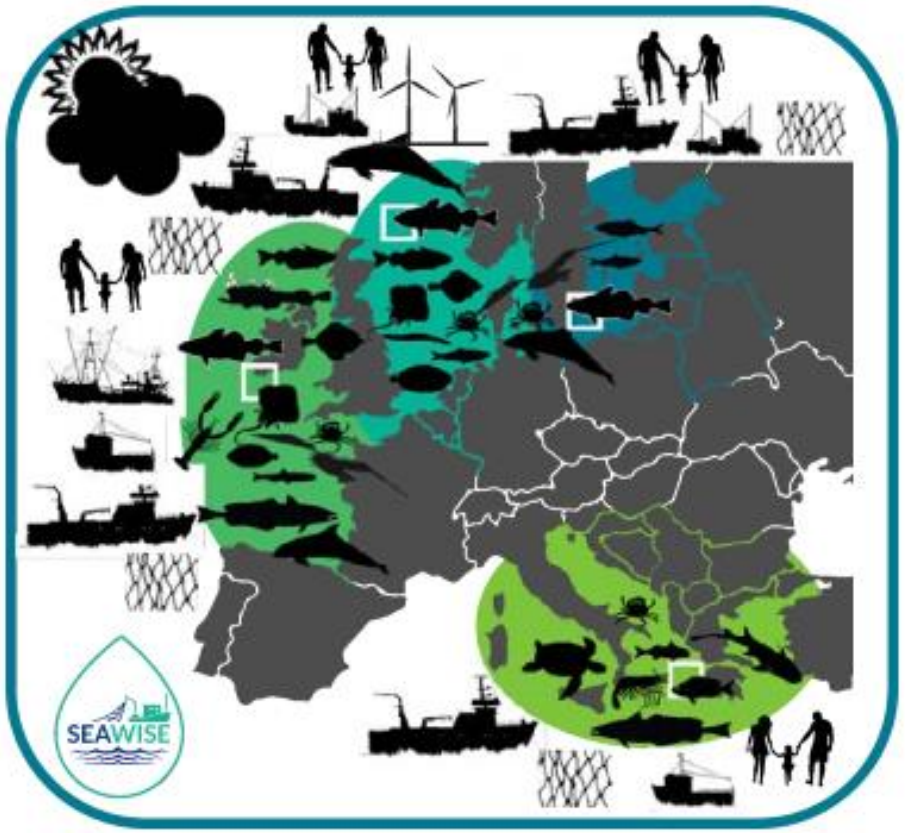
Welcome !

A practical course in the integration of the impact of environment on stocks productivity in Management Strategy Evaluation models

SEAwise has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000318



The SEAwise project

"Paving the way for the effective implementation of Ecosystem Based Fisheries Management in Europe"

- Accounting for effects of the environment and anthropogenic activities on fish stocks
- Accounting for effects of fishing on the ecosystem and the social system

Receiving end : WP6 – identify MS that ensure GES, economically efficient fishing sector and the well-being of local fishing communities

To ensure :
- Long term harm to fished stocks and other ecosystem components is avoided
- Sustained social and economic benefits are attained

Coord : Anna Rindorf DTU Aqua
24 partners across Europe
8 millions euros
2021 – 2025
4 regions
More info on :
https://seawiseproject.org/

Impact of the environment on fish productivity and integration of environmental considerations in MSE

Part of the project finished

WKECOMSE

Present and discuss the work produced in the seawise project with the stock productivity/MSE communities

Compare it to other approaches from colleagues

Produce best-practice/guidelines from collective experience

ICES CIEM

JOINT ICES-SEAWISE WORKSHOP TO QUALITY ASSURE METHODS TO INCORPORATE ENVIRONMENTAL FACTORS AND QUANTIFYING ECOLOGICAL CONSIDERATIONS IN MANAGEMENT STRATEGY EVALUATION TOOLS (WKECOMSE)

