



QUEENSLAND  
WATER  
MODELLING  
NETWORK

# ACCOMODATING CLIMATE CHANGE

*Community of Practice workshop - QUT  
June 2019*





## INTRODUCTION

A key issue in the Research Development Innovation Strategy for the QWMN is a desire to better understand the implications of climate change impacts and variability on the operations of water models and the subsequent use of the information derived from these climate impacted model runs.

This workshop was designed to provide an opportunity to start to build this understanding with QWMN participants.

The themes considered in this workshop, entitled “**Accommodating Climate Change and Climate Variability in water modelling and decision making**” include:

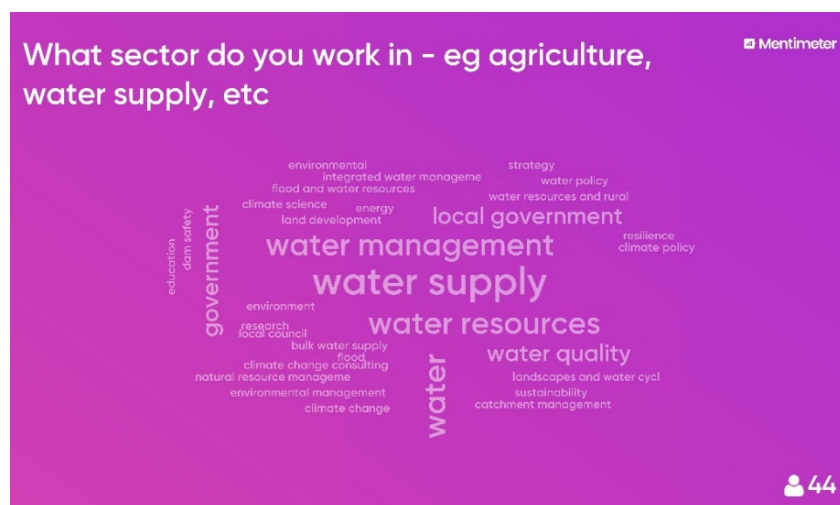
- What is the “climate science to modelling to decision-making” pipeline in which climate risks are considered?
- What level of consistency is required for applying climate change attributes in water models and how can climate change be included in a “fit-for-purpose” approach?
- What actions and steps can we now initiate to better accommodate the climate risk as practioners, organisations and sector wide?

The material presented by the Alluvium Consulting, Newcastle University and CSIRO consortium at this workshop was developed as part of the project “Critical Review of Climate Change in Queensland Water Models”, which was commissioned by the QWMN program at the Queensland Department of Environment and Science. Feedback from this workshop on future capacity building needs has been included in the project’s consideration and a final report will be available in the second half of this year.

Complementary to the day and building on the climate change implications is feedback from two prior CoP activities, namely:

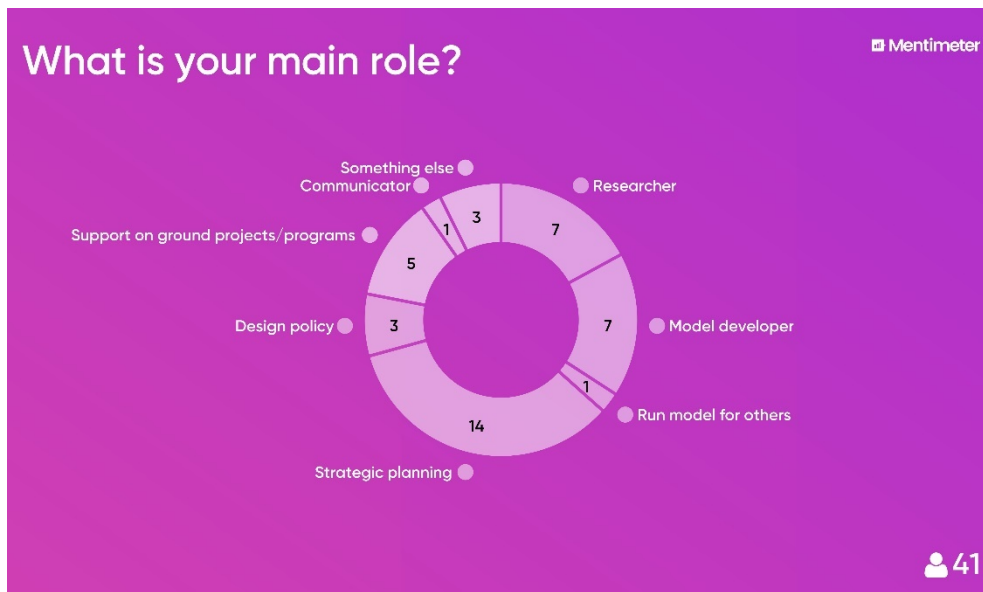
- Ways to better integrate urban water management initiatives: SEQ, a case study.
- Connecting landscape processes across different modelling scales in a catchment

