

Applications of machine learning to the forecasting of short-term sea lice abundances in British Columbia

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Abstract: Wild salmon populations have been negatively affected by farming efforts through the increased disease prevalence brought on by farms. Sea lice have been well-researched in the Broughton Archipelago of British Columbia, Canada. Through such surveys, it was found that sea lice affliction in farmed salmon have been shown to increase sea lice prevalence on wild populations. Therefore, it would be useful to conservation efforts to be able to predict sea lice outbreaks by identifying the environmental factors that affect sea lice occurrence. Indeed, knowledge of the variability in sea lice occurrence due to the environment is crucial for fishery and conservation efforts, yet it has not been fully explored in terms of forecasting. I used regression, machine learning models, and deep neural networks in order to identify the relative importance of climatic factors and standing stock of lice in nearby farms for the prediction of sea lice occurrence. I found that our current models are unable to consistently accurately forecast short-term sea lice occurrence. I would recommend future modelling efforts to explore the scale of the underlying processes that affect sea lice abundance as well as including explicit spatial factors and local densities. These findings indicate that further research is required in understanding the factors that would allow us to produce short-term forecasts of sea lice abundances.