Submission No 35

INQUIRY INTO FLOODPLAIN HARVESTING

Organisation: Alluvium Consulting Australia

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Ms Cate Faehrmann MLC
Chair, Select Committee on Floodplain Harvesting
Upper House Committees Legislative Council
Parliament of New South Wales
Parliament House, Macquarie Street, Sydney NSW 2000
(electronic submission)

Dear Ms Faehrmann

Submission to the Select Committee on Floodplain Harvesting
Thank you for the invitation to provide a submission to the Select Committee regarding the Inquiry into Floodplain Harvesting.

Members of the committee may be aware, Mr Tony Weber, of Alluvium Consulting Australia Pty Ltd, and Mr Greg Claydon, an independent contractor, delivered an independent review of the implementation of the NSW Floodplain Harvesting Policy (The Policy) for the NSW Government. This review, published in July 2019, is available here: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/272146/Final-floodplain-harvesting-independent-review.pdf. The report outlined the findings of the assessment of implementation of the policy and provided a series of recommendations which were agreed to by the NSW government in full.

Both Weber and Claydon have been subsequently engaged by the NSW Department of Planning, Industry and Environment to independently assess and verify the Department's responses in addressing the recommendations (as recommended by their review) to determine and transparently demonstrate whether the responses meet all aspects of the recommendations, In addition, Tony Weber has been assisting the Department with reviewing technical assessments of submissions from water users regarding proposed floodplain harvesting licences (also a recommendation from the independent review).

In this submission to the Select Committee, we wish to particularly address point 1 (c) of the Terms of Reference of the Select Committee Inquiry into Floodplain Harvesting, namely how floodplain harvesting can be licensed, regulated, metered and monitored so that it is sustainable and meets the objectives of the Water Management Act 2000 and the Murray Darling Basin Plan.

In summary, our submission to the Select Committee seeks to make four points, based on the findings from our Independent Review, and our ongoing interactions in the floodplain harvesting space in NSW and other jurisdictions:

1. We (Weber and Claydon) represent a credible and independent expert source of information
2. The application of computer hydrological modeling is an essential tool in the process of licensing, regulating, metering and monitoring floodplain harvesting, although there is a need to 'demystify' the modelling process
3. The current process for engagement of stakeholders regarding floodplain harvesting is less than adequate and urgently needs to be changed
4. There needs to be further consideration of the impacts of climate change on floodplain harvesting management in the future.

These are discussed further below

1. We (Weber and Claydon) represent a credible and independent expert source of information

Tony Weber and Greg Claydon were appointed by the NSW Department and the Murray-Darling Basin Authority as independent reviewers of the implementation of the NSW Floodplain Harvesting Policy in September of 2018, as outlined below (copied verbatim from the Department's website here: https://www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/harvesting/independent-peer-reviewers).

The Department of Planning, Industry and Environment engaged reviewers who are recognised nationally and internationally as experts in their respective fields. They were not involved in any activities regarding the modelling and/or implementation of the NSW Floodplain Harvesting Policy prior to their commencement of the review tasks. It therefore was a truly "independent" review without any preconceptions of departmental influences on the approach or considerations.

The reviewers were appointed based on the following reasons:

- *demonstrated capabilities to provide quality, responsive and specialist advice*
- *specialist experience in water modelling and floodplain harvesting*
- *technical capabilities for the work*
- *corporate knowledge and continuation of the work program*
- *immediate availability to service the needs of the program*
- *limited supply in the market for specialists (consultants that are independent from the department) with the required knowledge to provide expertise in water modelling and floodplain harvesting*
- *vetting by the department as part of the contracts and prequalification scheme (maximising savings through negotiated price reductions, enhancing the available product range and increasing supplier contract performance).*

We wish to highlight to the Select Committee two key points regarding the above:

- <u>the reviewers were not involved in any activities regarding the modelling and/or implementation of the NSW Floodplain Harvesting Policy</u>,
- <u>there was a limited number of specialists who are "independent" from the Department regarding water modelling and floodplain harvesting</u>.

