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Major Projects Team
Warragamba Dam Raising Proposal
Department of Planning, Industry and Environment
Locked Bag 5022
Parramatta NSW 2124

Dear Sir/Madam,

Objection to the proposed raising of the Warragamba Dam wall (SSI-8441)

How the dam wall raising proposal affects me

As the Executive Director of the Colong Foundation for Wilderness (now ret.) I spent thirty-five years enjoying and seeking better protection for the southern Blue Mountains wilderness, national parks and reserves. Some of the most rewarding times in my life have been enjoyed on the lower Coxs and Kowmung Rivers. These rivers are always crossed on route to the Blue Breaks, the Gangerang Range and the Nattai, the first wilderness declared in 1991 under the *Wilderness Act, 1987*. Crossing these rivers is always a high point on trips through an area that many consider some of the best bushwalking country in Australia.

In 1987 the Warragamba dam wall was raised by five metres. An Environmental Impact Statement (EIS) was then prepared in 1994 for the proposed raising of the Warragamba Dam wall for flood mitigation purposes. In August 1995 this proposal was rejected, and work began in 1999 on an auxiliary spillway to safeguard the dam without increasing storage capacity of the dam.

Now a second proposal to raise the Warragamba Dam wall is on exhibition. It too has the potential to cause a significant environmental impact on the southern Blue Mountains parks. The proposal troubles me due to its adverse impacts on the upstream environment and the downstream community.

This submission will demonstrate that the contingent outcomes of this proposal are damage to World Heritage listed wilderness in the southern Blue Mountains and further inappropriate urban expansion on the Hawkesbury-Nepean floodplain. These are highly adverse outcomes associated with this proposal more than cancel out any potential benefit associated with its downstream flood mitigation capability.

This submission will explain how the environmental impact statement for the proposed Warragamba dam wall raising has significantly overstated the benefits and understated the costs of this proposal. I will explain how the EIS report has misled most readers by presenting factual data in a distorted narrative.

I object to the raising Warragamba Dam wall because the proposal:

- as a flood mitigation strategy because it is only a half-measure and better alternatives were not adequately investigated in the EIS report;
- fails to adequately consider other measures required for flood safety;
- would deliver an effective zero or negative net flood risk mitigation outcome to the community, once floodplain development is factored into considerations of this proposal;
- would create a false sense of flood security;
- would cause significant wilderness impacts and the EIS failed to adequately describe and assess these impacts;
- would impose a third wave of cultural dispossession on the Gundungarra people and the degree of this dispossession has been understated in the EIS;
- is presented in the EIS in a way that significantly understates its natural heritage values; and
- proposes inadequate compensation for the great harm caused to natural heritage values because most of the upstream damage area is omitted from impact assessment in the EIS.

When a fair, true accurate assessment of costs and benefits are determined for the proposed raising of the Warragamba dam wall, it is clear that this proposal does not benefit NSW and should not proceed.

