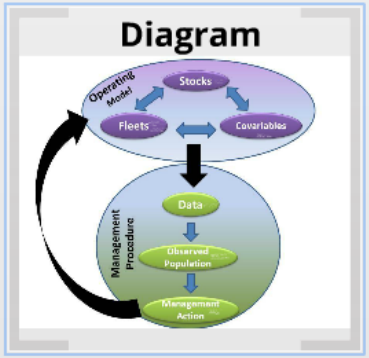
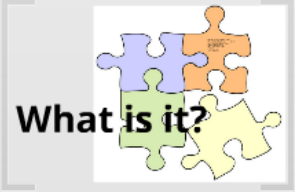


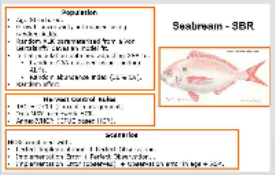


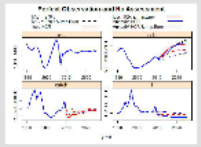
FLBEIA
Bio-Economic
Impact Assessment

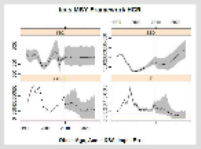
Dorleta Garcia, Raúl Prellezo, Sonia Sanchez, Marina Santurtun

azti tecnalia

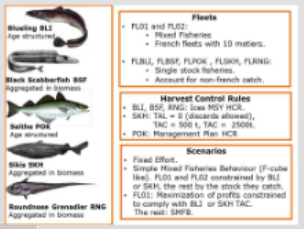
Seabream of Gulf of Cadiz

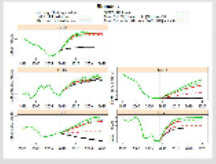


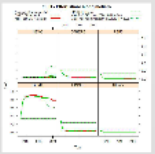




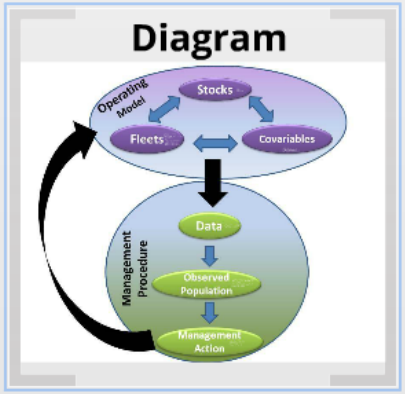
French Deepwater Mixed Fisheries

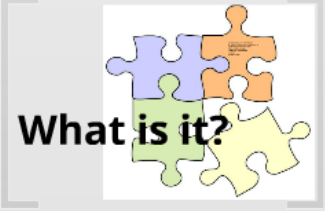






Prezi





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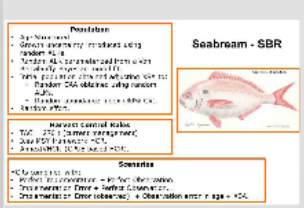

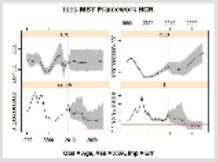

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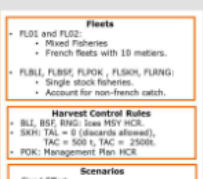
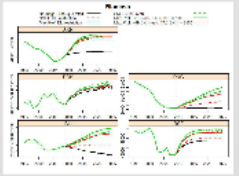
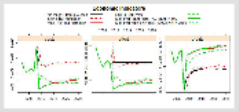
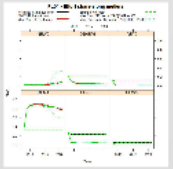


