

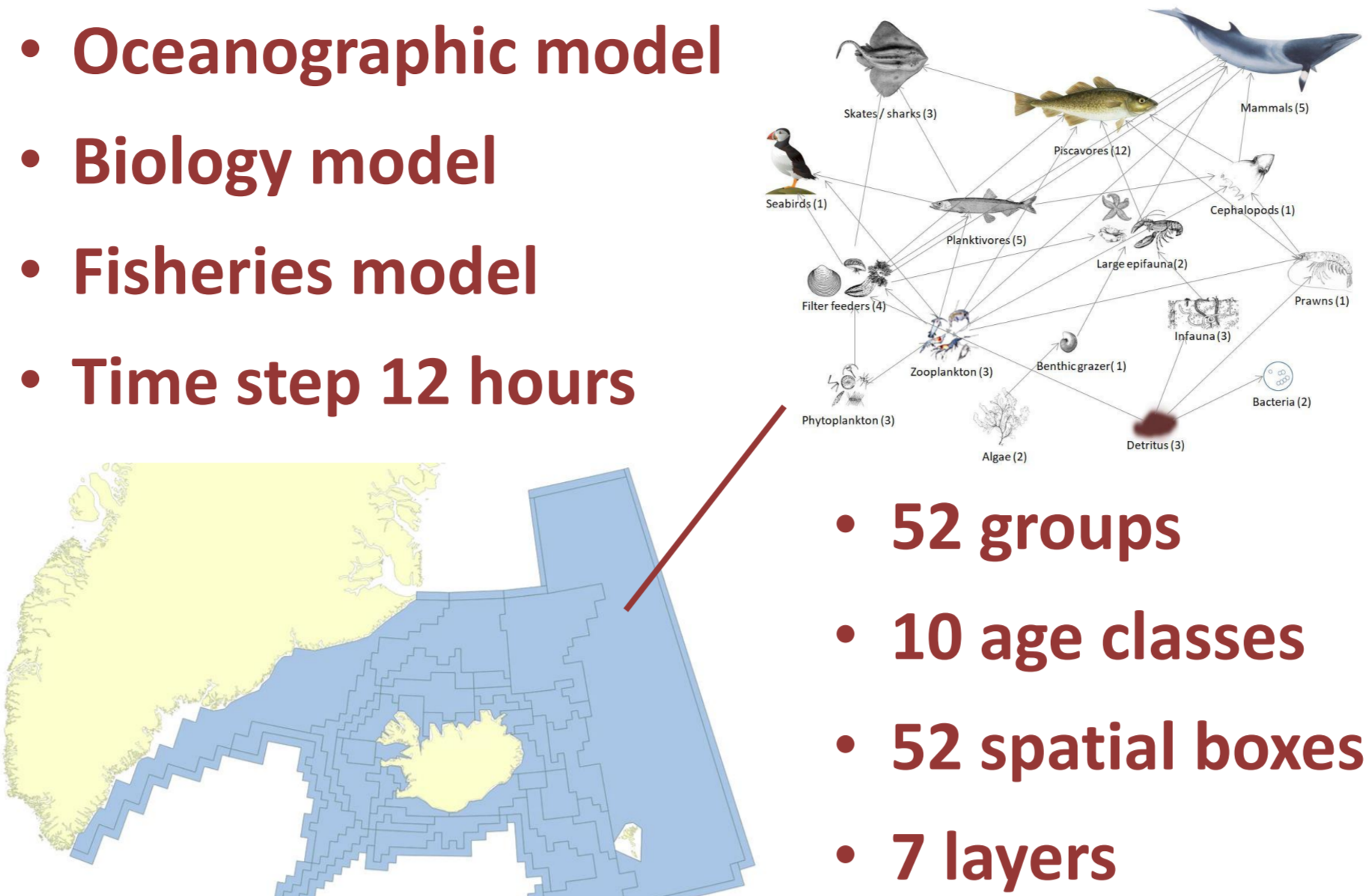
Can EwE mimic the Atlantis ecosystem?

Erla Sturludóttir and Gunnar Stefánsson
Science Institute, University of Iceland

Introduction

- Atlantis model has been constructed for Icelandic waters.
- Atlantis used as an operating model to test the performance of a simpler ecosystem model, Ecosim with Ecosim (EwE).
- Difficult to test the performance of ecosystem models because the true ecosystem is never known.
- In this study the Atlantis ecosystem is known.