The participants who attended the workshop came from a mix of sector types as indicated below<sup>1</sup>.



<sup>1</sup> Access to the complete Mentimeter responses, with finer resolution, are in the Resources & Link section.

Their type of role was also diverse, namely:



The opportunity to exchange, share, listen and learn was evident as the various participants interacted during the workshop.



## CLIMATE CHANGE AND VARIABILITY ISSUES DISCUSSED

The day was opened by Professor Kerrie Wilson, Executive Director for Institute for Future Environments at QUT who stressed the predictive importance of models.

To predict the future, we need good models. They will be the key for predicting the broader impacts such as increased frequency of droughts and floods and gaining understanding of how these will impact multiple sectors of our economy. In other words, we can use models to predict the future and choose the best management decisions to lead us to the future we want.

Kerrie also flagged the importance of communication through visualization to assist the water industry and climate change challenges:

Communication of our data, findings and ideas is another big challenge we data scientists face ...our amazing Visualisation and eResearch team, under the leadership of Gavin Winter, offers options. Currently, his team collaborates with Seqwater to enable their digital engagement and learning program. This program is crucial to educate and achieve community acceptance for the use of alternative water sources. Climate Change Futures is another new project of ViseR using the Sphere at the new Education precinct at Kelvin Grove.

The focus of climate change and variability and water models was led by a [presentation from Lisa Walpole and Tony Weber, from Alluvium Consulting](#). This review of water models and climate change aims to build a strategic response to the various needs arising from the review and aspects of this were discussed in small group activity which followed – more details to come.

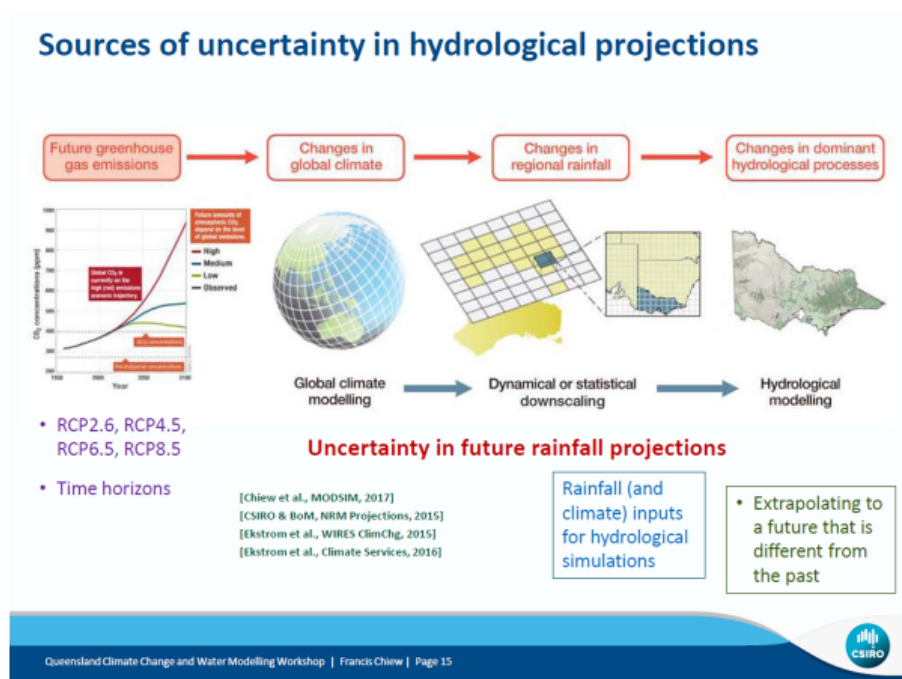




In terms of the science, a review of climate science was undertaken by Anthony Kiem - University of Newcastle Francis Chiew and Jai Vaze – CSIRO along with key inputs from Jozef Syktus – Department of Environment and Science and Chantal Donnelly – Bureau of Meteorology.

