

FORECASTING FISH COMMUNITIES UNDER CLIMATE CHANGE WITH EVOLUTION

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INTRODUCTION

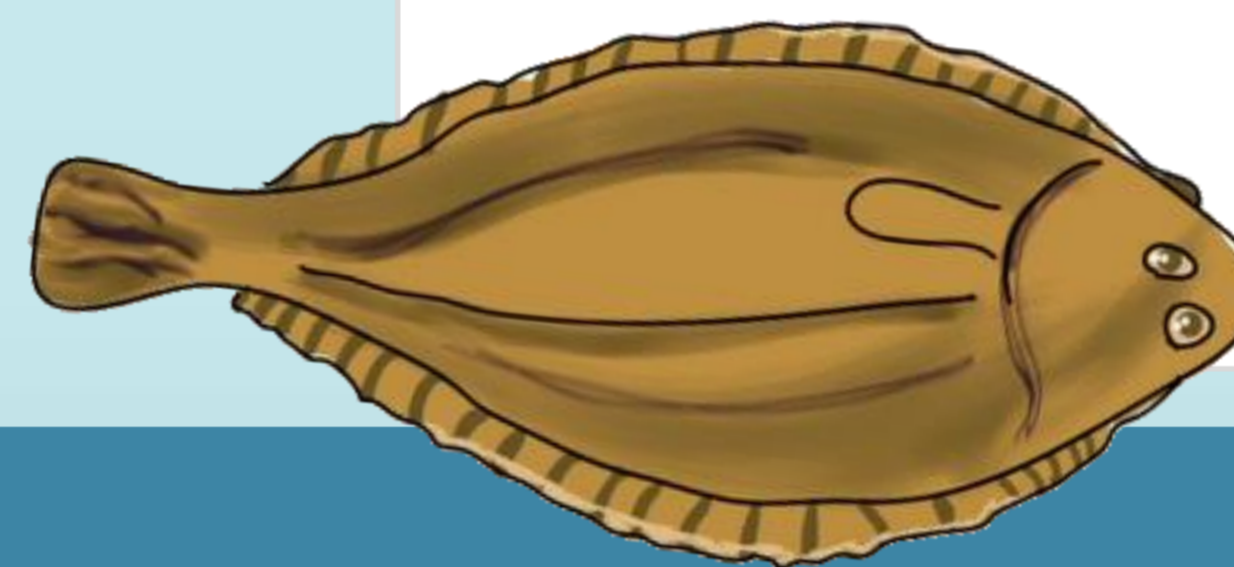
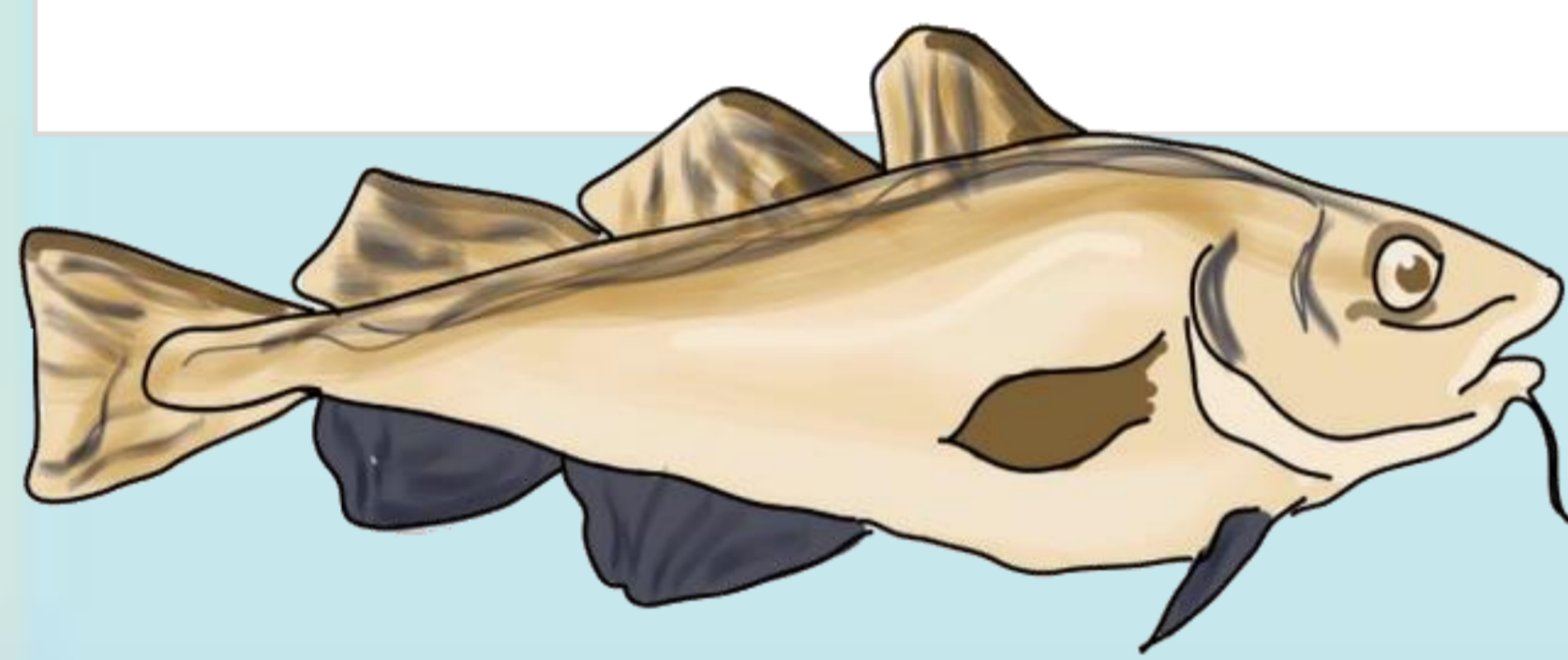
Context

