether the licence holder has been complying with the various conditions attached to its licences and approvals. In short, our client believes that information regarding the use of a scarce, shared public resource should be in the public domain. We note that the ACF appealed the decision to withhold the licence data to the NSW Civil and Administrative Tribunal. However, midway through the proceedings, on 14 September 2017, WaterNSW reversed its position and formally made a new a decision to release the licence data. The licence holders now have rights to object to WaterNSW's new decision, and if those rights are fully exercised, it may be several more months before a final determination is made as to whether the data should be released.

c) Closed-tender purchases of entitlements

As noted above, these purchases are not subject to public consultation and are only published after a contract has been entered into with the vendor. There is no reporting of their strategic, environmental and social value, and how they advance the objectives and substantive provisions of the *Water Act 2007* and Basin Plan. This is particularly concerning given that these purchases – which are for 2017 alone – amount to $182, 352, 078.

d) Infrastructure works

We understand that $3 billion dollars has been spent on both on and off-farm infrastructure works.[19] However, there is a dearth of information regarding how this money is being spent on a project-by-project basis, whether individual contracts are being properly implemented, whether water is actually being saved and so on. The recent exposé on Lateline[20] highlighted the risks associated with failing to systematically audit and monitor these projects.

e) Cap reporting

Cap reporting has not been undertaken by the MDBA since 2011-12, despite a requirement to do so under the Murray-Darling Basin Agreement.[21] While the 'cap register' includes figures up to 2015-16, this is not a legal or practical substitute for detailed cap reporting. Relevantly, the cap register merely contains figures, none of which are supported by publicly available data or analysis. It is therefore difficult for the community to assess the accuracy of the information provided.

f) Lack of parity

It is not clear that our clients have access to the same level of information as other stakeholders, in particular certain irrigator groups. We would welcome the opportunity to discuss this issue in more detail with the Productivity Commission.

Recommendations:

8. Licensing, works approval and water account information must be made available in free, publicly available registers to deter non-compliance and restore the community's trust in the management of water resources in all jurisdictions. We note

[19] Letter from Prime Minister Turnbull to the South Australian Premier, Jay Weatherill. Dated 29 November 2016.

[20] Lateline, October 24 2017.

[21] Murray-Darling Basin Agreement, Schedule E includes two separate, non-interchangeable obligations. Cl. 13 (5) outlines the cap reporting requirements (known as an 'audit monitoring report'), while cll. 13(7),(8) provides for the maintenance of a cap register.

that this is consistent with recommendations made by Mr Ken Matthews AO in his Interim Report.[22]

9. See recommendation 3 with respect to closed-tender purchases.
10. See recommendation 3 with respect to on-farm efficiency upgrades.
11. Cap reporting for the last five years must be completed and published as soon as possible. Note that draft reports must be subject to proper, independent peer-review by objective, non-conflicted experts.
12. Water agencies must ensure all levels of public servants and officers adhere to a clear code of conduct and code of ethics (in particular the requirement that civil servants be non-partisan). This requires genuinely balanced consultation with all stakeholders.

3. Compliance and enforcement

As EDO offices operate at the interface between community and government, we are often contacted by landholders with information about possible non-compliance and/or the failure by government agencies to properly investigate or act on these allegations. As noted in our first submission to the Productivity Commission, specific issues reported to and analysed by EDOs include allegations of:

- absent or ineffective metering;
- tampering with meters;
- unlawful extractions;
- unlawful construction of levee banks and other structures;
- failure to keep logbooks where required by law;
- failure on the part of responsible agencies to properly investigate serious allegations of non-compliance;
- insufficient number of compliance officers; and
- unlawful trading activity.

Allegations of non-compliance in the Barwon-Darling River have received a great deal of public attention over the last few months. However, our solicitors have been contacted by a number of people (including former compliance officers) alleging unlawful extractions and works in other catchments and jurisdictions. Our solicitors have also received reports regarding possible misconduct and corruption within government agencies. While we cannot comment further on these allegations, we would request that the Productivity Commission given due consideration to these issues when assessing progress against NWI objectives. This is particularly important given the impact of non-compliance on sustainable management of our scarce water resources, the equitable distribution of these resources and the proper functioning of water markets.

Recommendations:

13. A Commonwealth **judicial inquiry** is necessary to properly understand the extent of possible non-compliance, misconduct and corruption in relation to the management of Basin water resources.
14. EDOA supports the recommendations made by Ken Matthews AO in his recently published Interim Report 'Independent Investigation into NSW water management and compliance.'
15. Modern, functioning, tamper-proof meters must be rolled out across Australia. Telemetry must be universally applied and access to the resulting data made available to the community.

[22] Ken Matthews AO, *Interim Report, Independent investigation into NSW water management and compliance*, 8 September 2017.

16. Technology – including remote sensing – can and must be used to track consumptive use. This information must in turn be used by the appropriate compliance and enforcement unit(s).
17. Government agencies must be properly funded to ensure that they have a state-of-the-art, properly resourced compliance and investigations units.

4. Water markets and trade

EDOA notes comments in the Draft Report regarding the removal of barriers to trade. We wish to highlight, however, the importance of maintaining restrictions where they are necessary to ensure the sustainable management – and equitable sharing - of water resources. Such examples include restricting trade between systems that are not hydrologically connected or within a particular valley to prevent upstream over-extraction.

