

Commercial Scale Efficiency and Environmental Assessment of Integrated Multi-Trophic Aquaculture (IMTA)

- Project Introduction



Introduction

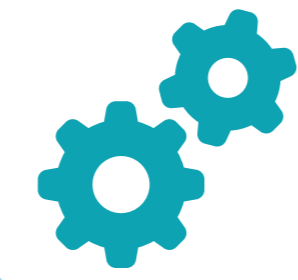
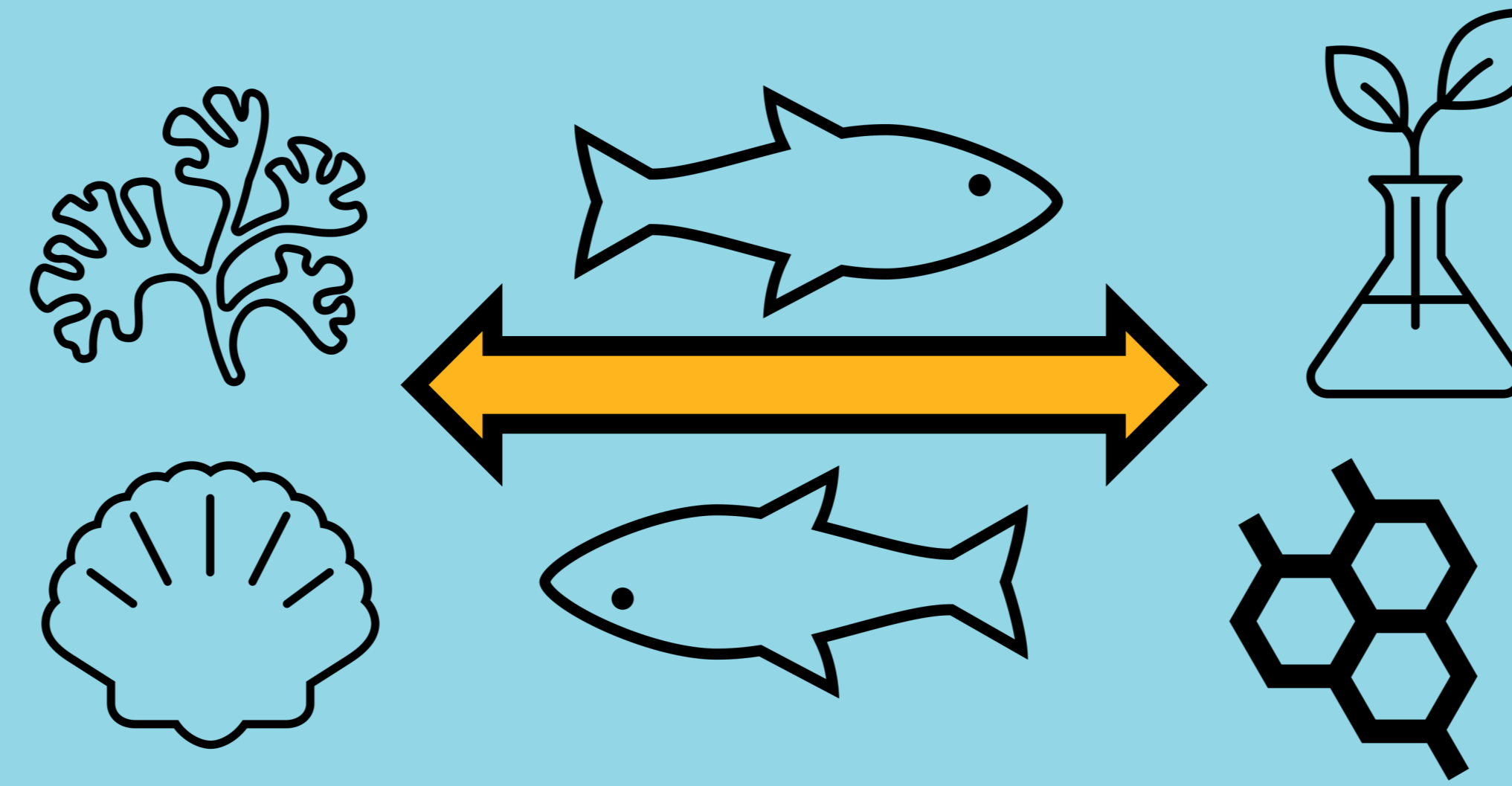
Few studies of IMTA systems have been at full commercial scale. This project incorporates Atlantic salmon with extractive bivalves and algae to investigate environmental mitigation efficiency and economic potential.

Main aims of research:

- Quantify nutrient uptake and removal by extractive species for farm waste mitigation and productivity;
- Examine the potential impacts of commercial scale treatment discharges on extractive species;
- Monitor pathogen uptake and expulsion;
- Develop guidelines for IMTA component positioning, site selection, licensing and governance of IMTA in Scotland



Photo: Trevor Telfer



Methods

- Hydrographic measurements and water quality collected using *in situ* measurements;
- Stable isotope analysis and fatty acids used to trace nutrients from the water column to sediments, benthos, plankton and extractive species;
- Treatment discharges emamectin benzoate, azamethiphos, deltamethrin, hydrogen peroxide, metals and plastics will be traced through the commercial scale IMTA system;
- Pathogen testing in each extractive species;
- Extractive species productivity analysis using morphological metrics;
- Plankton and benthic community assessments;
- Modelling – hydrographic data, water quality, plankton, socio-economic factors, nutrient & contaminant dispersal;
- GIS – benthic habitat mapping, GIS layers will provide a tool for assessing site suitability for each species and combined species as IMTA.



Key Questions

- What are the mechanisms of nutrient transfer and uptake between systems at commercial scale and how do these impact extractive species productivity, environmental mitigation and economic potential?
- Are anthropogenic contaminants transferred between systems at commercial scale and do these impact extractive species productivity, environmental mitigation and economic potential?
- Are pathogens transferred between components?
- What are the effects of large commercial scale integrated systems on the environment and stakeholders?
- What parameters should define site suitability for full-scale commercial IMTA?



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