VOLUME 6 | ISSUE 72

ICES SCIENTIFIC REPORTS

RAPPORTS SCIENTIFIQUES DU CIEM

Management Strategy Evaluation

Management Strategy
Data collection schemes
Specific analyses
Harvest control rules

Model

Management goals
Indicator 1
Indicator 2
…

Punt et al, 2016. Best Practices MSE. Fish and Fisheries

Management Strategy Evaluation models

Model categories	Parameter estimation	Uncertainty estimation	Context	
Stock assessment models	Internal	Y	Tactical	
Multispecies models	Internal	Y		
Multispecies multi fleets models	External	Y		FLBEIA, BEMTOOLS
Ecosystem models	External	N	Strategic	

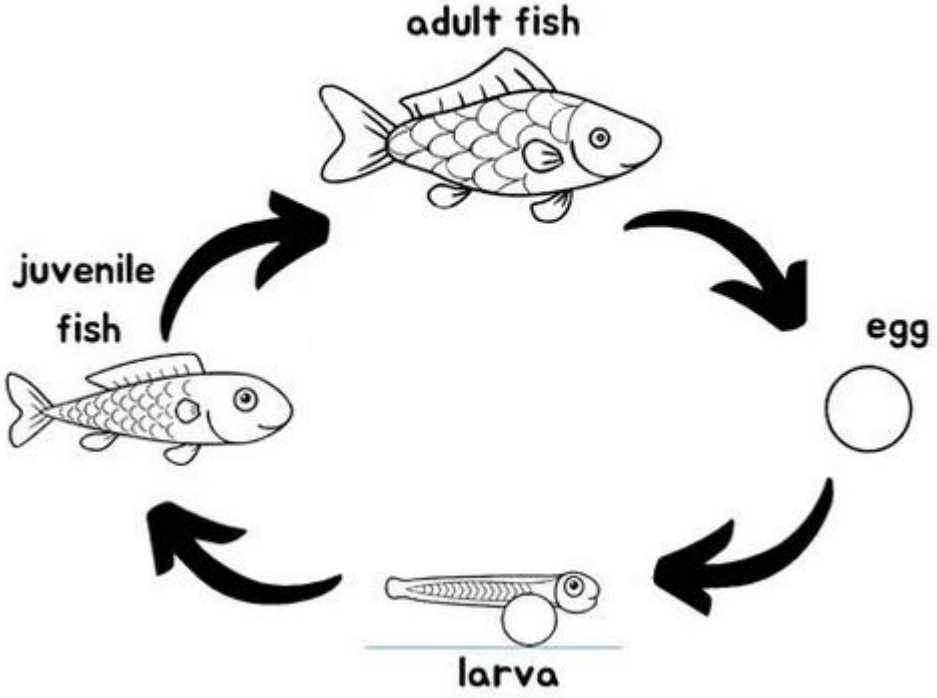
MSE addressing the environmental effects on commercial species productivity

Environmental and ecological drivers affects fish productivity through :