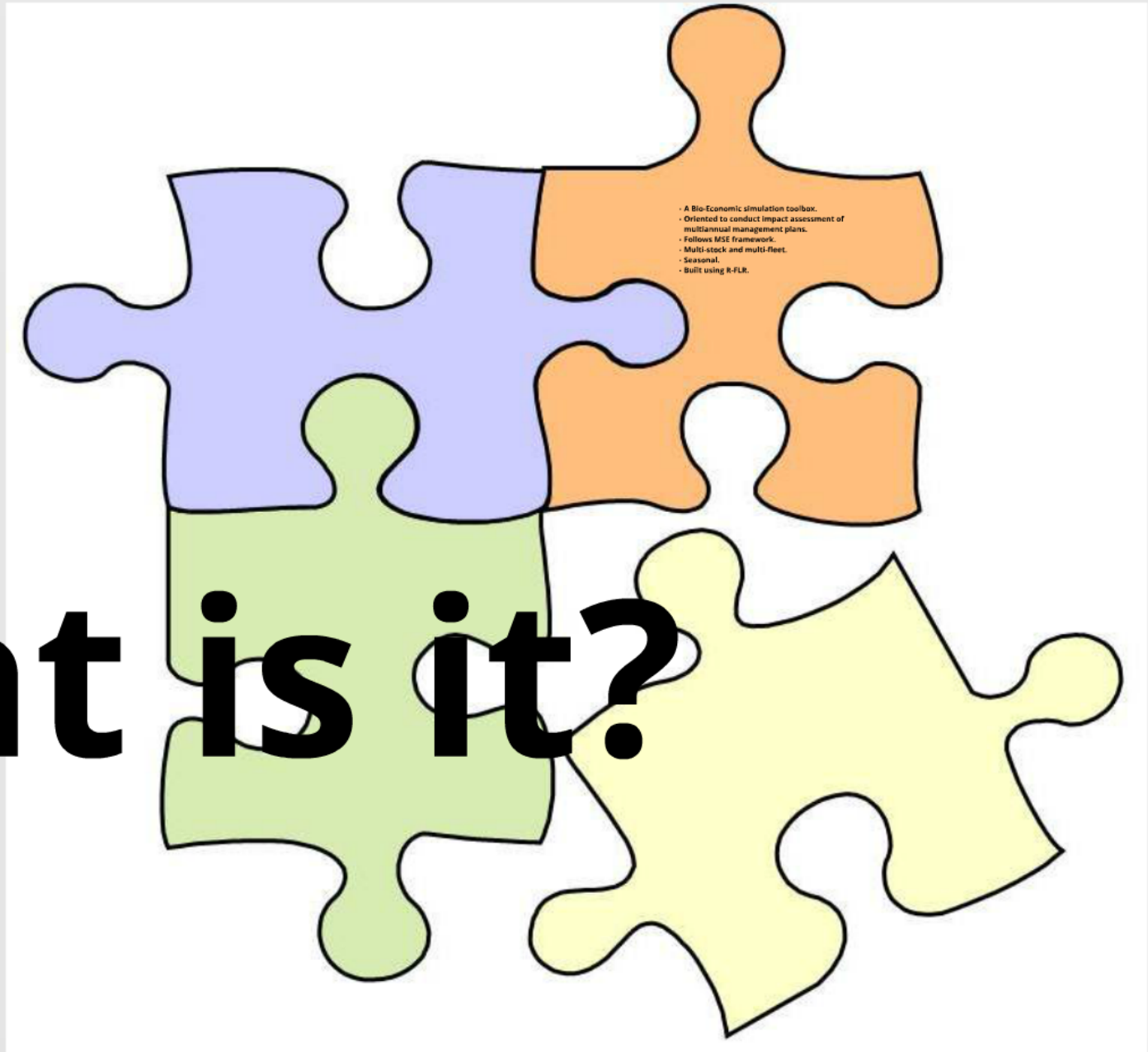






Prezi

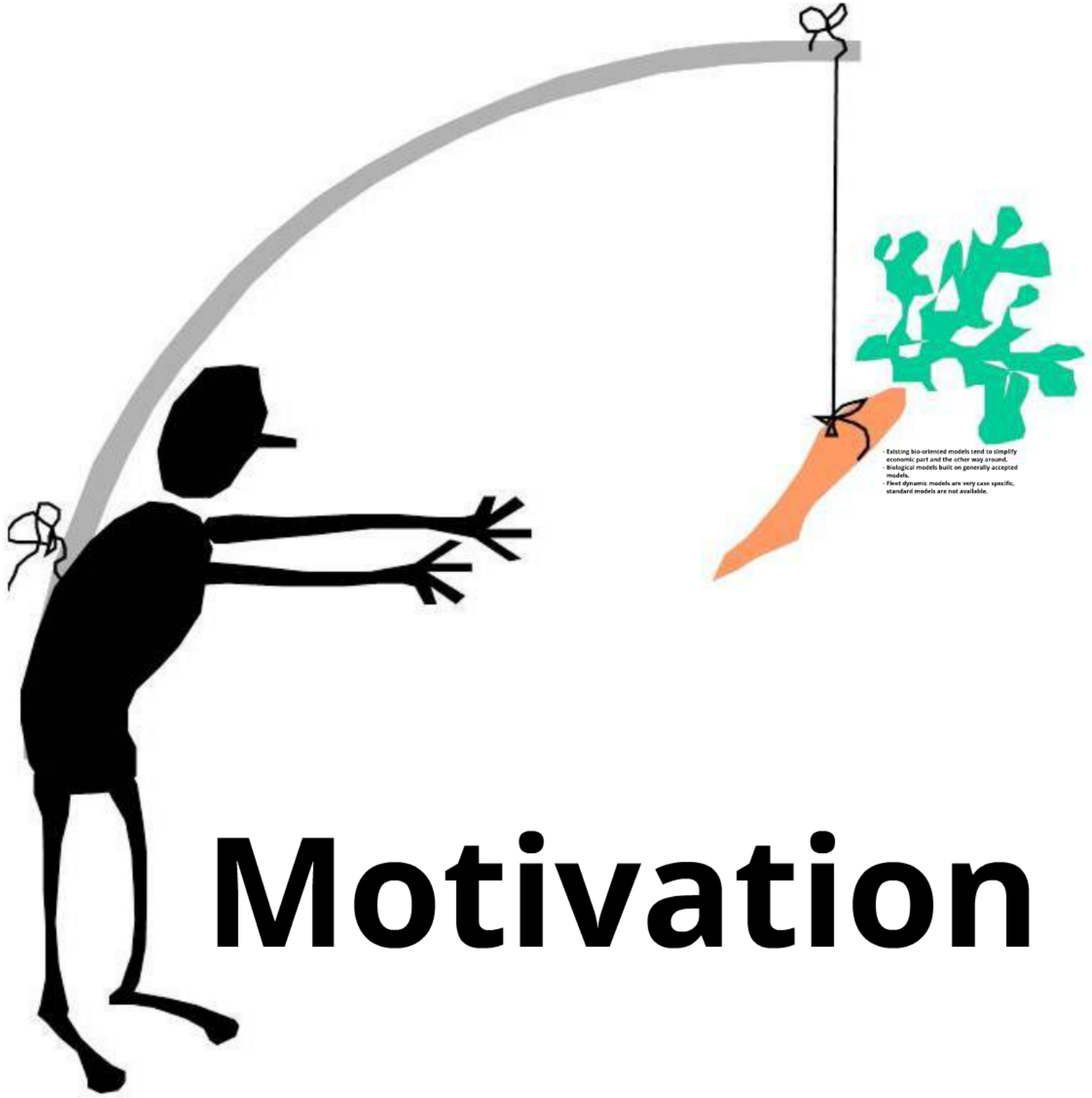
What is it?



Prezi

- A Bio-Economic simulation toolbox.
- Oriented to conduct impact assessment of multiannual management plans.
- Follows MSE framework.
- Multi-stock and multi-fleet.
- Seasonal.
- Built using R-FLR.

Prezi



Motivation

Prezi

- **Existing bio-oriented models tend to simplify economic part and the other way around.**
- **Biological models built on generally accepted models.**
- **Fleet dynamic models are very case specific, standard models are not available.**

Prezi

How is it built up?