Issues that [Antony raised in his comprehensive presentation](#) include the value and challenges around:

- Water models, infrastructure, planning, settlements, etc. are traditionally (and mostly still are) designed based on the “stationary climate assumption”;
- The IID assumption – where extreme events are considered as Independent and Identically Distributed;
- Understanding the major drivers of Australian hydroclimatic variability;
- Use of pre-instrumental records;
- Insights gained from a wet/dry time series using a composite of paleoclimate records relevant to eastern Australia;
- Sources of uncertainty in hydrological projections; and
- High resolution climate projections for Queensland.



In response to the review presentations and ideas, workshop participants were asked to identify and explore what actions and steps we can now initiate to better accommodate climate risks in our modelling and decision-making. This was considered in small groups for the following themes:

- Regional Landscapes & Agriculture
- Ecosystem services
- Infrastructure
- Urban planning with a link to health and liveability



Many thanks to our small group facilitators Abel Immaraj, David Rissik, Claudia Moreno, Chris Huxley and Aditya Singh, who together with their theme participants built a wealth of insights to these three questions:

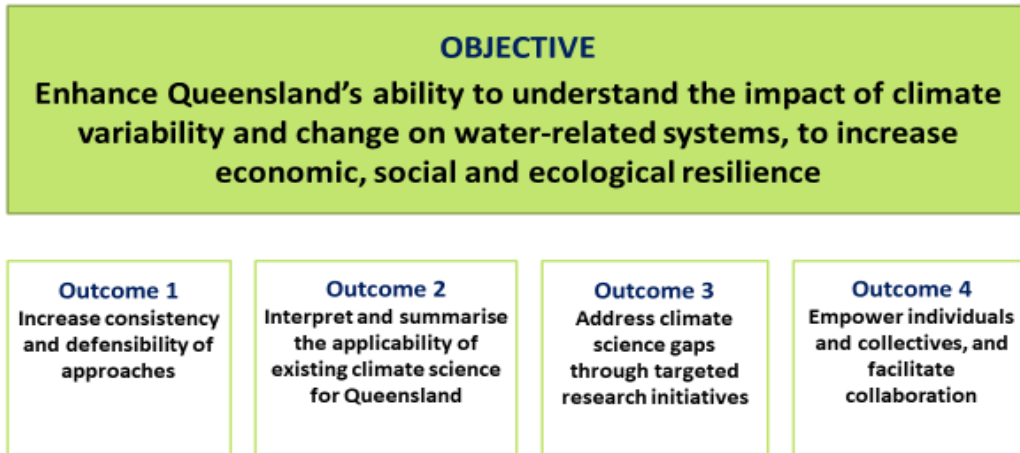
1. What are the climate relevant issues that this theme and sector face – impacts, threats, risks, etc.?
2. How can modelling help in accommodating to better understand the rises and help guide practice, etc.?
3. What needs to happen next to progress modelling practice for the sector?

[Click here to read the details collated for each of the five groups.](#)



