


# Strategic assessment of proposed river infrastructure, with Clarence River – Bellingen Pipeline, as an example

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**Abstract:** The NSW Department of Planning and Environment (NSW DPE) has been developing regional water strategies. The strategies develop, and then short-list water management options through community consultation and analysis to identify approaches to best meet secure future water demand. The likely hydrological (Dutta et al. 2023), economic (Taylor et al. 2021) and ecological effects (Driver et al. 2023) of those options more focused on providing water security during drought is then assessed. Regional water strategy modelling includes base case model development, which are compared to options models under hydrological, cost-benefit and ecological analyses. This paper is focused on the NSW north coast, with one option, the Clarence River to Bellingen pipeline, for improved water security for Bellingen Shire Council, as an example. Options were assessed using (1) modelled past climate data (Stochastic) and (2) drought impacts under more extreme climate change scenarios (NSW and ACT Regional Climate Modelling, or NARClIM).

The economic assessment estimated the value of changes in town water supply shortfalls and agricultural production. All unregulated water licences were assumed to be used for sorghum, given it is the primary crop grown in the region. The assessment showed that this option is not economically viable in its current form or under current population and climate forecasts. With just over 13,000 people living in Bellingen, even with favourably discount rates of 3% or a reduction in the capital cost of 30%, the option does not provide an economic benefit due to the few occasions demand is not being able to be met and the extremely high capital cost of the project relative to the number of people who would benefit from it. The shortfalls are not sufficiently sustained (up to 6 months) and large (ML/month) to trigger the second stage of restrictions and so the pipeline does not provide any major benefits in terms of mitigating the social costs of periodic water supply shortfalls.

The ecohydrology impacts of the pipeline option as compared to current conditions (base case) were assessed at representative locations along the river under Stochastic and NARClIM conditions. All ecological impacts were at levels below what was considered significant, but to show due diligence in this assessment we show these very minor effects against a range of ecological metrics. We discuss what further ecological effects would need to be explored if the pipeline is made a development priority. This would need to include further exploration into short-term low flow effects on the significant fish community in the Orara River.

The purpose of these options, and the utility and limitations of these model outputs, are discussed.

## REFERENCES

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