Prezi

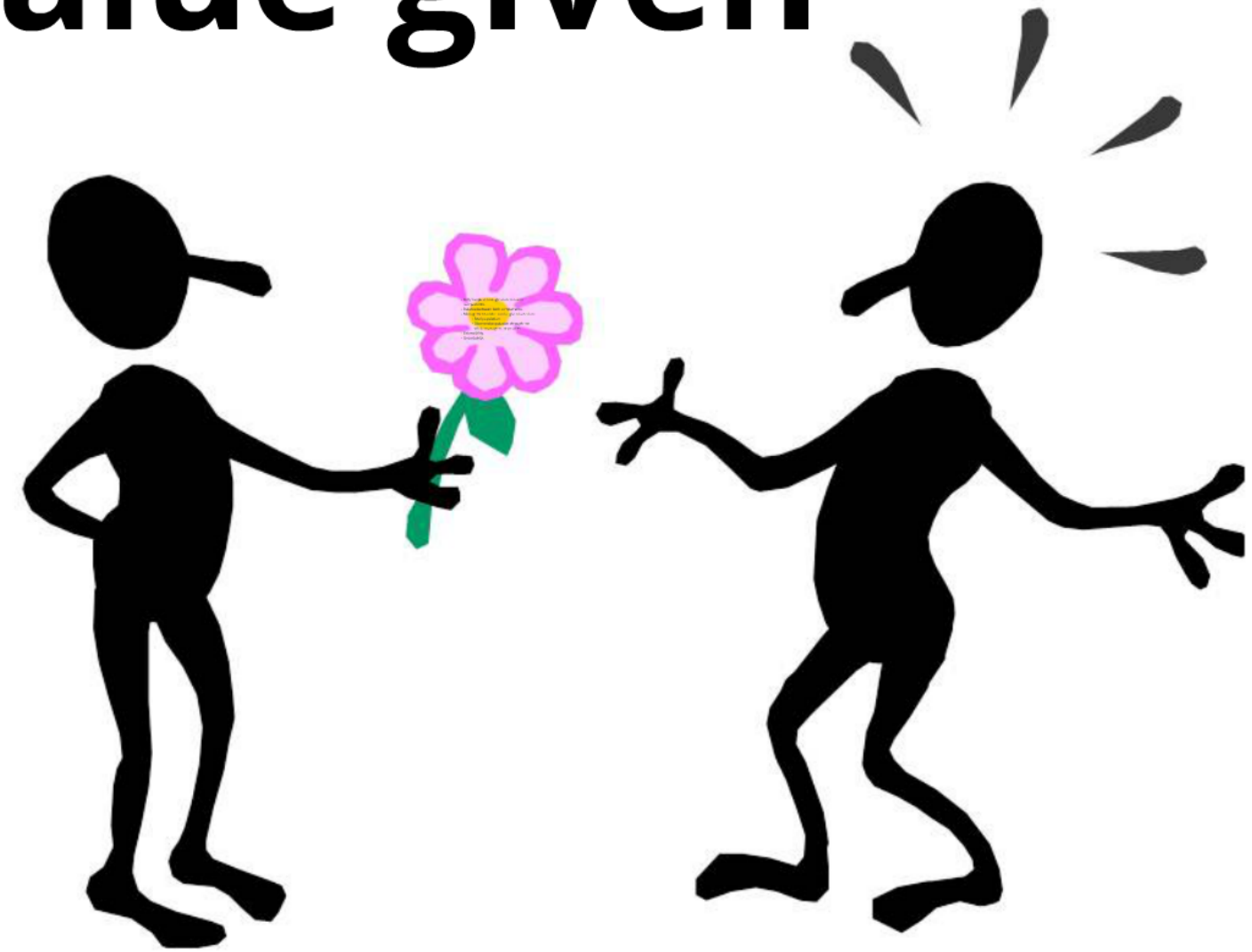
Composability:

"A model is nothing more than the 'sum' of its parts, which can be individually modelled and then put together "

- The model has been constructed modularly.
- The fishery and management systems are defined as the "sum" of "small" processes.
- Several models available for each process.
- 2 kind of processes:
  - Low level: Stock recruitment, catch production function...
  - High level: Population growth, fleets' short term dynamics...
- There are functions at different levels that assemble the models at lower levels.