- Fisheries and climate change induce evolutionary and plastic changes in fish life-history traits such as growth rate, size and age at maturation and fecundity
- Ecological consequences: decrease biomass and size-at-age
- Economic consequences: fisheries yields and fish values decrease

Current gaps:

- Evolutionary change is not included in marine ecosystem models. Forecasts ignore potential evolutionary traps or rescues and their ecosystem consequences

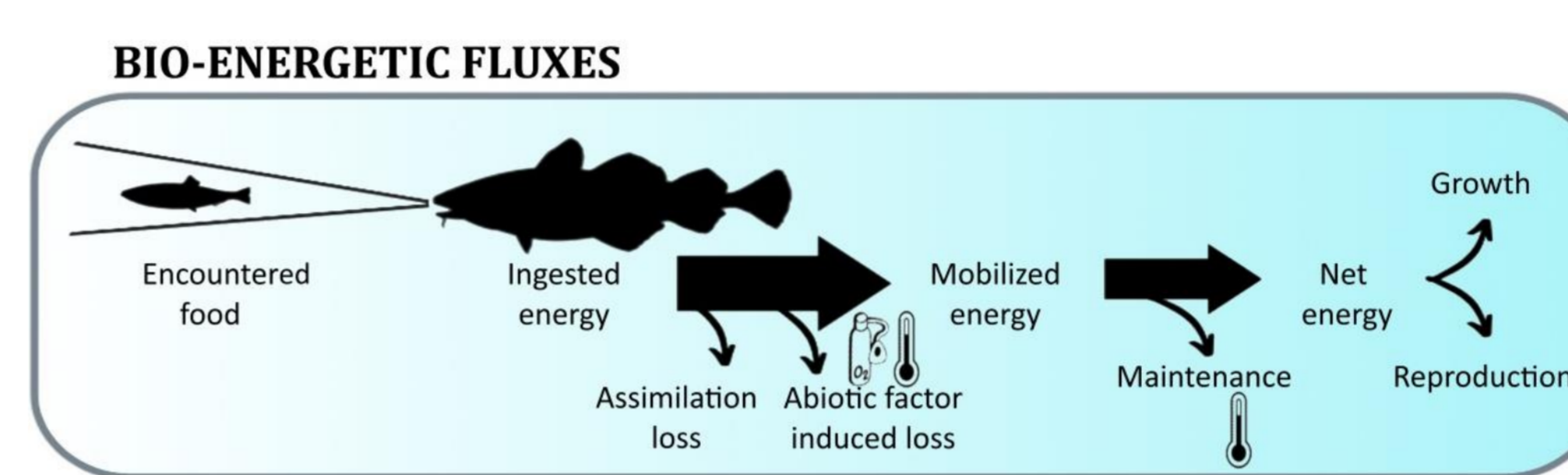
CAN EXPLOITED FISH IN THE NORTH SEA COPE WITH CLIMATE CHANGE THROUGH EVOLUTION?



