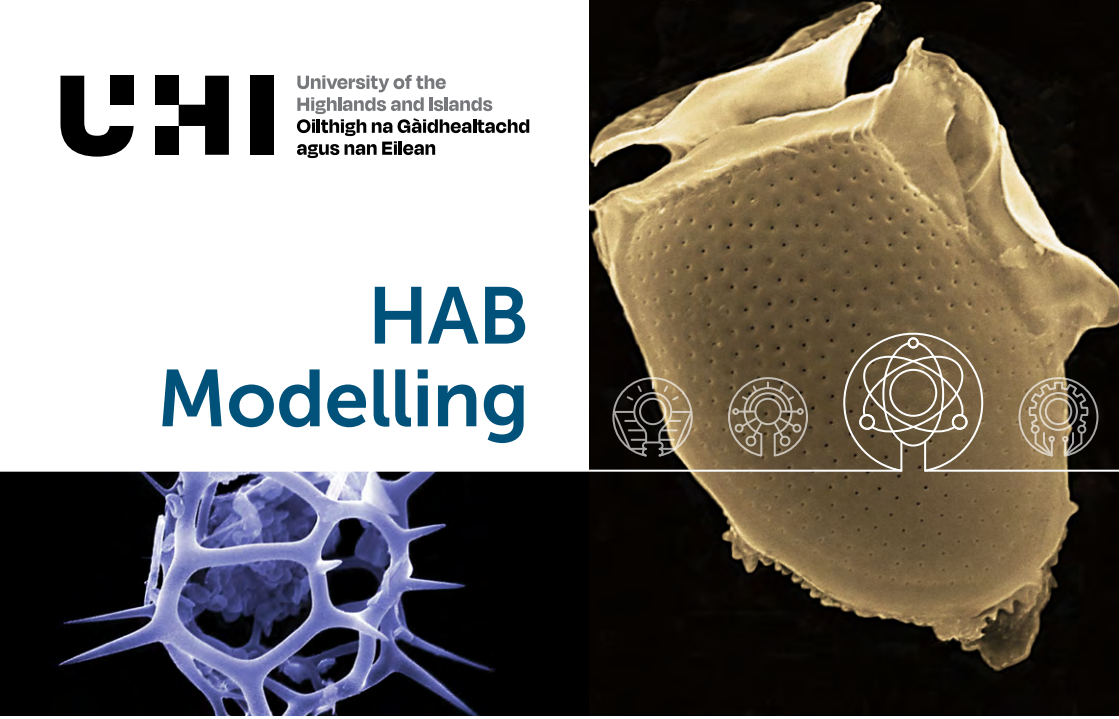
University of the Highlands and Islands
Oilthigh na Gàidhealtachd agus nan Eilean

HAB Modelling



A mathematical model based early warning tool for advective harmful algal blooms in Scotland.

Harmful algal blooms in Scottish water are often transported significant distances around the coast through the action of oceanographic currents. Hence, knowing the location of a bloom event allows mathematical model based forecast of its future development and location, offering the potential to provide early warning and risk assessment to other aquaculture businesses in the region.

Within the SAMS harmful algal bloom early warning web-portal (www.HABreports.org) we have implemented an operational model based forecast tool that uses SAMS' operational forecasting modeling system WeStCOMS to predict the subsequent anticipated size and trajectory of HABs identified at or near aquaculture sites.

The model consists of coupled atmospheric (weather-research forecasts WRF, 2km) and unstructured-grid finite volume community ocean modeling (FVCOM) components with up to 100 meters nearshore resolution.

Microscope counts of algal cells undertaken at aquaculture sites by finfish producers and though the Scottish regulatory shellfish safety monitoring programme are used to initiate the model. If cell counts exceed predefined threshold levels, virtual particles 'seeded' for advection into the flow fields, derived from an ensemble of suitable hydrodynamic forecasting models.

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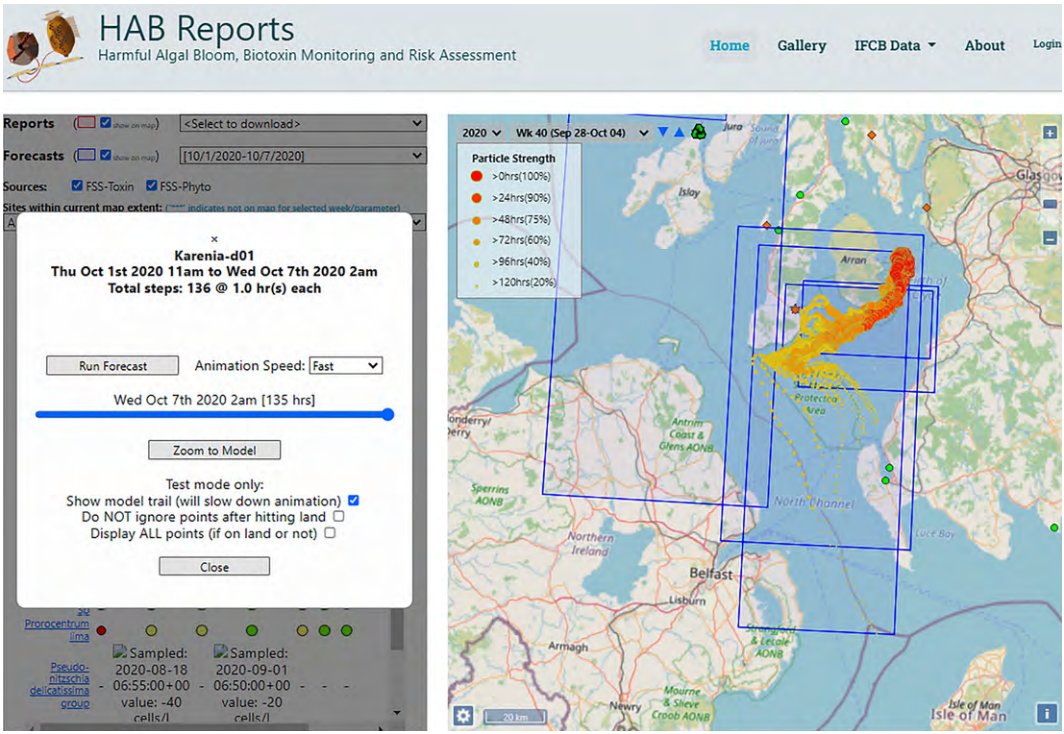

The figure above depicts a screenshot from www.HABreports.org highlighting modelled development identified in the Firth of Clyde on the 28th September, 2020. Colored particles shows the modelled HAB spreading pattern prediction from our WeStCOMS-FVCOM model up to the 4th October 2020.

The alert system is being further developed with support from a SAIC research grant to SAMS, Scottish Sea Farms and MOWI.

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