

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

Tristan Garry – EEB498 – 2019-2020

Supervisors: Martin Krkosek and Marie-Josée Fortin

<https://tristangarry.github.io/sea-lice-forecasting/>

## **Abstract**

Wild salmon populations have been negatively affected by salmon farms through the increased prevalence of disease brought on by farming. Sea lice have been well-researched in the Broughton Archipelago of British Columbia, Canada. Through resulting surveys, it was found that sea lice affliction in farmed salmon has been shown to increase sea lice prevalence on wild populations and the ability to predict sea lice outbreaks by identifying the relevant environmental factors would aid conservation efforts. Knowledge of the variability in sea lice occurrence due to the environment is crucial for fishery and conservation efforts, yet the benefit of forecasting has not been fully explored even with a large set of data available. Given that other industries have used machine learning to provide better forecasting based on large data sets, regression, machine learning models, and deep neural networks were used 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. Although observed years were modeled accurately, it was found that the chosen models were unable to consistently and accurately forecast short-term sea lice occurrence for unobserved years. It is recommended that future modelling efforts 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.