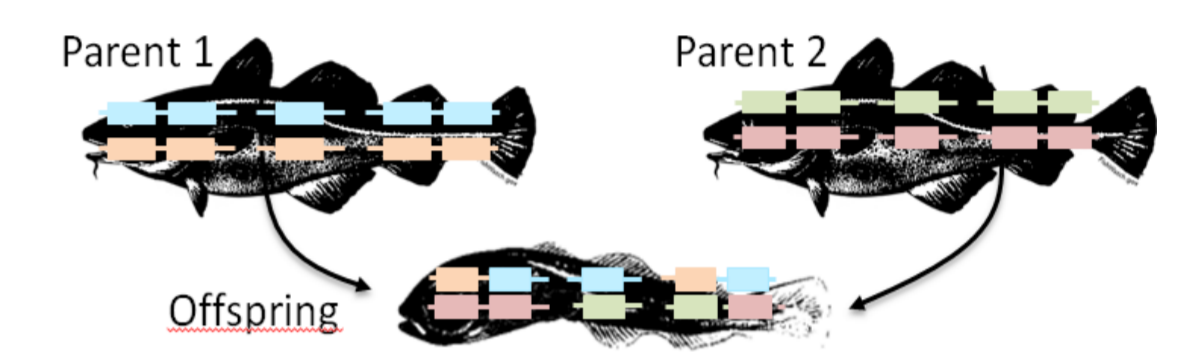
MATERIALS & METHODS

Evolutionary marine ecosystem model: the Ev-OSMOSE model

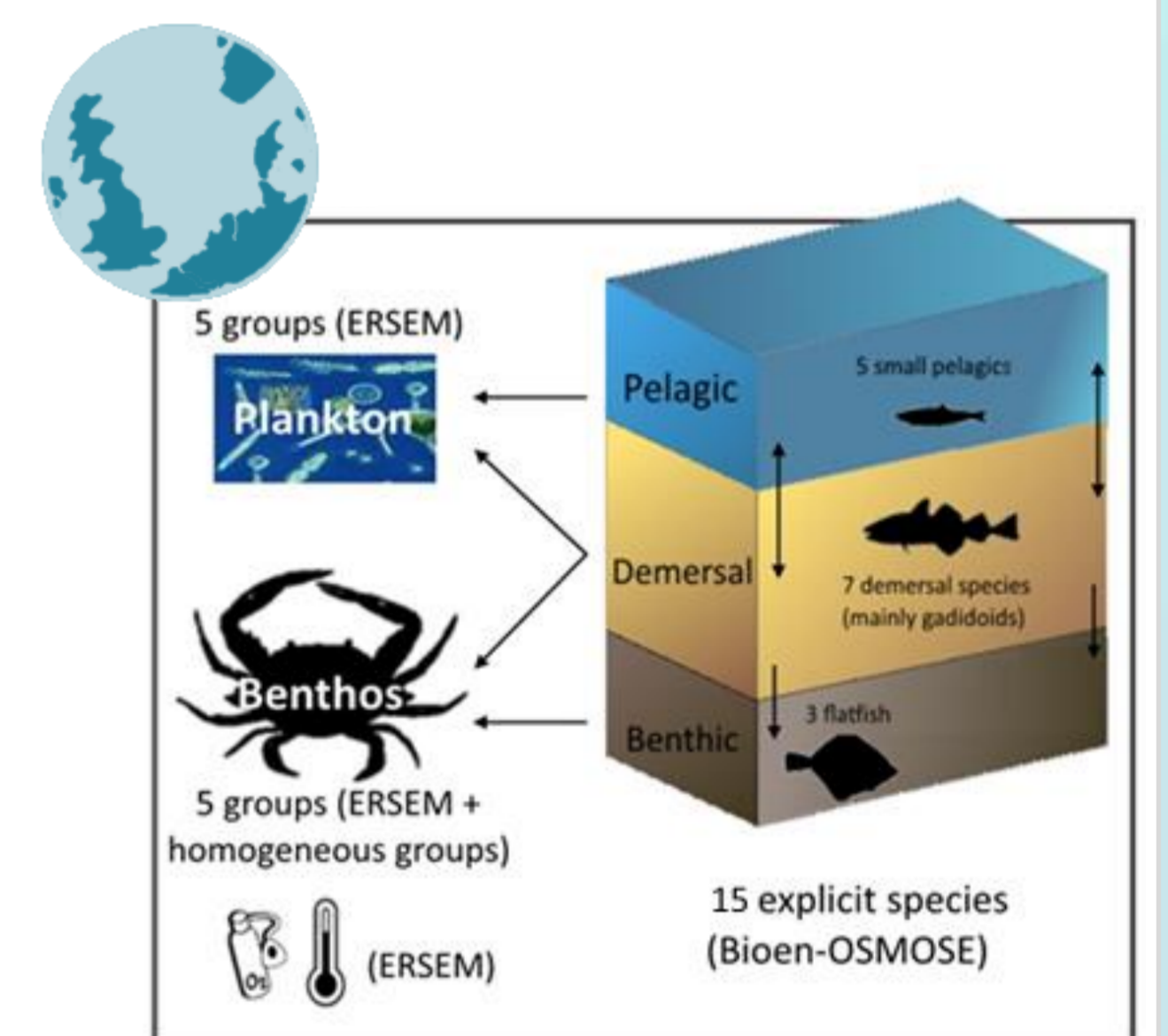
