Making good modelling practice common practice

S.H. Hamilton [a] ⓘD, **A.J. Jakeman** [a] ⓘD and **S. Elsawah** [b] ⓘD

[a] *Institute for Water Futures, Fenner School of Environment and Society, The Australian National University, Canberra, Australia*
[b] *Capability Systems Centre, School of Engineering and Information Technology, University of New South Wales Canberra, Australia*
Email: tony.jakeman@anu.edu.au

Abstract: Despite the plethora of modelling guidelines that exist, practice in environmental and socio-environmental modelling remains largely insufficient. Common inadequacies include:

- poor scoping with regard to model purpose, objective functions, system boundaries and scales
- insufficient consideration of assumptions, especially when applying models to new contexts or scenarios
- limited uncertainty assessment and model evaluation, which tends to be focussed on fit to historic data
- limited consideration of the socio-technical aspects of modelling
- weak model documentation and reporting on model strengths, limitations and assumptions.

The current state of practice also includes bias toward reporting success as well as reporting results (know-what) rather than practices leading to these outcomes (know-how). Part of this state of practice stems from the capabilities of modellers, due to poor technical examples of good practice and a lack of shared lexicon for defining and formalising practices. However, the current state of practice is also a consequence of poor motivation or limited capacity of modellers, in terms of resources, to carefully deliberate on choices made during the model development, and to prudently analyse uncertainties introduced and propagated through the modelling. We share a vision for the modelling community, wherein good modelling practice is the norm. This vision includes a roadmap for how this could be achieved, including the role of journals and institutions in creating incentives, and a shift in the modelling community's culture towards knowledge sharing, commitment to good practice as a minimum standard, and recognition and treatment of the social aspects of modelling.
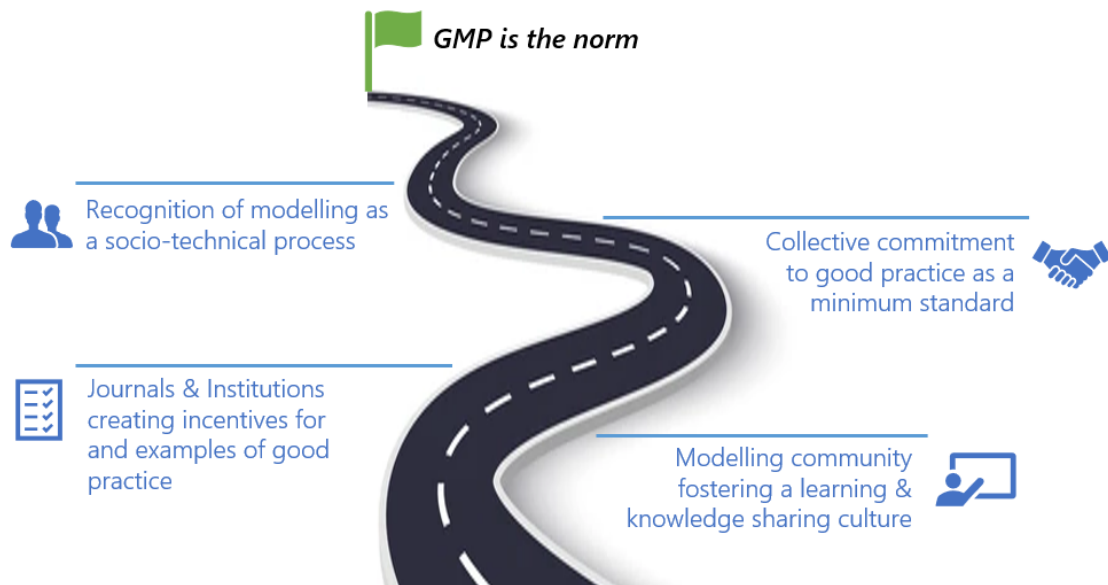
Figure 1. Our proposed roadmap towards making good modelling practice (GMP) the norm

Keywords: Modelling practice, fit-for-purpose, modelling standards