We draw attention of the Select Committee to a recent journal article by Colloff et al. (2021), we note that they highlight the dangers to the public interest of 'administrative capture' of science, whereby scientists are incentivised to narrow or close down the scientific questions asked, the debates on evidence and the scientific dialogue so to support predetermined policy actions. It could also be argued that reviewers should have no prior engagement by the relevant agencies that they are reviewing, but, as illustrated in the same article by Colloff, they highlight the degree of connectivity in Australia between scientists used in review processes and the agencies and institutions they may be asked to review.

To be effective in this context, we contend that specialist reviewers need a detailed understanding of the technical approaches (e.g. the modelling tools), the policy frameworks in place to manage water issues in the Murray Darling Basin and the stakeholder landscapes in which the modelling and policies are being applied. Unfortunately, there is only a small pool of professionals in Australia with this specialist understanding – and invariably, they have done some work with government agencies and/or stakeholder groups in some context in the past. In any event, specialist reviewers to be "independent" also need to undertake clear, transparent, unbiased and objective processes that no not constrain the scientific and other issues addressed, the decision options explored, or the evidence, data and views put forward by stakeholders.

The review process that we undertook considered the issue of independence by ensuring that the review scope was developed through presentations by the Department, discussions with a broad range of stakeholders and formal submissions made to us. This process allowed us to ascertain both the stakeholders key issues to be considered, and also the key issues associated with the Department approaches to implementation. Our Final Report followed the questions posed by us, as the independent reviewers, in the "scope of review" and built on several workshops and discussions with the Department, the MDBA and stakeholder groups, an earlier draft Report and further formal submissions to it from a broad range of stakeholders. If it was argued that to be truly independent, no engagement with the stakeholders or the Department prior to the review should have been undertaken, then it may not have led to key contentious issues being investigated thoroughly.

Given this, we believe our roles as "independent reviewers" of the implementation of the Floodplain Harvesting Policy and our subsequent review engagements with the Department are very likely to ensure a high quality review that provides meaningful outcomes to the NSW Government and Murray Darling Basin stakeholders in ways that are open, transparent and do not favour some parties at the expense of others or the community as a whole.

We therefore argue that:

a) There is only a small pool of professionals in Australia who have sufficient expertise and understanding of the approaches to floodplain harvesting modelling and policy implementation in the Murray Darling Basin who could also be considered as reviewers
b) It is most unlikely to find reviewers who would not have had done some kind of work with government agencies and/or stakeholder groups in the past and who would also have sufficient expertise and experience to thoroughly evaluate key issues for review of hydrological modelling and implementation of floodplain harvesting policy in NSW or the Murray-Darling Basin
c) Reviews that have their scopes developed collaboratively with stakeholders and Departmental staff are much more likely to identify and prosecute key issues that are of concern to all parties.

From this, our recommendations to the Select Committee, regarding "independent reviews" to ensure how floodplain harvesting can be licensed, regulated, metered and monitored so that it is sustainable and meets the objectives of the Water Management Act 2000 and the Murray Darling Basin Plan, are that:

- A panel of reviewers be established that is agreed to by both Murray Darling Basin stakeholders and the NSW Government to further monitor and review and report on the implementation of floodplain harvesting licensing, regulation, metering and monitoring
- That the panel of reviewers outline their engagements with stakeholders and the NSW Government with respect to works undertaken with relevance to the Murray Darling Basin
- That the scope of any reviews be developed collaboratively with stakeholders and Departmental staff
- That a minimum of two and preferably three or more reviewers be selected at any one time to ensure that sufficient diversity and breadth is available to conduct reviews.

2. The role of computer modelling and data in the process of licensing, regulating, metering and monitoring of floodplain harvesting

2.1 Modelling

The distrust of the models being used as part of the licensing has been one continuous theme concern throughout our engagement with stakeholders in the floodplain harvesting space. We examined this in some detail during our review, including reviewing the models themselves, interviewing the modellers who prepared them and examining how the models were developed from the information, data and evidence available. What was very clear is that the modelling undertaken is of a very high technical standard, uses multiple lines of evidence in their development and are possibly the only way of developing a sound, equitable and quantitative assessment of a complex, networked water management system.

