Submission No 234

INQUIRY INTO PROPOSAL TO RAISE THE WARRAGAMBA DAM WALL

Organisation: Ecological Surveys & Planning

Date Received: 10 September 2019

Environmental Impact Assessment in the Greater Blue Mountains World Heritage Area: a context for assessment and decision-making in relation to proposed flood mitigation works

Dr Steven Douglas (BSc., MEnv.Plan., PhD.)
Consultant ecologist (BAM certified) and environmental planner, Ecological Surveys & Planning;
Visiting Fellow, Hawkesbury Institute for the Environment, Western Sydney University.

Introduction

This document focuses on environmental (or ecological) assessment as described under the World Heritage Advice Note: Environmental Assessment written by the World Heritage Programme of the International Union for Conservation of Nature (IUCN 18 November 2013)[i]. The IUCN is the scientific advisory body to the World Heritage Commission in relation to natural World Heritage Sites.

The proposed construction of a higher Warragamba dam for flood mitigation entails effects on part of the Greater Blue Mountains World Heritage Area (GBMWHA) and its Outstanding Universal Value (OUV). OUV is the basis for addition to the World Heritage List and is defined as "...natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity." OUV has three components:

1. **Values** (natural phenomena or areas of exceptional beauty; important examples of Earth history; ecological and biological processes; biodiversity conservation including threatened species);
2. **Integrity** (a measure of ecological wholeness and ability to maintain all ecological functions);
3. **Protection & Management** (ability to maintain integrity and values through appropriately enduring legislative, institutional and/or traditional protection, with clear boundaries, effective buffer zones from external threats, and effective management systems).

"An Environmental Assessment for a proposal affecting, or with the potential to affect, a natural World Heritage Site is intended to ensure that the proposal's likely impacts on the OUV of the site are fully considered in land-use planning decisions with the objective of preserving these exceptional places for future generations. The assessment should also consider the site's links with the surrounding landscape as a natural World Heritage Site cannot be considered separately from the wider ecosystem" (IUCN, 2013:3).

"IUCN's position is that infrastructure and other development proposals and/or concessions located within, or outside the boundaries of a natural World Heritage Site, should be considered in terms of whether they are compatible with the long-term objective of preserving the OUV of the site for future generations. Those proposals that are not compatible with this objective should not be permitted within these sites. Note that most major infrastructure proposals and other large-scale development proposals are unlikely to be compatible with the preservation of a natural World Heritage Site, and alternatives should therefore be sought" (IUCN, 2013:5).

The proposed extension to Warragamba dam would also generate effects on Matters of National Environmental Significance (MNES) under the Commonwealth Environment Protection & Biodiversity Conservation (EPBC) Act in the form of listed threatened species and communities, National Heritage, and the GBMWHA. The EPBC Act requires that the environmental assessment details how significant impacts on MNES have been avoided, mitigated, and if necessary, offset (in that order). The proposal has been declared a Controlled Action under that Act because of its likely effect on MNES. This means it will be subject to the full scope of assessment under that legislation, however the Bilateral Agreement between the NSW and Australian Governments means that much of the assessment is delegated to the NSW Government. The NSW Government is also the project proponent. This creates at least a reasonable perception of a conflict of interest, especially in the absence of independent specification, supervision, and review of the environmental assessment.

The proposal also directly and indirectly affects numerous threatened biota[ii] (species, potentially populations, and ecological communities) prescribed under the NSW Biodiversity Conservation (BC) Act, both upstream and downstream of the dam wall. However, because of when the planning application for the project was lodged, it is being assessed under the superseded Threatened Species Conservation Act and the associated Framework for Biodiversity Assessment (FBA). Ideally, the project should be assessed under the State's current threatened biota legislation (BC Act) and its more rigorous Biodiversity Assessment Method (BAM).

The project is required to be assessed under the NSW Environmental Planning & Assessment (EP&A) Act, under which it has been deemed State Significant Development – a designation that grants it a degree of exemption and privilege over matters that do not have this status. Under that Act, the project is required to undertake the environmental assessment in accordance with the Secretary's Environmental Assessment Requirements (SEARs). Oddly, two versions of this critical component of the assessment process were issued: the first dated June 30, 2017; and the revised edition dated March 13, 2018. The second edition of the SEARs reflects the apparent failure of the first edition to have adequate regard to the specifics of this project. The first SEARs is relatively generic, whereas most SEARs for major projects are case-specific in recognition that projects entail particular impacts that require detailed consideration. The first edition of the SEARs appears to have been rushed. The fact that even the first SEARs was issued in mid-2017, let alone that a revised version was issued nine months later further begs the question of why the project is not assessed under the BC Act and BAM? Other legislation such as the Fisheries Management Act is relevant but is not considered here.

Environmental Assessment advice

World Heritage Areas "represent a commitment to future generations that the international community has a duty to uphold, as embodied in Article 6(1) of the World Heritage Convention which states that "...such heritage constitutes a world heritage for whose protection it is the duty of the international community as a whole to cooperate." However, many of these unique places are increasingly faced with threats such as mining, major infrastructure projects, poaching, illegal logging, agricultural encroachment and climate change" (IUCN 2013: 1).

"Environmental Assessments are intended to identify, evaluate, avoid and mitigate the potential environmental and social impacts of development proposals **before** a decision on their funding or implementation is taken. Environmental Assessments are also intended to **assess alternatives** to development proposals, including the 'no project' option, in order to recommend the least environmentally damaging, and most sustainable, option to decision-makers" (IUCN 2013:2). However, many assessments fail to consider the full range of effects of a proposal before significant decisions have been made and significant resources committed. Whilst not always the case, environmental assessments at various levels, including for very large-scale projects, can document a only a subset of impacts of a proposal that has been deemed inevitable, and where the assessment process is reduced to tokenistic and sometimes quite partial compliance with a range of statutory obligations. This has significantly undermined scholarly, professional and public confidence in the environmental assessment process. At worst, political decisions are made prior to or during the environmental assessment such that the project has been effectively approved before the assessment is completed, or a project is granted specific exemption from legislation or from a subset of associated obligations such as harm minimisation.

I note that unlike some national signatories to the World Heritage Convention, Australia is a wealthy state with ample funds to undertake a through environmental assessment in accordance with international best practice. $57 M has already been allocated to the Hawkesbury-Nepean Flood Strategy.

Contrary to the IUCN's advice and to good practice, most assessments provide relatively scant consideration of alternatives to a project and are usually simplistic in this regard – comparing only the project and a 'no project' option. This is perhaps because assessments are almost always prepared by consultancy firms engaged by the project proponent or a related entity, so are not independent of the proponents' interests. At their worst, environmental assessments serve primarily to persuade regulatory bodies to approve a project i.e. they are methodologically prejudiced towards advocacy for the project rather than objective assessment of it. Some consultancy firms even market their services on those terms i.e. as 'supporting' a proposal, rather than as assessing it. They are very rarely a genuinely independent and fulsome assessment of a project's effects, and as such, fail to properly consider the full range of alternatives to the project and their respective consequences. Again, this has further undermined trust in such assessments – a situation worsened by the fact that the environmental assessment industry has been long subject to very little, or in many cases, no regulation in regard to the personnel and businesses who undertake this work.