Addressing these points of objection in seriatim

1. The proposal is a half measure

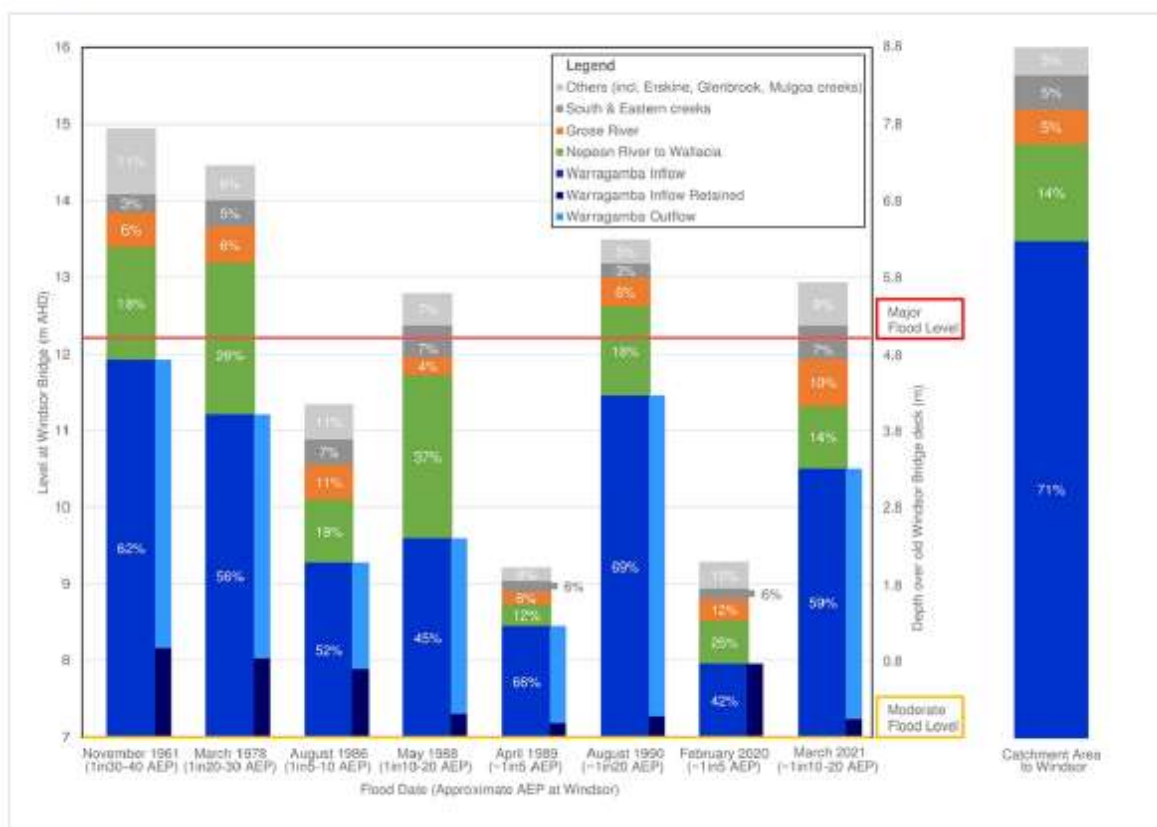
Raising the Warragamba dam wall would not control floods arising from other major rivers affecting the Hawkesbury-Nepean floodplain than the Warragamba River. Almost half of the floodwaters, about 45% of floods, arise outside the Warragamba Dam catchment from the Cordeaux, Cataract, Avon, Nepean, Grose, Macdonald and Colo Rivers, as well as from South Creek.

Even if the dam wall were raised, flows from other catchments shall continue to cause significant flooding events on the Hawkesbury-Nepean floodplain. Since the dam's construction in 1960, the contribution of the Warragamba catchment to major flooding events has ranged from 73% to 42% (NSW SES 2015, page 13).

The EIS claims that ‘The large Warragamba Dam catchment historically contributes up to 70 percent of flows during flooding in the Hawkesbury-Nepean’ (see Figure 2 in the executive summary). This claim is misleading as it refers to **inflows** to the dam. Only outflows from the existing dam impact on flooding downstream, so the reference to 70 percent of flows during flooding is misleading.

The EIS narrative for Figure 2 should instead state that **outflows** from Warragamba Dam to have, on average, contributed slightly less than half of downstream floods (i.e. the light blue bars in Figure 2). In other words, providing additional flood mitigation by temporarily storing additional flood water behind Warragamba Dam over the World Heritage Area can only address half the floods. So, the proposed raising the dam wall can only be a half-measure.

Figure 2. Relative contribution of different river catchments in a range of floods in the Hawkesbury-Nepean Valley



Only the light blue bars showing Warragamba dam's outflows to downstream floods are relevant to the analysis of relative contributions from catchments (inflow-retained waters).

Further, the Colo River and the Macdonald River that join the Hawkesbury River just below the Sackville Gorge influence flood behaviour upstream. The Colo River during flood injects a large flow into the Hawkesbury River at Lower Portland. These flood inflows cause backup flooding along the Hawkesbury River towards Sackville and slow the drainage of any upstream floodwaters from the primary floodplain around Richmond and Windsor. In these circumstances floods coming down the Macdonald-Colo rivers act as a plug in the Sackville Gorge increasing upstream flooding (NSW SES 2015, page 19). This “plug in the bathtub of the floodplain

effect” is not addressed by raising the proposed raising of the Warragamba dam wall which can only control one of the eight “taps” flowing onto this floodplain “tub”.