The major problem we identified though was the lack of transparency in the modelling process, with insufficient documentation and exposure of the methods used to develop the models and the data relied upon. This has been addressed to some extent through the recent reports published by the Department in the

Border Rivers, Gwydir and Macquarie River Valleys. However, through ongoing engagement with stakeholders during farm entitlement submission reviews, it is obvious that the complexity of the modelling makes it difficult to demonstrate to a wider audience that sufficient robustness is present. There is also a lack of engagement with stakeholders in the model development process.

Success in model building and application for challenging interdisciplinary issues is about more than getting the science and engineering right. It is also about embedding model building in a social process that links and engages scientists, modellers, decision makers, interest groups and the wider public towards achieving impact beyond merely technical performance of a model, notwithstanding the critical importance of the latter for credibility and confidence.

In a journal article by (Voinov and Bousquet (, 2010), they present a process for a participatory model development that is useful to refer to in terms of engaging stakeholders in a participatory modelling process as shown in Figure 1 below. It stresses in particularly the need to set clear goals for the modelling projects, engaging stakeholders early in the process, and discussing the model development throughout.

The process of modelling undertaken by the Department has not been consistent with this approach, both through history of development and through concerns with undue influence by any one stakeholder group. Until our review, there were no clear goals documented for the modelling in each river valley, with only higher-level goals around developing models of the system. Stakeholder engagement was, and still is largely top-down, from the Department to stakeholders, rather than a true participatory process. This leads to distrust of the development process by stakeholders and an inability for them to understand the choices made by the modellers in representing farm scale and river scale processes, for example.