Only with the recent gazettal of the NSW Biodiversity Conservation Act has a majority of this industry in NSW come under regulation through an accreditation and auditing scheme. However, this has not excluded individuals and/or firms notorious for incompetent or prejudicial practices. Early indications are that the auditing processes is under-resourced and potentially hamstrung in its ability to curtail malpractice. Some parts of the industry remain entirely unregulated and inadequately scrutinised. I note that the SEARs for this project require that "unless otherwise agreed by OEH", biodiversity impacts must be assessed by a person accredited to do so under the then TSC Act. It is relevant to ask whether OEH/DPIE granted an exemption or whether the person or persons undertaking the assessment are accredited under the TSC Act and if so, to what extent?

IUCN (2013) emphasizes the need to avoid the above-described serious procedural flaws, and to have full regard to alternatives, not just the 'no project' or 'do nothing' option. In the case of the proposed flood mitigation works at Warragamba Dam, publicly available documents indicate that comparatively little consideration has been given to alternatives to the proposed project, and that ecological impacts are inadequately addressed. Additionally, as is the norm with commercial projects, the consultancy firms engaged to prepare the Preliminary Environmental Assessment (PEA) and full environmental assessment were selected, are/were paid by, and are/were answerable to Water NSW on behalf of Infrastructure NSW. Both are NSW Government agencies that can, as many assessment clients do, effectively influence the real scope of the assessment by constraining the time available to complete it, and the budget allocated to this process. This situation is worsened when the specifications for the assessment (SEARs) are determined by the NSW Department of Planning & Environment. This situation is insufficiently independent of the NSW Government, which is the proponent of the project, the determinant of the scope of assessment, and the consent authority for any matters not limited to the EPBC Act. As such, it risks outcomes that include:

- an assessment that is of insufficient scope to properly address all statutory requirements at all levels of government, thus requiring excessive reliance on assumptions rather than evidence of environmental effects;
- that is inconsistent with IUCN's WHA assessment advice;
- that invests the majority of assessment resources in considering only the proponent's preferred flood mitigation option, thus under-valuing the potential alternatives and their potentially very different effects and costs;
- that treats ecological effects not as a matter that could determine whether or how the project might proceed, but only as a set of issues to be documented and managed as part of the approval process; and
- that lacks scholarly, professional, and public credibility.

Such a flawed approach is likely to result in public and professional scepticism or even ridicule and is vastly more exposed to successful legal challenges. As an example of this, the EIA for the North West Sector large-scale urbanisation project has been used in university courses as an example of 'how not to do things' because of its numerous failings of process and substance, partly due to it being rushed and apparently treated as a 'rubber stamp' for a project that government had effectively already approved.

The assessment of flood mitigation options and the subsequent environmental assessment of the proposed extension to Warragamba Dam risks becoming a similar lesson in the failings of decision-making and project evaluation. Indications are that the assessment process in this case was flawed from a very early stage as evidenced by the preliminary cost/benefit analysis in the Hawkesbury-Nepean Flood Management Strategy. It did not substantively cost environmental effects, let alone effects on World Heritage values. This is suggestive of the proponent being disinterested in a thorough environmental assessment, or at least that the proponent failed to properly design and cost the analysis within the Strategy.

As an example of this failing, it would have been feasible to generate a preliminary estimate of the cost of offsetting biodiversity losses associated with construction of and inundation caused by the higher dam wall. This could have been done using existing resources such as vegetation community maps and models; verified threatened species occurrence records; and models that predict habitat for and occurrence of threatened species. Combined with a map of the extent of inundation and the clearing associated with works at the dam wall, these parameters could have been used to calculate the extent to which vegetation communities, including threatened ecological communities, and threatened species or their potential habitat, would likely be degraded or destroyed, and the required cost to purchase biodiversity offsets (if available). Had this been done, the results would likely have been a cost estimate in the many millions of dollars, with some offsets flagged as unachievable because there are no alternative areas that might be secured as habitat for some of these threatened entities, including some Critically Endangered species. Such data would have been vitally informative when evaluating flood mitigation options, and may well have resulted in the assessment of those options determining that raising the dam wall would be economically unfeasible or at the least, the biodiversity costs (within the limitations of the offsetting model) are very high to the extent that this option becomes uncompetitive or much less competitive compared with others.

Key questions arising from this situation include:

- Why wasn't a preliminary costing of biodiversity offset liabilities and feasibility undertaken as part of the evaluation of flood mitigation options?
- Why was the first SEARs so generic and by what process did it come to be amended several months later?
- What tender and selection processes were used to appoint the consultancy firms that prepared the Preliminary Environmental Assessment (PEA) and the current environmental assessment, including whether the briefs specify that all alternatives to the project be given equal consideration and assessment?
- Do the authors and supervisors of the PEA hold qualifications and experience directly relevant to that role? The PEA does not specify such information.
- What timeframes and budgets were specified for the PEA and the full assessment?
- Do the consultancy briefs include assessment of World Heritage Area OUV?
- Do the consultancy briefs require or allow the consultants to fully assess all threatened biota values at State and Commonwealth levels or do they rely instead on predictive tools? The SEARs require that ecological surveys comply with the FBA and associated protocols, but does the consultancy brief specify this and provide the required time and funding?
- Were or are any DPIE/OEH-recognised 'species experts' formally involved in designing the consultancy brief for the environmental assessment; in the assessment process; and are there mechanisms and funding in place to engage them in evaluating the adequacy of the assessment?
- Did the consultancy brief for the full environmental assessment have regard to the advice of IUCN (2013)?
- Is the required section on World Heritage impacts (under the EPBC Act) being prepared by a person with appropriate qualifications and/or expertise?

IUCN (2013: 2) note "that very often, economically viable and feasible alternatives can be found to environmentally damaging development proposals. A detailed consideration and evaluation of alternatives can enable the identification of these economically viable options. For this reason, it is important to involve experts with World Heritage, protected area and biodiversity knowledge early on in the Environmental Assessment process, as they can work together with developers and engineers to find solutions." To date, it appears that insufficient engagement with relevant experts has taken place, in the context of considering alternative flood mitigation options, and weighing their various effects – social, ecological, and fiscal.

Expert engagement prior to, during and in the review of the environmental assessment is recommended by the IUCN. 'Expert' now has statutory meaning in the context of biodiversity assessment under the NSW BC Act, with a mechanism now available in which a person can be accredited by the State as an Expert in relation to particular biota, e.g. for a particular animal or plant species, or for an ecological community such as 'Cumberland Plain Woodland'. This mechanism is yet to become fully operational, and the assessment of persons as prospective Experts is apparently under-resourced. Consequently, the statutory public list of accredited Experts is currently very small and does not reflect the level of potentially accreditable experts available.

However, NSW Department of Planning, Industry & Environment (DPIE) has another list of informally accredited experts as a result of consultation and advisory processes undertaken by the agency's predecessors over several years (i.e. the so-called PAS1, PAS2, and now Saving Our Species (SOS) project panels). I am unaware of any such list of experts being used to advise government or to participate in or guide the environmental assessment of the proposed flood mitigation works or their alternatives.

I note that DPIE has ecological expertise within its staff, and that engagement with this is appropriate in all stages of the assessment process. However, that agency is under-resourced such that were its prospective experts required to engage significantly in the assessment, they may be unable to meet their other duties due to excessive workloads. The very generic nature of the first SEARs suggests that departmental experts were not involved in drafting that document, despite its pivotal role in the assessment process. The second edition of the SEARs is an improvement, but it is unclear whether any departmental experts were engaged to formulate it in relation to threatened biota.