Further, trade of both permanent and temporary entitlements must be considered within the context of accounting and other rules for a particular valley. We are aware of at least one example where unfettered temporary trade and continuous accounting have resulted in over-extraction in a particular part of the river system.[23] Clients living downstream have reported significant impacts on both flows and water quality, which has in turn reduced their ability to access or use water for stock and domestic use. Turning to the Courts for a remedy is costly and time-consuming and should not be considered a substitute for appropriate rules in water plans (including, where necessary, limitations on trade).

EDOA also believes that the assumption that moving water to its highest value use is in all instances beneficial requires further analysis and interrogation. Again, we are aware of instances where the highest value use in a particular valley (for example mining production) has had or will have negative impacts on the integrity of the water resource and other users, including landholders. To that end, we have attached at **Annex A** an expert report prepared by Julia Imrie in relation to the proposed Bylong Coal Mine Development. [24]

We are also aware of at least one instance where the movement of water to the highest value use has resulted in a quasi-monopolistic concentration of licences in a particular part of the river system.[25] This, combined with other rules in the relevant water plan, has resulted in negative impacts on users further downstream[26] and more generally in unsustainable levels of extraction.[27] We would therefore recommend that the Australian

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[23] The Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012 allows a licence holder to extract three times their allocation plus any water temporarily assigned to the licence in an accounting year: cl. 42(3). Further, it provides for unlimited carryover: cl. 42(8). We note that the absence of individual daily extraction limits for licence holders and the ability to extract A Class (or low flow) water with 600 and 660mm pumps has also contributed to this problem. Again, this highlights the need to consider trade rules within the overall context of a water plan.

[24] This report was provided to the NSW Planning and Assessment Commission (**PAC**) which held a public hearing in relation to the Proposed Bylong Coal Mine. For further information, please see: http://www.pac.nsw.gov.au/projects/2017/02/bylong-coal-project

[25] Two licence holders in the Barwon-Darling River own approximately 70% of all entitlements.

[26] As noted above, clients have reported reductions in flows and in water quality.

[27] While extractions over the long-term are constrained by cap, this does little to prevent over-extraction in the short-term (which has negative impacts on users and ecosystems). Further, there has been no official cap reporting for the Barwon-Darling for five years. There is also a history of cap exceedance in the Barwon Darling. See for example: Water Auditing Monitoring Report, 2005/6, p. 2; Water Auditing Monitoring Report 2007/8, p. 2; Water Auditing Monitoring Report 2008/9, p. 2; Water Auditing Monitoring Report 2009/10 which noted at p. 2 'that in the absence of

Competition and Consumer Commission (**ACCC**) investigate whether it is necessary to extend anti-competition laws to entitlement holders for the purposes of maintaining sustainable and equitable water sharing arrangements.

Recommendations:

18. Trade restrictions that are required to protect the hydrological and ecological integrity of water resources should be maintained and/or introduced where necessary.
19. Trade restrictions that are required to protect equitable water sharing (in particular protection of stock and domestic use) should be maintained and/or introduced where necessary.
20. The ACCC should investigate whether it is necessary to extend anti-competition laws to entitlement holders for the purposes of maintaining sustainable and equitable water sharing arrangements.

5. Climate change (including assignment of risk)

EDOA welcomes the Productivity Commission's characterisation of climate change as a significant challenge that needs to be addressed.[28] However, we note that its recommendations focus on realigning consumptive use on the basis of past, proven climate change.[29] By way of contrast, there is scholarship suggesting that water management should be based on best-available evidence regarding future, likely climate change. For example, Professors Pittock and Grafton[30] note that:

> *It is our view that the failure to use current knowledge on projected impacts of climate change in the computation for the Basin Plan's sustainable diversion limits, or provision for systematic adjustment into the future, significantly increases the risks to the ecological heath of the river systems. It also increases the uncertainty to communities, who now have no clear policy setting or process to manage the anticipated changes in water availability into the future.*[31]

It is our understanding that these comments are broadly applicable to other jurisdictions vulnerable to reductions in rainfall and runoff.

We further note that a significant proportion of the entitlements recovered by the Commonwealth are what may be broadly classified as low to medium security entitlements,[32] which are particularly vulnerable to climate change as they do not guarantee reliability of supply during drier years. In practical terms, this means that the water held on these licences will be unavailable for the environment as water availability decreases in certain parts of the Basin.[33]

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an accredited model for Barwon-Darling, it was not possible to conclude that the long term Cap exceedance in the valley had been addressed.'

[28] Draft Report, p. 12.

[29] Draft Report, p. 24.

[30] Pittock, J and Grafton, R. Quentin, Williams, J, *The Murray-Darling Basin Plan fails to adequately deal with climate change*, Water, January 2015.

[31] Ibid, p. 26.

[32] Variously known as general security, supplementary, low reliability, and overland flow licences. For open tender purchases see: http://www.agriculture.gov.au/water/markets/commonwealth-water-mdb/average-prices#southern-murraydarling-basin-tenders-201213

[33] Modelling (dry extreme scenario) indicates that parts of the MDB could experience a 37 percent reduction in water availability by 2030. See: CSIRO, *Water availability in the Murray-Darling Basin. A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project.* CSIRO, Australia, 2008 p. 35.

Finally, we are concerned that by failing to take a proactive, risk-based approach to this issue, the government is in effect shifting the burden of reduced allocations caused by climate change to entitlement holders. Specifically, the current NWI risk assignment provisions provide that reductions in allocations that are caused by climate change are to be absorbed by entitlement holders, while reductions in allocations that are the result of improved knowledge or changes in policy are to be borne by governments.[34] By failing to enact policy based on new knowledge regarding climate change – or to change policy to enhance consideration of future, likely climate change – governments are avoiding compensating entitlement holders. As noted above, this means that they are shifting the burden of reduced allocations caused by climate change to entitlement holders. In other words, landholders will eventually be penalised for governments' failure to act now in relation to climate change, which is an unacceptable outcome.