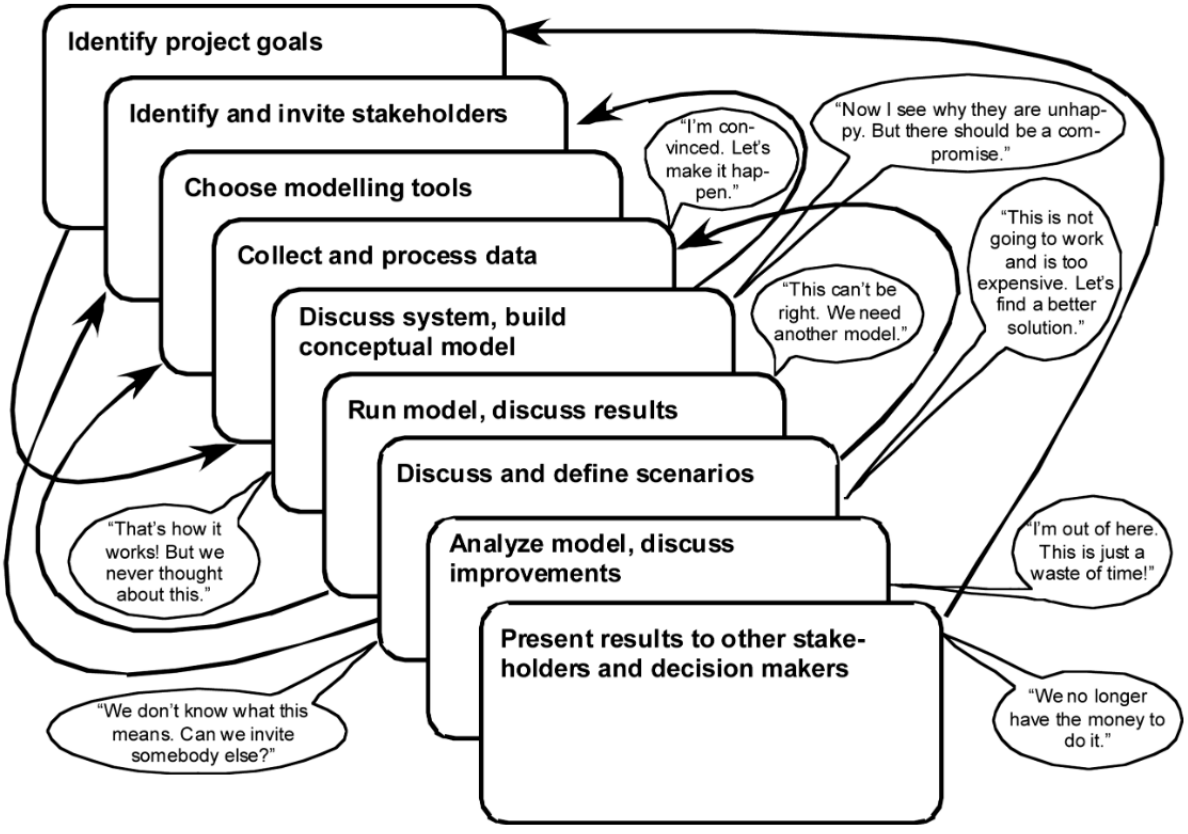

Figure 1. *Different stages of a participatory modelling process (Voinov and Bousquet, 2010)*

The modelling also is focused only providing the information and assessment frameworks associated with developing licensed entitlements. It is not able to be used directly to quantify downstream flows, although the models are able to provide some contextual information in that process. This leads to distrust by downstream stakeholders that the models are not suitable to determine equitable water use across all water users in the Basin. What the models are capable of doing is determining how much water is being taken for consumptive

use within each of the river valleys, how this compares to long term extraction limits set through water plans and the Murray Darling Basin Sustainable Diversion Limit (or "Cap") and how growth in development of consumptive water use needs to be constrained to meet those limits or caps.

2.2 Data and evidence

One area that has seen considerable investment by Departmental staff has been in the collection, analysis and application of a range of data sets and lines of evidence to support the modelling. The approaches undertaken to collect and analyse that data have demonstrated robustness and consistency across the Valleys where modelling has been completed.

However, again there is room for improvement. In particular, the information used in the models to represent particular water user enterprises are often less than adequate because insufficient information has been provided by those landholders through surveys has led to discrepancies. As part of our review, we recommended that this property scale information be cross-checked through collaboration between the modellers and the landholders, and landholders provided with the opportunity to submit evidence as to why the model data needs to be updated. Although challenging, this process has been found by landholders to be beneficial and, to some extent, demonstrates the usefulness of a participatory process in the model development. Unfortunately, other water users, such as those representing the environment, or downstream users, have not had the same opportunities for engagement in examining the data used in the model. We suggest that this needs to change.

We also note that in some cases there is still a dearth of information around some parts of the water cycle in the Murray Darling Basin. In particular, there is a distinct lack of scientific data and research around the way rainfall converts to runoff in many parts of the Northern Basin where floodplain harvesting occurs. While this is not typically a large component of the overall floodplain harvesting take, it has been the most contentious when dealing with irrigation stakeholders. Further work is needed to improve the understanding here if the opportunities for contention are to be addressed, and to improve the understanding of the importance of this part of the water cycle.

Overall, we believe that these models are an essential component in ensuring how floodplain harvesting can be licensed, regulated, metered and monitored so that it is sustainable and meets the objectives of the Water Management Act 2000 and the Murray Darling Basin Plan. Without the models, it would be extremely challenging to understand the complexity present in the various river valley water networks and how the relationships between consumptive use, environmental and essential human needs and downstream impacts can be equitably evaluated. We do believe though that there is room for improvement.

Modelling agencies need to provide more "open access" to their models, and greater transparency about the science, the methods, the data and the assumptions used and the corresponding uncertainties. The skills required for this include being able to appropriately apply models to help solve problems, to communicate well and sufficiently inform and assist decision making. These are important to the social licence to operate. Providing greater clarity in the way that models are used and where the benefits and constraints lie can lead to transformative conversations and greatly increased water literacy and understanding.

