Learnings from an update to Australia's flood guidance

Conrad Wasko [a]

[a] *School of Civil Engineering, The University of Sydney, Sydney, Australia*
Email: conrad.wasko@sydney.edu.au

Abstract: Design flood estimation is the process of calculating flow statistic, such a flood level, with a defined annual exceedance probability (AEP). A typical example is the calculation of the 1% AEP flood event to define the flood planning level for infrastructure development and land use zoning. The methods used for design flood estimation in Australia are prescribed in Australian Rainfall and Runoff. Traditionally these documents have assumed that historical data is stationary and representative of the future planning horizon. More recently, while acknowledging the historical data may not be stationary, due to the high levels of uncertainty it was deemed that climate change was a secondary consideration. Now it acknowledged that climate change has already occurred, altering flood risk, and hence needs to be incorporated in design flood estimation.

One could argue that the previous guidance represented an opportunity to improve design flood estimation outcomes. What wasn't working before? Only half of studies in Victoria were factoring in climate change (Ladson, 2016) and "there [was] little information on how to consider climate change in design flood estimation" mean there was a concern that "the latest science is not always being appropriately applied in policy outcomes" (DCCEEW, 2023a).

Updating Australian Rainfall and Runoff involved a four-stage process of (1) expert elicitation (2) stakeholder engagement (3) scientific review and metanalysis, and (4) guidance preparation with stakeholder engagement to close the feedback loop. The meta-analysis concluded that hourly extreme rainfalls intensify by 15% per degree of global warming while daily rainfall intensify by 8% per degree of global warming. Surveys of the draft guidance revealed little dispute over the scientific accuracy of the proposed guidance, but a comparison between the draft guidance (DCCEEW, 2023b) and final guidance (Wasko et al., 2024) highlights that there were many changes made in response to user feedback – highlighting the need to learn from stakeholder feedback. While work remains to ensure all current and future stakeholder needs are met, the update to Australian Rainfall and Runoff resulted in several novel outcomes, representing a learning from previous efforts and stakeholder feedback.

Keywords: *Extreme rainfall, flooding, climate change, Australian Rainfall and Runoff, guidance*

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