Prezi

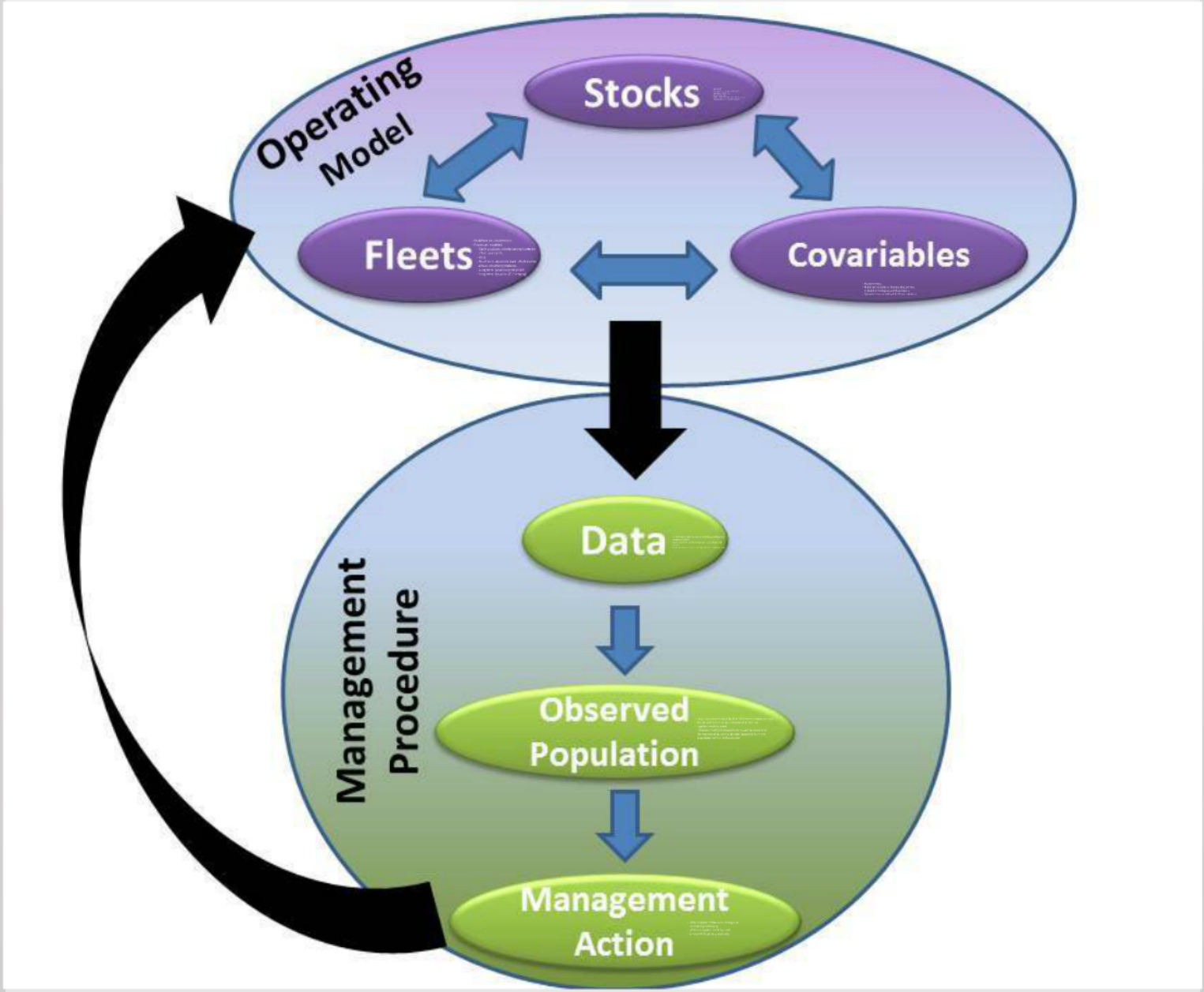
Value given



- Fully coupled: biologic and economic components.
- Balance between both components.
- Management advice can be given based on:
    - Real population.
    - Observed population through the whole management process
- Extensibility.
- Uncertainty.