Relevant questions include:

- Have ecological experts within DPIE been involved at any stage of the assessment process, including consideration of alternative projects?
- Have they been able to review the adequacy of the SEARs, the consultancy brief, timetable and budget to ensure that appropriate methodologies and methods are applied and appropriately resourced?
- Is there funding in place to ensure that any relevant DPIE experts are afforded the time and support required for them to appropriately engage in the assessment process or at least to review the draft and final documentation?

How to progress the environmental assessment consistent with IUCN guidelines

IUCN (2013:6) provides the following 8 clear principles for 'World Heritage Impact Assessment':

Principle 1: All proposals that may adversely affect a natural World Heritage Site must undergo a rigorous Environmental Assessment early on in the decision-making process, whether they are located within or outside its boundaries.

This assessment should take place as early as possible in order to provide timely and effective input to decision-makers. Assessments that take place late in the decision-making process or after the decision has been made cannot adequately inform decision-makers.

Response: I have not seen evidence that the consideration of flood mitigation options or the subsequent PEA for the selected option have undergone the required level of rigour early in the decision-making process or subsequently. World Heritage values do not appear to have been adequately considered in the engineering and economics focused decisions about which option to favour. Biodiversity impacts and offsetting costs and feasibility are not considered but had they been assessed, may have significantly influenced the decision-making process. Instead, determination of those values has been left to very late in the process, and after the Government selected its preferred mitigation option. This is despite the fact that anyone familiar with biodiversity assessment and offsetting could have made even a rough calculation that might have caused the Government to reconsider its options.

Principle 2: Experts with World Heritage, protected area and biodiversity knowledge must be closely involved in the assessment process in order to identify the issues that will need to be assessed.

These experts can also work together with developers and engineers to find alternative solutions to proposals that may adversely affect a World Heritage Site's Outstanding Universal Value.

Response: I have not seen evidence that experts in relation to World Heritage, protected areas and biodiversity have been closely involved in the assessment of project options, or of the Government's preferred option. Instead, earlier decisions appear to have used knowledge primarily from within NSW Government agencies but not related to the named values. Once that process generated a preferred project option (in the absence of any substantial regard to biodiversity and World Heritage considerations), a consultancy firm was chosen by an agency of the proponent to prepare a PEA. I did not see any evidence in that document of consultation with experts in the required fields. The PEA appears to be a standard 'in-house' document prepared by the firm for its client – essentially little or no different to what I would expect to see in the context of a commercial development proposal such as a mine or urbanisation. I later comment on other deficiencies of the PEA, and I consider it to be relatively superficial, even within the accepted constraint of it being a preliminary assessment. OUV is not dealt with, and only the most minimal mention is made of World Heritage considerations.

Principle 3: The likely environmental and social impacts of the development proposal on the site's Outstanding Universal Value must be assessed, including direct, indirect and cumulative effects.

This assessment should consider the site's values, integrity and protection and management, as well as its connection to the wider landscape, and should be based on adequate information and data.

Response: I have not seen evidence that World Heritage OUV has been addressed in deliberations or assessments to date. The original SEARs issued for the project failed to have adequate regard to this, but the amended edition is significantly improved in this regard.

To comply with the EPBC Act, regard has to be given to the GBMWHA, but this does not necessitate doing so in accordance with the IUCN's formal advice, nor referring the assessment to IUCN or its recommended third party for independent review. The technical requirements of a thorough assessment of direct, indirect and cumulative effects of the proposal on the site's OUV are likely to be appropriately onerous and require expertise, considerable time and funding that may not be made available in this case. A standard impact assessment for the project is unlikely to adequately consider indirect and cumulative effects and may struggle to adequately assess direct effects if the consultants undertaking the work are not provided with an appropriate brief, funds, time, and unfettered access to relevant expertise. Such a situation would be similar to the sort of environmental assessments often seen for corporate projects where the proponent does not want to spend any more time or money on assessments than is required to gain approval – but in this case, the Government is both the proponent and the regulator, with the exception of some EPBC Act matters. Again, this highlights the need for the assessment to be independent of the proponent and for the review of the assessment to be undertaken by appropriate experts who are not subject to direct or indirect influence by the proponent.

Appropriately detailed survey of direct effects would require a large amount of time and budget to conduct field surveys across the substantial impact zone and across at least one full year to cover all seasons, with considerable allowance for the fact that the study area has been and remains in drought. Very rarely are such assessments given the resources required to be thorough. This risks not detecting significant species simply because the consultants could not cover all of the site across all seasons and without significance limitations caused by drought that can suppress some species entirely such that the remain present as seeds or rootstock but won't be seen until the drought ends. Given that droughts can last for years, the conventional method to deal with that constraint is to use the 'presumed present' method. Species that might credibly occur in the study area based on known range and habitat requirements plus a buffer to allow for the fact that it may occur at least some distance outside that area, should be presumed present and assessed accordingly. The key difficulty with this is quantifying how many of that species might be present and if so, over what area. This becomes no more than variously educated guesswork. For a large public project such as this within conservation estate and a World Heritage Area, it is unreasonable to require that assessment be undertaken in a comparatively short time, especially during drought. To be as credible as is reasonable for a project of this nature, survey and analysis over a small number of years is appropriate given the effect of drought and its uncertain duration.

It would not be appropriate to limit the full environmental assessment to a predictive process based on mapping and identifying vegetation communities as a surrogate for which threatened flora and fauna or communities are or might be present and affected. Ecological community mapping can be a useful way to indicate which species might be present, but this presumes that there is very strong knowledge about both those species and their association with particular communities. This is not likely to be the case in this relatively remote study area. Identification of plant communities is a necessary part of the assessment but is only one part and should not be relied upon in place of properly funded flora and fauna surveys over all seasons, with additional allowance where drought is a factor and where replication of sampling is required for rigour i.e. where surveying one area on one occasion at one time of year will not produce sufficiently meaningful data.

Were the project to be assessed under the BC Act and the BAM, it could potentially use Expert Reports to fill gaps in the survey effort that is able to be deployed for a range of reasons, including drought. This method has been used by NSW Department of Planning & Environment for the very large-scale and complex environmental assessments associated with biocertification of urbanisation projects in western and south-western Sydney. In that project, access was not available to all of the land within the scope of the project, most of which is in private tenure, and persistent drought was also a constraint on the effectiveness of the surveys that were able to occur. The BAM requires that Expert Reports be prepared where survey effort was not able to comply with its specifications. Whilst access is not a constraint in the assessment of impacts arising from the higher dam wall, drought is an on-going constraint. Expert Reports could reasonably be used as part of the response to drought constraining the effectiveness of field surveys. These can only be prepared by Department-certified persons and are subject to the requirements of the BC Act and BAM. The use of accredited experts in this context would be more aligned with the IUCN advice than is the current method of environmental assessment.

Principle 4: Reasonable alternatives to the proposal must be identified and assessed with the aim of recommending the most sustainable option to decision-makers.

The different options should be clearly communicated to decision-makers, and those that are least damaging in relation to the site's Outstanding Universal Value should be highlighted, including in some cases the 'no project' option. Very often, economically viable and feasible alternatives can be found to development proposals that may be damaging to a World Heritage Site's Outstanding Universal Value. A detailed and early consideration of alternatives can also help to ensure that resources are not wasted in developing proposals that are incompatible with World Heritage status (for example extractive projects).