Further the proposed dam wall raising design cannot mitigate large floods over a 1:250 year occurrence.

Whether this proposal is built or not, the flood behaviours described above require other flood management techniques to be adequately resourced to keep people safe.

The EIS does not properly explain to decision makers that alternative and additional flood management techniques will be required, such as elevated escape routes.

2. The Environmental Assessment fails to adequately consider other measures or alternatives required for flood safety

The full supply level could be lowered in Warragamba Dam wall to use part of the dam’s existing capacity for flood mitigation. Water security can be retained when this measure is combined with augmentation of water supply by additional water reuse and stand-by desalination capacity. This modest mitigation measure should be applied in conjunction with floodplain management where properties always are risk of nuisance flooding are purchased or insured by the NSW Government and flood escape routes enhanced for existing urban development on the floodplain.

For example, the full supply level (FSL) could be made ‘flexible’ within a modest range and lowered during wet periods, such as during La Niña conditions. The dam storage water level would be lowered when a flood event was looming, providing a mitigation benefit, with little risk to water security.

An augmented desalination reuse plant could be on when required to fill the supply security gap and recoup the water security lost by dropping the dam FSL at a marginal extra cost above that of the plant standing idle (Andrea Turner, et.al., 2016).

In addition, the flood planning level should be raised to 1:250 to prevent new development on the floodplain, in recognition of that fact that the Hawkesbury-Nepean floodplain is unsuitable for urban development.

The above measures, when combined with an on-going flood awareness campaign for the community, elevated escape routes and adequate funding of NSW State Emergency Services would protect life and property more effectively than the planned mitigation dam and floodplain development.

Such an integrated water management approach would be delivered at less cost than raising the existing dam wall by 14 metres because it would more efficiently utilise the existing water resource infrastructure.

3. The net mitigation of flood risk to the community from dam wall raising either negative or zero

At best, the Warragamba proposal has a flood mitigation outcome of zero. The proposed raising of the Warragamba dam wall does not eliminate dam outflows from flood events. The reduction to existing property damage will be much less than predicted because, as noted in point 1, outflows from Warragamba Dam have, on average, contributed are slightly less than half of downstream floods.

The NSW Government has two poor urban planning choices associated with this mitigation dam proposal. It can either continue with its proposal to place more people at risk by retaining the existing 1:100 year floodplain development limit as intended, or, it can raise the flood limit to, for example, a 1:250 year flood return frequency.

If the former case, the NSW Government intends to build housing for 134,000 people on the floodplain (Hawkesbury-Nepean Floodplain Management Steering Committee, 2007). Under that contingency any reduction in flood risk to the floodplain community from the proposed billion dollar dam wall raising project will be cancelled by the planned placement of more than twice as many people at risk on the floodplain.

Also, the addition 134,000 people will not be able to escape future floods without much greater investment in high-elevation flood evacuation roads that the NSW has no budget for and that property developers have no intention of funding.

If on the other hand, if the flood risk limit is raised to a 1:250 year flood return frequency, then further floodplain development would be prohibited, defeating the claimed urban development purpose of the dam (and greatly reducing the claimed damage reduction benefits from the wall raising). In this later scenario, money currently earmarked for the dam proposal can be better invested into high level escape roads and other flood management techniques as described in point 2. For existing floodplain residents there are better, cheaper flood management solutions, such as government purchase of low-lying properties and flood insurance schemes.

4. Creates a false sense of flood security

Like this Warragamba Dam proposal, the flood mitigation afforded by Queensland's Wivenhoe Dam regulates about 50% of flood flows in the Brisbane River. From the 1980's the community on the Brisbane River floodplain developed a false sense of security due the Wivenhoe Dam flood mitigation capacity. Urban development expanded over that river's floodplain and in 2011 a major flood caused hundreds of millions in damages to urban growth areas.

The similar false sense of security will be created if mitigation is provided by Warragamba Dam and subsequent urban development of the floodplain occurs. Then as escape routes are likely to remain inadequate under significant population growth. More deaths and flood damages are likely than if further floodplain

development is prevented and the existing dam is retained but with different operating rules to utilise some of its capacity for flood mitigation.