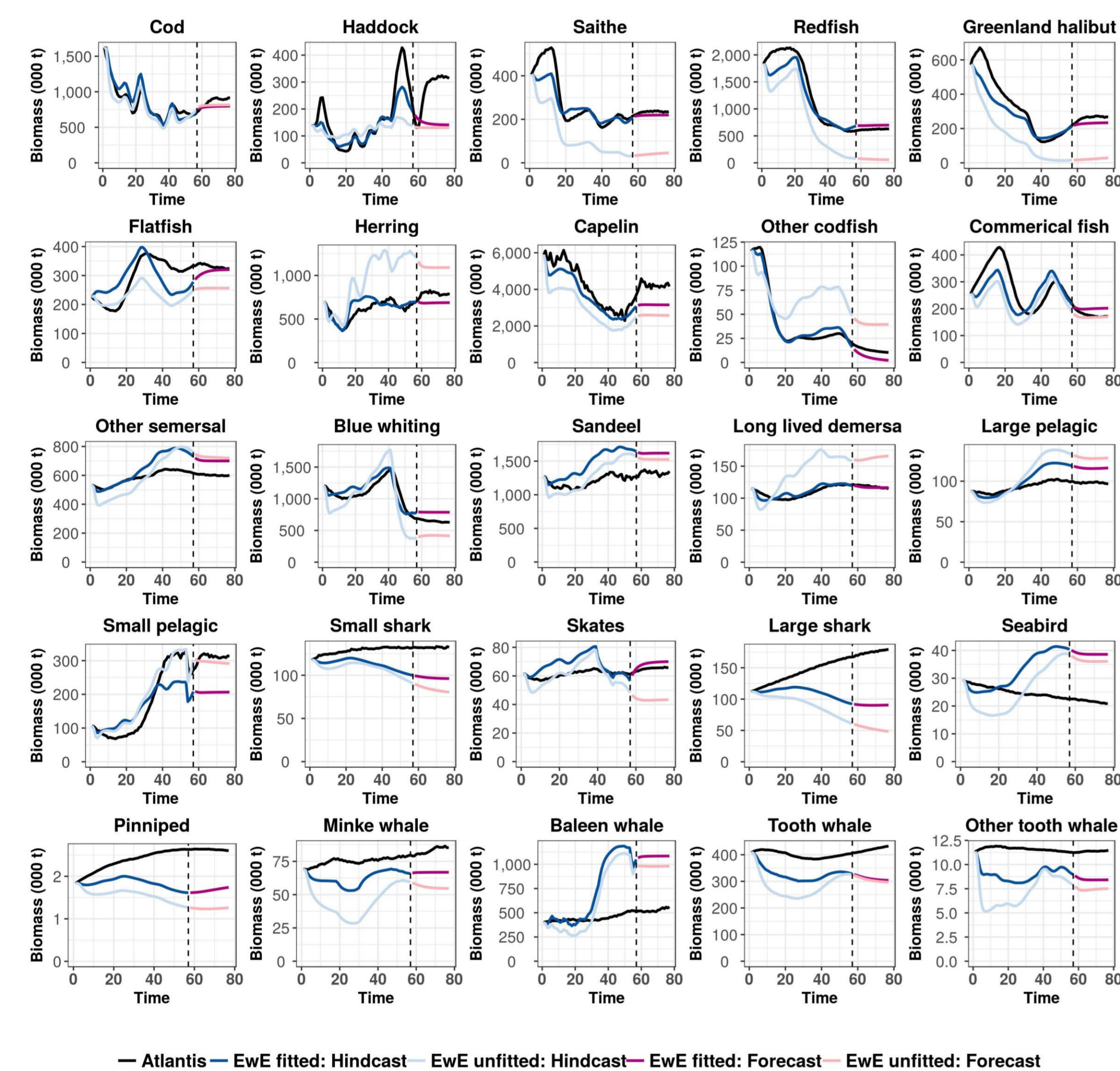
The Atlantis model

- Oceanographic model
 - Biology model
 - Fisheries model
 - Time step 12 hours
- 
- 52 groups
 - 10 age classes
 - 52 spatial boxes
 - 7 layers