Prezi

Diagram

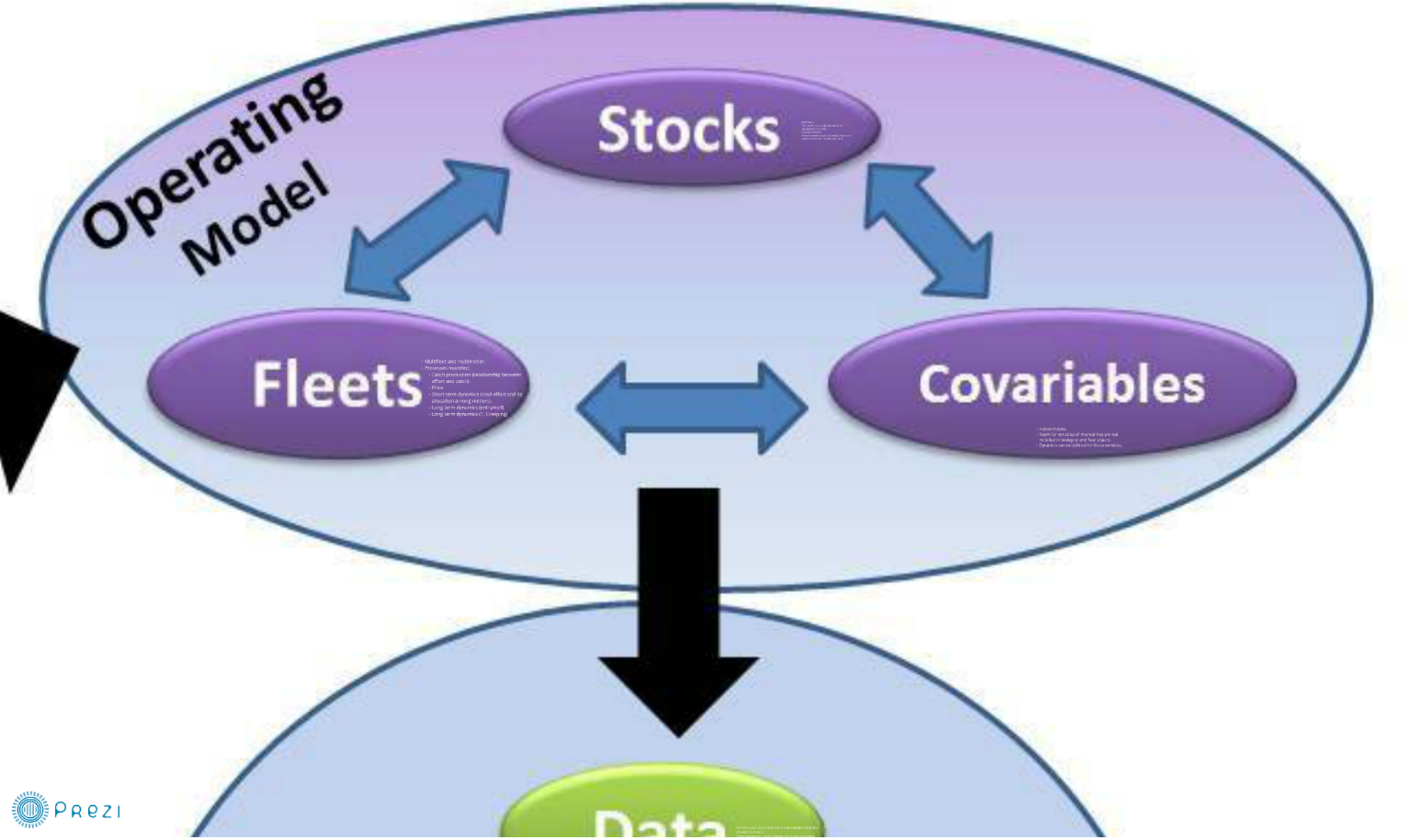


Prezi

- Multi stock.
- The stocks can be age structured or aggregated in biomas.
- Seasonal cohorts.
- At the moment trophic interactions are not implemented but could be included.