5. Ignores wilderness impacts

The dam raising proposal will damage the Greater Blue Mountains World Heritage Area, the birthplace of wilderness conservation in Australia, that has the state's most protected national parks and reserves. Myles Dunphy, father of large national park conservation, developed his conservation ideas in the Blue Mountains. His son, Milo, then established his vision for large national parks across NSW and Australia.

In terms of government funding and effort expended by National Parks rangers, the southern Blue Mountains is almost certainly the best managed and protected wilderness in Australia. Extra resources are a key benefit of Special Area catchment management overlain on reserve management for the southern half of the Greater Blue Mountains World Heritage Area.

Layers of legislation protect the southern Blue Mountains environment. If approved, this framework of law will be demonstrated as unable to stop the environmental damage caused by this proposal. The heritage conservation efforts of generations of Australians to protect the southern Blue Mountains will be desecrated. If we fail to protect the southern Blue Mountains the most protected area in NSW from this proposal, then nowhere in Australia will nature or national parks be safe from damaging development. The lessons of mining limestone at Colong Caves, and flooding the Franklin River and the loss of Lake Pedder in Tasmania will have to be relearnt to our great cost.

The Kanangra-Boyd wilderness is the second largest wilderness in NSW, and yet the EIS executive summary for this proposal does not mention wilderness, not once. The EIS analysis of wilderness values and the environmental impact assessment of harm to it are facile and incorrect, considering only whether approval to harm wilderness requires Ministerial approval. As the EIS reaches a negative conclusion to this question, further wilderness impact analysis is considered unnecessary.

Wilderness is considered by the community to be the most protected land category in NSW, sitting within national parks and nature reserves as another layer of protection. The EIS authors should have undertaken a wilderness impact analysis, for example, an assessment of disturbance on wilderness remoteness and naturalness values. Damage to the ecological integrity of wilderness should have been assessed by estimating potential weed incursion, stream sedimentation and soil loss beside streams likely to be inundated.

This dismissal of a wilderness that conservationists fought hard for eight decades to protect makes the environmental impact statement deficient. It ignores wilderness heritage value of the southern Blue Mountains enshrined in law, an area which is probably the best-loved bushwalking area in NSW. It also ignores the impacts of 65 kilometres of wild streams, including impacts on the Kowmung, a designated wild river under the National Parks and Wildlife Act, 1974.

The joy experienced when fording these streams that will become despair over what was once well a managed World Heritage property. Yet the EIS does not even bother to consider its cherished values that are protected by statute.

6. A third wave of dispossession for the Gundungarra people

By the end of the 19th century and start of the 20th, many Gundungarra families from the Burragorang that were dispossessed of their ancestral homes had eventually found refuge on the headwaters of the Kedumba River in The Gully, Katoomba. The flooding of the Burragorang Valley completed the first cycle of dispossession from land, traditional economies and ceremony. The Gully was then colonised with its own artificial lake by damming part of the Kedumba Creek for a swimming pool. A Catalina aircraft was then installed on this artificial lake, and other amusements followed. In 1957 a motor vehicle racetrack was built and its construction forced a second dispossession on the Gundungarra.

Now, the proposed dam wall raising will not just flood specific sites but ruin Gundungarra dreaming trails and stories. Only about a quarter of the impact area was assessed for Aboriginal Cultural Heritage, so the number of sites impacts would be far more than those identified. An unknown number of cultural heritage sites, well over the 1541 sites identified, would be inundated by the Dam proposal.

The Aboriginal Cultural Heritage Assessment Report has been severely and repeatedly criticised by both the Australian Department of Environment and the International Council on Monuments and Sites (ICOMOS) for not appropriately assessing cultural heritage and conducting meaningful consultation with Gundungarra community members.

While some citizens may attempt to excuse past dispossession as actions of a different age, raising the Warragamba Dam wall would dispossess the Gundungarra of their culture and stories for a third time. Such a decision, when taken in a context of international censure, is disrespectful and unfair. The only acceptable course of action is to prevent this major cultural dispossession and not raise the Warragamba dam wall.

