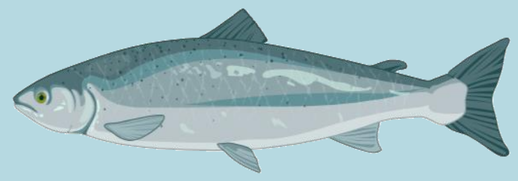
Net Pen Density and Biomass: Uncovering the Hidden Link Between Aquaculture and Sea Lice (*Lepeophtheirus salmonis*) Impact on Wild Salmon



HYPOTHESIS

The density of fish net pens in the Norwegian production areas is contributing to the rise in female sea lice infestations on wild salmon populations.

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METHODS

We collected and analyzed data on Atlantic salmon (Salmo salar) and salmon lice (Lepeoptheirus salmonis) across Norwegian aquaculture production areas. The datasets were sourced from Barentswatch, Statistics Norway (SSB), and Lusedata. Our primary dataset spans 15 years of lice counts per wild salmon, while the comparative dataset provides biomass production data by production area (PA) from 2017–2020. PA 1 and PA 3 were excluded due to incomplete data. To examine the relationship between aquaculture density and lice levels, we calculated net pen numbers, average biomass, and lice counts for each PA. Dual-axis charts in RStudio compared lice levels per wild salmon with biomass and net pen density.

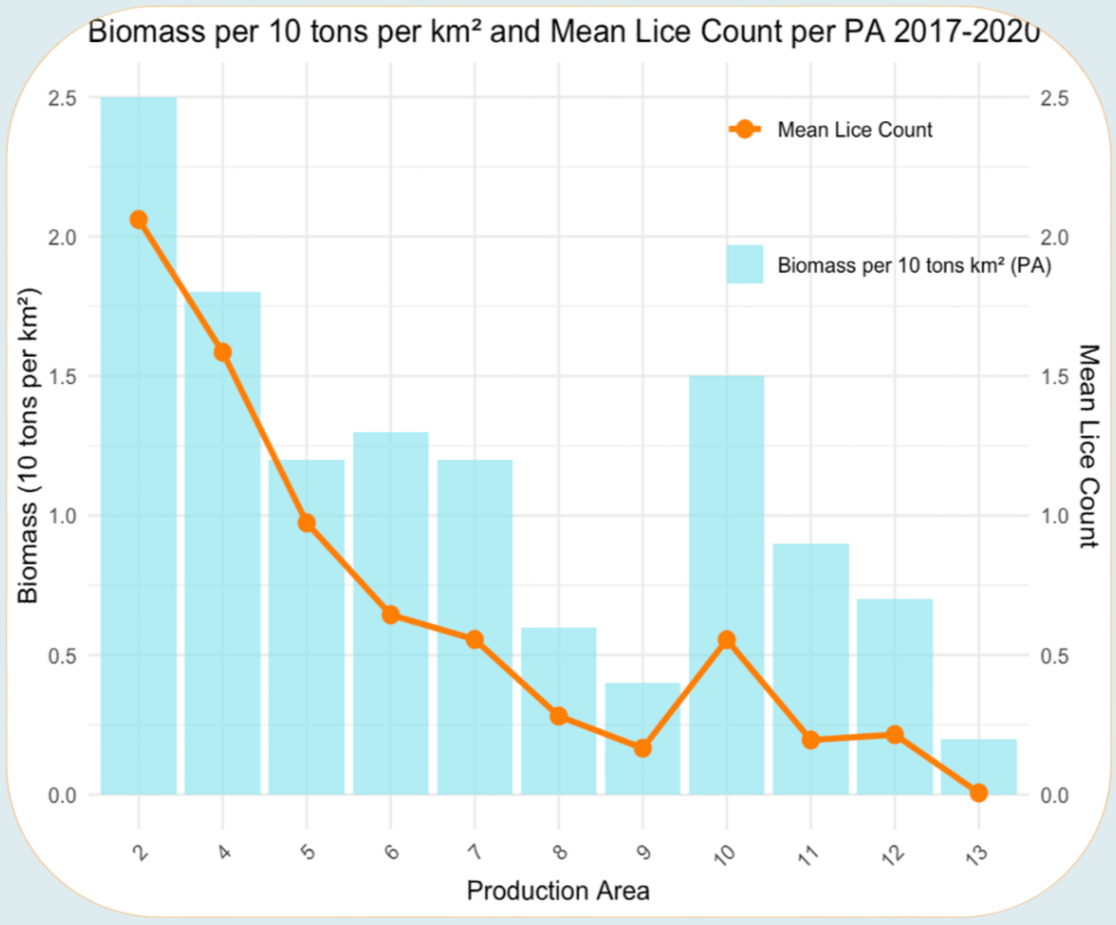

Figure 1: Average production in biomass (10 tons) for the time period 2017-2020 per km^2 per PA and Mean lice count per wild salmon within each PA.