- Reproduction and recruitment

- Growth and maturity

- Natural mortality



MSE addressing the environmental effects on commercial species productivity

Empirical approach

Examine broad scenarios without explicitly identifying mechanisms

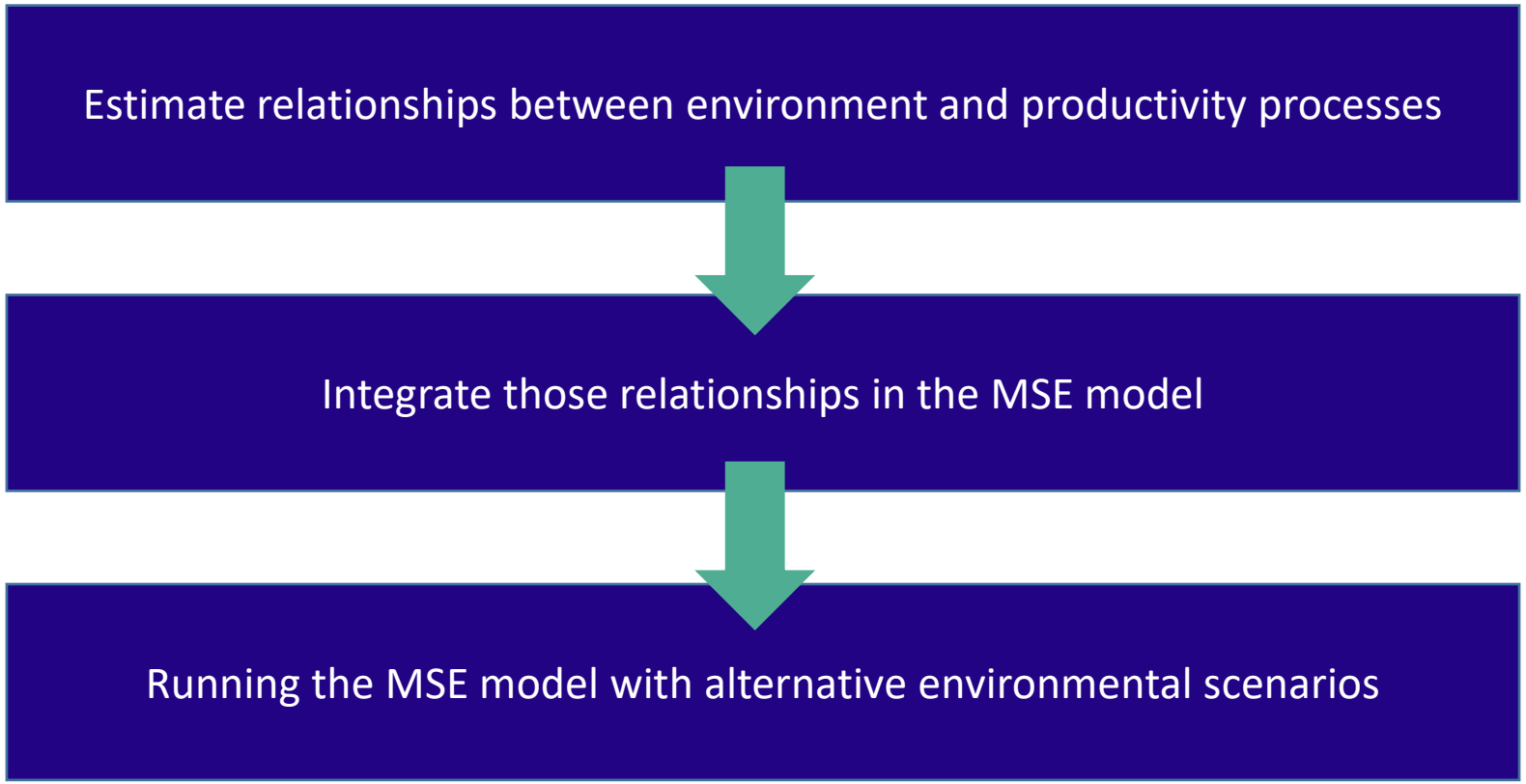
=> Imposing trends or variability in the values of some parameters (controlling productivity processes)

« Data-poor approach »
No projection of environmental data
No evidence for environment-induced effect on productivity processes

Punt et al, 2014. ICES JMS

MSE addressing the environmental effects on commercial species productivity

Mechanistic approach



« Data-rich approach »

