SUPPORTING QUEENSLAND'S NEXT GENERATION OF WATER MODELLERS

The Queensland Water Modelling Network (QWMN) aims

> to improve the state’s capacity to model its surface water and groundwater resources and improve the quality of it’s models.

Established by the Queensland Government in 2017, the QWMN provides tools, information and collaborative platforms to support best-practice use of water models and the uptake of their results by policy makers and natural

resource managers. The QWMN encourages engagement between modellers, researchers, policy makers and resource managers.

A key focus of the QWMN is building Queensland water sector capability through its mentoring program. The program partners experienced modellers with university undergraduate students and young water professionals interested in water modelling, it The aims to:

- Grow the size and capabilities of the Queensland water modelling workforce by building a pipeline of skilled and enthusiastic graduates who want to pursue water modelling careers in Queensland.
- Expose students to ‘real world’ water policy issues so that they develop applied knowledge and become enthused about the work of water modellers.
- Develop undergraduate student critical analysis and systemic understanding of how the outputs from water models are and can be used.

The program has two components. Firstly, students

undertake online water model training and tutorials to become familiar with the relevant models and tools. Students then undertake a ‘real world’ modelling challenge, supported by mentors who are experienced Queensland Government modellers.

eWater is an active supporter of the mentoring program, providing access to the full version of Source, training materials and technical support for participants.

Phase 1 of the program has been successfully completed by students from Griffith University, James Cook University, University of South Queensland, Queensland University of Technology and University of Queensland and a young professional within the Queensland Department of Natural Resources Mines and Energy (DNRME).

Students used eWater Source to understand how water quality targets are set for the Great Barrier Reef catchments. The Cattle Creek sub catchment within the Mackay/Whitsunday region used in the challenge. Through the project, participants both learn how to use Australia’s National Hydrological Modelling Platform, eWater Source and

are exposed the the challenges faced by both government and industry to meet the Great Barrier Reef water quality targets.

The program has since been extended to students at the universities of Central Queensland and the Sunshine Coast in 2020-21. The QWMN is also working to engage modelling experts from the private sector.

More about the QWMN

More about eWater Source and managing the Great Barrier Reef

PADDOCK TO REEF – INTEGRATED MONITORING, MODELLING AND REPORTING PROGRAM

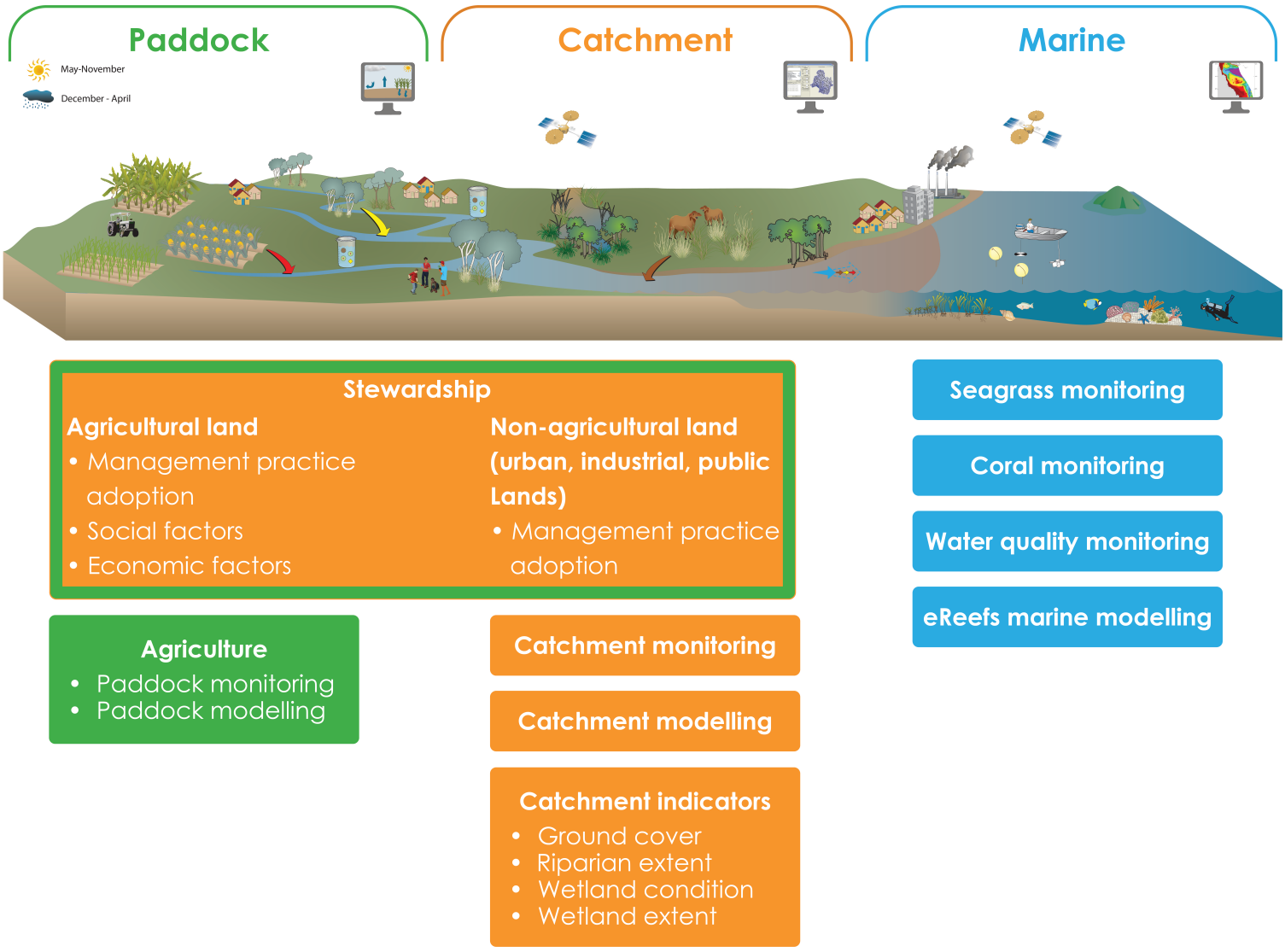
Targeting investment to improve the health of the Great Barrier Reef.

