



The pipeline that enables water models to deliver

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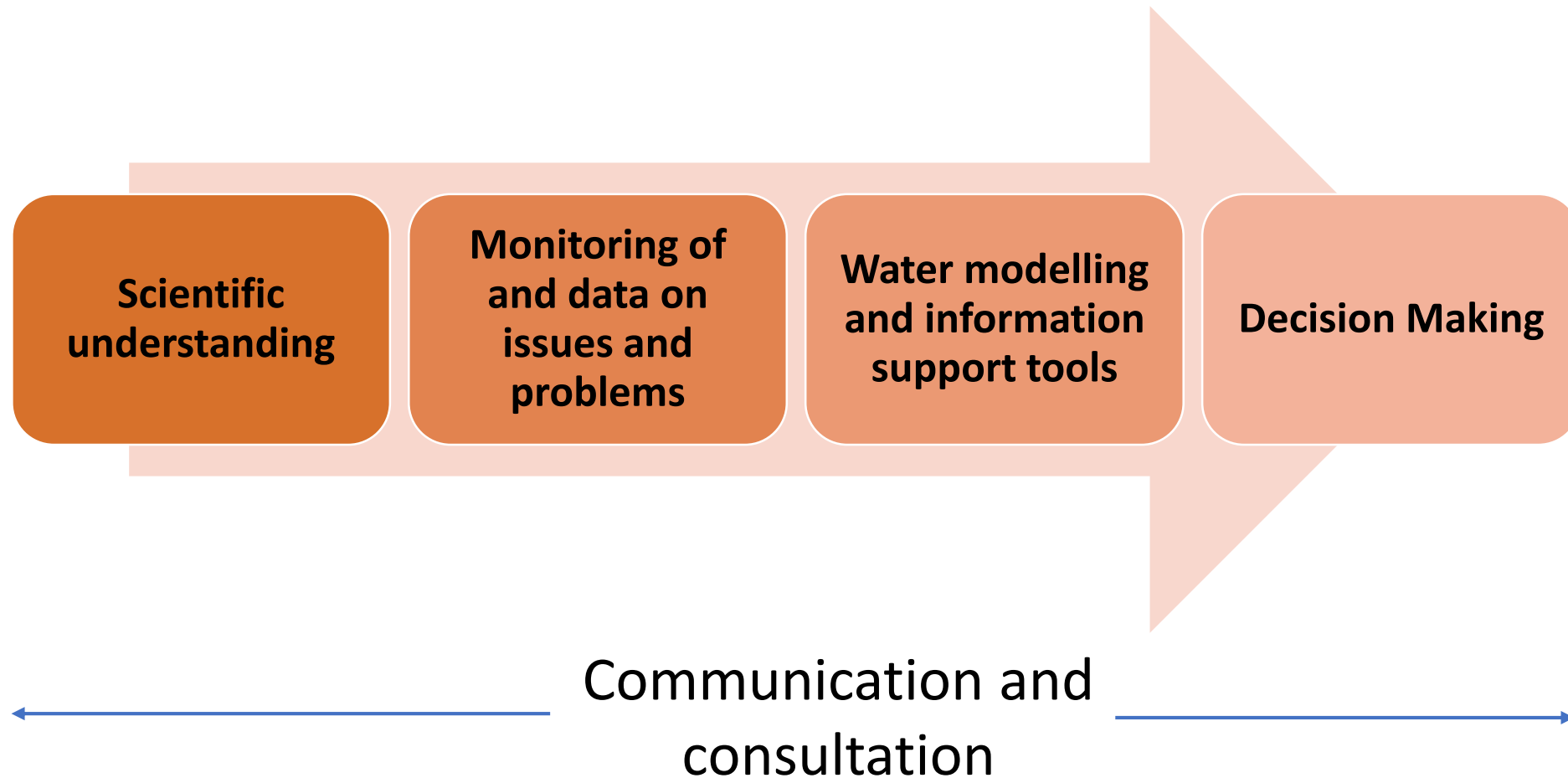
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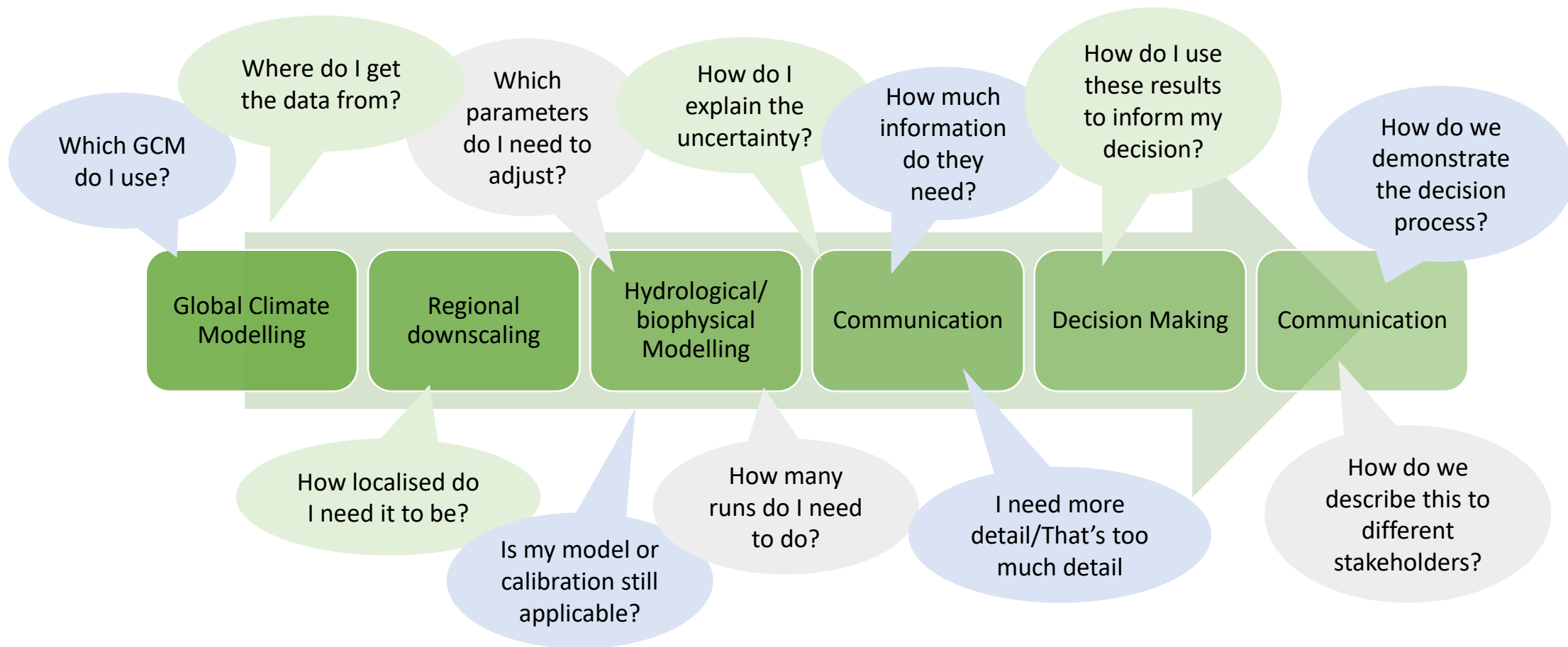


