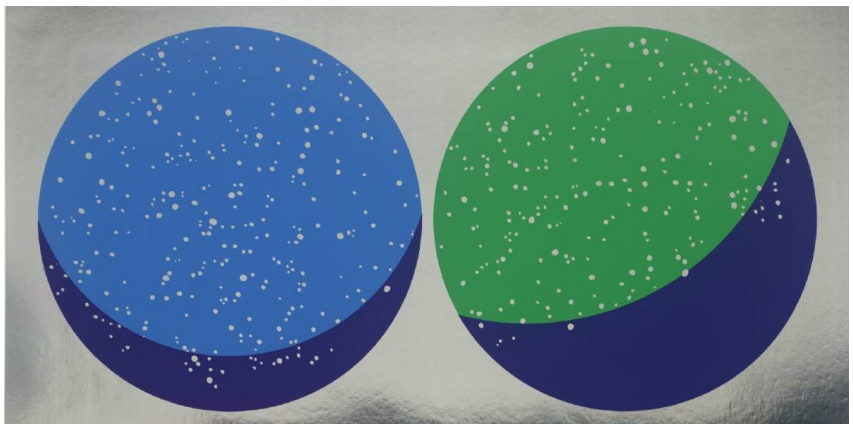
The Costs of Ignoring Stock Structure



Colin Millar
Ernesto Jardim
Iago Mosqueira
Chato Osio
European Commission
Joint Research Center

Motivation

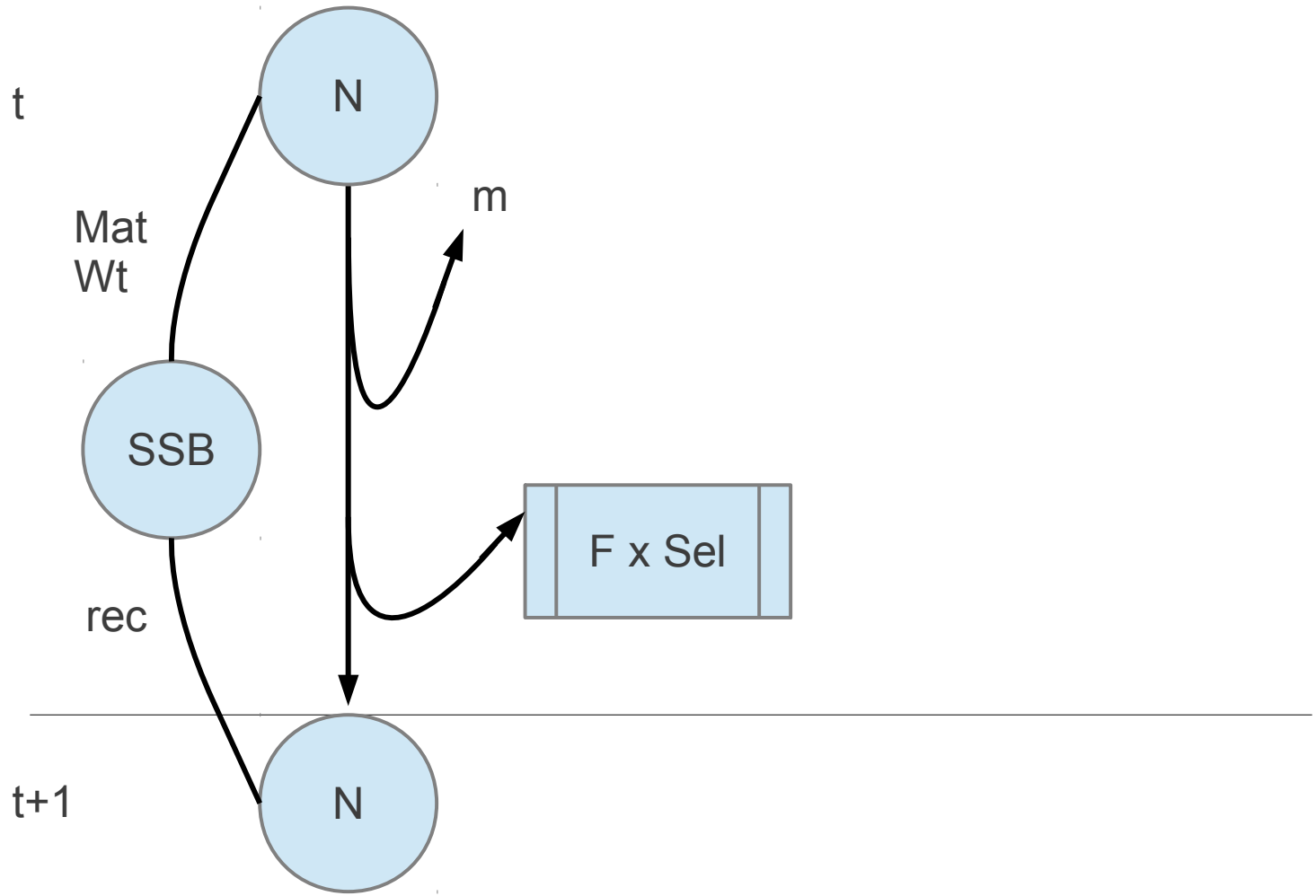
- By:
  - Simulating a range of realistic stock dynamics
  - Modelling fisheries management
- We aim to:
  - Investigate managing two stocks as one
  - Identify risks
  - Suggest robust reference points