Recommendation:

21. Risk to water users and the environment can only be mitigated if the future, likely impacts of climate change are properly provided for in legislation.
22. Risk assignment provisions should not reward governments for failing to take adequate measures now to manage water resources on the basis of best-available information regarding future, likely climate change.

6. Extractive industries

EDOA strongly supports the Productivity Commission's recommendation to review 'entitlement exemptions' for extractive industries.[35] These exemptions are neither evidence-based nor sustainable and in many instances operate as subsidies, thereby disadvantaging other industries (in particular agriculture).

EDOA strongly supports the requirement that entitlements be held for all take (including incidental take). While we note that all modelling (including for future incidental take) involves uncertainty, monitoring can provide a more accurate reflection of extraction levels over time. As such, conditions of consent for mining projects should require ongoing monitoring of incidental take and iterative modelling, which should in turn be used to inform licensing requirements for the project in question.

Finally, increased consideration must be given to the capacity of a water resource to support mining operations over time. This involves greater integration of land use planning and water management frameworks. As noted in an article concerning incidental take in the Hunter coal field:

> *If we concede that many mines in the Hunter cannot help but continuously extract water from aquifers, this necessarily involves assessing cumulative impacts of mining and other activities at a catchment level, and ensuring that overall development does not exceed the capacity of ecosystems within the catchment.*[36]

While the 'water trigger' in the *Environment Protection Biodiversity and Conservation Act 1999* (Cth) (**EPBC Act**) does provide for consideration of cumulative impacts,[37] it does not require the Minister to refuse a given mining development on the basis that it will be associated with significant cumulative impacts. Further, the water trigger involves

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[34] NWI, cll. 46-50. We note the risk assignment provisions provided for in cl. 49 for licence holders subject to water plans. However, these provisions do not change our overall analysis of the issue

[35] Draft Report, p. 79.

[36] Carmody, Emma, Exemptions from cease-to-pump rules in the Hunter coal field: mines 1, aquifers 0. *Australian Environment Review*, Vol 28, No 4, p. 568.

[37] EPBC Act, ss. 24D, E.

assessment on a project-by-project basis rather than strategic assessment of an entire catchment/water resource (and a determination regarding the overall capacity of a catchment/water resource to support mining and other development). While bioregional assessments are being undertaken in areas with significant coal deposits to determine the cumulative impacts of coal and coal seam gas development on water resources,[38] this is yet to result in any legislated strategic planning for those areas (and associated limitations on mining development).

Recommendations:

23. Entitlements should be held for all extractions, including incidental take.
24. In order to improve the accuracy of calculations regarding incidental take, consents for mining developments should include a requirement that ongoing monitoring and iterative modelling being undertaken with a view to informing future licensing requirements.
25. Greater integration of land use planning and water management frameworks are required to ensure that overall development does not exceed the capacity of water resources and ecosystems within a catchment. This requires proper strategic planning and the imposition of an overall limit on mining development within a given catchment.

7. Aboriginal water ownership and management

EDOA is generally supportive the Productivity Commission's recommendations regarding Aboriginal cultural objectives.[39] Having consulted with Aboriginal clients, we are of the view that these recommendations could be enhanced, as noted below.

Recommendations:

26. Water Plans should explicitly provide for water to be set aside and protected in order to ensure that Aboriginal objectives can be met – not just identified. Jurisdictions should work with Aboriginal people to determine the best options for achieving this goal.
27. Aboriginal people have the right to own and manage water for a range of purposes, not just designated 'cultural' or 'economic' purposes.
28. Funding is required to enable Aboriginal communities to purchase held water.
29. Governance arrangements (as provided for in the *Water Act 2007*, for example) must ensure Aboriginal representation on boards and committees.

[38] http://www.iesc.environment.gov.au/bioregional-assessments

[39] Draft Report, p. 25.

Potential impacts and risks from the proposed Bylong Coal Mine development - Goulburn River catchment[1]

Julia Mullins Imrie

18 May 2017

Please find below my report, as requested by EDO NSW on behalf of the Bylong Valley Protection Alliance, addressing the following issues:

1) In my opinion has the environmental impact assessment adequately considered the potential impact on surrounding and downstream catchment areas and users, particularly in relation to changes to water quality and quantity?

2) Provide any further observations or opinions which you consider to be relevant.

Acknowledgment – I have read the Expert Witness Code of Conduct in Schedule 7 of the Uniform Civil Procedure Rules 2005 and agree to be bound by it.

In 2012 I commenced a PhD research project on the Goulburn River catchment through Australian National University, with the assistance of the NSW Office Water, *"Changing land use in an uncertain climate: Impacts on surface and groundwater, Goulburn River, Upper Hunter Valley, NSW"*.(Imrie-Mullins, 2017). I have lived on the Goulburn River since 1975 downstream from the Ulan Coal & Moolarben Coal mines and have observed the impact of mining on the river system following major mine expansions in the 1980s and since 2005. The comments in this report are based on my professional opinion.