We therefore recommend to the Select Committee that:

a) A participatory process in model development be considered and applied for future model updates and developments within the Northern Basin
b) Clear goals for modelling, as per those currently documented in Model Build Reports for the Border, Gwydir and Macquarie River Valleys be tested with stakeholders and further refined as the basis for future modelling
c) Engaging stakeholders in review of model data and evidence be improved to provide transparency in the use of that information
d) Research and data collection around the variability and importance of rainfall conversion to runoff in areas of the Northern Basin be progressed.

3. Engaging stakeholders in the process

Our observations of the stakeholder engagement process regarding floodplain harvesting is that the methods used for that engagement have been, as noted previously, very much applying a "top-down" approach. This has been through using town hall style meetings with stakeholders where presenters deliver PowerPoint slides from the front of a meeting and tell people what has been done and no interactive or consultative component is included, other than to provide time for questions to be asked. We feel that this has been a major failing of the methods of engagement and has led to many contentious, argumentative and disruptive meetings, with examples of "grandstanding", hijacking of meetings for particular messages to be delivered by some stakeholder groups and a lack of involvement of stakeholders. This has to change.

We understand the need to deliver particular types of stakeholder engagements in regulatory environments. However, we believe that the methods used were fundamentally flawed and were not effective engagement at all, but simply delivering decisions made (and then defending those decisions).

There have been a number of positive examples with smaller groups, such as the consultation and deliberations made in partnership with industry groups to examine the issues surrounding rainfall runoff exemption approaches that occurred in late 2019. We also noted that when talking with stakeholder groups through our review process, they appreciated that someone was actually listening to the issues they had raised and taking them through the review process. Many felt that this was a much improved approach and suggests a more consultative, collaborative approach to engagement "brings people along on the journey", rather than just telling them about the "destination".

A wholesale change in stakeholder engagement, using openness, transparency, inclusivity and processes suited to contentious environments, is required if mutual trust and ownership in the process of floodplain harvesting licensing, regulation, measurement and monitoring are to be established. Without this, the current process will continue to see a lack of trust and understanding by stakeholders, leading to a loss in transparency of the process and an inability to understand how the implementation of a sustainable floodplain harvesting management approach can work. We strongly believe that management of water on floodplains has to be brought into an effective and efficient regulatory framework – water on floodplains has environmental, cultural, social and economic values, just like water in watercourses and in underground aquifers. To do this effectively requires building understanding and trust around how the regulatory framework has been developed and is to be applied, through engaging in transparent and inclusive engagement with all stakeholders.

We therefore recommend to the Select Committee that:

a) A thorough review and redevelopment of the stakeholder engagement process used by NSW government agencies in the water management arena be undertaken
b) The future process be based on openness, transparency, inclusivity and processes suited to contentious environments to help build mutual trust and understanding
c) A revised engagement approach be applied to future stakeholder activities in the floodplain harvesting and other water management arenas.

4. Floodplain harvesting management in the future.

Currently, all focus on the implementation of the Floodplain Harvesting Policy and associated modelling has been on assessing historical water use and growth over long terms to understand how the variability in the historical record affects water availability and allocation. This is consistent with the requirements of the Murray Darling Basin Plan, but does not represent what may happen in the future under climate change or what analysis of the climate before recorded observations were made tells us about the true variability of the climate.

With respect to the modelling and the Policy implementation, there is an argument that they perhaps don't need to consider this if reviewed on a regular basis, say every 5 years, as they are able to be then adjusted to represent the effects of a variable and changing climate. Currently however, they do not even do this, as they

are constrained by evaluating water use over a set 114 year climate period consistent with how long-term water use is evaluated across the Murray Darling Basin.

From our experience, and confirmed by recent research (Ajami et al., 2016; Chiew, 2006; Chiew et al., 2009; Kiem et al., 2020; Potter and Chiew, 2011; Vaze et al., 2011, 2010) , it is necessary that, rather than just continuing to look backwards at the observed historical record, we also need to turn our attention to understanding the risks to equitable water management from both the true variability of our existing climate, and from future climate change.

We have raised this aspect within our review, and we are also aware of the work that the Department has been undertaking through their Regional Water Strategies with regards to incorporating a better assessment of both existing climate variability and future climate change into water modelling. However, more needs to be done, particularly with a focus on how this may impact all water users (regional towns, irrigators, Indigenous communities, the environment and downstream users).

