

ADICFito, FarmWatch and BloomPredictor: Technical Tools for HAB study and monitoring

Abstract

Plancton Andino has been monitoring HAB in Chile's salmon industry for more than 25 years through the POAS program. From its origins, POAS has provided a consistent dataset based on laboratory analysis and standardized protocols, ensuring high-quality information to support aquaculture management. In the last decade, digital transformation has become a central part of our strategy, enabling the development of specialized modules, this presentation will showcase **BloomPredictor**, **ADICFito**, and **FarmWatch**, modules designed to bring technological support to HAB monitoring and decision-making.

BloomPredictor is a machine learning model that integrates phytoplankton data with meteorological station measurements and global circulation models (GFS) to predict short-term (1–7 days) HAB risk. By linking environmental drivers with biological indicators, BloomPredictor provides actionable forecasts that allow the salmon industry to prepare and respond to bloom events.

ADICFito is a web-based platform for systematically storing phytoplankton images and associated metadata, enabling indexing by taxonomy and morphological traits. The platform has been enhanced with AI models for taxonomic family-level classification and large language models for generating descriptive content.

FarmWatch aimed to empower fish farmers to actively contribute to monitoring efforts. Users can integrate microscopy analysis made in the fish farms and connect it with environmental data from in-situ sensors, creating a unified platform for environmental and biological monitoring.

Together, these three modules mark a step toward a automated HAB monitoring program, where real-time data collection, AI-powered image analysis, and predictive modelling converge to strengthen early warning systems and support sustainable aquaculture.