

Great Expectations - How groundwater managers should use model outputs

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Players in the modelling game

- FACILITATOR – Provides conceptual model, stratigraphy, pumping and observation data
- CALCULATOR – Actually designs and runs the model
- **APPLICATOR** – Takes the model results and applies them for policy and management outcomes
- INTERROGATOR – Usually a Manager who doesn't understand models and asks lots of 'dumb' questions



Uncertainty

As a hydrogeologist, I am well aware of the uncertainties present in the modelling process

- Gross simplifying assumptions required
- Large natural variations in geological properties
- Input uncertainties (extraction, recharge)
- Non-uniqueness issues



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Uncertainty

Even if a well calibrated/validated model is constructed, the most significant uncertainty in applying model outputs for management purposes, is

- **We don't know what is going to happen in the future !**
- Virtually an infinite number of prediction scenarios that could be run
- Future climate/recharge, extraction unknown



Applying model results

- Given the aforementioned uncertainties, rarely use absolute values eg
 - on 26th July 2020, the water level will be 5.43m
 - in 2050, discharge to river will be 65.66 m³/day
- Instead, use ranges of values, water level trends and % change from current values



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Applying model results

- Unfortunately, some managers think a model will answer all their questions and ignore real data about how the aquifer is performing
- They do not appreciate that changes in recharge or pumping regimes could invalidate model predictions
- These people need constant reminders and education about the limitations of models





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