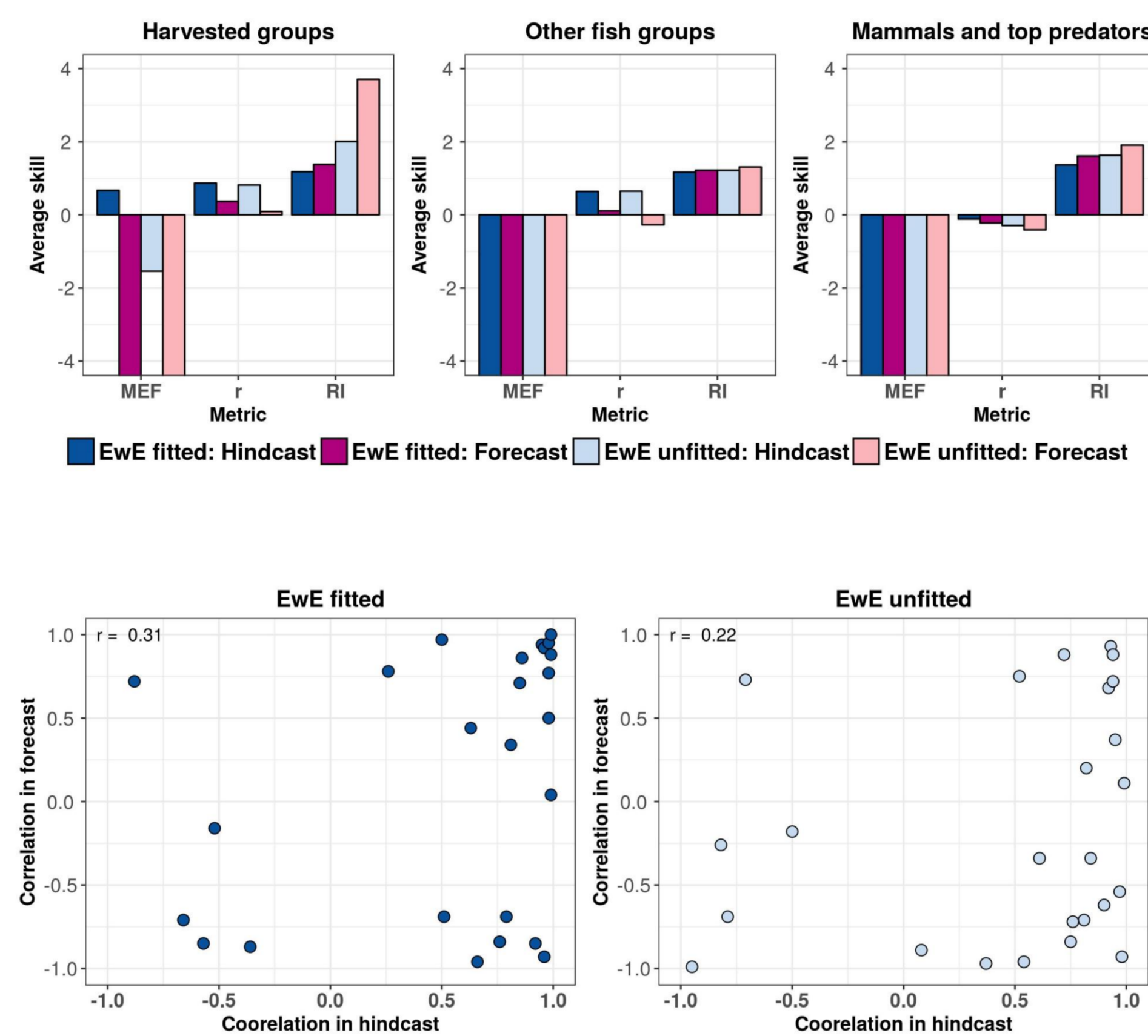
Methods

- EwE model with no age-classes and no spatial component constructed.
- Parameters and harvest rates calculated from the Atlantis model.
- Automatic balancing process and time-series fitting by estimating the vulnerability in the predator-prey interactions.
- Simulated biomass compared to the true Atlantis biomass using three metrics: model efficiency (MEF), reliability index (RI) and correlation (r).