Two fundamental areas of risk from the proposed Bylong Coal Mine development (KEPCO) affecting the downstream catchment are:

- Degradation of water quality from the export of salts and other contaminates into the river system – with the risk of this increasing during and/or post mining
- Reduction in water quantity during droughts – with the risk that mining will permanently intercept or damage alluvial, porous and fractured rock groundwater systems affecting downstream base flows and water security to other users (including GDEs)

[1] Copyright: The material and figures contained in this report include current work leading to a PhD. It is provided here solely to assist the PAC in its determination in relation to the KEPCO Bylong Project. No permission for use for any other purpose or by any other person is granted.

Our Limited Understanding of the Goulburn catchment

The Goulburn is one of the least studied and understood catchments in NSW despite salinity being recognised as a critical issue in the catchment. Salt export from the Goulburn has a significant impact on water quality affecting downstream riparian vegetation, water users, irrigators and the Hunter River. Monitoring of stream salinity (EC) commenced post mining - major land use change (1992 @ Sandy Hollow GS210031, 2012 @ Coggan GS210006). Groundwater resources and groundwater dependent ecosystems (GDEs) are largely unmapped due to insufficient survey data, with limited spatial layers shown in Geoscience Atlas of GDEs.

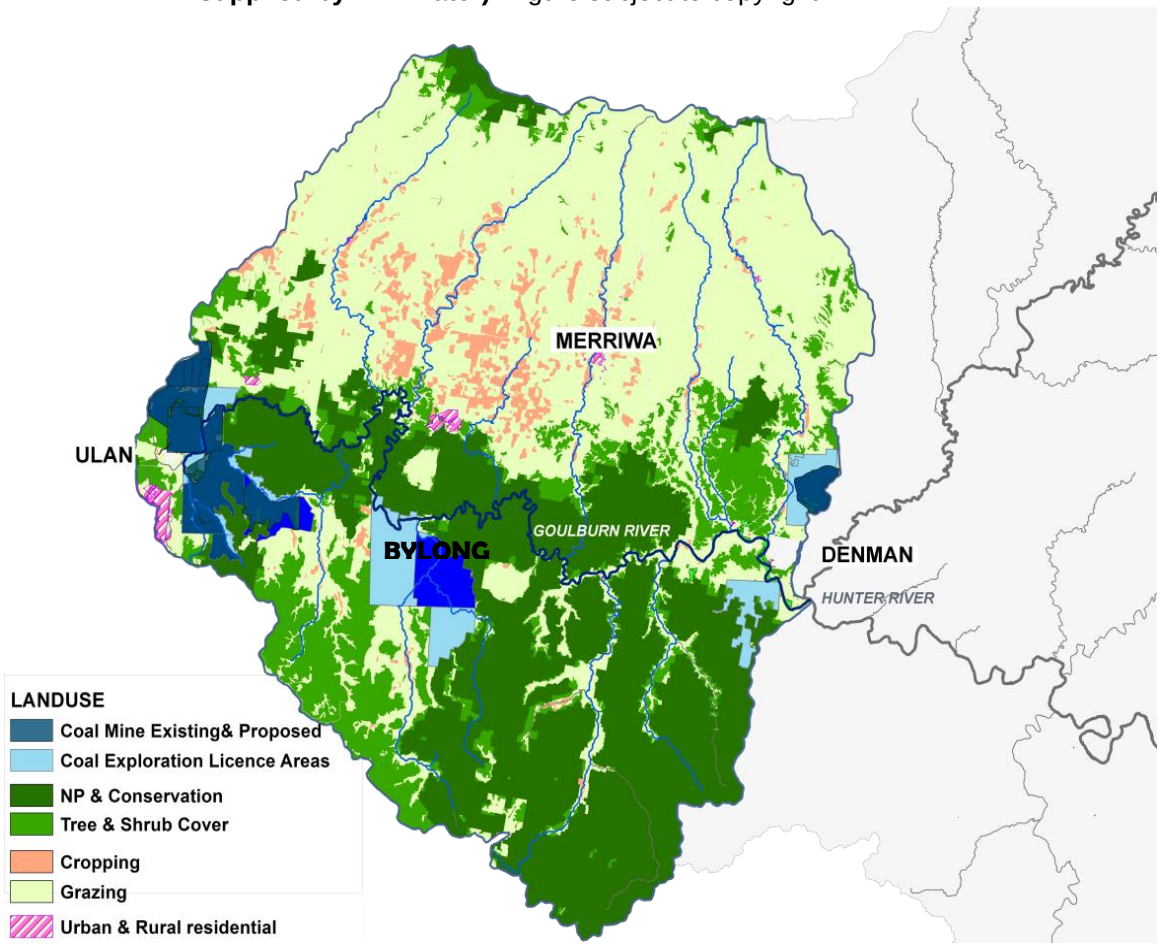
A general lack of long term, good quality water records has been a recurrent challenge in all assessments concerning the Goulburn catchment (Krogh et al., 2013; Biswas, 2010; Beale et al., 2000). Goulburn stream gauge (GS) records contain significant spatial and temporal data gaps in stream flow and water quality records caused by non-continuous and interrupted monitoring; terminated programs, and systemic technical difficulties related to stream and sand bed controls. These difficulties make the assessment of catchment yield and changes in electrical conductivity over time problematic, limiting the robustness of predictions.