7. Natural heritage values are understated in the EIS

The damage to upstream national parks and state conservation areas was greatly underestimated in the environmental impact statement due to two factors:

- Inadequate flora and fauna field work that is incapable of determining the full extent of biodiversity values impacted as, for example, the threatened species surveys did not meet minimum area guidelines; and
- Under estimation the area damaged by upstream flooding due to the proposed raised dam wall, as will be explained in **Point 8**, page 10.

The EIS omits the areas most affected by upstream inundation for flood mitigation, those nearest the full supply level, and the significant future damage to these important wild places is passed off as attributable to the existing dam. This includes the environmental impacts to the Kowmung, protected as a wild river for its pristine condition under the *National Parks and Wildlife Act 1974*. Impacts to the Kowmung River are not assessed in the EIS because these impacts are inside the flood impact area of the existing dam. How floods in the “likely inundation” between 2.78m and 10.3m level above FSL do not impact on Kowmung River is not explained.

This excluded area between the FSL and 2.78m flood level includes healthy valley floor woodlands on Permian sediments that are proportionately small (<0.2% of the World Heritage Area in extent), but actually protect over 50% of habitat for most threatened woodland fauna species of the World Heritage Area. Several threatened species are almost entirely restricted in habitat to the immediate surrounds of the current dam Full Supply Level include Brown Treecreeper, Speckled Warbler, Hooded Robin, Regent Honeyeater, Diamond Firetail and the last wild population of Emu in Greater Sydney.

The EIS denies impacts to the last viable remnant of two threatened eucalypt species restricted to the valley floor - *Eucalyptus benthamii* (Vulnerable NSW & Nationally) and *Eucalyptus mollucana* (NGO letter to World Heritage Centre, 2017). As will be described in point 8 of this submission, the new dam’s operational rules may allow floods stand over these woodlands for weeks, and not days or hours as the EIS states.

As already mentioned, no wilderness impact analysis was attempted in the EIS.

Just three and a half hours were spent surveying for koalas and a day surveying for platypus across 65 kilometres of watercourse that will be intermittently inundated by floodwaters from the raised dam wall.

The wildlife expert reports required when wildlife surveys are lacking are absent from the EIS report.

As a result of flora and fauna surveys being deficient, the impacts on wildlife presented in the EIS are far less than what should be done in a reasonable expert assessment of these important values in wilderness quality national parks and reserves of a World Heritage listed property.

Further, the relative value of unburnt habitats, such as for the Regent Honeyeater beside the Wollondilly River, has become much greater since the 2019-2020 wildfires. This foraging and breeding habitat in the Burratorang Valley represents an irreplaceable refuge for this critically endangered, nomadic bird. This habitat will be inundated more often and for longer but the importance of this impact is understated in the EIS because it is much reduced by fire elsewhere and the area between FSL and 2.78m above it hasn’t been much impacted by the existing dam.

The proposal could cause the extinction of the Regent Honeyeater, but there were no post fire wildlife surveys to describe the relative changes in importance to its

remaining habitat and other environmental changes arising from 81% of the World Heritage Area being burnt.

8. Inadequate compensation by omitting most of the upstream areas flooded

This section is the crux of this submission. It examines how the EIS report has underestimated impact area.

Based on WaterNSW published flood levels, an estimated 65 kilometres of wilderness rivers, up to 4,700 hectares of Blue Mountains National Parks and reserves, 1,300 hectares of which is within the Greater Blue Mountains World Heritage Area, would be inundated if the dam wall raising proposal were built. I believe these areas will be impacted by temporary flood inundation from this proposal.

The flawed EIS analysis evaluates only about a third of the area damaged by upstream inundation, or just 1,400 hectares.

The EIS does not examine the damaging effects on the upstream environment caused by the application of new flood mitigation operation rules for the raised dam.

The EIS uses an erroneous argument to remove areas flooded by the existing dam from its consideration of impact for the proposed elevated dam wall. In addition, the area inundated by a flood storage from 10.3 to 14 metres above FSL is removed from EIS impact assessment. I believe the EIS analysis omits up to 3,300 hectares of the upstream flood inundation area impacted by the proposal.