“Success in model building and application ... is about more than getting the science and engineering right.

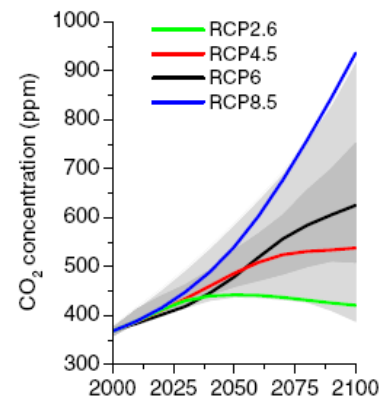
It is about embedding model building in a social process that links and engages scientists, decision makers, interest groups and the wider public towards achieving impact beyond merely technical performance of a model.”

What are the elements of the “Pipeline”





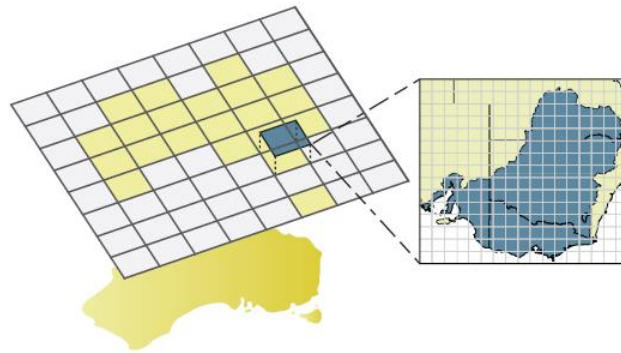
