

9 November 2021

Warragamba Dam Assessment Team  
Planning and Assessment  
Department of Planning, Industry and Environment

Via Major Projects Portal

Dear Sir,

**Proposal:** Submission – Warragamba Dam Raising Project – SSI-8441;  
**Property:** Warragamba Dam, Nepean River – Wollondilly LGA

Thank you for your referral seeking comments on the proposal from the NSW Department of Primary Industries – Fisheries (DPI Fisheries).

DPI Fisheries is responsible for ensuring that fish stocks are conserved and that there is no net loss of key fish habitats upon which they depend. To achieve this, DPI Fisheries ensures that developments comply with the requirements of the *Fisheries Management Act 1994* (FM Act) (namely the aquatic habitat protection and threatened species conservation provisions in Parts 7 and 7A of the Act, respectively), and the associated *Policy and Guidelines for Fish Habitat Conservation and Management (2013)*. DPI Fisheries is also responsible for ensuring the sustainable management of commercial, recreational and Aboriginal cultural fishing, aquaculture, Marine Parks and Aquatic Reserves within NSW.

The Department has reviewed the information provided in the EIS and provides the following advice.

There is only one species or sub species of *Macquaria* within the Warragamba Dam study area, not two, regardless of the ongoing taxonomic clarification discussion. All the *Macquaria sp.* endemic to the Hawkesbury-Nepean catchment (eastern “maccas”) are either Blue Mountains Perch (*Macquaria sp. nov. ‘hawkesbury taxon’*) (BMP) if eventually formally recognised as a separate species or sub species, or Macquarie perch (*Macquaria australasica*) if not.

Consequently;

- The preferred habitat of BMP does exist in the upstream study area / flood mitigation zone. BMP have been recorded in four streams within the upstream study area / flood mitigation zone – Coxs River, Kowmung River, Kedumba River and Little River, plus in a number of tributaries in the downstream area (Bruce et al. 2009; Robinson et al. 2013).
- Impacts from this proposal are likely to occur to both critical habitat and to BMP populations upstream of the dam within the four tributaries, noted above and highly likely in other tributaries not yet surveyed.
- BMP data appears to indicate that breeding occurs mainly Jan-Mar, with occasional later spawning events, as listed in the IUCN assessment for BMP, not Oct-Jan when Macquarie Perch spawn.
- Part of the EIS’s reasoning behind declaring a low risk to these fish is that their habitat only occurs in upstream catchments. BMP generally occur at 100-175 m altitude, and in the reaches just above Warragamba FSL (currently 178m alt, proposal is +14m = 192m), so all reaches within the Coxs River, Kowmung River, Kedumba River, and Little River that will be within the proposed new FSL are considered to be critical habitat for BMP, as noted in the IUCN assessment describing the habitat at BMP sites DPI Fisheries surveyed within the proposed inundation zone.

The confusion generated by the species classification has resulted in a number of errors and in consistencies through the document. As a result, the Department has concerns about the potential impacts of this proposal being understated in the EIS. This is of particular concern when assessing the test of significance for Threatened Species impacts. The department recommends these issues be reconsidered, having regard to the matters raised above.

In dealing with risk assessments related to aquatic ecology the EIS appears contradictory. (Table 11.9) states that upstream operation risks, before mitigation, are High (orange), and are still Medium (yellow) after mitigation, but there appear to be no proposed mitigation measures for upstream impacts. In Table 27-19 Water quality risk analysis notes: "Rapid filling of the FMZ may result in reduced water quality, however this was assessed as being relatively minor and no significant upstream water quality changes would occur."

The months with the highest average rainfall and highest risk of floods for the catchments are all Jan-Mar (BOM), which coincides with the BMP spawning season. If the increased dam height results in the extra stream reaches being flooded while they are attempting to spawn, this could greatly reduce the available spawning habitat for the species, due to flooding of riffle habitat and increased smothering of habitat with silt. The department recommends that these impacts need to be clearly identified in the EIS, considered in the test of significance and mitigation or offsets measures proposed.