Atlantis model version 1



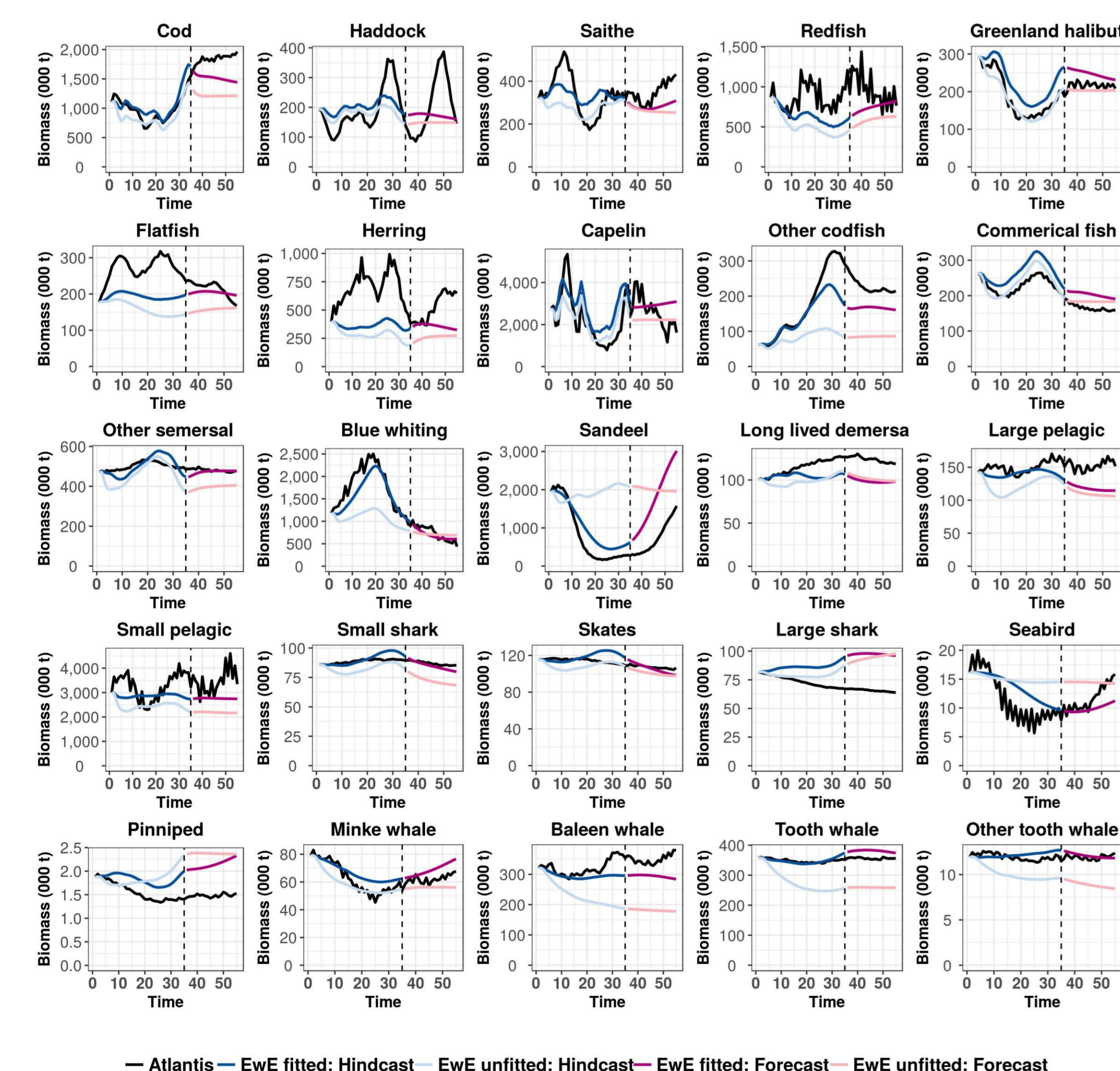
Version 1 No recruitment scales in forecast and respiration off