Future GHG concentrations



Changes in global climate



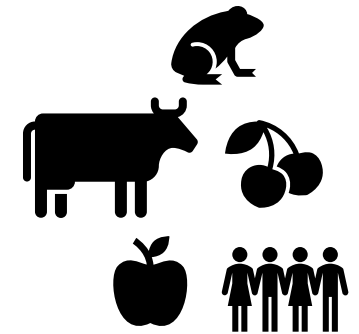
Changes in regional climate

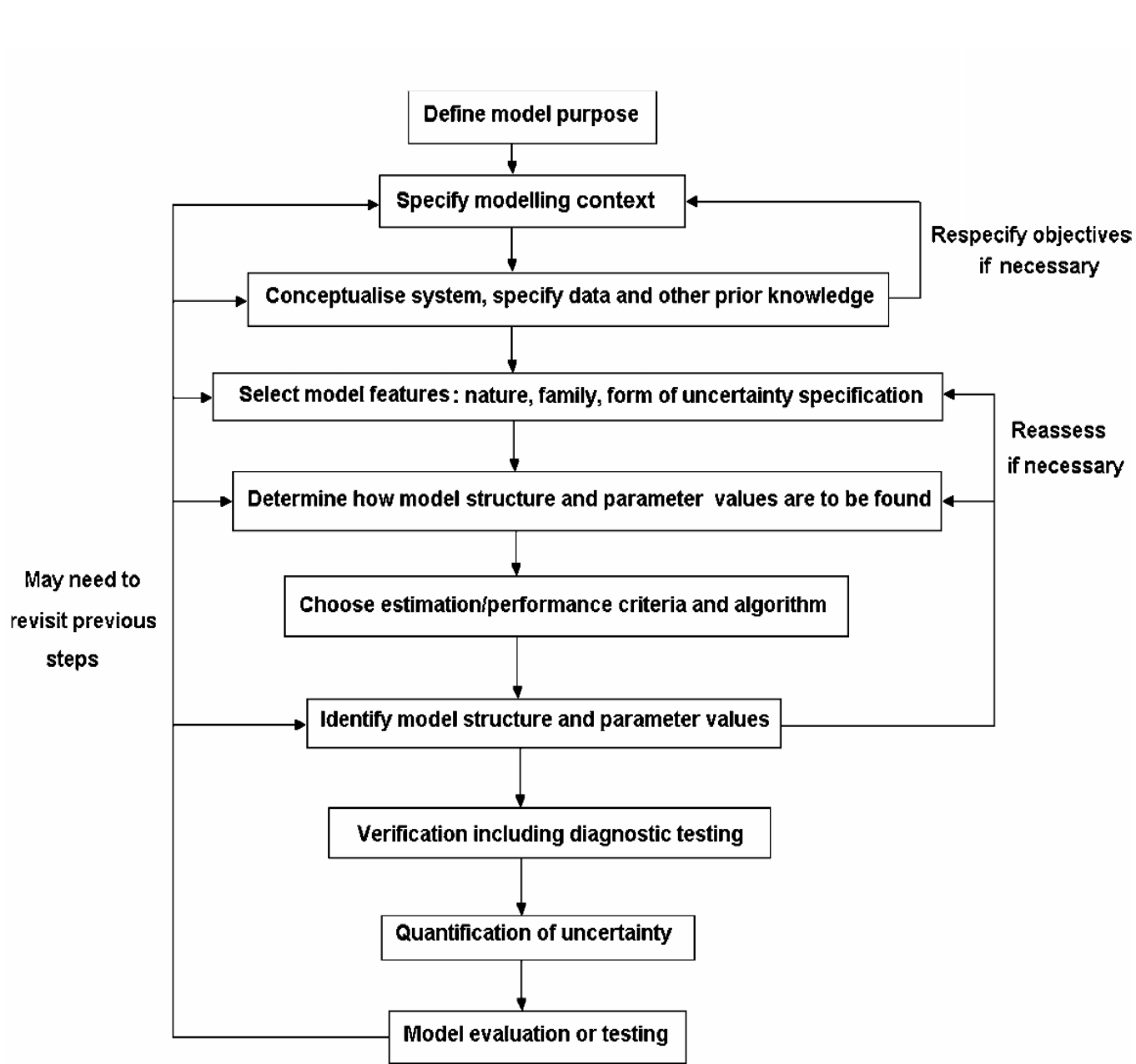


Changes in regional hydrology

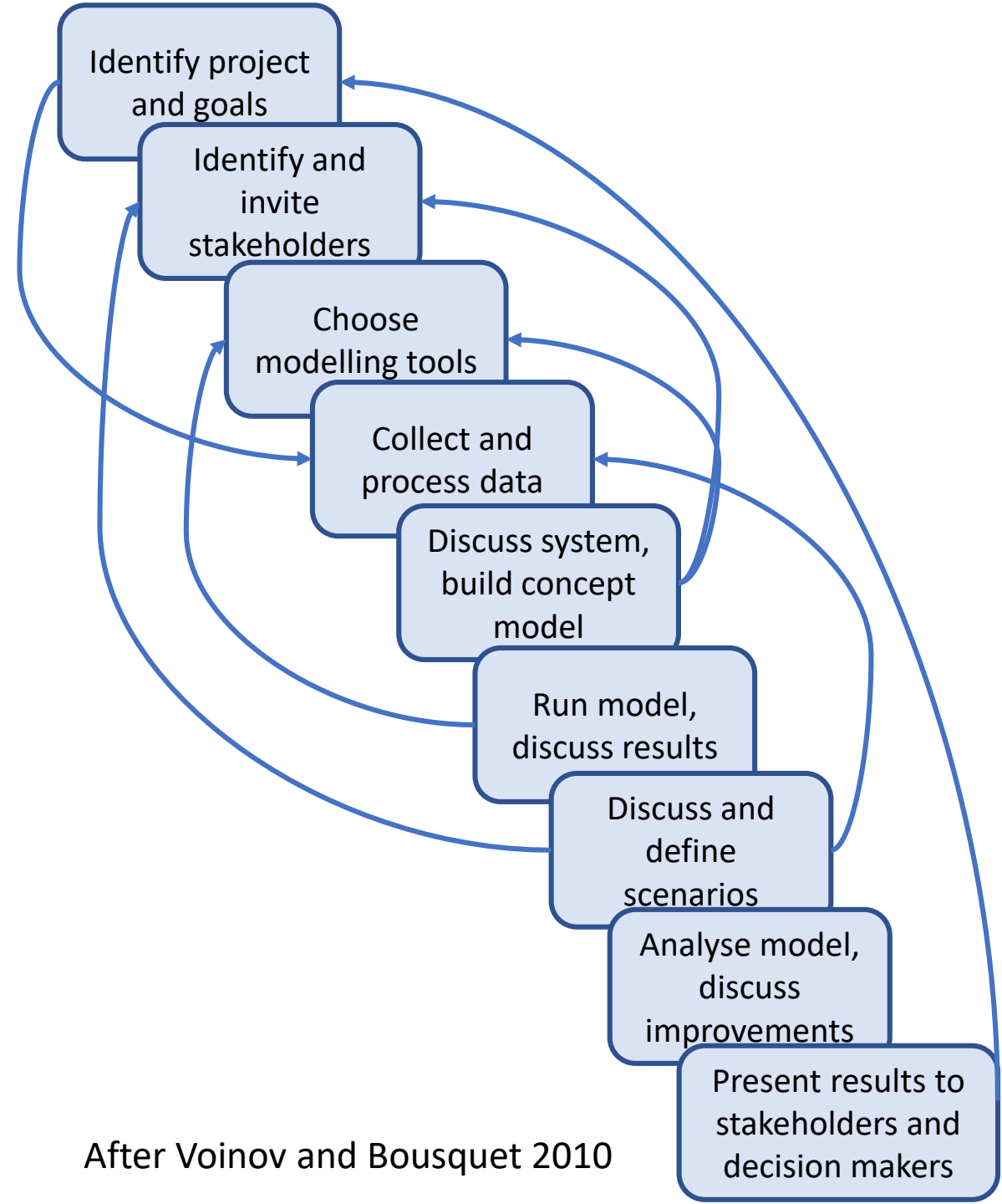


Changes in water dependent systems





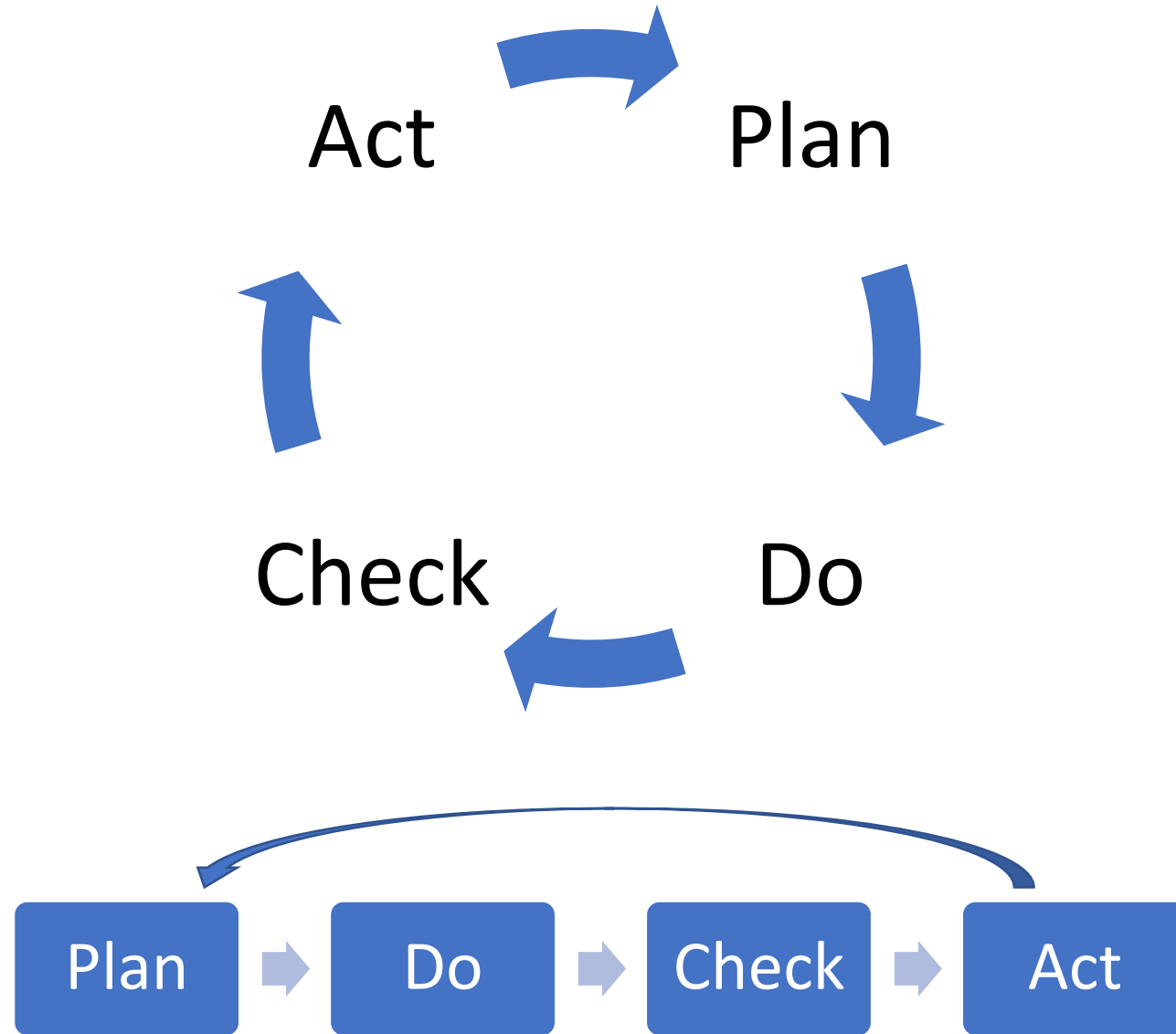
From Jakeman et al 2006



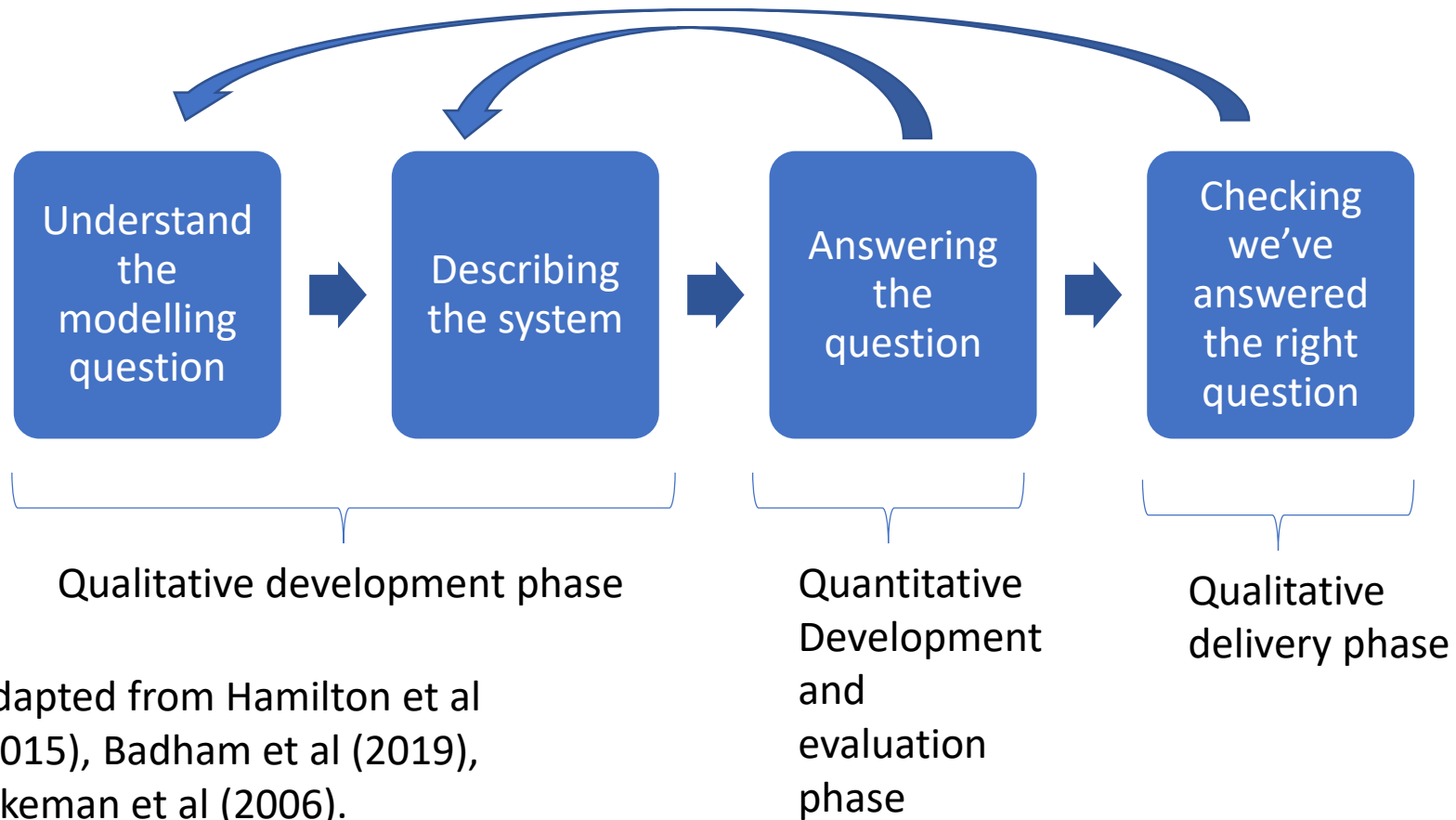
After Voinov and Bousquet 2010

Is there one pipeline to rule them all?

- Ultimately, the various process descriptions can be boiled down to
 - A qualitative development phase
 - understanding the problem and understanding the system
 - A quantitative development and analysis phase
 - Numerical evaluation of the problem using a quantitative description of the system
 - A qualitative delivery phase
 - Fitting the evaluation to the problem and the system
 - Making sure in the decision phase we have answered the right problem