The EIS also notes that impacts on macro-invertebrate assemblages associated with poor water quality due to the operation of the FSL having an impact on the food sources of the fish. Again, this would result in impacts to the BMP and the department recommends this is clearly identified in the EIS and test of significance.

The geomorphic assessment had a considerable amount of information relating to the potential increase of sediment loads and deposition from out of channel erosion and translocation of sediment features upstream. There is a need to correlate the amount and location of this deposition of material with the geomorphic structures required by BMP to spawn, to quantify potential habitat loss.

The added impact of more frequent bushfires due to climate change needs consideration. As the recent floods following the recent bushfires in the region resulted in significant amounts of eroded material washing into known BMP habitat areas.

Due to the issues identified above, the Department recommends the following conditions of consent to be included in an approval of the subject proposal.

1. A Blue Mountains Perch Monitoring and Recovery Program is to be developed in consultation with DPI Fisheries. Major points to address include:
  - Recovery actions to include investigations of potential mitigation strategies to address sedimentation and siltation of key breeding habitat of BMP, if monitoring detects an impact on those habitats. (see Appendix 1)
  - Monitoring is to occur for 5 years after the first new FSL event to determine if any impacts have occurred from the inundation and the controlled lowering of water levels. If impacts are detected, then mitigation or offset measures must be developed and implemented as part of the recovery program.
2. FSL levels to be maintained for a maximum of 2 weeks. DPI Fisheries to be notified if the FSL level is to be maintained for longer than 2 weeks in the period from 31 December and 31 March each year. This would allow us to consider if there is any BMP mitigation actions to be implemented.



## Department of Primary Industries

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If you require any further information, please do not hesitate to me at [scott.carter@dpi.nsw.gov.au](mailto:scott.carter@dpi.nsw.gov.au) or on 4916 3931.

Yours sincerely,

Scott Carter  
**Senior Fisheries Manager – Central Region**  
**DPI-Fisheries**  
Authorised delegate of the Minister for Primary Industries

## Appendix 1.

Outline of requirements for potential ongoing monitoring programme.

There are significant knowledge gaps around the general biology of *Macquaria sp. nov. 'hawkesbury taxon'*. Further studies into the biology and life history of *Macquaria sp. nov. 'hawkesbury taxon'* is critical to assessing the impacts of flood mitigation strategies and will help with informing flood mitigation zone operations to minimise risks to Blue Mountains perch populations. This will involve examining:

1. Reproductive biology- Age/size at sexual maturity, spawning season, habitat and flow requirements for spawning and recruitment.
2. Movement and habitat requirement – acoustic tracking to identify seasonal movement patterns, spawning habitats and flow cues associated with reproduction.
3. Age and growth rates.
  - Estimates of population size and habitat mapping are required to provide a baseline to examine for potential impacts associated with the flood mitigation zone. This monitoring should be continued over the long-term (10+ years). This should involve:
4. On ground and aerial surveys of in-stream and riparian habitat.
5. Fish community monitoring studies to examine species compositions, recruitment and relative abundances.
  - Broadscale surveys are required throughout the species potential distribution to determine the species current range. This would involve broadscale eDNA surveys to examine for the presence/absence of the species in waterways. This would extend on the current '2021/22 Post Fire Assessment study' allowing for more waterways to be examined.
  - Genetic rescue - Translocation and re-stocking are important management actions that are increasingly being carried out by NSW DPI for threatened fish species to provide assisted geneflow to prevent the loss of small, isolated populations due to the combined negative impacts of genetic drift and inbreeding.
  - Research and establishment of a hatchery breeding program would allow for the production of fry for population re-establishment in fire impacted systems (identified in the 2021/22 LLS funded 'Post Fire Assessment study') and genetic rescue of small, isolated populations.
  - Clarification of the taxonomy of *Macquaria sp. nov. 'hawkesbury taxon'*. This involves morphometric studies of the blue mountains perch and the output of a peer-reviewed manuscript detailing the newly described species.
  - As further data is collected on *Macquaria sp. nov. 'hawkesbury taxon'* an IUCN assessment is required to re-assess the species threatened status.
  - Broadscale habitat assessments and remediation activities for fire impacted habitat. This may involve desilting, riparian improvements and addition of instream rocky habitat.