1) Explicit physiology, varying with T° and O_2 from which emerges life history



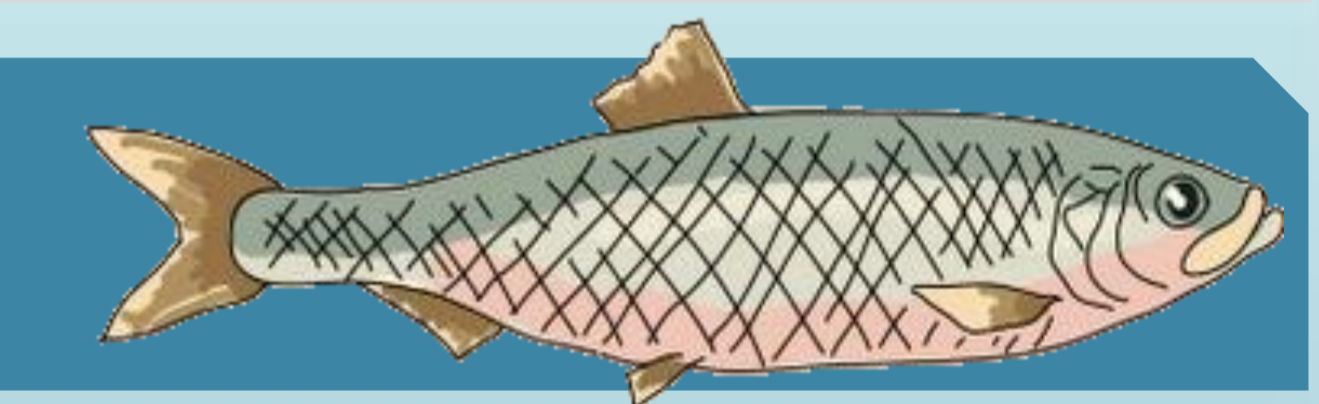
2) Transmission of life history genotypic values



