

A new model to monitor Atlantic Salmon farming in Storm Bay

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Fisheries Research & Development Corporation (FRDC) has today released an independently reviewed report (2017-215) presenting a modelling and information system for water quality conditions in Tasmania's Storm Bay.

The research undertaken by CSIRO, Australia's national science agency, with funding from FRDC, has developed a new coastal water quality model, to assist informed decision-making based on accurate and timely information.

The model presented in the Storm Bay Modelling and Information System report, simulates the seawater circulation and nutrient dynamics of the Storm Bay area, including inputs from rivers, wastewater and salmon farm discharge and interactions with offshore ocean water.

The modelling system was developed using a 'digital twin' approach i.e., a virtual model of a physical object or in this instance, the coastal waters off southeast Tasmania. The model predicts the observed circulation and water quality in coastal waters over multiple years and can be used to explore future scenarios with various levels of salmon farming.

FRDC Managing Director Dr Patrick Hone said the model provides a high-quality scientific tool to help better understand what might happen in Storm Bay under different conditions in the future.

"This model provides information for the best practice management of Atlantic Salmon farming in this area, and it also delivers detailed insight into potential changes to the coastal ecosystem in the future.

"As the Tasmanian salmon sector continues to innovate and develop, tools such as this provide invaluable insight into what we might expect under different conditions and allow us to understand the possible effects of potential changes to farming loads in the future," said Dr Hone.

Calibrated using observations from a previous FRDC-funded project (2014-031), this new model can accurately simulate local currents and water circulation, nutrient cycling, plankton and dissolved oxygen. To confirm the accuracy of the model, new continuous data were collected from moored water quality sensors placed on the bottom and surface of Storm Bay waters for extended periods. Profiling autonomous underwater vehicles, were also used to collect water quality observations throughout Storm Bay and in the open ocean, including one trip from Macquarie Harbour on the west coast of Tasmania.

Simulated circulation, water quality and analysis products from the new model are available on the [CSIRO website](#). This data and analysis provides a much-improved understanding of the whole marine environment within Storm Bay. The project final report is available on the [FRDC website](#).

Lead researcher from CSIRO Dr Karen Wild-Allen, said the project provided new understanding of the key drivers of water quality in Storm Bay.

"The Storm Bay model has shown that water quality in the area is strongly influenced by inflow of offshore ocean water that contributes considerable seasonal and interannual variability to the system."

"A better understanding of all drivers of water quality will equip fish farmers and resource managers with knowledge to underpin their strategic and tactical decisions."

This project and two other projects overseen by the Storm Bay Steering Committee are funded by FRDC and Tasmanian Salmonid Growers Association. The other two projects are also scheduled to be completed this year. One is a project co-funded and led by CSIRO to develop decision support tools from the model outputs, including a connectivity analysis tool, a desktop analysis for rapid assessment of water quality under contrasting fish farm loads and a fine scale modelling tool for local assessment of water quality. The other project, led by the University of Tasmania, will underpin a future physical monitoring program to confirm predictions made using the modelling tools and confirm impacts on the natural environment of Storm Bay.

These projects and the tools they provide can be used to inform sustainable management of not just Salmon farming but also the entire Storm Bay system across a range of human based impacts.

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About FRDC

Fisheries Research and Development Corporation (FRDC) takes a leading role in planning and investment in [fisheries research and development](#) (R&D) to support the ongoing sustainability of our aquatic sectors and aquatic ecosystems.

FRDC is a co-funded partnership between the Australian Government and fisheries and aquaculture. In addition to planning, investing in and managing [R&D](#) for fishing and aquaculture and the wider community, FRDC also prioritises the adoption of the knowledge and innovations resulting from its investments.

About CSIRO

As Australia's national science agency, we solve the greatest challenges through innovative science and technology.

We are thinkers, problem solvers, leaders. We blaze new trails of discovery. We aim to inspire the next generation.

We collaborate with industry, government, universities and research organisations to turn big ideas into disruptive solutions.

We use collaborative research to turn science into solutions for food security and quality; clean energy and resources; health and wellbeing; resilient and valuable environments; innovative industries; and a secure Australia and region.

About Storm Bay Steering Committee

The Storm Bay Steering Committee provides strategic oversight and recommendations to FRDC for the Storm Bay Research Program planning and management. This committee also reviews and evaluates research milestone reports and outputs to ensure outputs are achieved. The committee includes Patrick Hone, FRDC (Chair); Heidi Mumme, (Executive Support), Josh Fielding, FRDC; Beth Fulton, CSIRO; Catriona MacLeod, Institute for Marine and Antarctic Studies; Deidre Wilson / John Adams / Ian Dutton, Department of Natural Resources and Environment; Sue Grau, Tasmania Salmonid Growers Assoc.; Ursula Taylor, Derwent Estuary Program; Darryl Cook, Environment Protection Authority Tasmania.