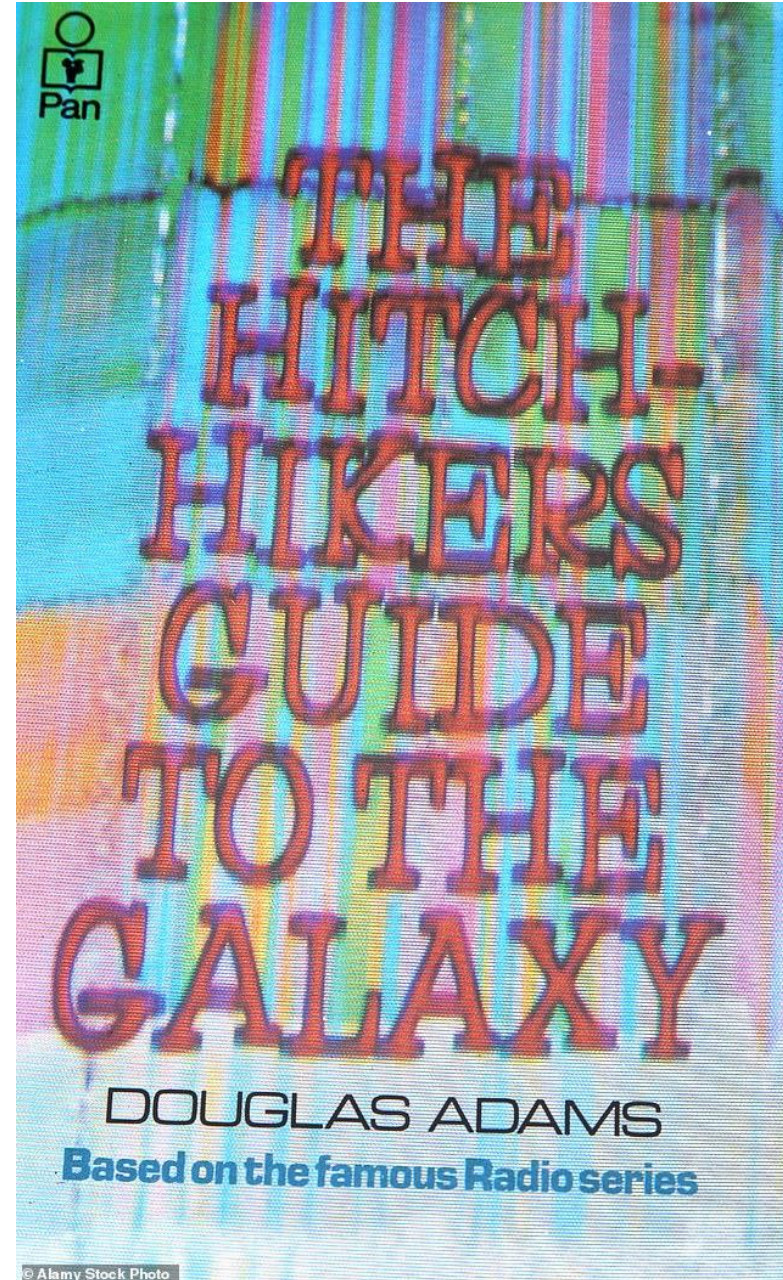


A pipeline for water model delivery



Understand the modelling question

- Define the problem and scope
 - Overall objectives
 - System boundaries (what's in and out)
 - Stakeholders (who needs to be involved, informed, consulted)
 - How can it be delivered and by who





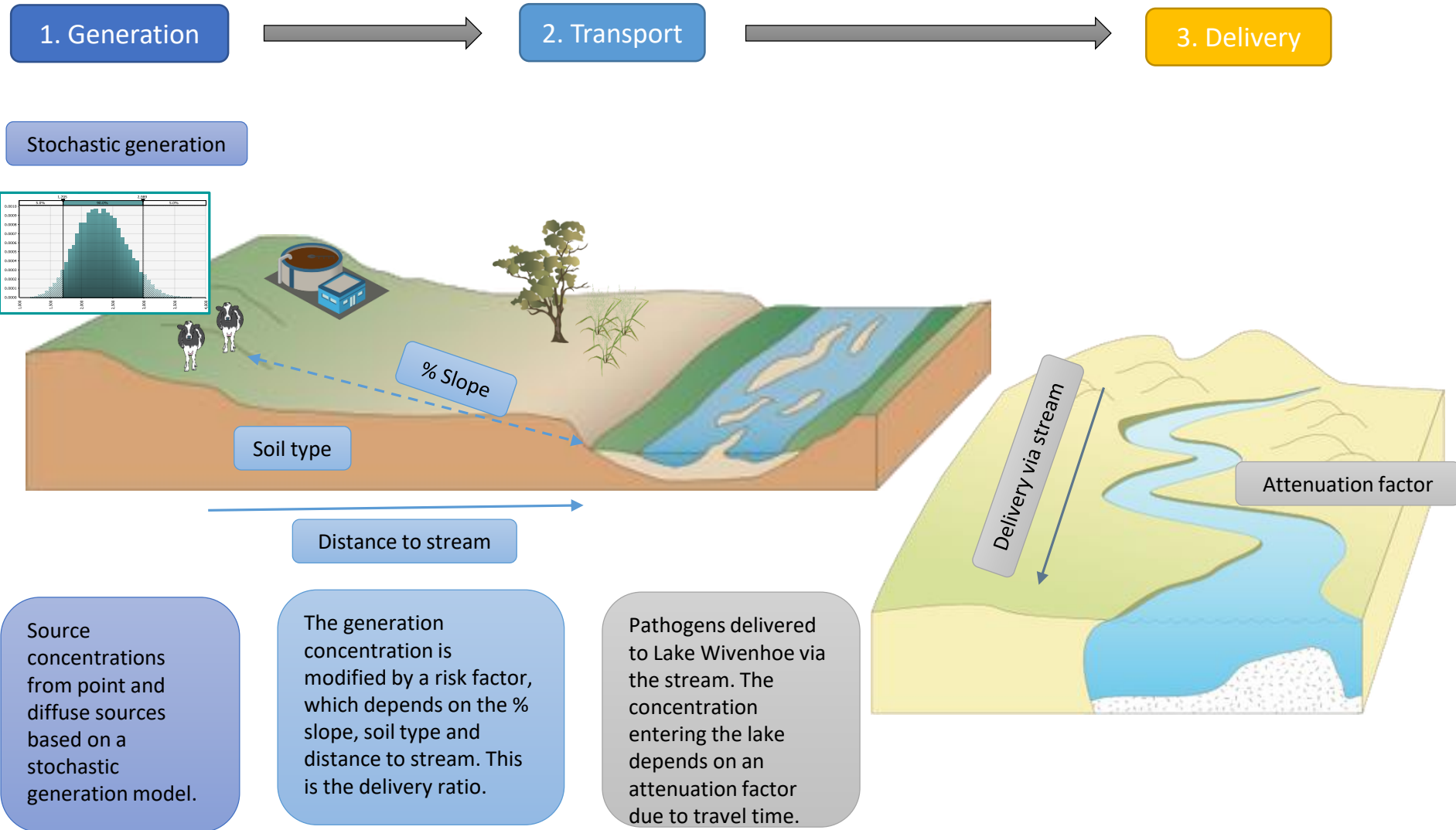
Describing the system

- Develop conceptual understanding – model, visuals, flowchart
 - Get out there and kick the dirt!
 - Describe the variables
 - Visualise the processes and functions
 - Outline indicators, scales, timeframes and timesteps
 - Understand inter-relationships
 - Consider if you have all the right people to build a conceptual understanding