8a. Land from FSL to 2.78 metres above FSL should be included in calculation of biodiversity offset

The biodiversity offset compensation package omits areas affected by floods below 2.78 metres but above existing dam's Full Supply Level (FSL or 119.5mAHD) (EIS offset report p15) because this area is subjected to (short term) flood inundation from the existing dam. This area currently supports rare box-gum woodlands that are home to the Regent Honeyeater. These woodlands are currently in good health and not dead, as the EIS analysis must have assumed, as the report wrongly assumes there will be no additional damage from this proposal.

Compensating loss of these healthy woodland areas would cost many tens of millions of dollars, perhaps hundreds of millions of dollars. Avoidance of compensation seems to be more the motivating factor, than any reasonable impact analysis.

The NSW Government, fearing litigation from those on the downstream floodplain, will require (or even legislate?) operating rules for the mitigation dam that must prevent any flood releases that add to or prolong downstream flooding. In other words, the flood mitigation dam must be operated in a manner that at the very least does no harm to people residing on the downstream floodplain. As a result, flood

waters will be retained by the proposed mitigation dam wall over the areas near FSL for days, weeks or even months longer than claimed by the EIS.

No matter the size of the flood, the water will drain last off those areas upstream of the dam that are closest to the Full Supply Level. So, given the likely “do not harm” dam operation rules, it is surprising that the areas of wildlife habitat that would be most damaged by operation of the proposed flood mitigation dam have been omitted from biodiversity offsets considerations in the EIS.

The EIS claims that ‘under existing conditions inundation above full supply level can be by up to four days. The duration of increased inundation would range from hours up to around 10 days.’ The EIS claimed time period changes ‘from hours to around 10 days’ is incorrect as these periods only reflect the minimum times required to physically draw down the floodwaters from the dam, and not the effect of the dam’s future operating rules for mitigating various floods. The dam’s yet-to-be-revealed operating rules shall determine that the residence periods of upstream storage of floodwaters and these times will be much longer than those stated in the EIS.

The proposed drawdown procedure in the dam operating rules will determine the extent of upstream flooding of the World Heritage Area; and the time taken to drain the upstream inundation area. For example, drawdown in the dam is unlikely if there were a ‘reliable prediction of significant future rainfall,’ as is so often the case, as doing so would often increase flood height and/or duration. Also discharges will not occur if it would cause ‘unacceptable downstream flooding impacts.’ What is unacceptable will be determined by political factors such as downstream resident concerns, litigation risk and its associated “do not harm” directive. These factors operate to keep water in the dam for longer than the periods claimed in the EIS.

Further, the EIS claim that ‘In the event of a second forecast significant flood inflow, it would be possible to empty the whole of the FMZ with piggy-backing within 3-4 days. The piggy-backing claim that would allow FMZ capacity to mitigate further downstream flooding’ is also incorrect. The “bathtub effect” of floodwaters on the downstream floodplain seriously limits any capacity to piggy-back floodwaters in the manner proposed because doing so can raise flood storage levels downstream and/or flood residence times on the floodplain. Any operating rules that increase flooding extent or duration will lead to a litigation risk against the dam operators for negligence. In other words, new dam’s operating rules will not allow piggy backing of floods or be only allowed for minor flooding contingencies.

Once the dam wall is raised, upstream areas near full supply level will be buried underwater for weeks and perhaps even months in some circumstances because dam operation will not be allowed to raise the height of or extend the period of downstream flooding.

Recall that the operators of Wivenhoe Dam have been required to pay the victims of the 2011 Brisbane floods \$440 million in compensation from a class action against the Queensland government and Sunwater, in a partial settlement over the operation of the Wivenhoe Dam, north-west of Brisbane (Rachel Riga, ABC News, 26

February, 2021). The dam operation will see the area inundated by storage to 2.78 metres above FSL effectively destroyed by operation of the new raised dam.

8b. Land flooded from 10.3 metres above FSL should be included in calculation of biodiversity offset

The proposed raised Dam wall would also contain inflows above 10.3 metres, up to those of the 1 in 100-year flood and beyond to the maximum possible flood. During these larger floods, due to the shallow and flat shape of the upper Burragorang Valley, the area flooded would be many times larger for floods above the 10.3 metres FSL level, the so-called “likely inundation” level.