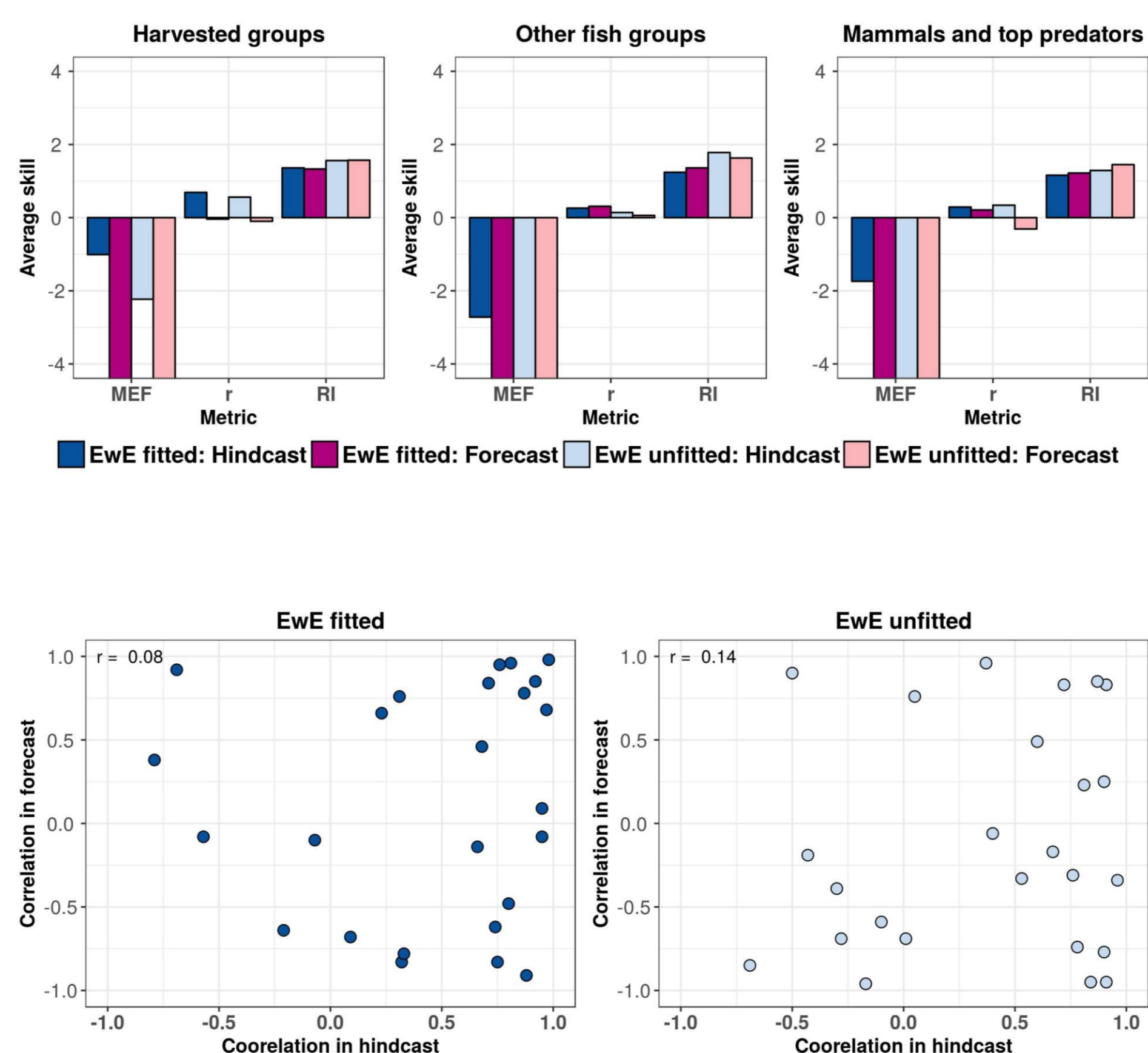
Results

- Time-series fitting improved the fit of the model, especially when looking at MEF and RI.
- Positive correlation between simulated biomass from the EwE model and the true Atlantis biomass for the fish groups.
- The EwE model was not able to mimic the biomass of the mammals and top predator groups.
- Most groups that had high correlation in hindcast also had high correlation in forecast.

Atlantis model version 2



Version 2 Recruitment scales in forecast and respiration on



Results

- Not as good fit as for version 1, except for the mammals and top predators.
- Positive correlation between simulated biomass from the EwE model and the true Atlantis biomass for the fish groups.
- Negative correlation in forecast for the harvested groups.
- High correlation in hindcast did not result in high correlation in forecast.
- It was possible to make a simple EwE model that was able to mimic the Atlantis ecosystem.
- The forecasting ability of the model was however not reliable.



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 613571 and from the European Commission's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 634495 for the project Science, Technology, and Society Initiative to minimize Unwanted Catches in European Fisheries (MINOUW)