Context

The Bylong Valley is located at a mid-point in the Goulburn catchment, entering the Goulburn River immediately above the Coggan gauging station (GS210006). The Goulburn River is the largest tributary of the Hunter River, covering 36% of the valley and contributing 23% of the flows to the Hunter River. It has a significant influence on Hunter downstream water quality and on occasions contributes a greater salt load than the Hunter River at Denman. For example the annual salt load in the lower Goulburn (Sandy Hollow) in 2010-2011 was 93,200 tonnes opposed to 71,000 tonnes in the Hunter (Krogh *et al.*, 2013). The export of salts from the Goulburn can have a significant influence on the operation and functioning of the Hunter River Salinity Trading Scheme (HRSTS[2]) as well as other downstream users including the Goulburn River National Park and irrigation in the lower Goulburn.

[2] HRSTS is designed to minimise the impact of saline water discharges by the mining and energy industry on other Hunter River water users and the environment by using tradeable credits for discharging saline water, while limiting river salinity to <900 µS/cm. **The Goulburn River is not part of HRSTS**

Figure 1: Goulburn Catchment – land use (Land-sat classification shape-files supplied by DPI-Water). Figure subject to copyright



Coal Mining

Large scale open cut mining commenced at the top of the catchment in 1983 with the diversion of 5.2 kms of the Goulburn River near Ulan. There are currently three large coal mines operating in the upper Goulburn catchment– Ulan Coal Mine (UCML), Wilpinjong Coal Mine (WCM) and Moolarben Coal Operations (MCO). Since 2007 all three mines have been granted major extensions and numerous modifications increasing the total approved coal production to over 52.5 million tonnes per annum. The current approved underground mining footprint in the Ulan Wollar area is approximately 144 square kilometres with an approved total open cut area of over 68 square kilometres. The licensed extraction of water by the coal mines, including incidental take (interception) of groundwater, as predicted in mine reports, will exceed 42 ML/day over the next decade. In 2015 the combined water usage by Ulan, Moolarben and Wilpinjong coal mines was estimated at 8,650 million litres (UCML, 2015b; MCO, 2015; WilpinjongCoal, 2015).

All three mines were initially approved with a 'nil discharge' Environmental Protection Licence (EPL) condition. This did not extend past the first substantial wet period due to excessive onsite water and the risk of an uncontrolled spill. In early 2010, following heavy rain, the Environmental Protection License (EPL) conditions were suspended for coal mines in the upper

Goulburn to allow unlimited disposal of excess mine water offsite (up to 3 months). Now UCML, WCM and MCO all have EPL licenses[3] that permit regulated offsite discharge of treated mine water and spillage from sediment dams. The EPA response to BCP states that should approval be granted they will not licence any discharges from mine water storages during the period of mining, although, in its Response to Submissions (RTS), KEPCO maintains that "*the EPL may be modified to include the discharge of water from the site as required*". (RTS.AppG-p.22-23). Practical experience over the last six years in the upper catchment tends to suggest licenced discharges for the BCP will be a practical necessity, despite the EPA's current position. (Either that, or KEPCO's plans seem to require significant revision.)

During 2016 UCML discharged around 8,000 million litres of treated mine water offsite, carrying an estimated 4,287 tonnes of salt (UCML, 2016). UCML water discharge is predicted to peak at around 10,000 ML/year by 2023 with a salt load of approximately 5,000 tonnes of salt (EC ~750 µS/cm). The gross salt output from the Wilpinjong catchment is estimated to reach 5,076 tonnes/year in 2018, and 7,918 tonnes/year by 2031 at the completion of mining (WEP, 2017). No similar estimated gross salt output for the Moolarben catchment is provided. The MCO EPL license, however, permits 10ML/day of mine water discharge (<900µS/cm EC) and spillage from sediment dams when there is > 44 mm rain over 5 day period.

Most assessments of water quality focus on salinity levels (EC), however the chemical composition of saline mine discharge water can differ significantly to what naturally occurs in surface waters. Mine de-watering, seepage and the discharge of excess mine water in the upper Goulburn is not only increasing downstream salt loads and altering the natural flow regime, but is also changing surface and groundwater chemistry. The relative proportion of ions in saline waters as well as other co-occurring environmental stressors (e.g. turbidity) can have a combined greater effect on ecosystem health than total salinity (Kefford *et al.*, 2013; Krogh *et al.*, 2013; Imrie-Mullins, 2017). The impact of mine water discharge on macroinvertebrates and groundwater stygofauna requires further research.

Climatic Extremes

The Goulburn River has a highly variable rainfall and can experience extended periods of droughts, intense heavy storms and rain events. Drought conditions are considered extreme when the previous 12 monthly cumulative rainfall falls below the 5th percentile (CSIRO, 2015). **Figure 2** shows 12 monthly percentile ranking of rainfall for the Goulburn catchment – severe drought conditions occurred during the 1940s, 1960s, 1980s and 2000s. The green zone in **Figure 2** (90th percentile) is indicative of the wettest period when significant recharge of groundwater systems is most likely to occur. Climate indicators show a rising trend in rainfall since the 1950s

[3] UCML EPL394, MCO EPL12932, WCM EPL12425

particularly during the warmer season (October to March). However analysis of stream discharge data shows a *decline* in catchment yield (monthly stream flow) most noticeable since the 1980s. Catchment yield measured from stream discharge records was significantly less during the millennium drought than during the 1940s and 1980s droughts – despite these earlier periods having statistically lower precipitation (**Figure 3**).

Figure 2: Percentile ranking 12 monthly precipitation – based on spatially interpolated rainfall statistics for the period 1920-2014 compiled for the upper Goulburn catchment using monthly precipitation (BOM) tied to a grid digital elevation model (DEM) - resolution of around one square km ANUSPLIN (Hutchinson et al., 2014).