Response: I have indicated earlier that the full range of alternatives to this proposal do not appear to have been adequately explored by sufficiently expert personnel who are independent of the proponent or other vested interests. The process has largely been within government agencies and has so-far sidelined consideration of World Heritage and OUV, with consideration of biodiversity implications and offsetting costs left to this late stage of assessment.

Principle 5: Mitigation measures should be identified in line with the mitigation hierarchy, which requires first avoiding potential negative impacts and secondly reducing unavoidable residual impacts through mitigation measures.

The Environmental Assessment should outline how any minor residual negative impacts on Outstanding Universal Value that cannot be avoided will be mitigated and monitored through a budgeted Environmental Management Plan, indicating how the mitigation measures will be implemented, who will implement them within what timeframe, and what resources are secured for their implementation.

Response: Some of the values at risk from the proposal are not readily able to be protected by mitigation or monitoring plans, and there is a risk that reliance on such approaches produces a situation where effects are detected but are determined to be irreversible or are deemed able to be offset by dubious mechanisms such as declaring a new National Park elsewhere. Some of the challenge in meeting this Principle is in the likely very different interpretation of the term "minor residual negative impacts" given that this is not defined. Is the increased fragmentation of two populations of a threatened species such an impact or is it not minor?

Monitoring is useful to track a range of variables but reliance on monitoring to deal with impacts that the assessment was unable to determine due to excessive constraints on its scope, is unsound. Typical scenarios of that kind entail approvals of mines where monitoring the effects of groundwater drawdown on threatened biota are specified. But when the groundwater is contaminated or the aquiclude is cracked and the groundwater drains away, monitoring is not very useful – it isn't a mitigation measure or remedy – it just tells you that 'it went wrong' and as such, suggests that something should be done to fix the situation, if possible. Sometimes, there is no remedy for such failures.

Thus, it is very important that the assessment for this proposal and any government decisions regarding it, not rely on monitoring to fill critical knowledge gaps related to the effects of the proposal. Equally, mitigation in the form of ecological offsetting should be a tool of last resort and requires independent expert design and scrutiny. Some assets and values cannot be offset, and some threatened species cannot be translocated for a range of reasons. Offsetting is a legitimate mitigation measure in specific circumstances, but it is increasingly being used as a routine practice, rather than avoiding harm through alternative designs or by not proceeding with a particular project. A common and well-document consequence of 'offsetting by default' is the continued destruction and depletion of biodiversity values. This is especially evident in jurisdictions that allow any or almost any biodiversity values to be offset in some form (often not 'like for like') and that grant a range of exemptions from conventional offsetting obligations to projects that are deemed State Significant or similarly privileged. There is a risk of that occurring in this situation because the project is designed State Significant. For example, destruction of habitat for a Critically Endangered species for which there are no offset areas available elsewhere, could be allowed if the proponent (the NSW Government) decides that the offset obligations for this species cannot be met ordinarily, so can be 'met' extraordinarily by gazetting a new National Park or Nature Reserve over Crown land that was likely to ultimately become some sort of conservation estate anyway, even if there is little or no habitat for that species in those reserves. NSW biodiversity legislation is currently so loose in this regard, that for projects of privileged status, some offsetting obligations can be bypassed in some cases, and the proponent can simply fund research related to a threatened species (not necessarily the one or ones being harmed) and be deemed to satisfy an equivalent offset requirement. This amounts to a 'get out of gaol free card' for projects that cause significant harm but are unable to meet biodiversity offset requirements by normal means. This project has potential to be of that nature.

Principle 6: A separate chapter on World Heritage must be included in the Environmental Assessment.

This chapter should present clear conclusions to decision-makers on the proposal's potential impacts on a site's Outstanding Universal Value and should be reflected in the Executive Summary.

Response: The first edition of the SEARs does not comply with the Principle. However, the second edition does specify (on p24) that "The EIS must identify and describe the characteristics and values, including Outstanding Universal values, of any World Heritage property(s), and/or any National Heritage places that are likely to be impacted by all stages of the proposed development with appropriate reference to relevant management plans". It does not specify that a separate chapter on World Heritage be provided.

Principle 7: The assessment must be publicly disclosed and subject to thorough public consultation at different stages.

Consultation should take place at the scoping, draft Environmental Report, and monitoring report stages. All relevant stakeholders should be involved, including local communities, indigenous peoples, scientists, relevant government agencies, and non-governmental organizations. Feedback from consultation should be fully reflected and documented in the assessment.

Response: There does not appear to have been any public consultation in relation to the Preliminary Environmental Assessment. That document rightly specifies the regulatory need for a minimum of a 30-day exhibition period of the environmental assessment. As noted elsewhere, that would be insufficient time for most interested parties to properly review the document and provide a comprehensive response. I have not seen sufficient evidence of the overall project evaluation being sufficiently transparent, accountable, independent and rigorous. See also below.

Principle 8: An Environmental Management Plan must be proposed, implemented and independently audited.

The plan should detail operating, monitoring and restoration conditions in relation to the site's Outstanding Universal Value. The developer must set aside funds from the outset to cover the costs of independent auditing of the implementation of the Environmental Management Plan at regular intervals.

Response: Such a plan is yet to be prepared, however legislation passed last year specifies that the management plan would be made by Water NSW and as such is not independent of the proponent and its interests. I am unaware of any proposal for independent auditing of a future management plan.

Review of the Preliminary Environmental Assessment

As an example of flawed process, the Preliminary Environmental Assessment (PEA) was commissioned by Water NSW (a State corporation) which engaged consultants through an undisclosed tender and selection process that resulted in the appointment of a multinational firm that I had never previously encountered in >20 years of work in this field, and whose corporate background is apparently maritime engineering. Whilst the firm offers an environmental assessment service, the public cannot determine from its website or from the PEA, whether the required level of project-specific environmental expertise was available and applied in this case. There is no evidence that the firm engaged with relevant experts other than perhaps a subset of those within NSW Government agencies.

Whilst as a PEA, it is not intended to be definitive, it is intended to assist regulators and the public to understand the likely scope of environmental impacts and how they are proposed to be assessed. What is apparent, is that the PEA is not well written – a situation that suggests it may have been rushed such that adequate proofreading was not able to be conducted. The document has numerous errors, some in terms of text, some of a technical nature, such that it does not generate confidence that it was produced with sufficient expertise, budget and time to achieve a high quality outcome. Even if the firm did not have the skills, time or budget to ensure a sufficiently high quality product, Water NSW should have invested the time required to proofread the document to ensure that errors were corrected, and the level of writing proficiency was appropriate for a technical document of this standing, and that would be a key component in a larger assessment that will be subject to administrative, public, and potentially legal scrutiny within all levels of government, and by the World Heritage Commission and IUCN. DPIE should also have scrutinised the PEA and sent it back to Water NSW and its consultants for review until it was presented at a suitable standard. The fact that this did not occur suggests that DPIE did not have the resources to properly scrutinise it, or was perhaps under direction not to impede the PEA's processing, but to process it as quickly as possible, irrespective of its quality.