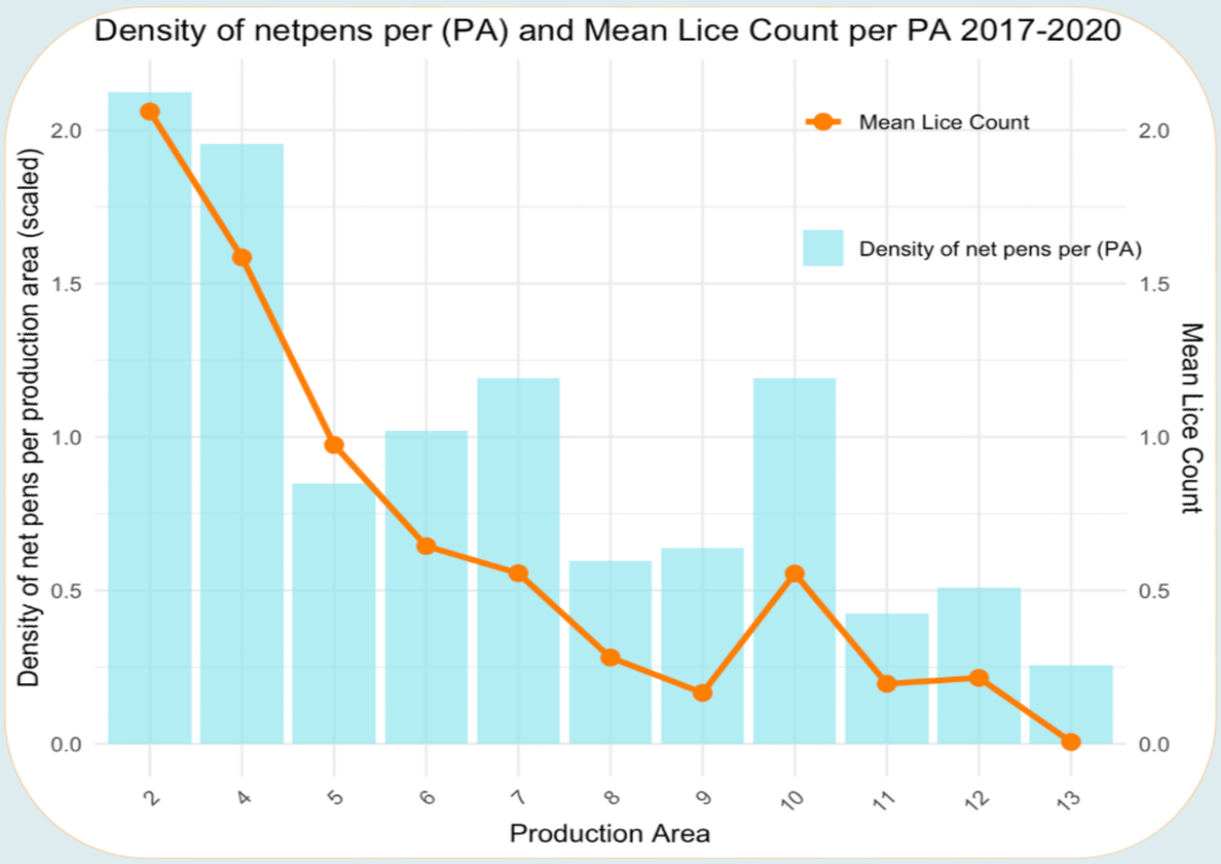

Figure 2: Density of net pens per production area (scaled for visual purposes) and mean lice count per wild salmon within each PA for the time period 2017-2020.

RESULTS

Our analysis showed a clear relationship between total biomass production in production areas and average sea lice levels per wild salmon. Higher biomass correlated with increased lice per wild salmon, suggesting that aquaculture intensity influences lice transmission. We also found a positive correlation between net pen density and lice prevalence. These results highlight biomass and net pen density as key factors in lice transmission, indicating that targeted regulation of aquaculture density could help reduce environmental impacts on wild salmon populations.