**Workshop reporting**

**1st Australia and New Zealand Water Quality Modelling Symposium**

7-10 April 2024, Queenstown, NZ.

**Workshop Topic** – 1.1 Developing and improving modelling platforms.

**Vision**

*What does success look like? What are the outcomes?*

Success looks like a sustained system or platform that is maintained beyond short-term funding, with an inventory of models that people have been working on. The platform should be a portal for models and data, enabling more effective outreach, making more models more available to a wider group of people, and enabling sharing of model outputs. The platform should be an extension of the interoperable modelling framework, handle different software languages, and incorporate new and emerging models. The outcomes include a system or platform that is sustained by organisations coming together to commit to long-term maintenance of the platform, and addressing current problems and questions while enabling updates and upgrades with new models and technologies.

**Scope and Issues**

*Discuss and capture the boundaries and known barriers*

The scope of the platform includes geographical constraints, focusing on Australia and New Zealand, and implementation of moderation, QA/QC, and curation of new models and data. The data needs of the platform need to align with the vision and scope of the data platform. Known barriers include short-term funding, unclear governance, data availability, intellectual property, model complexity, and organisational constraints. Other issues include the need for training for new users, workshops, and an active user or developer group, and the need for a change in attitude towards working in an open way.

**Short, medium and long term goals**

*Can we identify logical steps to make progress?*

In the short term (1-2 years), the goals include building governance structures, identifying suitable models for inclusion into the platform, thinking about what kind of coupling we would like to develop, involving software engineers to design the platform, and modellers coming together to simulate the same system and start thinking about how to integrate different models into a platform structure. In the medium term (3-5 years), the goals include having a governance structure in place, identifying funding opportunities, developing calibration and validation tools, and developing post-modelling data analysis and wrangling tools. In the long term (5-10 years), the goals include a fully functional governance structure, a training programme in place, software support, and multiple applications of the platform.

**Prioritisation of goals**

*Do we need to prioritise goals?*

The priority goals include a first useful release or platform, making a case for the platform, building governance structures, identifying suitable models, involving software engineers, and developing journal papers. These goals need to be prioritised to ensure progress and success.

*Identify key actions to achieve the priority goals*

To achieve the priority goals, key actions include writing a sales pitch, writing a document with the intention of the platform, involving software developers, writing papers, defining the scope and purpose of the platform, developing and sending out an online survey, discussing ideas and the platform with key individuals, and developing case studies. These actions will help to build momentum and progress towards the goals.

**Prioritisation of actions**

*Can we prioritise actions?*

Actions can be prioritised by focusing on defining the scope and purpose of the platform, developing and sending out an online survey, discussing ideas and the platform with key individuals, and developing case studies. These actions will help to progress the goals and ensure success.

**Implementation plan**

*Responsibilities, funding, timeline, how organising (what, who, when)*

The implementation plan includes defining the scope and purpose of the platform, developing and sending out an online survey, discussing ideas and the platform with key individuals, and developing case studies. These tasks will be undertaken by designated subcommittees and will have specific timelines and funding requirements. The plan will be organised and implemented by the designated subcommittees, with progress monitored and reported regularly.

**The below excerpt from workshop paper submitted to the Journal of Hydrology is included for broader context of the discussions during the workshop (Guao et al. Invigorating the science and practice of water quality modelling in Australia and New Zealand: a community-led initiative):**

The development of adaptive and accessible modelling platforms that seamlessly integrate across multiple model structures/components will reduce the recurring investment in developing modelling approaches that are ‘re-inventing the wheel’. Such modelling platforms will facilitate collaboration and knowledge and model sharing amongst the modelling community, enabling real time data integration, model calibration and validation. The modelling platforms will not bind users to a specific model but will allow to plug-in the best available model for a specific case. For example, a variety of biogeochemical process models are available to describe specific water quality dynamics, but not all are suitable everywhere as they can only include subsets of process dynamics (e.g., Aquatic EcoDynamics, Huang et al., 2019). Integrated data systems combining information from a variety of sources such as sensor networks, catchment information, cloud-based Earth observation datasets will be well established (e.g., Digital Earth Australia (Geoscience Australia, 2021)) and applied in the water quality modelling domain. Modelling platforms will facilitate best practices particularly regarding model selection and evaluation; they will also be highly adaptive and open source to facilitate continuous development, as well as wide model sharing, acceptance and trust by allowing users to see inside the implementations of water quality processes. Such modelling platforms will have an ongoing investment and community engagement (See Section 4.3) to ensure 1) the foundation model is actively maintained; and 2) the model users are trained with adequate background and modelling expertise.

*Complete workshop discuss transcript can be found here:* [*Workshop Reporting Template.docx*](https://waikatouniversitynz-my.sharepoint.com/%3Aw%3A/g/personal/deniz_ozkundakci_waikato_ac_nz/EQw3gai3yFlFipMOXbX6zZUBJHUDXpSu3Pus5mx3AZUtYQ?e=Sm7j0d)