



---

## Workshop 1

Simulation, modelling and analysis of the living water system: Improving our beneficial return on investment.

### Facilitators



Dr Michael Barry has undergraduate degrees in Engineering and Science, and a PhD in Engineering. He has almost 30 years' experience in environmental hydrodynamic and water quality modelling as a consulting engineer and researcher. This has included 20 years modelling and managing a wide range of receiving waterways from small urban lakes, estuaries and reservoirs, up to systems of scale including the Red Sea and Great Barrier Reef lagoon. Michael currently is the water quality lead within the TUFLOW software team. He is committed to working with environmental practitioners to continually advance the ways in which numerical models are developed, applied and exploited to better support the management of our precious natural resources.



Mitchell Smith is a Principal Environmental Engineer based in Brisbane, Australia. He has 18 years' of industry experience in the fields of flood hazard, floodplain management, coastal hazards and coastal hazard adaptation. He holds a Bachelor of Environmental Engineering with Honours and a Bachelor of Science with a major in physical geography.

Mitch is a lead engineer responsible for developing the flooding and coastal hydraulic model TUFLOW. Mitch's role includes the delivery of R&D software projects, software support to our global user base, training, and collaboration with industry to provide improved workflows including customised applications for floodplain and coastal assessments and management.

---



Aim of workshop

The aim of this workshop is to share, discuss, develop and record ways of maximising the beneficial return on the investment made in environmental catchment and receiving water modelling component of studies. This includes both technical and communication aspects of these studies.

Objectives of the Workshop

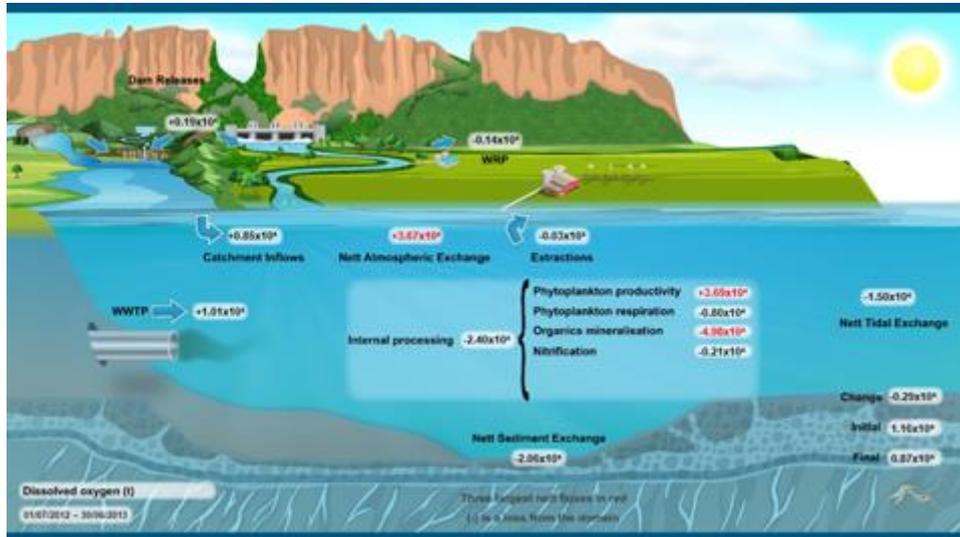
The objectives of this workshop are therefore all focussed on discussing ways and means to improve the beneficial return on investment in catchment and receiving waterway modelling activities. This improvement revolves around both modelling cost reduction and outcome (communication) enhancement. Specifically, the objectives will be to:

- Collectively review state of the art catchment and receiving modelling tools and workshop their pros and cons. Matters that will be discussed include (at least – pending participant contributions) are the move away from using antiquated bucket hydrology models and toward automated catchment-receiving model linkage techniques. Obviously, this will need to be time limited, but high-level discussion of key matters is anticipated
- Discuss and collaboratively expand on ways of using the richness of model data to execute smarter (and therefore less resource intense) model calibration. One key example that will be discussed is the use of diagnostic outputs (i.e. model volumetric and mass flux outputs, rather than velocities and concentrations) to understand the flow of water, sediment and water quality masses in a system (i.e. mass balances), and how this drastically reduces the reliance on educated guessing of parameter tweaking during calibration. Closely related to this are the implications for model scenario construction, and these will be workshopped
- Discuss and collaboratively expand on state-of-the-art non-technical model communication methods, that relate to and draw on the above, especially the conceptualisation of mass balance outcomes under varying modelled scenarios

A demonstration model will be prepared in advance of the workshop to support these discussions and collaborations. It will be constructed so that it can be run quickly during the workshop to support discussion. Optional pre reading will also be provided for attendees.

An example of modern ways in which the above mass balance techniques are exploited to enhance upward communication of results is shown below for a hypothetical living water system.

---

Outcomes will include:

- A raised awareness of new techniques and approaches that improve the beneficial return on investment made in catchment and receiving waterway modelling activities
- A written summary of outcomes
- A participant feedback survey

Sponsors