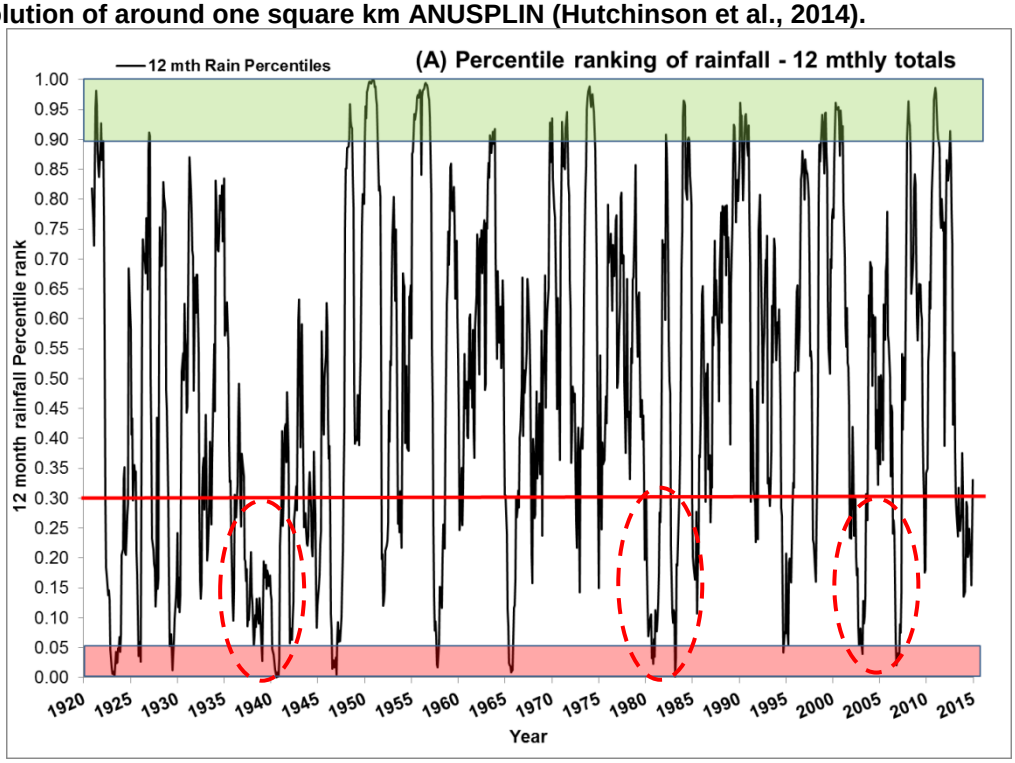
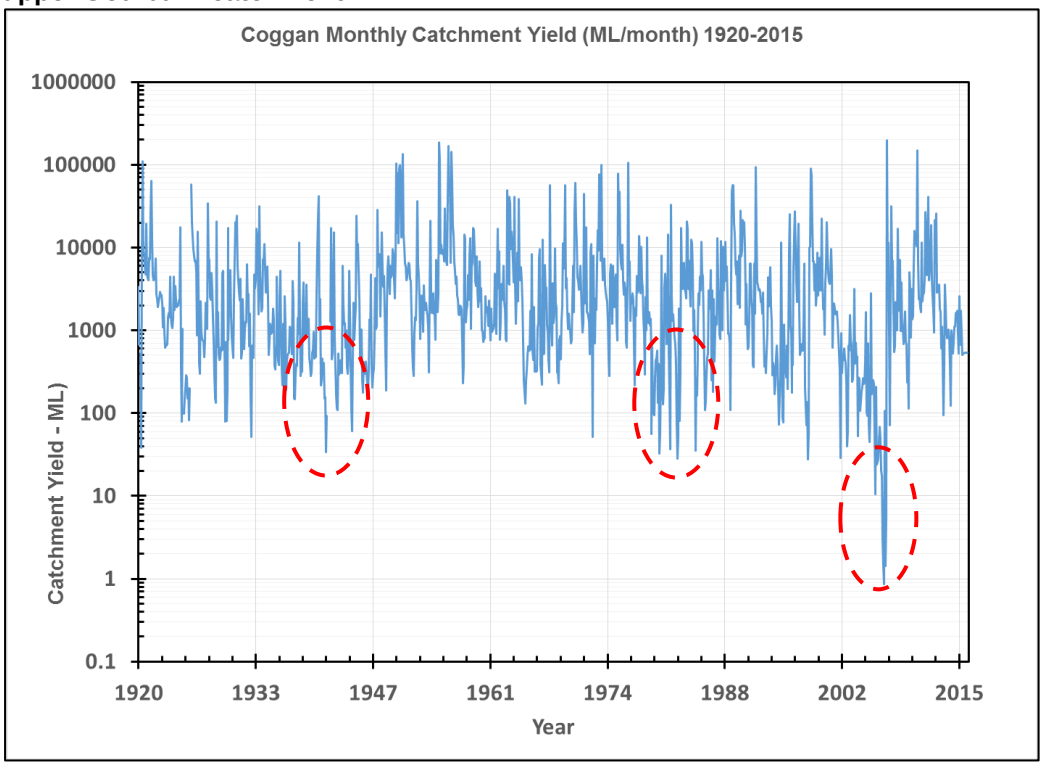


Figure 3: Hydrograph of monthly stream discharge (ML) at Coggan 1920 - 2015 upper Goulburn catchment