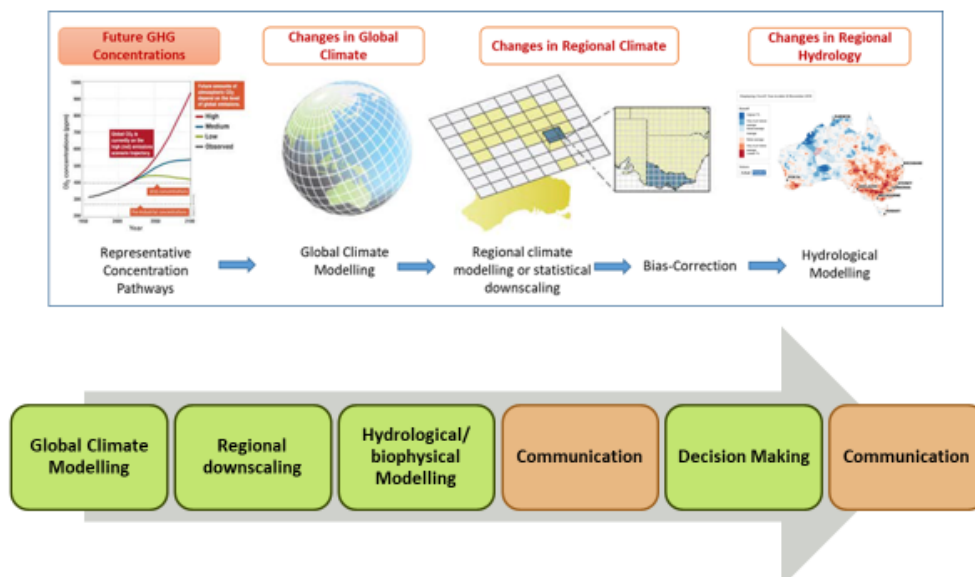
A key output from the Project team are a set of recommendations and strategic priorities to underpin an investment response to deal with the findings of the review. The essence being sought is summarised as:

## Draft recommendations and strategic priorities



In concluding this part of the workshop, the project team shared a suite of actions arising from the review and they were presented as options across short, medium and long-term timeframes. See the Project team’s presentation for the specific details. In response, the workshop participants identified up to 105 actions that currently meet their needs and, in some cases, why they were important. [The details are included in the Mentimeter compilation](#) and do align with breadth of needs across the information, decision-making, and communication pipeline depicted below.

## Projections to outcomes ‘pipeline’



# Interest groups in the QWMN Community of Practice

## Integrated Water Management role of water models



## Connected Catchments



Over the last 4 months, small groups of QWMN practioners have met to consider themes of interest raised previously.

Chris Tanner, who jointly convened the first workshop in March at the annual CRC Water Sensitive Cities Conference, [presented a summary of the discussion](#) into “Integrated urban water management in SEQ and the role of water models”. [A report on that workshop is also available](#) and outlines a series of next steps around project registers, liveability case studies and a Sustainable Equitable Queensland Water road map.

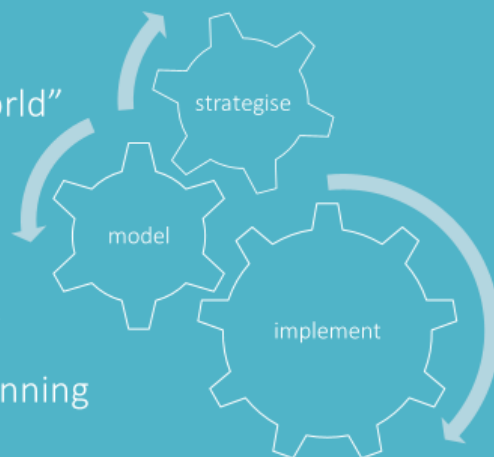
Abel Immaraj, an active QWMN practioner and participant, [provided a stimulating insight into role of models.](#)

### WHAT

- ‘tools’ - process simulation
- representations of the “real world”
- depicting the “ideal”

### HOW USED

- decision support tools –what-if
- management tools – digital twinning
- operating systems - SCADA