assessment 4 all - a4a

Some notes on a4a

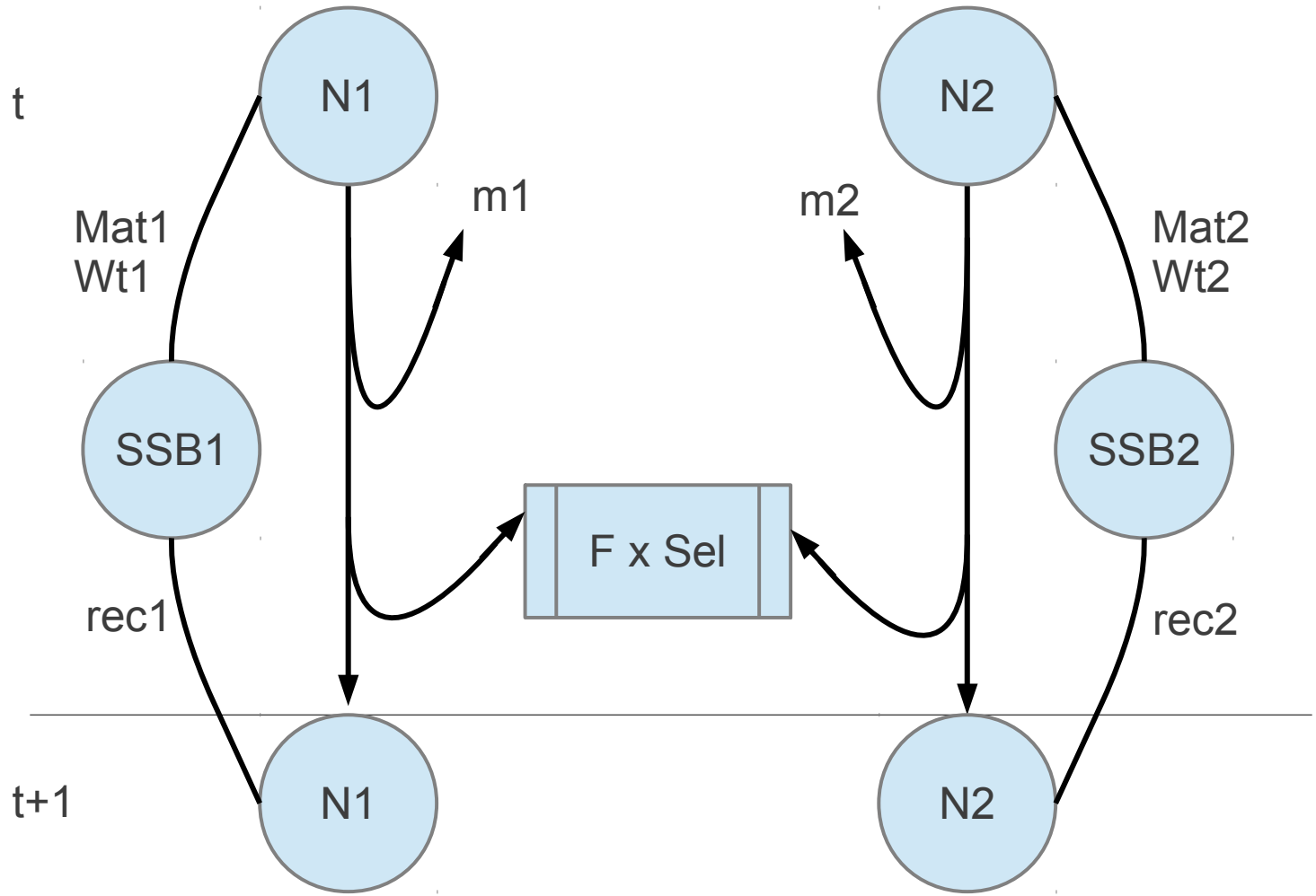
Simulation Design

The Population Model



Simulation Design

The Population Model



Simulation Design

The Population Model: candidate model for

- Lophius Piscatorius and Budagassa
- Atlantic Blue-Fin Tuna
- Whitining in the North Sea...?