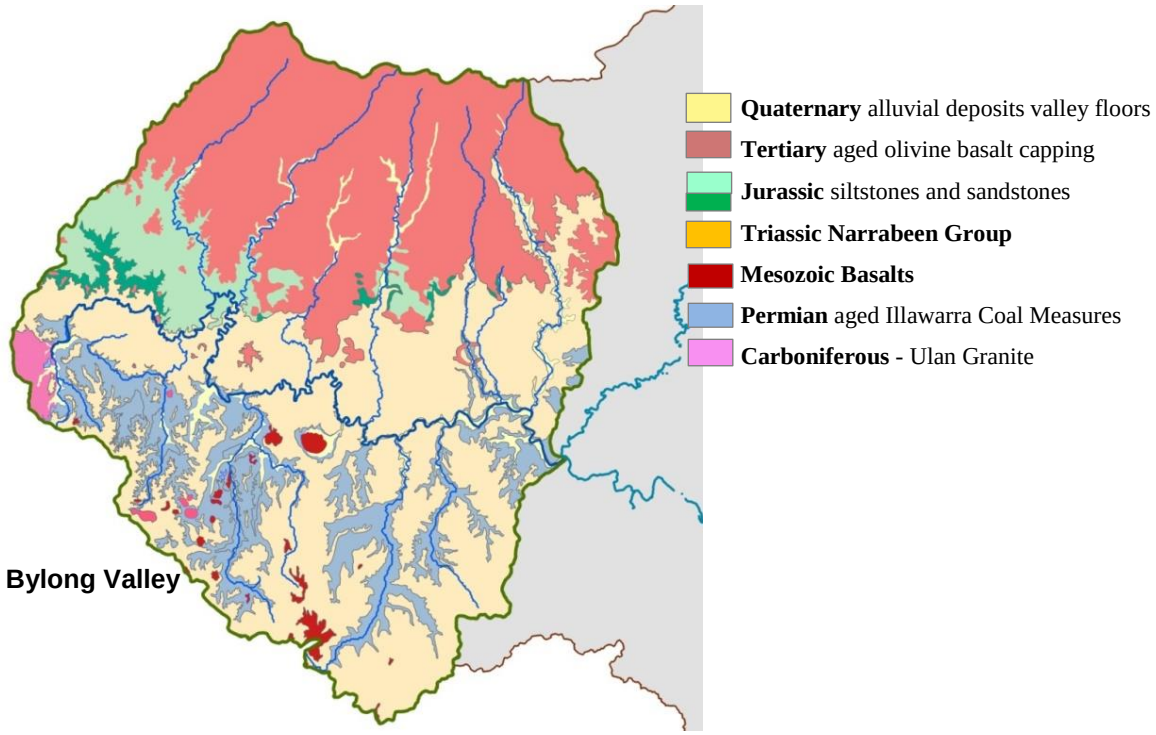


The proposed Bylong Coal project is likely to experience climatic conditions outside the range of the historical climate record. The stated 1% chance is a significant risk when impacts of the project on surface and groundwater interaction and water quality extend well into the next century. A declining trend in catchment yield generates substantial uncertainties when estimating water balances and an identifiable environmental risk for water planners assessing sustainable water limits. Climate uncertainties and limited monitoring data combined with the complexity of the hydrogeological system make environmental assessment and use of modelling to confidently predict future impacts quite problematic.

Hydrogeology

The Goulburn catchment has a complex geology; the western and southern catchments are dominated by the Narrabeen Group of Triassic sandstones and conglomerates underlain by Permian Coal Measures and shale. The geology in the north is dominated by Tertiary basalts underlain by Jurassic shales, siltstones and sandstones that outcrop as a halo, around the elevated basalt plateau. Volcanic activity in the Mesozoic period is thought to have also contributed volcanogenic material to the Permian and Triassic sedimentary sequences.

Figure 3.4 Geological Map of Goulburn Catchment (copyright)



The Goulburn is regarded as a highly connected surface-groundwater system with groundwater inputs *providing crucial low flows (or base flows) during droughts*. The Goulburn River and its tributaries act as regional sinks whereby groundwater mounding reflecting the elevated sandstone topography and basalt hills drains towards topographical lows discharging as base flows to rivers and streams. Secondary permeability through connected bedding planes, fractures and joints, augmented by igneous intrusions, form conduits for horizontal and vertical groundwater flow paths. The Narrabeen Triassic sandstones have been found to be porous and highly conductive strata supporting a regional and localised groundwater system *contributing good quality, low salinity groundwater that supports base flows in streams and groundwater dependent ecosystems* (McVicar TR *et al.*, 2015; Kellett *et al.*, 1989; Imrie-Mullins, 2017).

Bylong River alluvium contains an extensive and productive groundwater store, dependent on rainfall recharge and augmented by fresh and saline flows from Permian groundwater and the surrounding Triassic porous/fractured rock system. Subsurface groundwater flows that slowly discharge into the Goulburn River system are a characteristic feature of this tributary.

The main contributor to high salinity levels in streams is the export of salts in surface runoff and groundwater from disturbed Permian coal measures within the incised valleys of the southern catchment. The activation and mobilisation of salts is accelerated by land clearing and in recent years the large scale disturbance of the landscape from the expansion of coal mining that directly targets coal reserves in the valley floor.

Diffuse seepage from mined areas is very difficult to measure and is inevitably modelled based on numerous assumptions. Saline deposits, once activated, concentrate with evaporation during dry times and consequently mobilised during wetter periods accumulating downstream within the sand and sediments of the river alluvium or exported into the Hunter River at high flows. The risk of cumulative saline leakage from buried mine tailings, disturbed interburden and reject material, contaminated groundwater in underground goafs and buried brine waste from desalination plants represent a potential long term hazard to water quality in the Goulburn. This risk will continue for 100s of years post mining, when management effectively ceases.