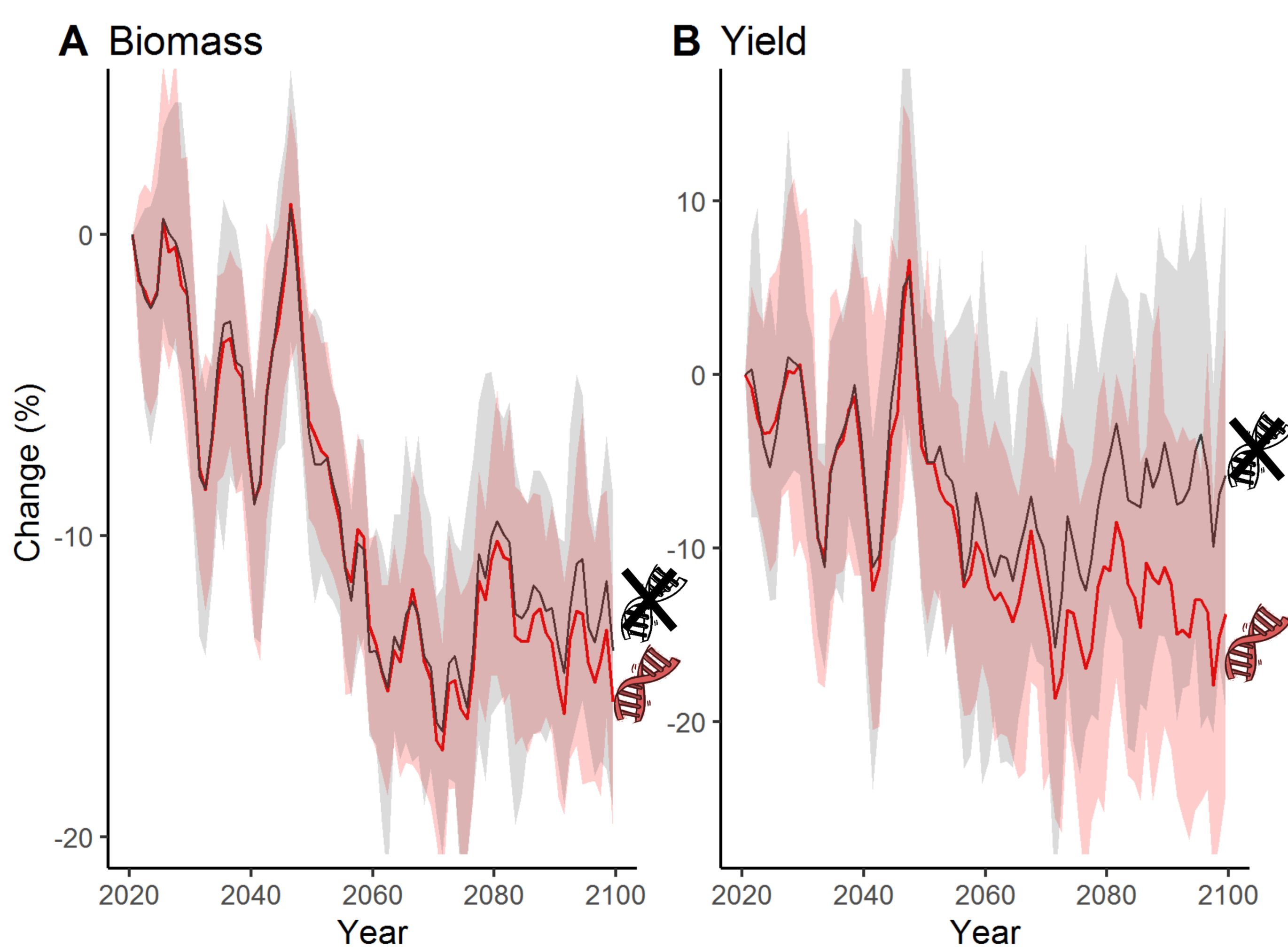
3) Applied to the North Sea ecosystem



RESULTS & DISCUSSION

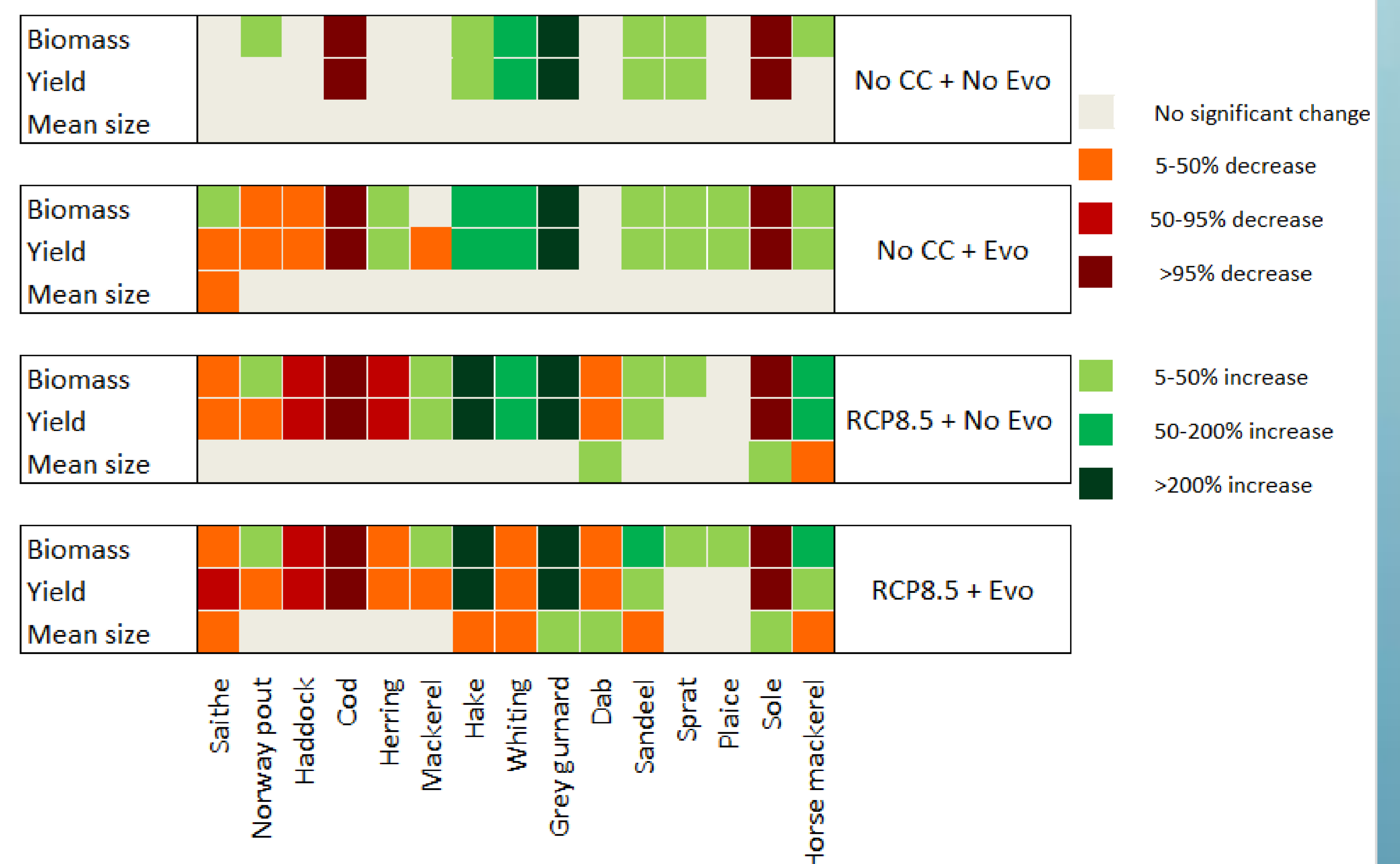


Total biomass and yield (RCP 8.5)



- Evolution does not impact the response of total biomass to climate change (A)
- The total fishing yield decreases more in scenarios with evolution (B)

Biomass, catch and mean size per species



- Evolution accentuates patterns of change mainly changes in size. A decrease in size could impact the economic value of fish
- The biomass and yield of valuable species (cod, sole, saithe, haddock, herring) decrease

With evolution, the volume and value of catch worsen