Simulation Design

Assessment inputs:

$$\text{Observed log Catch} \sim \text{Normal}(\log \text{Catch}, 0.1)$$
$$\text{Observed log Index} \sim \text{Normal}(\log \text{Index}, 0.1)$$

$$\text{Catch} = \text{Catch}_1 + \text{Catch}_2 \qquad M = 0.5(M_1 + M_2)$$
$$\text{Index} = q \times (N_1 + N_2) \qquad \text{Mat} = 0.5(\text{Mat}_1 + \text{Mat}_2)$$
$$\text{wt} = \frac{N_1 \text{wt}_1 + N_2 \text{wt}_2}{N_1 + N_2}$$

Simulation Design

Assessment Model and Management procedure

Simulation Design

Feed back into the population model

Simulation design

The MSE diagram

A picture of the set up, with arrows that show the data input, 2 stocks into 1 data set and a MP that goes from TAC to F

Choosing Parameter Values

- the lh() function
- the gislasim function
- recruitment levels - ICES north sea estimates
- Stock recruit curve shapes designed to be viable under fishing

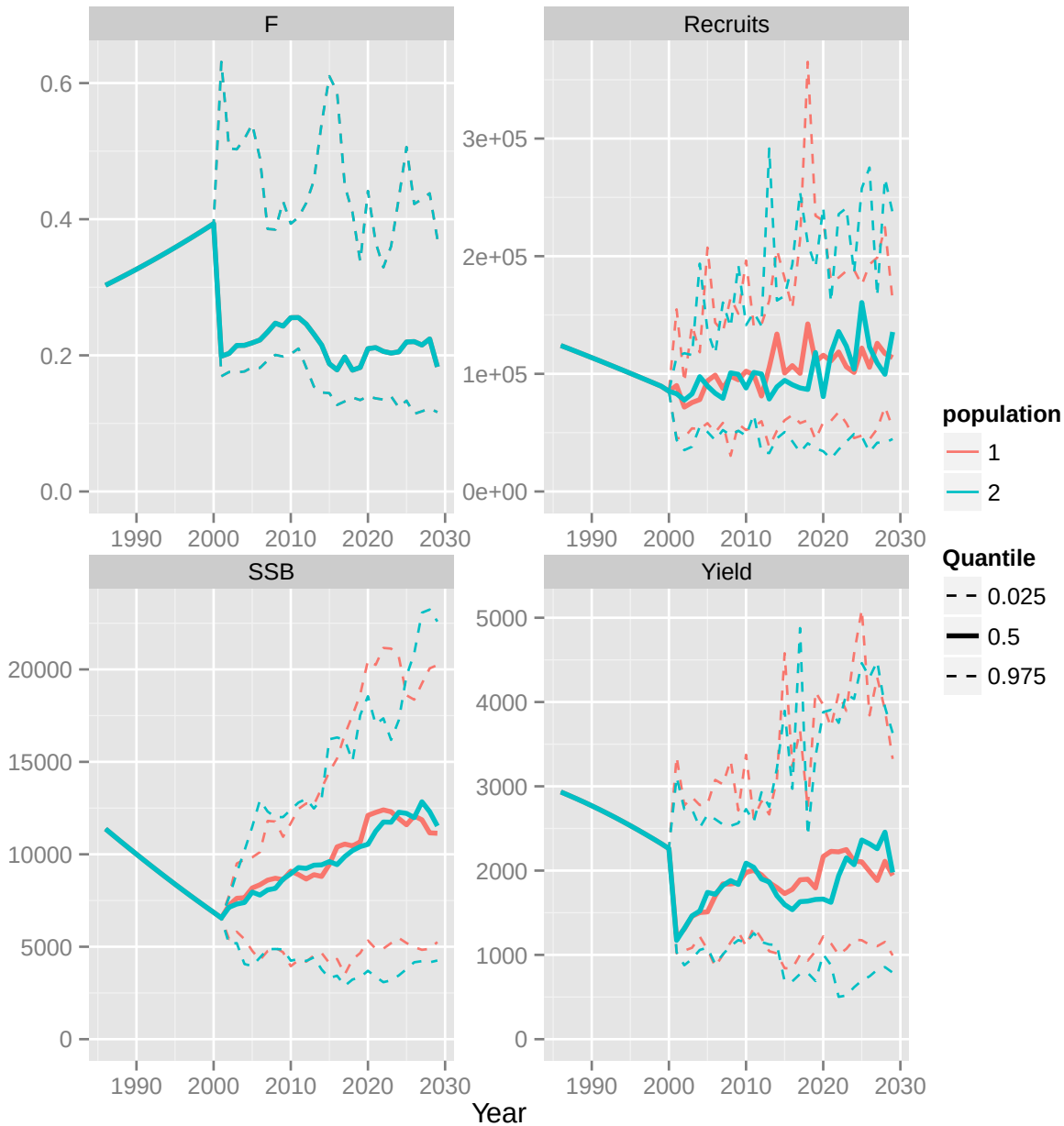
The Simulated Sub Stock Units

Show some of the stocks explaining the fishing pattern We use take as a start point the 40th year of fishing