The PEA is largely intended to be a scoping report to advise DPIE (OEH) and the Commonwealth Department of Environment & Energy (DEE) about the scope of potential impacts so that those agencies can dictate the scope of the assessment. It is inherently somewhat superficial because of its preliminary nature. It does identify threatened species of flora and fauna and threatened ecological communities that could be affected by the proposal based on database records, digital maps, and a very small number of consultancy reports. I wouldn't expect it to do much more than this, though it needs to do this well. It considers effects up and downstream of the dam. However, even within the limits of its preliminary nature, it doesn't appear to have adequate regard to the effect of the higher dam on floodplain communities downstream, particularly those that evolved in the context of natural flood regimes. It dismisses this issue by indicating that the changed flood regime as a result of the higher dam could beneficial threatened ecological communities because it would reduce flood-vectoring of weeds. There is very little consideration that some threatened ecological communities and component species may be detrimentally affected in the medium to long term because of the additional change to flood regimes that a higher dam would cause.

The following are examples of technical errors that I readily detected in a brief review of the PEA:

Appendix B is entitled "NSW Threatened Flora and Fauna Species and Ecological Communities in the Proposed Impact Areas". The title suggests that it is only dealing with threatened ecological communities (TECs), but its first paragraph lists several broad vegetation types (Formations) that are not TECs in themselves but can contain vegetation communities that are associated with one or more TEC. In short, it muddles these issues and isn't clear what it is trying to present. This suggest a lack of the required expertise.

Table B-1 muddles consideration of relevant legally listed threatened species and ecological communities by providing a poorly compiled list of plant communities and "Associated threatened species/communities" from data in NPWS's 2003 "The Native Vegetation of the Warragamba Special Area". The list of plant communities is not filtered to reflect the potential scope of effects of the dam wall being raised and is instead a complete list of communities from the Special Area. As such, it is misleading, though harmlessly so. The PEA confusingly states "Threatened species include those protected under the TSC Act 1995 and EPBC Act 1999 as well as those classified as poorly known, rare, vulnerable or endangered under Briggs and Leigh (1995), *Rare or Threatened Australian Plants* (RoTAP)." This is incorrect– threatened species may be RoTAPs but many RoTAPs are not and are never likely to be threatened species. The sentence is actually a quote from the NPWS document that provides a list of threatened and RoTAP species, whereas the PEA should probably have only listed relevant threatened species, or at least clearly distinguished between them and RoTAP species that may have other conservation significance but are not currently listed as threatened in law. Table B-1 does not do this, meaning it is unclear to a reader which of the listed species is legally listed as threatened.

I note that it is appropriate for the PEA to consider non-threatened RoTAP species because these can and should be dealt with under the EP&A Act 'heads of consideration' because it is not confined to assessing effects on legally listed threatened biota, irrespective of the SEARs. The RoTAP program was defunded in 1995 and its data can be very outdated in terms of a species' status today. The PEA does not take account of that issue, and instead simply provides a long table of plant communities and threatened or RoTAP species, many of which are or may not be relevant to the environmental assessment of the project. This suggests that this aspect of the PEA was rushed and/or prepared by insufficiently experienced staff or at least not adequately reviewed by sufficiently skilled senior staff.

Some of the entries in Table B-1 are apparent 'cut and paste' errors and/or spelling mistakes. Both indicate that the authors do not have a botanical dictionary in their word processors – a factor that may indicate they are relatively inexperienced at botanical work or at least in preparing species lists with the correct spelling. It is also further evidence of the document being rushed and/or not subject to appropriate quality control.

Some of the entries in the Table do not follow standard nomenclature for serial abbreviations. For example, if the species *Persoonia bargoensis* is written in full, and another *Persoonia* species is written after it with no intervening mention of another genus starting with 'P', then the second *Persoonia* is written as *P. acerosa* to avoid redundant repetition of the full genus name. In some cases, this is not adhered to such that it would be difficult for a non-botanist to know which species are referred to in some cases, and I found it confusing enough to have to check further up the table to match abbreviations to the full species name.

Table B-2 seems to be an appropriate attempt to narrow the scope of RoTAP and threatened flora and fauna that are known from Warragamba Dam and upstream (though it does not define how far upstream and how this might relate to the zone of potential environmental effects from the project). It cites sources used to generate Table B-2 (only two consultancy reports from the early to mid 1990s) and the NSW Atlas of Wildlife (now commonly known as BioNet or BioNet Atlas). Importantly, in the third dot point listing sources, the 'Atlas' data is dated 2014, yet in the table, this is referenced as "OEH 2016". It is unclear whether the 'Atlas' data is from an unspecified time in 2014 or 2016. If the data is from 2014, this would pose a question as to why an outdated database search was used when it is important to use the most current information available, especially given how quickly such information can change?

Use of outdated data of this kind could readily have meant that the PEA did not include mention of threatened species previously unknown from the study area in 2014 but discovered by 2016, or of new occurrences of threatened species in the study area that might be significantly more at risk from the project. Indeed, during unrelated fieldwork for OEH, I discovered a new occurrence and range extension of the threatened shrub, *Pomaderris brunnea* near Tonalli Cove in an area where the entire population is within the zone of effects of the project, along with a new population and range extension of the threatened shrub, *Acacia clunies-rossiae*.

Setting aside the timeliness of the 'Atlas' database search, the PEA presents those records without questioning their accuracy. This database, especially in its current form, is known to contain a range of errors, and unless the record is substantiated by a specimen, observation-only records can be made by anyone, so may be incorrect identifications. Even specimen records are sometimes incorrectly identified or named under outdated taxonomy that means they appear in 'Atlas' under the wrong name. DPIE/OEH does apply a basic spatial filter to records such that if the species is not known to occur in the IBRA Subregion in which it has been claimed to occur, the record is flagged as potentially dubious and can be reviewed by staff, if available, or the person who lodged the record can be contacted for more information or evidence. The upshot here is that database records should not be taken at face value – they need to be scrutinised to determine if they are or were credible. The PEA doesn't do this. Whilst poor practice, in this case, it would likely be harmless because it means that the document will includes threatened species in its list of those that may be affected, even though some of those species may not actually occur in or near the zone of environmental effects – they could just be misidentifications or spatial errors. In a very small minority of cases, a threatened species may have been genuinely recorded in the area at risk from the project but may be accepted by relevant experts to be extinct in that locality. This does not mean it should not be considered, but it is appropriate to note what is known or considered likely about its current status at that site.

In presenting the data in Table B-2, the PEA does not distinguish between the scope of the three sources that it cites. For example, the two consultancy reports that are cited are not explained as to their physical and ecological scope. Did they only examine particular areas or particular species – perhaps only fauna, or only flora? The data in the Table suggests that both of those studies had limited scope in area and/or the type of species that were surveyed. The Mount King Ecological Surveys report seems to have been limited to fauna, as only fauna records appear from that source in Table B-2. Failure to explain the limits of those sources could be misleading, depending on how the data is interpreted. For example, the absence of records of threatened flora from one source could appear to indicate that those species were not found by that consultancy, when in fact that work was restricted to fauna surveys.

Table 5-2 of the PEA "Ecological Values that could be Impacted by Proposal Operation" lists the values and a description of the associated impact, divided into upstream, downstream, and aquatic threatened flora, fauna and communities. It partially mirrors information provided on p33 of the PEA but is a subset of that information. The entry for upstream threatened ecological communities and flora notes that the main concern is inundation of uncertain duration, though potentially "for a period of weeks", noting that the severity of effect depends on the relative tolerance of the affected biota. It should have been noted that the assessment is not of a single flood event under a worst case, but of potentially recurrent flood events over an indefinite time but effectively 'forever', and of an unknown duration and frequency (these factors can only be modelled from available data and predictions). The PEA claims, without explanation, that the vegetation values most at risk consist of three TECs and two plant species, with a third species mentioned in the paragraph below. It doesn't specify that one of the TECs is not at risk from inundation but from construction-related damage (though this is mentioned elsewhere in the document). It doesn't differentiate between the remaining two TECs, one of which is associated with dry environments, with most of what little remains of this community in the region occurring well outside natural riparian zones, suggesting that it is likely to be extremely *intolerant* of inundation. The other TEC is a riparian and floodplain community that could reasonably be expected to be more tolerant of inundation because some flooding is a natural occurrence in that environment.