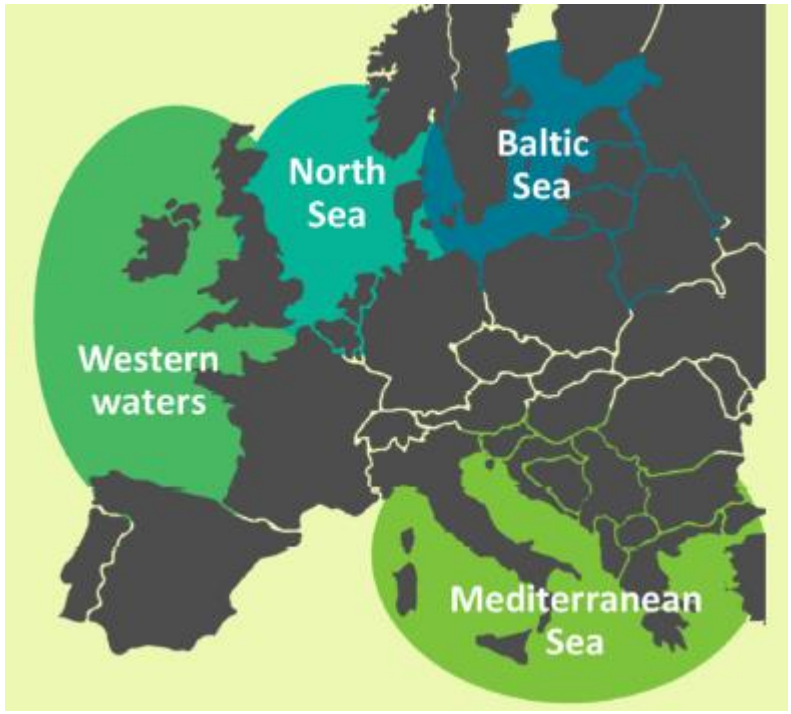
Punt et al, 2014. ICES JMS

What was achieved in SEAWise

Model and predict the effect of environment on the main biological processes controlling productivity : recruitment, growth, maturation and survival

Drivers

Temperature mainly,
primary production or chl a,
zooplankton,
SSB,
salinity,
turbulence,
NAO



Scenarios of change

RCP4.5 (intermediate, most probable)
and 8.5 (business as usual worst case scenarios)

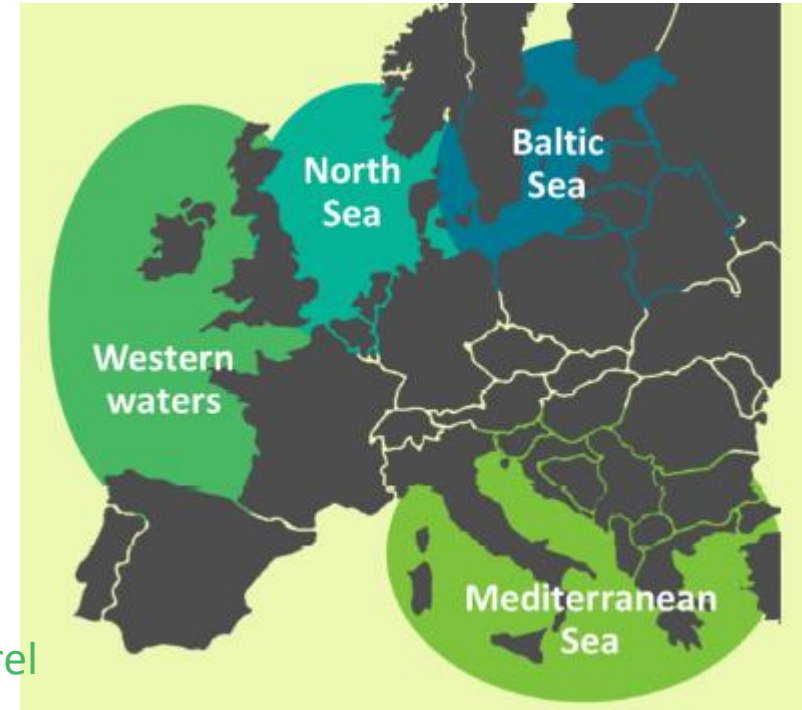
Produced with POLCOMS ERSEM or NEMO MEDUSA, and NEMO SCOBI (Baltic)