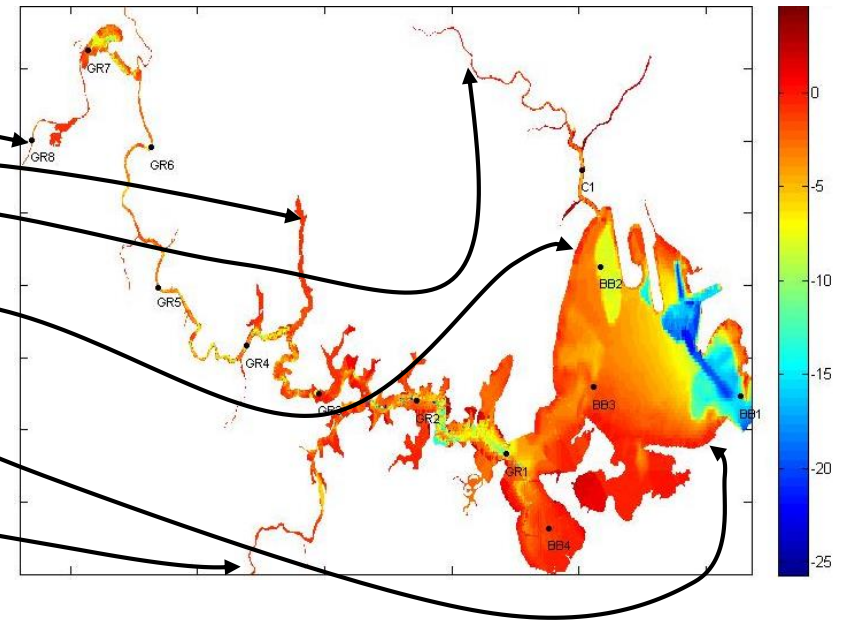
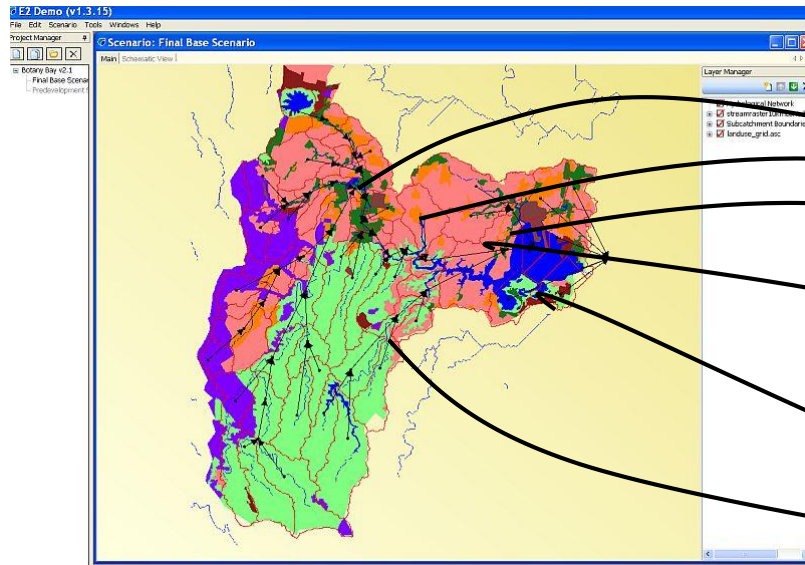


