**Workshop reporting**

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

7-10 April 2024, Queenstown, NZ.

**Workshop Topic** –2.1 Developing good-practice modelling guidelines.[[1]](#footnote-1)

**[1] Vision** *What does success look like? What are the outcomes?*

A set of guidelines, supported by tools that promote their usage, that become the industry standard for water quality modelling expected to be adhered to by both modellers and model consumers / decision makers.

These guidelines will:

* Establish industry standards
* Promote modelling as a science
* Lift levels of trust and transparency
* Guide modelling practice, and provide a framework for modelling decisions
* Provide a commonality of expectations
* Provide a framework to communicate modelling practice decisions, including saying “no” to a client
* Promote and support consistency in external communications
* Provide guidance and training to new modellers
* Avoid bad practices and their associated costs.
* Support the tendering and project management processes for consumers / decision makers

The guidelines will be a product that uses multiple formats to achieve these goals, and include tools to support their practical application.

**[2] Scope and Issues** *Discuss and capture the boundaries and known barriers*

|  |  |  |  |
| --- | --- | --- | --- |
| Modellers | Barriers | Consumers / Decision makers | Barriers |
| Model developers / designers | Diversity of views  Resistant to change -> do we need more rules?  Lack communication  WQM lots of purposes  -> hard to be specific  -> stuck at parental statements  Different world views  -> language  -> approaches  -> needs | New to the application area | High diversity of understanding and preconceptions and bias on WQM (WQ also) / quantitative  Uninformed purchasers asking for wrong thing -> take model outside of the original scope / outside model’s “fit for purpose” (our guidelines should help with this!) |
| Practitioners / application |  |  |  |
| Software developers | Own standards to meet |  |  |
| Emerging / new / early career | Competing priorities & existing resources (time & $) | Emerging / new / early career |  |
| All | Time limitations |  | Time limitations |

**[3] Short, medium and long term goals** *Can we identify logical steps to make progress?*

The development and adoption of the guidelines requires ongoing engagement with the broader water quality community to ensure the vision of the guidelines is achieved. Ongoing outreach is essential to ensure the guidelines are informed by the community, and inform the practice of the community to support their uptake and practical adoption. Outreach should focus on modellers, peak bodies, model consumers/decision makers, everyone else.

Peer and end user review is essential at all stages to ensure that fit-for-purpose guidelines are developed.

SHORT (1-3 years)

1. Review / survey of end user needs (1 year goal)

* Who are the end users – what does this landscape look like?
* Do our end users/decision makers see value in the guidelines?
* Do they see other purposes (we haven’t seen) for the guidelines?

(does this shift what we are looking to achieve with the guidelines?)

2. Review of the current landscape of guidelines and their applicability to WQ modelling (1 year goal)

3. Gap analysis against what we want the guidelines to achieve (Conduct workshop at MODSIM2025)

4a. Develop the guidelines (progress report 2025, present draft at MODSIM2027)

4b. Decide on form the guidelines should take:

* outputs range from formal to informal (journal, traditional print, video, checklists, mix)
* online portal to host information together
* might want to codify in detail but summarise in different ways

5. Develop tools to support application of guidelines (workshop dev/review tools or applying and using the guidelines @ MODSIM2027)

* E.g. checklists, case studies

MEDIUM (4 – 10 years)

Communication and review of the guidelines and related tools.

LONG = Visionary Goal (10 + years)

* Industry standard similar to ARR / a chapter in ARR or equivalent
* Embedded in expectations for publication / becomes standard operating practice

**[4] Prioritisation of goals** *Do we need to prioritise goals?*

See previous point [3]. Prioritisation based on estimated deadline for each goal, and practical ordering of the goals.

**[5] Identify key actions to achieve the priority goals**

See previous point [3]. Actions are listed for each goal.

**[6] Prioritisation of actions** *Can we prioritise actions?*

See previous point [3]. Actions based on estimated deadline for each action, and practical ordering of the actions.

**[7] Implementation plan** *Responsibilities, funding, timeline, how organising (what, who, when)*

Do Steps 1 and 2 (from [3]) in parallel (review/survey of user needs + review of guidelines literature):

1. User or stakeholder map. (Who might be the users we would survey?)
2. Virtual sticky post-it session. (Capturing the users’ viewpoints.)
3. A form questionnaire. Including in that questionnaire, asking around for what guidelines papers/grey literature that they use/recommend. (To add to the “stocktake” of modelling guidelines.).
   * Follow up with targeted conversations with representatives of different sectors to support a deeper dive, and nuanced understanding of existing resources and limitations.
4. Establish a working party to compile all the information (literature / survey results). This will naturally lead to the gap analysis (Step 3 in [3]), which will likely involve expanding the working party.
5. Stress-test the draft gap analysis at MODSIM 2025 (e.g. in a workshop).

* **Important:** This is primarily advice for modellers but will be useful for other actors connected to the modelling process (e.g. end users, procurers, etc.).
* E.g. there are heaps of guidelines that have come out in the last 3 years in NZ for environmental modelling, but they are not written by modellers.

Form an oversight group: an oversight group is important to ensure the guidelines developed are appropriate to the broad community of modellers (development, application, research, consulting, compliance etc.) and valuable to consumers/decisions makers, team leads/managers, project managers, procurement etc. The oversight group will be formed (and periodically reviewed to ensure meets current needs of the project) following the collation and initial review of existing resources.

***Funding*** While many activities will occur based on community volunteering their time/resources, some aspects (e.g. development of tools to support the guidelines) will require financial support. Funding opportunities need to be identified to enable these activities in a timely manner. A list of potential funding opportunities will be developed, once the form of resources to be created has been identified.

***Who***Melanie Roberts, Val Snow, Matthew Adams, Vaughn Grey, Richard Muirhead and Michael Barry (especially the gap analysis component) volunteered to lead the initial stages of the project during the workshop. Additional participants welcome from the broader community.

***Risks***

1. Guidelines not hitting the mark, so it sits on the shelf.
2. Ensuring input from different sectors, e.g. consultant input, which requires different incentives to an academic.
3. Ensuring messaging (during outreach) is very clear. [What makes good modelling? What makes bad modelling? Why do the latter continue to occur?]
4. Won’t be able to make sense of the plethora of guidelines that already exist.
5. The perfect guidance document already exists!

***Note:*** Discussions at the workshop were wide-ranging, and extended to specific ideas for the form of the guidelines as a product, identification of existing resources, key topics to consider, and ideas for the substance of the guidelines. Notes of these discussions were recorded to support the development of the guidelines.

1. This document is a summary of discussions at the workshop with notes prepared by Matthew Adams, Vaughn Grey and Melanie Roberts. Workshop participants were Matthew Adams, Maggie Armstrong, Chinenye Ani, Michael Barry, Hugo Borges, Vaughn Grey, Tapuwa Marapara, Richard Muirhead, Melanie Roberts, Theo Sarris, Val Snow, Tom Stephens, Ken Taylor, Ben Tuckey, Andrew Western, Joerg Wicker, and Karen Wild-Allen. [↑](#footnote-ref-1)