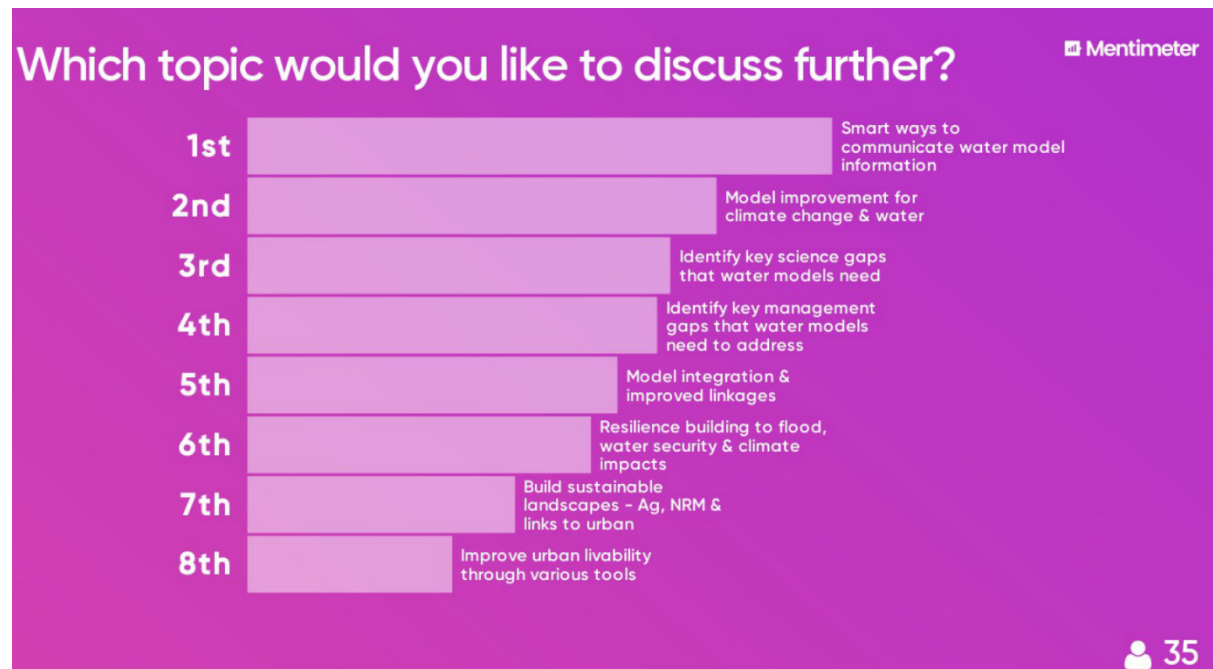




His presentation from the Connected Catchments workshop at Noosa in June highlighted the conceptual needs of models to aid paddock management, prioritise investments and inform the achievement of strategic outcomes. Details of this workshop are available, [click here](#), where the group agreed on a suite of follow-up actions to better appreciate the various approaches currently underway in “catchment connection” efforts, ways to better share Great Barrier Reef, SEQ and Murray Darling Basin experiences in catchment modelling and also consider a local SEQ pilot project to better connect model processes at different scales and across different rural /urban interfaces.

## FUTURE DIRECTIONS – COMMUNICATION

In concluding the workshop participants considered what further topics the QWMN might consider.



Not surprisingly, the issue of communication, which has been a constant issue of importance at all QWMN Community of Practice and Forum activities over the last 12 months, was identified as a priority topic.

To progress this issue further two small groups deliberated to scope the key elements of:

- Who are we communicating to? Definition of the audience and “Key message”.
- What are we communicating? Knowledge transfer/education.
- How can we better communicate model results?
- Do we know how to generate trust in models?

The details of this response are available, [click here](#), and will form the basis for a future QWMN Community of Practice event.

## RESOURCES AND LINKS

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### PRESENTATIONS

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Event information presentation – Piet Filet – [click here](#)

Participant responses to questions, captured by Mentimeter, during the workshop – [click here](#)

Climate Review presentation – Lisa Walpole & Tony Weber – [click here](#)

Science overview presentation – Anthony Kiem – [click here](#)

Integrated Water Modelling summary presentation – Chris Tanner – [click here](#)

Connecting Catchments summary presentation – Abel Immaraj – [click here](#)

### SMALL GROUP IDEAS

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Responses for accommodating climate change for four theme topics – [click here](#)

Communication needs for improving use of modelling information – [click here](#)

### SUMMARY REPORTS FROM PREVIOUS QWMN COMMUNITY OF PRACTICE FOCUS GROUPS

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Urban water management through integration and the role of models – [click here](#)

Connecting catchments – [click here](#)