The area impacted by floods up to the dam wall height of 14 metres above FSL should be considered in the biodiversity offset calculation as this level is maximum mitigation capacity of the dam. Due to contingent political and economic considerations of placing over 134,000 more people on the downstream floodplain, the proposed mitigation capacity will be fully utilised so that downstream floods are reduced to as low as practicable. Keeping flooding as low as practicable is probably the only way to avoid politically ‘unacceptable downstream flooding impacts’.

The level of inundation upstream and association inundation area will have little to do with the so-called “likely inundation” as presented in the EIS, for this assumes that the operating rules would underutilise the mitigation capability and drain the dam quickly in most circumstances. If a series of floods occur in succession, then full utilisation of the dam to 14 metres is likely, and not the inundation associated with 10.3 metre level.

The presentation of upstream flooding in the EIS assumes that operating rules of the mitigation dam will have little bearing on upstream flooding impacts. In fact, the operating rules are the determining factor on how long and to what extent the upstream environment is flooded. The NSW Government will require that the proposed mitigation dam operating rules prevent any flood releases that add to height of or prolong the duration of downstream flooding. The operating rules shall ensure that the upstream storage is utilised up to the 14 metre level to ensure downstream floods are kept as low as practicable.

8c. Land flooded from 0 to 14 metres above FSL should be included in calculation of biodiversity offset

The EIS dismisses most of the potential upstream inundation impacts by considering the impacts associated with only 7.5 metres of the proposed 14 metre dam wall raising, that is impacts associated with 1,400ha and not 4,700ha. An impact area of approximately 3,300ha is omitted from biodiversity offset consideration in the EIS.

I believe that the proposed mitigation dam operation, both in the 0-2.78 metres above FSL area and the 10.3-14 metres above FSL area will suffer significant impacts on important upstream environments.

In the 2.78-10.3 metre FSL inundation area of 1,400ha, the biodiversity offsets were reduced by underestimating the numbers and diversity of threatened species present as explained in point 7. Funding for native animal and plant surveys was not adequate, and the necessary expert opinion reports to provide impact estimates when these data were lacking were omitted.

Due to omission of about 3000ha of upstream inundation area and inadequate surveying techniques, the outcome from biodiversity offset calculations were reduced to a third the actual cost and then at least halved again. The correct area and biodiversity value calculations would add, by a factor of six, billions to the costs of the biodiversity offset compensation package. This is the ultimate billion dollar “red light” derived from the biodiversity offset process, flashing “Don’t raise the Dam!”

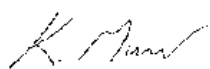
Conclusion

The EIS overstates the potential benefits and understates the potential cost of the proposed dam wall raising. The EIS impact analysis is based on faulty logic that does not stand close examination. Upstream inundation caused by the dam proposal would cause irreversible damage to threatened species, wild rivers, and risks international censure due to the damage caused to the Blue Mountains World Heritage Area. Given the funding provided, I expected that the EIS would treat the outstanding southern Blue Mountains wilderness with respect. Instead this disingenuous EIS report is one of the most misleading I have examined.

Any downstream benefits of the proposal will not survive the urban growth onslaught on the floodplain. The commonsense maxim, “keep floodplains for floods” is lost in the 4000 pages of EIS details. The doubling of floodplain urban growth places more people at risk and the net result of this dam proposal will be that everyone loses. One of our greatest achievements in nature conservation in NSW, protection of the World Heritage listed southern Blue Mountains wilderness is harmed, and we take cultural heritage from the Gundungarra traditional owners for a third time to our eternal shame. So much damage for placing more property and people at risk on the floodplain due to a mitigation strategy that is only a half measure. The correct analysis of this proposal would find it causing billions more damage to biodiversity and placing 100,000 more people in harms way.

The proposed raising of the Warragamba dam wall for flood mitigation should be refused development consent as it will provide no net benefit to NSW and damage our international reputation as a leader in nature conservation.

Yours faithfully,



Keith Muir O.A.M.

References

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