



Salmon
TASMANIA

MACQUARIE HARBOUR OXYGENATION PROJECT (MHOP)

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OVERVIEW

The Tasmanian salmon aquaculture industry will partner with Tasmania's world-leading Institute of Marine & Antarctic Science (IMAS), and the Australian Government's Fisheries Research & Development Corporation (FRDC), in a major initiative to stimulate dissolved oxygen levels in Macquarie Harbour.

It is expected the Macquarie Harbour Oxygenation Program (MHOP) will begin this summer and run over two years in a Tasmania-first trial of engineering solutions to help improve and regulate oxygen levels in a major waterway.

The \$6 million project is the industry's contribution to the Maugean Skate Conservation Recovery Plan, and will

further elevate the sustainability principles underpinning aquaculture in the harbour.

Our objective is to trial this technology on Macquarie Harbour over the next two summers to test whether it could be a long-term solution to improve the Macquarie Harbour environment for the Skate, while responding to the challenge of warming waters.

The project will be delivered by the industry on the West Coast and overseen by IMAS scientists, who will independently report the results of the trial to all stakeholders, including the EPA and the Australian Government. We expect IMAS will also make the results public.

MHOP BASICS & MONITORING

- Remediation working group spoke with national and international experts and heard of working systems across natural waterways through to aquaculture and marine ecosystem restoration projects.
- The recovery group and remediation working groups agreed that engineering solutions to offset net effects from aquaculture to avoid any further reduction in biomass. Biomass has been reduced in MH by 70% in the last 10 years with little-to-no change in bottom DO. It was agreed that an oxygenation trial would be activated by industry as a priority and before Summer 2023. More recently EPA data has shown bottom water DO to be increasing over the last 3 years.
- Nanno bubble and micro bubble concepts were agreed to be the best oxygen delivery method to avoid any upwelling or mass water movements in the highly stratified waterway.
- This type of technology is regularly used around the world for port and harbour remediation, river and estuarine systems to assist natural water exchange and oxygenation. There is a long serving installation that has been in the Swan River in Perth to assist this naturally low water exchange river and provide oxygen. Internationally these systems are commercially available and used to boost deep water oxygen levels.
- The aquaculture industry's oxygen demand has been calculated as the total of average daily oxygen consumption. This relates to the current TPDNO allocation and the corresponding biomass. This was done for both species of fish that are grown in the Macquarie harbour system – Atlantic Salmon and Ocean Trout.



MHOP BASICS & MONITORING CONT...

- The system that is to be used generates oxygen and mixes it with water. This saturated water is then pumped to depth to the high resident marine water that sits beneath the fresh water surface layer. Macquarie Harbour is known to have distinct water layers which is known as a stratified system where little mixing occurs between surface and bottom waters. The project is aiming to boost the oxygen level of these dissolved oxygen poor bottom waters over time. This will be done in conjunction with other work that is concurrently being looked at by other sectors that influence the Harbour and its ability to have oxygen recharge naturally. One of these is Hydro Tas, they are looking to assess what they can do with their river flows through modelling to assist natural oceanic exchange. This work is thought to be less immediate than the oxygenation trial which is aiming to be in place by Summer.
- The oxygenation trial will aim to offset a large portion of this net consumption and assess the broader ecosystem effects within the Harbour throughout this trial period. This important ecosystem work will be conducted by IMAS and will involve baseline and ongoing survey work and will also install additional real time sensors to add to the salmon aquaculture real-time sensor network that is currently installed within the Harbour. The use of ADCP current measurement devices will also be used along with CSIRO hydrodynamic modelling to fully assess all areas of the Macquarie Harbour system through the trial. Other work in the scientific space will

include:

- ROV and underwater camera technology to assess the deeper Main Basin section of the MH system where the trial will be based
- Assessment of background oxygen levels in the deeper water section of the Harbour including the King River and Franklin basin sections of the waterway (deepest points)
- Collaboration with IMAS and CSIRO in relation to an environmental assessment project including before, during and after the trial with formal reporting milestones to be led by IMAS
- Hydrodynamic modelling to be conducted by CSIRO to assess the effect of oxygen addition to the system, any oxygen debts in the ecosystem and where oxygen plumes will be expected to penetrate
- FRDC will be the project sponsor through the salmon Industry Partnership Agreement and all funding will come through this partnership for the trial and overall project. The project will run for 2 years with the trial to be conducted for 18 months. This will allow two summer periods to be assessed and oxygen to be provided over these lower exchange periods.
- All three companies are working together on this project that uses Tassal equipment, near a Huon lease with Petuna running day to day operations.





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