Ecosystem effects on fisheries yields

Model and predict the effect of environment on the main biological processes controlling productivity : recruitment, growth, maturation and *survival*

Cod, Saithe, Haddock, Whiting, Herring, Plaice, Sprat

Cod
Sole
Haddock
Megrim
Anchovy
Sardine
Anglerfish
Hake
Mackerel
Bluewhiting
Seabass
Horse mackerel



Herring
Cod

Hake
Red mullet
Deep-water rose shrimp
Giant red shrimp
Blue and red shrimp

Methods
Linear (mixed) models
Generalised additive (mixed) models
Mediated length-based growth models
Hierarchical mixed models for otolith increments
Bayesian nested hierarchical models
Dynamical factor analysis
…

SEAWISE

Ecosystem effects on fisheries yields => Evaluation of Management Strategies

Multistock-multifleet MSE models deployed in SEAWise

FLBEIA NORTH SEA

BEE

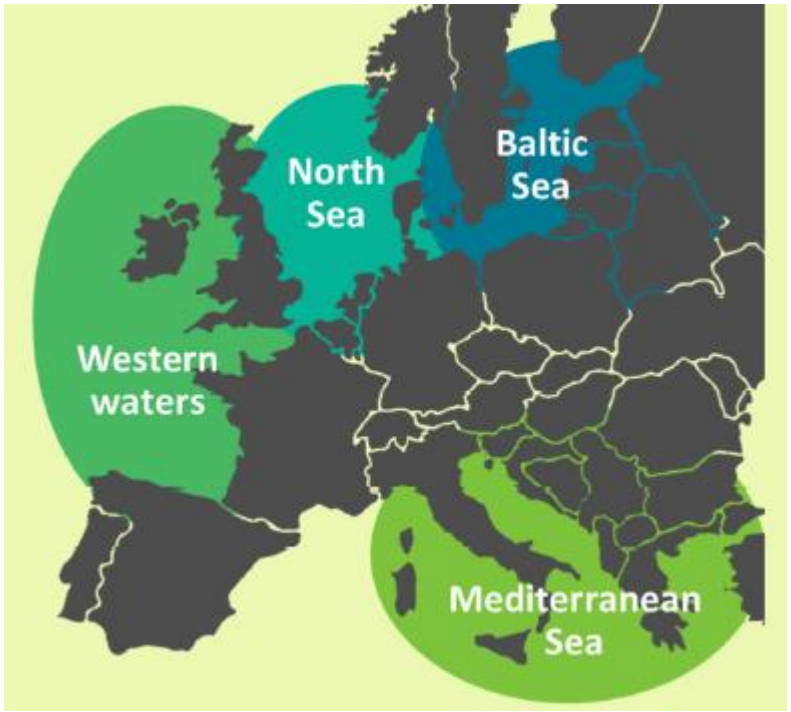
FLBEIA CELTIC SEA

FLBEIA BoB demersal

FLBEIA BoB pelagic

ISIS Fish BoB demersal

ISIS Fish BoB pelagic



FLBEIA Eastern Ionian Sea

BEMTOOL Adriatic and Ionian Seas

⇒ Enhanced MSE models incorporating the impacts of climate, environmental conditions and multispecies interactions on the productivity of the stocks

Agenda

7 sessions : Presentation + tutorial

Environmental data 1 and 2
Fitting relationships to data : Growth and recruitment
Statistical model evaluation
MSE model enhancing and running 1 and 2

Time for questions – please use the chat during the presentations

Day 2 and 3 – additional time for questions on your data and or any specific issues

Tools and methods

Sharepoint :

https://community.ices.dk/ExpertGroups/WKECOVMSE/_layouts/15/start.aspx#/SitePages/HomePage.aspx

Agenda, links to the sessions, background documents, presentations

Check in / Check out

Talk to Alondra : alondra.sofia.rodriguez@ices.dk

Github:

https://github.com/ices-tools-dev/SEAwise_ecoMSE

README section