What is the Paddock to Reef program?

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program) started in 2009 as a joint initiative of the Australian and Queensland governments to report on water quality improvement resulting from investment in improved land management practices. Improving the quality of water leaving properties by reducing pollutant run-off is critical to build the health and resilience of the Great Barrier Reef (GBR). The program brings together industry bodies, government agencies, natural resource management bodies, landholders and

research organisations.

The program provides a framework for evaluating and reporting progress towards the Reef 2050 Water Quality Improvement Plan targets. It integrates monitoring and modelling information on management practices, catchment indicators, catchment loads and the health of the Reef at the paddock, sub-catchment, catchment, regional and whole GBR scales (image below). The program evaluates management practice adoption, management practice effectiveness (in terms of water quality benefits and economic outcomes), catchment condition, pollutant run-off and marine condition.



Focus areas for the Paddock to Reef program

How does Source support the program?

The catchment modelling for the program is based on the Source platform, with customised plug-ins developed by the Queensland Government to provide additional water quality functionality. A range of other purpose-built data collection

and reporting tools have also been built to support the program. These include interactive maps to show pollutant generation rates and priority investment areas.

The models are primarily used to report on annual progress towards the reef water quality targets as a result of investment in improved land management practices. Model outputs are also used to determine priority areas for investment and to assess possible outcomes from different scenarios such as different rates of adoption of improved practices. The catchment models also provide inputs for the marine models.

The Paddock to the Reef program helps manage the impacts of landuse on the quality of water flowing to the Great Barrier Reef, Qld
(credit: WITTE-ART.com / Adobe Stock)

Information sharing

Many of the actions required to achieve the water quality targets need to be undertaken by farmers and other land managers. To support greater uptake of the required actions, the Paddock to Reef program has been designed to share

technical information in a way that can be easily understood and used. It also incorporates the local knowledge of land managers. Program features include:

- Multiple lines of evidence to inform progress towards the targets.
- Technical experts are based in the regions, giving them a good understanding of the local environment, issues and the effectiveness of management actions. This also helps build relationships with local land managers.
- Ongoing refinement of the models and other tools to incorporate new knowledge, data and methods.
- Results are presented online through an interactive reporting system to cater for the broad range of stakeholders interested in the results from the general public to scientific experts.
- Data is made available to support other programs, for example regional report cards and regional natural resource management body and local government investment decisions.
- ‘Cut down’ models provide locally specific tools to assess individual projects and prioritise local investment.

Peer review, continual improvement and validation are critical elements for any modelling program. The Paddock to Reef catchment modelling program undertakes an external review every three years. The program is supported by a GBR-wide pollutant loads monitoring program which provides data to calibrate and validate the catchment models and increase confidence in the models over time.

For further information go to Reef 2050 Water Quality Improvement Plan website https://www.reefplan.qld.gov.au/tracking-progress

Acknowledgements

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