Rigorous management regulations and approval conditions requirements have reduced (but far from eliminated) offsite discharge and seepage of contaminated water from current mining operations within predicted range of climatic conditions. However, weather extremes and post mining uncertainties extending decades, introduce a high level of uncertainty and unacceptable risk to downstream environments, leaving a potentially costly legacy for society and future generations. In my opinion KEPCO's Bylong Coal proposal has not adequately considered or modelled the potential risk to the Goulburn catchment from extreme climatic events during or post mining.

Water Security

Stream flow hydrographs supplied by KEPCO for the Bylong and Goulburn River (AGE RTS p.35 Figure 5-12) show a significant difference between the modelled flows for the Bylong River and measured stream discharge in the Goulburn at downstream Coggan gauge (GS210006). One explanation for this discrepancy is the predicted groundwater recharge rate for the Bylong catchment is significantly higher than assumed in the modelling. Recharge rates are a critical parameter in surface and groundwater modelling predictions.

KEPCO groundwater modelling also assumes a very low recharge rate for fractured/ porous rock groundwater. The estimated recharge rate 0.7% rainfall for sources other than the alluvium (6.3.2 Part 2 RTS) is significantly lower (~ x 10) than generally accepted 5-7 % recharge level for Triassic Narrabeen group geology (Pearse – Hawkins *et al.*, 2015; Ross and Webb, 2015). This potentially underestimates the contribution of fresh, slow release groundwater from the fractured and porous rock hydrogeological units.

In my opinion the KEPCO groundwater assessment does not adequately consider the potential interference and contamination of fresh (low salinity) groundwater from the upper Bylong River and Lee Creek and emanating from the surrounding fractured rock system (Triassic/Upper Permian) that sustain groundwater storage and help dilute more brackish water in the alluvium. Potential connectivity between the coal seams, alluvium and Permian/Triassic weathered zone was initially overlooked and appears to still be underestimated. The report

assumes the extent of coal seam depressurisation will not be significant. This is a substantial claim that is yet to be tested.

> *"…available data does indicate in some areas there is a direct or direct hydraulic connection between the alluvium and the coal seams proposed to be mined….*
>
> *The unit (*Triassic Permian*) underlies the alluvium and will act as a pathway for flow from the alluvium to the proposed open cut mining areas in some parts….*
>
> *….bores installed within the weathered zone (*Triassic/Permian*) show a response in groundwater levels to climatic events and confirm the unit is well connected to the surficial alluvium …"* AGE RTS p.41-45

Monitoring from the longest operating coal mine at Ulan has shown conclusively that mining has resulted in the depressurisation of the coal seam for many kilometres outside the mine footprint affecting both the Permian coal measures and Triassic strata (MER, 2015; MER, 2011; UCML, 2015a).

KEPCO repeatedly consigns potential unresolved issues and remedial measures to a future, yet-to-be-prepared Water Management Plan. These include monitoring seepage from overburden placement, resolving groundwater trigger levels, gaps in the groundwater monitoring network and borefield production; validation of water models and risks with site water management, including delaying rehabilitation of open cut voids and post closure monitoring (RTS S4.3, SRTS Vol 2. App.J. pp.3, 7, 15-24, AGE RTS, pp.41.84)

The experience from other mining operations in the area has shown that once mining commences, many (if not most) of these impacts *cannot* be reversed or adequately mitigated. The loss of water security to the Bylong Valley will destroy its agricultural potential and reduce base flows in the Goulburn, most critical during extended dry periods and droughts. This threatens the resilience of the riparian ecosystem in the Goulburn River National Park which provides invaluable ecosystem services, improving surface water quality, reducing turbidity and algae blooms. Such outstanding issues and risks need to be fully tested and plans scrutinised before any true assessment of the impact of this green-field project and its costs (broadly defined) can be made.

Conclusion

The existing three mines in the upper Goulburn catchment have initially claimed there will be no mine discharge but all have subsequently required modifications to allow discharge of excess mine affected water. Each mine has also been granted approval for significant expansion of their mining footprint that has placed further pressure on water resources.

It has proved very difficult to accurately measure and quantify the potential combined contributions from coal mining operations resulting from point and diffuse seepage of saline

water or loss of fresh groundwater inflows from regional Triassic-Permian groundwater system. . The cumulative impact of opening another coal mine in a green field, highly vulnerable landscape has the potential to significantly increase the total salt load in the Goulburn River over coming years, considering point and diffuse discharge of mine affected groundwater and mobilisation of geologically sequestered salts from disturbed mined areas.

The lack of adequate monitoring in both the upper and lower sections of the Goulburn River catchment demands further strategic real-time monitoring of flow and salinity; the regional groundwater system and surveying of GDEs. The assessment of the long term impacts of the Bylong Coal Project on water security requires further scientifically robust investigation and consideration of climatic extremes. The proponent's claim that the proposed Bylong Coal mine will achieve *nil discharge* (direct and diffuse) over the life of the mine and post closure requires particular scrutiny and interrogation by the PAC.

The Goulburn is a vulnerable catchment at risk from climatic extremes and rising salinity that requires very careful and sensitive land and water management to maintain resilience and avoid escalating degradation and loss of valuable ecosystem services and sustainable agricultural production.

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