Of the two species mentioned in the dot points, *Eucalyptus benthamii* is likely to be the most affected by inundation in terms of numbers of trees and the area and percentage of habitat, but it is a riparian and floodplain species, so would be expected to be relatively tolerant of and even favoured by some forms of inundation, with duration being the major concern along with loss of habitat caused by slumping of saturated soils. In contrast, the other species, *Hakea dohertyi*, is a shrub of dry habitats, often very dry shrubby woodlands. As such, it would be expected to be extremely poorly adapted to inundation, as this is not a natural part of its environment. The population at Tonalli Cove is noted by DPIE[iii] to be affected by the proposal. This occurrence is relatively close to Lake Burragorang but should be understood in the context of the pre-dam situation in which the species and that population came to occur.

A third species, the shrub, *Bossiaea oligosperma* is also listed in the context that "Impacts may also occur" to it, "however, known populations of this species in the Operation Study Area occur along ridges and outside of expected inundation zones." This is correct, but the same is true of *H. dohertyi* yet this isn't mentioned for that species. I am familiar with *B. oligosperma* because I have undertaken earlier work on the Yerranderie and Nattai/Allum populations for OEH/ DPIE. What is not disclosed in the PEA is that whilst most of the *B. oligosperma* population in the vicinity is above the maximum inundation level, the nearest eastern occurrences are apparently within the inundation zone, and their likely demise through inundation would increase the distance between the western (Tonalli Ridge) and more easterly (Nattai/Allum) occurrence, potentially worsening their degree of genetic separation. Most of the Nattai/Allum population reportedly occurs low on the hillslopes, and available information indicates that whilst above the 14 m additional dam wall inundation zone, it may be within the extended 17 m inundation zone. This species occurs in difficult to access terrain and there are likely to be occurrences downstream of the documented sightings such that it should be considered at additional risk from the proposal. The Yerranderie and Nattai/Allum occurrences of this species are very disjunct from its primary range in the Southern Tablelands and occur in different habitats such that they may prove to be genetically distinct and worthy of subtaxonomic rank i.e. they may be a new subspecies or variety. This species is highly likely to be intolerant of inundation because most occurrences of it are in dry habitats well removed from riparian or floodplain environments. The exception is part of the Nattai/Allum population which has been reported to occur in or near what could be short-duration flood-affected habitats, however this is yet to be verified due to difficulty accessing that site.

Of particular concern is that the Endangered shrub, *Solanum armourense* is shown in the PEA's map of threatened flora records to be within the inundation zone and is mentioned in the list of threatened species affected by the proposal on p33, yet it is not mentioned in Table 5-2. Whilst most records of this now extremely rare species occur on ridges or hill slopes where they reportedly colonise after fire or analogous disturbance, it is also known from sites that are in or near the flood zone. This may be because it is disturbance oriented, so potentially benefits from the 'destructive' effects of fast-flowing riverine floods by colonising habitat in which the vegetation has been removed, flattened or thinned, and where deposits of new alluvium are available.

I have assessed the conservation status of this species in earlier work for OEH/DPIE and recommended, along with others who have considered it, that it be listed as Critically Endangered. However, even with the $25M Saving Our Species funding, chronic under-resourcing of DPIE means that to the best of my knowledge, this recommendation has not been able to be actioned. It is concerning that the PEA does not give this species the same consideration as other threatened flora that it mentions as being at particular risk from the project. This is likely because the authors were not afforded the time or other resources to properly research this species (including gaining data from OEH staff). Whilst it is only a Preliminary Environmental Assessment such that its failings need not determine the content and quality of the final assessment (which is notably not being prepared by the same firm), its deficiencies are indicative of what seems to have been a rushed process undertaken by personnel who seem insufficiently familiar with the relevant issues to have done a better job in the short time provided.

Similarly, p33 of the PEA lists other threatened flora and fauna species and TECs that aren't all repeated in the later Tables. For example, the listed plant species on that page but not in Table 5-2 include *Gyrostemon thesioide*s, *Acacia clunies-rossiae*, *Phyllota humifusa* and *Epacris purpurascens* var. *purpurascens*. This difference may be simply because the authors only include the most likely and most significantly affected biota in the tables. To this extent, it is reasonable to not include *Phyllota humifusa* in Table 5-2 because the only record in the general study area is nowhere near the construction or inundation areas – it just happens to be in the vicinity. But that is not an adequate basis for not including some of these other species when full regard is given to their extent of occurrence (range) and habitat preferences, combined with the relatively low level of specialised survey effort within the zone of environmental effects.

The PEA relies far too heavily on database records when determining which biota are relevant and to what extent they might be affected. Significant use of database searches is reasonable in a preliminary assessment, but should have been addressed with a fulsome explanation of the limits arising from that method i.e. the weaknesses within datasets, the absence of some datasets, the low level of targeted survey for threatened species in the study area, specialised knowledge required to detect some threatened species, etc. I explore this further below.

The PEA treats the lists and maps of threatened species records from 'Atlas' as though this dataset is definitive. The authors have made some relatively definitive comments about which species are likely to be affected, without acknowledging the partiality of the data used to draw those conclusions. This is a common but serious flaw in many ecological assessments where the authors have failed to understand and demonstrate a critical understanding of how limited database records can be. The fact that a species occurs in a database does not mean it was correctly identified or is correctly located, but more importantly, *the absence of records of a species does not mean that the species does not or could not occur in that area*. The PEA seems to fall for the assumption that database records tell us what occurs where, and by default, what doesn't occur there. But many areas are inadequately surveyed for threatened species and not all records are in commonly used databases (the PEA only uses 'Atlas', which contains *some* records from other databases, but does not include *several* other data sources). Some large datasets such as records of Sydney University's herbarium are not databased at all but are likely to contain threatened flora records of considerable importance and that are absence from other sources. Even use of all available database records will only give a partial indication of threatened species presence and must only be used in that context.

The PEA also uses DEE's Protected Matters Search Tool (PMST) as is required for assessments that could involve entities or areas listed under the EPBC Act. The PEA appropriately notes that this Tool uses some database information but combines it with coarse models to predict which entities might occur in the study area. The PMST is poorly regarded in the ecological industry because it routinely generates sometimes-absurd predictions of threatened species and communities well outside their known range and habitat. For example, it predicts the potential occurrence of the TEC Natural Temperate Grasslands of the South Eastern Highlands Bioregion even though the search area (upstream of the dam, within the inundation area) does not include any former or current habitat for that TEC. When questioned about such outputs, DEE staff usually respond that they are aware of the problem but lack the resources to remedy it. Nonetheless, it is better that the Tool over-predicts rather than under-predicts the potential presence of threatened biota. In this case, the Tool predicted the occurrence of *Pomaderris brunnea*, even though there were no records of it in the study area within 'Atlas' at that time. I have since found this species at Tonalli Cove and had the sighting verified by the NSW Herbarium, with a record then lodged in 'Atlas'. The PEA does seem appropriately aware of the problems with the Tool's output, and primarily relies on 'Atlas' data because it is not predictive, but as a result, the PEA missed the potential for *P. brunnea* to occur in the study (based on habitat) and to be significantly affected by the proposal, as it is now known to be. The PEA generated a similar outcome for *Acacia clunies-rossiae* based only on 'Atlas' data from that time, concluding that whilst present in the study area, it was not significantly at risk. I have since found that species at Tonalli Cove in a site where the population would be inundated. As an example of scientifically baseless inconsistency between NSW BC Act and Commonwealth EPBC Act lists and statuses of threatened species, *Acacia clunies-rossiae* is not dealt with by the PMST because it is not listed under the EPBC Act, even though it is listed as Vulnerable in NSW law and only occurs in NSW. There is a process to resolve such discrepancies, but it too is severely underfunded relative to the workload, and funding for that work in NSW expired last financial year, with most of the staff or contractors who were working on it having since left DPIE.