Conceptual model

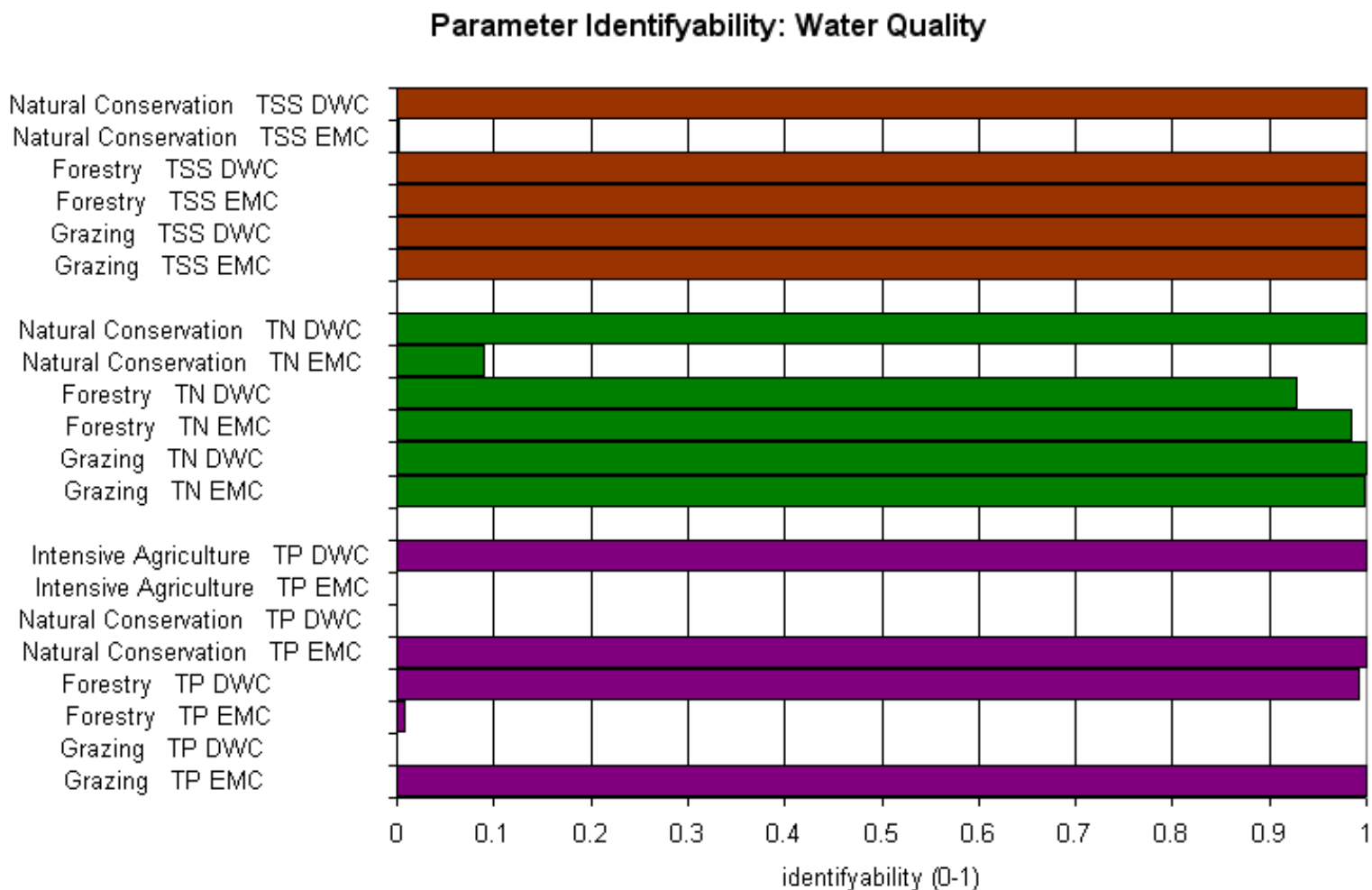


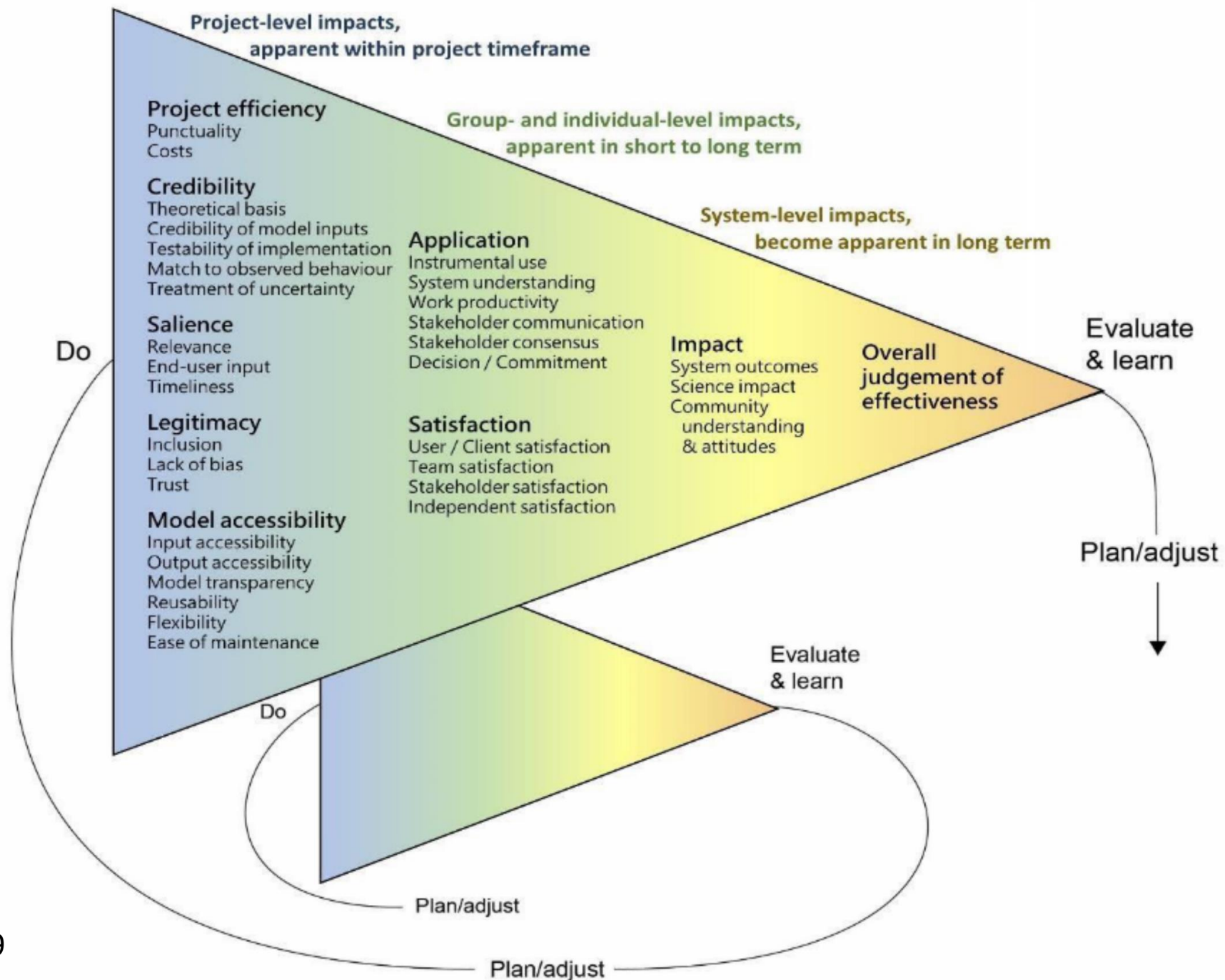
Answering the question

- Running the models
- Calibration, verification, validation
- How do we know it is fit for purpose – evaluation criteria
- Uncertainty and sensitivity
- Processing and visualisation – representing the results



Model Analysis and Uncertainty





Checking
we've
answered the
right
question

- Putting the answer into the decision process
- Does it make sense
- How does it fit with the conceptual model
- Does it fit the story, and if not, why not

Does it mak



Conclusions – things to think about when flowing through the pipeline

- Remember you are telling a story
- To do this, focus on building the narrative
- Understand the people
- Understand the context
- Understand the system
- Evaluate the right problem
- Checking that you have answered the right question