We see that climate risk is of critical importance to understanding how floodplain harvesting may be sustainable in the future.

What is certain is that future is going to be warmer and drier, but also that changes to the climate are already here. We note the recent release of the Intergovernmental Panel on Climate Change AR6 Report on the Physical Basis for Climate Change and the Regional Summary Report for Australia here https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Australasia.pdf). This notes that Australian land masses have warmed by 1.4 degrees Celsius already, and that climate factors such as heat extremes, extreme fire days, length of fire seasons, heatwaves, droughts and floods are expected to increase and be more widespread. Of particular interest is that the changes in soil moisture, which supports both environmental and agricultural vegetation growth, is likely to diminish across the Murray Darling Basin in addition to other parts of Australia, as illustrated in the figure below.

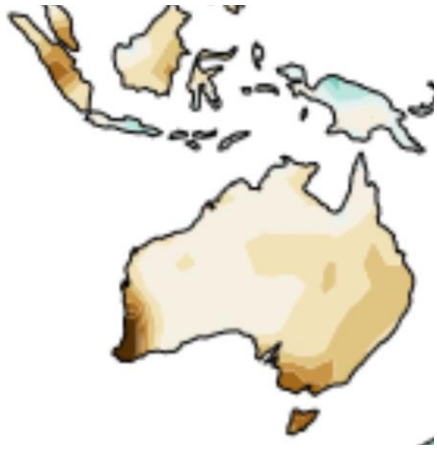

Figure 2. *Decreases in soil moisture at 4°C warming (extract from https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf)*

While the particular extract shown above is at the extreme end of potential warming, it does illustrate the susceptibility of the Basin to impacts of climate change, particularly around water scarcity and use, and strongly suggests that if we are not considering the risks of climate change now, both in terms of actual changes to date and plausible future changes, we are not managing our water resources for the near term and long term in an equitable and sustainable manner.

In terms of floodplain harvesting, the key areas of impact are likely to be on reduced flood frequency but increased severity, and also on the importance of flood events to transport flows down the river system given the overall drying trend (drier conditions will mean fewer flows will reach key areas such as environmental assets and downstream users, so flood events may become more critical to ensure water reaches these areas).

This requires research and further assessment and commitment across the Basin to continue to explore how climate change will interact with the water cycle and how this influences its ongoing management.

We therefore recommend to the Select Committee that:

a) Assessment of the impacts of both existing climate variability and future climate change on the risks to equitable and sustainable water management over the long term needs to be urgently undertaken within the Murray Darling Basin (and elsewhere).
b) Changes to climate are already present, so consideration of those changes needs to be incorporated into how floodplain harvesting is managed in order to ensure sustainability in the near term, especially on elements such as low flows, flood frequency and severity changes and the needs of downstream users and the environment under these changed conditions.

We have provided a number of recommendations within this submission for consideration by the Committee, however we believe that while all of them are important, the need for much improved stakeholder engagement in all areas of floodplain harvesting and water management in general is the highest priority.

We also note that the time for implementing a sustainable, and equitable framework for licensing and managing floodplain harvesting is NOW. The recommendations we have provided within this submission are made with the conscious focus on supporting what has already been undertaken through ongoing improvements. This is a complex and contentious space and the efforts by NSW government agencies, stakeholders, researchers and the community to date should not be disregarded. Without this work continuing and improving, it will not be possible to ensure that floodplain harvesting can be licensed, regulated, metered and monitored so that it is sustainable and meets the objectives of the Water Management Act 2000 and the Murray Darling Basin Plan.

We would welcome the opportunity to discuss the content of this submission with the Committee to expand and/or clarify the content and recommendations within. We must reiterate that it is our experience that the Department has been undertaking significant improvements in the implementation of the NSW Floodplain Harvesting Policy through adoption and implementation of the recommendations contained within our 2019 Independent Review. This needs to continue.

Yours sincerely

Tony Weber Greg Claydon

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