A further problem in the PEA is that in listing "Downstream TECs/EEs and threatened flora species" it only lists Threatened Ecological Communities, failing to list a very large number of threatened plant species known to occur in those TECs within the zone that would be affected by the altered flood regime. From my limited review, I believe this problem is throughout the PEA, not just a discrepancy between its sections.

The PEA determines that Species Impact Statements (SIS) will be required for listed threatened biota (in NSW law) that are assessed as likely to experience a 'significant' impact from the proposal. Preparation of a SIS is meant to be undertaken by an accredited expert in the relevant species or community as determined by OEH/DPIE, but this is not mentioned. As I understand it, the environmental assessment that is currently underway is not being undertaken by departmentally certified species experts, nor is it necessarily occurring in the form of one or more SISs. This may be simply because the current assessment is intended to determine whether SISs are required, for which entities and why.

The PEA says that the required Environmental Impact Assessment for the project must be publicly exhibited for at least 30 days. Were the exhibition period limited to 30 days, this would be an unreasonably short time to review and comment on what should be a large and complex document that requires specialist expertise to adequate scrutinise it in all regards.

Evaluation of the project's environmental assessment against IUCN principles:

The proposal is undergoing a statutory environmental assessment, the functional (as opposed to theoretical) scope and limitations of which are unknown to the public. The original and revised SEARs for the project are public but were determined by a NSW Government agency, and apparently without the substantive input of independent experts. This creates the perception of a potential conflict of interest and may represent a deficient response given the increasingly limited ecological expertise within the public service. Vital knowledge appears not to have been included in determining the terms of the environmental assessment. It is also unclear whether the firm appointed to comply with the SEARs as part of the environmental assessment has been given sufficient time and funds to complete the work thoroughly. The NSW Government's decision to assess the project under the superseded TSC Act and FBA protocol is disappointing given that it has enacted a more comprehensive law and an expanded assessment protocol (the BAM) that has some greater affinity with IUCN principles (within limits).

The environmental assessment is occurring late in the decision-making process and after the decision to favour raising the dam wall has been made by the NSW Government based on earlier, very limited reviews that are inconsistent with IUCN guidelines for projects that effect natural World Heritage estate. Earlier investigations of options for flood mitigation precede substantive environmental assessment and are predominantly engineering and narrow-scope economic comparisons of a small number of options determined primarily or exclusively by NSW Government agencies, without external expert environmental advice. Ecological effects and impacts on OUV within the GBMWHA are variously not considered or only afforded token reference and dismissed as something to be quantified in a later assessment.

It is clear that the choice of project was made in a paradigm and process in which effects on ecological and OUV considerations are not considered to be of a potential magnitude or nature as might warrant reconsideration of the project and alternatives. Instead, the project was selected for other reasons, with ecological and World Heritage values seemingly considered a side-issue that can be managed through a conventional assessment process that could not possibly produce findings that might result in this project not proceeding. In other words, the choice of project, even though it is being subject to a belated environmental assessment, appears to have already been made by Government such that the assessment is simply a compliance matter – some 'paperwork' that needs to be completed before the final details can be agreed, then final approvals granted. Clearly, such a situation is profoundly at odds with best practice project evaluation and environmental assessment, and as such, is inconsistent with the IUCN advice.

Failure to consider potential biodiversity offsetting feasibility and costs early in the process is arguably incompetent and may further indicate a bias in the decision-making process. At the very least, this failure is inconsistent with economic due diligence, as it exposes the State to potentially enormous costs that were not considered in critical cost/benefit analyses.

The earlier investigations of flood mitigation alternatives assume, without justification, continued urban expansion out to 2040 in or adjacent to at-risk terrain. They also fail to disclose or appropriately manage financial conflicts of interest within the NSW Government and at least some of the relevant Local Governments in relation to revenue that would be generated by that urbanisation. Whilst Local and State Government do not determine levels of immigration (currently the primary driver of population growth in Australia), both have capacity to redirect growth pressures away from flood-sensitive areas and adjacent areas where growth may impede egress during flooding. Yet this option is not addressed. Instead, the evaluation process should have excluded further urban expansion in at-risk areas because it is clearly the more direct route to reducing risk to property and human lives. By assuming further urban growth in and adjoining those areas, the evaluation process is fundamentally flawed and prejudicial. It highlights the problem of the NSW Government being the proponent; having an undeclared financial and arguably political vested interest; being the assessing agency; and being the determining authority (with the exception of specific EPBC Act matters that aren't delegated to the State). Such a situation requires as much external expertise and appropriately objective decision-making as is feasible to avoid a typical 'fox guarding the hen house' scenario.

The current level of environmental assessment would not comply with IUCN's notion of "rigorous" and components were not undertaken "early on in the decision-making process". Improvements to the level of rigour would include ensuring that unbiased and fulsome consideration is given to alternatives to the project, and that these are fully costed in relation to all economic, ecological and social considerations to reveal the least harmful option, which may include only undertaking works outside the World Heritage Area; that the process by which consultants undertaking the assessment were appointed and briefed be made public; that the timeframe, scope of works, and budget for the consultancy work be made public; and these should be assessed against law and policy to ensure consistency and feasibility.

At present, there is reason to believe that the consultants have not been given sufficient scope of works (particularly in relation to World Heritage matters), time or funds to undertake the assessment with the required level of rigour. IUCN advises that the State Party (the jurisdiction responsible for decision-making in relation to the project assessment) should ordinarily submit the Terms of Reference, Scoping Reports and Draft Environment Reports to the IUCN for review. In this instance, the State Party has not complied with this advice. This should be rectified, and because the process is already advanced, as a minimum, the draft Reports should be provided to IUCN for review.

Expertise that is within key State and Commonwealth agencies should be engaged to ensure that the consultants have a scope of works, timeframe, budget, methods and technologies suitable for them to complete an internationally credible assessment in accordance with best practice. Specialist expertise may be required to assist the consultants, or as a minimum, to review relevant sections of the assessment to ensure the document is consistent with that expert advice.

Consultation with expertise should extend to engagement with indigenous people in relation to cultural heritage values and how those values interact with environmental values such as landscape, ecological communities and species.

All aspects of the assessment process, its review, and any post-approval monitoring should be transparent and public to the extent that this does not conflict with any need to protect cultural or ecological values from inappropriate disclosure.

Any post-approval monitoring and mitigation actions must be fully and enduringly funded by the proponent and be consistent with the best available scientific or other independent expert advice.