Scenarios

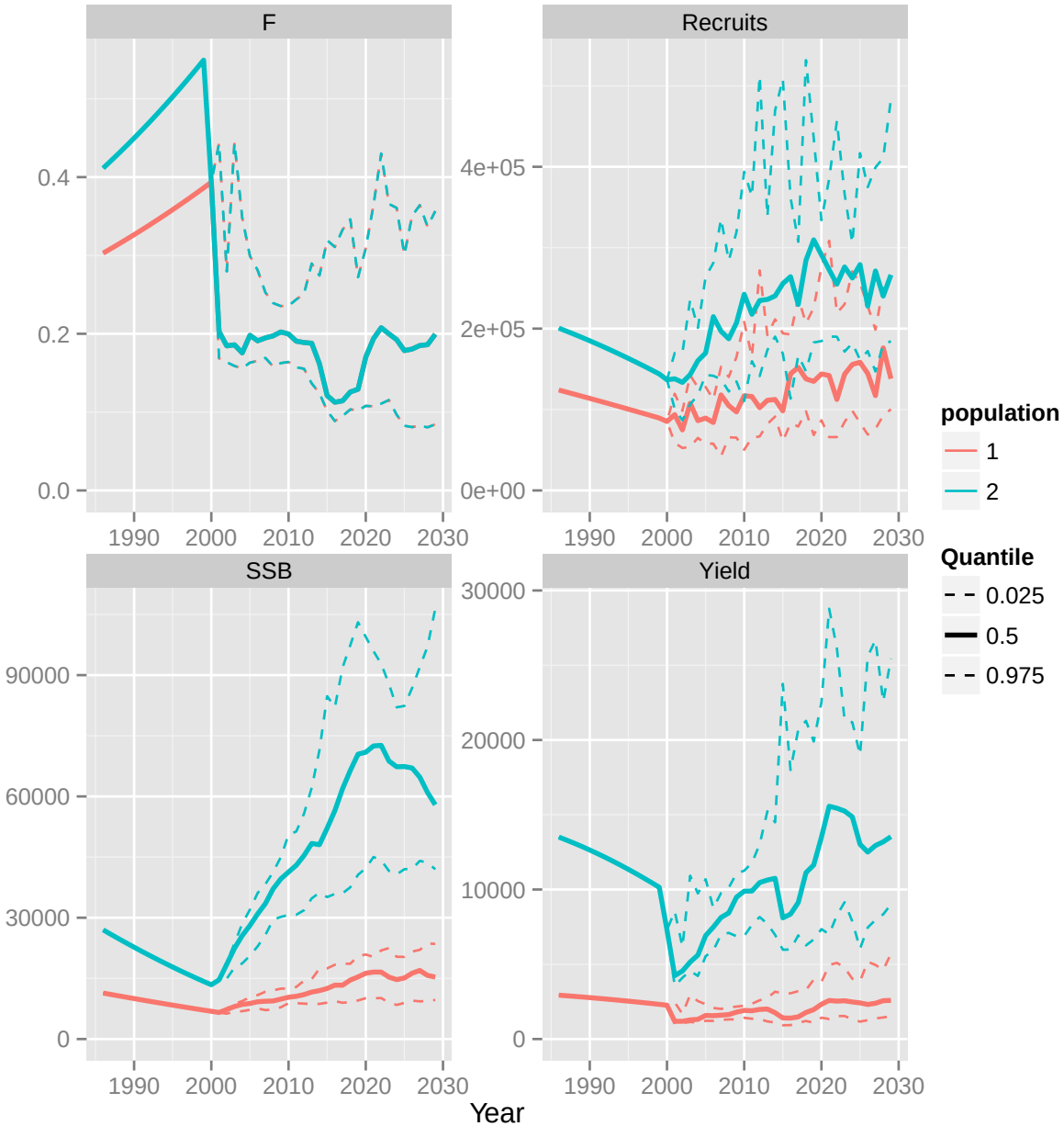
Show table of what scenarios

One full result



Joint Research Centre

One full result



Joint Research Centre

Results Summary

Final Thoughts

- Improve simulation speed by running in parallel on clusters
- Test other LH parameter sets
- Investigate link between virgin biomass and M etc.
- these is being explored at the ICES WGMG in two weeks