A specific component of the assessment, at least one substantial chapter, should address the relevant effects on the OUV of the GBMWHA in terms of values, integrity and management.

The assessment should be consistent with the NSW Biodiversity Conservation Act's hierarchy of Avoidance, Mitigation, then Offsetting of impacts on biodiversity. This is consistent with the IUCN advice to the extent that once mitigation measures are exhausted, offsetting of losses and harm could be regarded as a second tier of mitigation. The EPBC Act takes a similar approach but a key question is whether either the NSW Government or the seemingly disinterested Commonwealth Government assessing agencies will review the environmental assessment in accordance with this hierarchy? This is particularly relevant because the nature of the project is such that there is very limited scope for avoidance and mitigation of harms, so most of the focus goes to attempting to offset those harms, which in some cases is impossible, and in others, is extremely costly.

Note that because the proponent, the NSW Government, is also a key statutory decision-maker regarding the project and it is primarily in control of the assessment process and the consultancy firm's work, there is a need for an independent review of the environmental assessment to be commissioned. As a matter of proper process, the assessment should be reviewed by the World Heritage Programme of the IUCN, given Australia's World Heritage Convention obligations. Regardless of a review by IUCN, a truly independent review of the environmental assessment is necessary for probity and credibility and may significantly improve the rigour of and outcomes arising from the assessment.

Conclusion

The inconsistency between the major infrastructure proposal of raising the Warragamba Dam wall by 14 or 17 metres and the OUV of the GBMWHA appears not to have been considered at all in the Hawkesbury-Nepean Valley Flood Management Taskforce's Flood Strategy, and earlier Flood Management Reviews. Those processes and documents appear to make policy decisions in the substantive absence of environmental considerations and have driven the NSW Government's decision to propose the higher dam wall for flood mitigation. The cost benefit analysis only partially considered economic effects, and when discussing "damages" caused by flooding, only considers effects on infrastructure, not natural values. The exception is that the "significant environmental impacts" associated with potential dredging of the river were deemed one reason not to give it further consideration, yet similar regard was not given to the effects of raising the dam wall (Infrastructure NSW, 2016:27-29). Environmental considerations are effectively sidelined and regarded as matters to be dealt with in an assessment process determined by, funded by, and overseen by the proponent. Contrary to best practice and IUCN advice, the full range of alternatives to a higher dam wall have not been given proper consideration. Instead, a policy decision has been made and then a relatively generic assessment process established around it. This means that the full set of economic, ecological and social options, costs and effects has not been considered despite the process now being quite advanced, with the environmental assessment due in 2020.

It is noteworthy that the Flood Management Taskforce was independently chaired but that representatives consist only of NSW Government agencies. The Stakeholder Reference Panel was established in part to engage with local Councils that have an undisclosed conflict of interest in that they can generate large property rate increases when land is liberated from flooding constraints then rezoned for more intensive and economically valuable uses. Some Councils also have direct conflicts of interest as potential developers or vendors of land that they own and that would increase in value under some flood mitigation scenarios.

The evaluation and policy-making process includes an unquestioned assumption of increased population growth and urbanisation in areas at risk of flooding or that could impede egress from flood-affected areas. Whilst the NSW Government has no control over the Federal Government's determination of immigration levels, it has direct capacity to redirect population pressures away from areas at risk of flooding under current and forecast scenarios. This has given rise to public suspicion that the policy preference for raising Warragamba Dam is only partially related to protecting existing residents from severe floods and is instead substantially linked to generating very large revenues for the State and its benefactors from releasing currently flood-threatened lands for urbanisation or other intensive uses, as referenced on page three of the Strategy. As such, the overall evaluation process appears profoundly compromised, even before the environmental assessment was commissioned.

Ideally, to comply with best practice and to restore credibility to the process, the current environmental assessment should be placed on hold and all flood mitigation options should be fully examined by genuinely independent expertise in a transparent process in which any vested interests are disclosed. This process should include removal of the assumption of increased urban growth in flood-sensitive areas, as this is a simple mitigation measure over which the NSW Government has complete control, and that would reduce the intensity and extent of flood risk.

The PEA is technically weak, poorly written in several sections, and appears to have been rushed, with inadequate quality control.

The current environmental assessment is being undertaken by a consultancy appointed by an agency of the proponent and it is unclear whether that assessment has been granted sufficient scope and resources to produce a competent and thorough product. There does not appear to have been any independent expert contribution to the design of that assessment and its parameters. All indications are that the NSW Government intends to continue with assessing its preferred project using its own agencies with the exception of some external contributions from consultants that it appoints. There is no evidence of the assessment process being consistent with the formal advice of IUCN (2013) or having any significant regard to World Heritage values. To date, the process appears to assume that Government will approve its own project, and that environmental assessment is just a formality to document effects and perhaps mitigate or offset some of these.

Declaration of Interest

This submission was commissioned by the Colong Foundation and I received a fee for its production. Under that arrangement, I was not instructed as to any limitations on the nature or substance of my findings, and I was free to report as I saw fit. The only limitation of that arrangement is the amount of time available for preparation of the document, based on when submissions close, and with regard to the modest funds that the Foundation allocated for the report's preparation. I am not and have never been a member of the Colong Foundation.

I disclose that I am currently accredited by DPIE as an Expert for four terrestrial plant species (with applications pending for many more) and that I am also recognised by that agency as a 'Threatened Species Expert' for numerous plant species in the SOS database. I am also recognised as an expert in relation to several Threatened Ecological Communities. As such, I could potentially be engaged to assist with some specialised or more general aspects of the project's environmental assessment and/or its review. The potential for me to gain financially from such prospective employment has not influenced my recommendations in this document, and I believe my recommendations to be consistent with the independent advice of the IUCN. Any such engagement would be a matter for agencies over which I have no influence and would be subject to standard procedures for the engagement of consultants. I also note that I have worked in parts of the study area that would be affected by the proposed extension of the dam wall, and that this relates to surveys and monitoring of threatened plant species commission by OEH/DPIE. I do not have any current contracts to undertaken work in those areas.

I do not have any conflict of interest in relation to property or other assets that occur within the Hawkesbury-Nepean floodplain.

The opinions expressed in this document are my own unless cited otherwise.

Endnotes

[i] https://www.iucn.org/sites/dev/files/import/downloads/iucn_advice_note_environmental_assessment_18_11_13_iucn_template.pdf

[ii] Note that the lists of threatened biotas and their status under the BC and EPBC Acts are constrained in their accuracy by chronic underfunding of processes that are necessary to determine which biota warrant listing as threatened and at what level. Irrespective of climate change and its implications there are highly likely to be substantial numbers of poorly known biota that would warrant listing as threatened were there the resources available to do so. This is partially evidenced by trends in the addition of biota to biodiversity protection laws based not on novel threats, but on well-known and often long-term threats. Conversely, some biota listed as threatened are known to either not warrant listing at all, or to warrant 'downlisting', whilst others warrant 'uplisting' to higher threat levels, but under-resourcing frequently means that there is insufficient data available to verify this, or simply no personnel to do the required work. Thus, assessment of a proposal's effects on legally listed threatened biota will be inherently incomplete and should have wider regard to biota for which there is reasonable grounds to suspect that it may be threatened but simply not yet listed as such. The latter is feasible under the NSW EP&A Act, whereas biodiversity-specific laws only consider entities listed as threatened.

[iii] https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10388