Prezi

Diagram

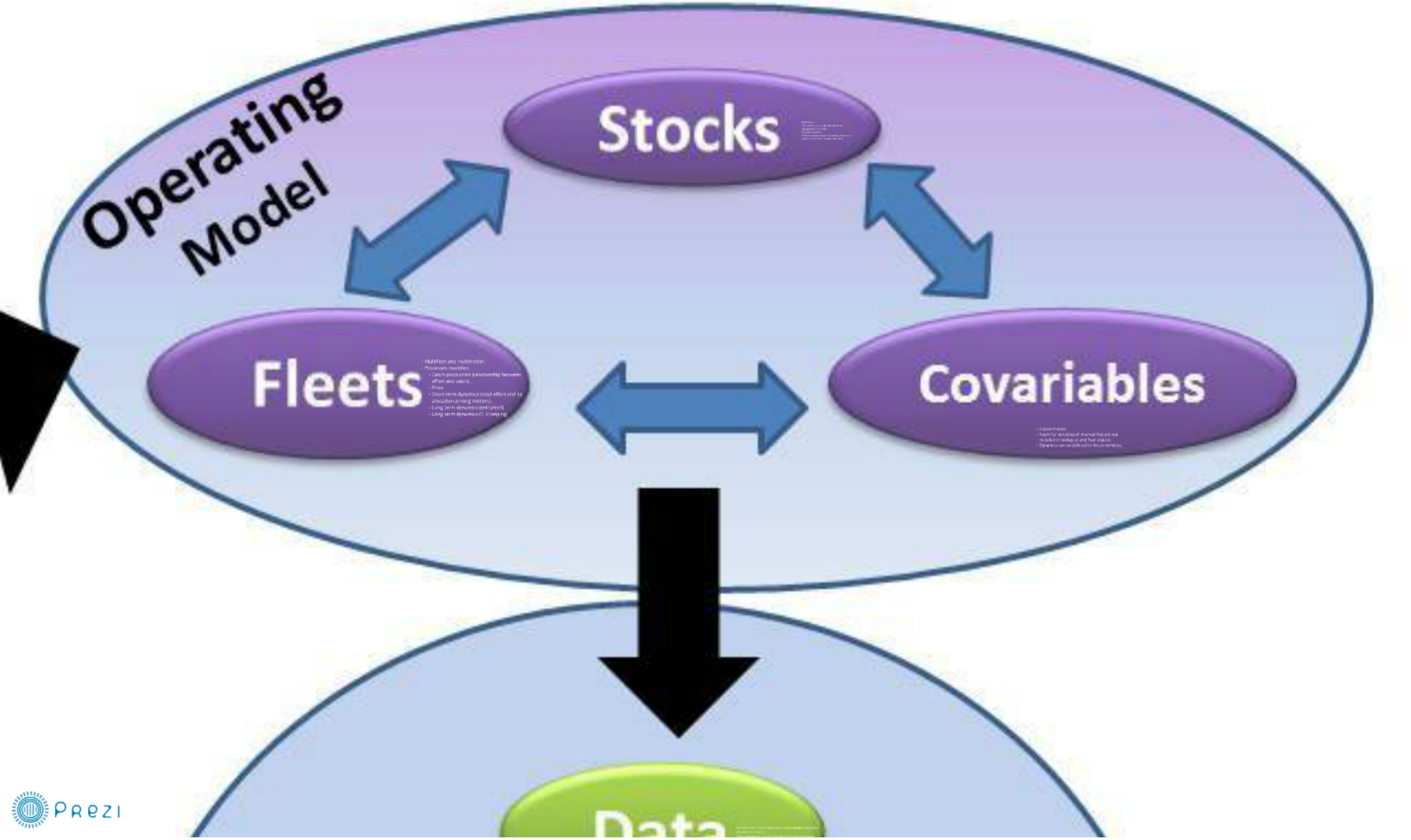


Prezi

- Multifleet and multimetier.
- Processes modeled:
  - Catch production (relationship between effort and catch).
  - Price.
  - Short term dynamics (total effort and its allocation among metiers).
  - Long term dynamics (entry/exit).
  - Long term dynamics (T. Creeping)

Prezi

Diagram

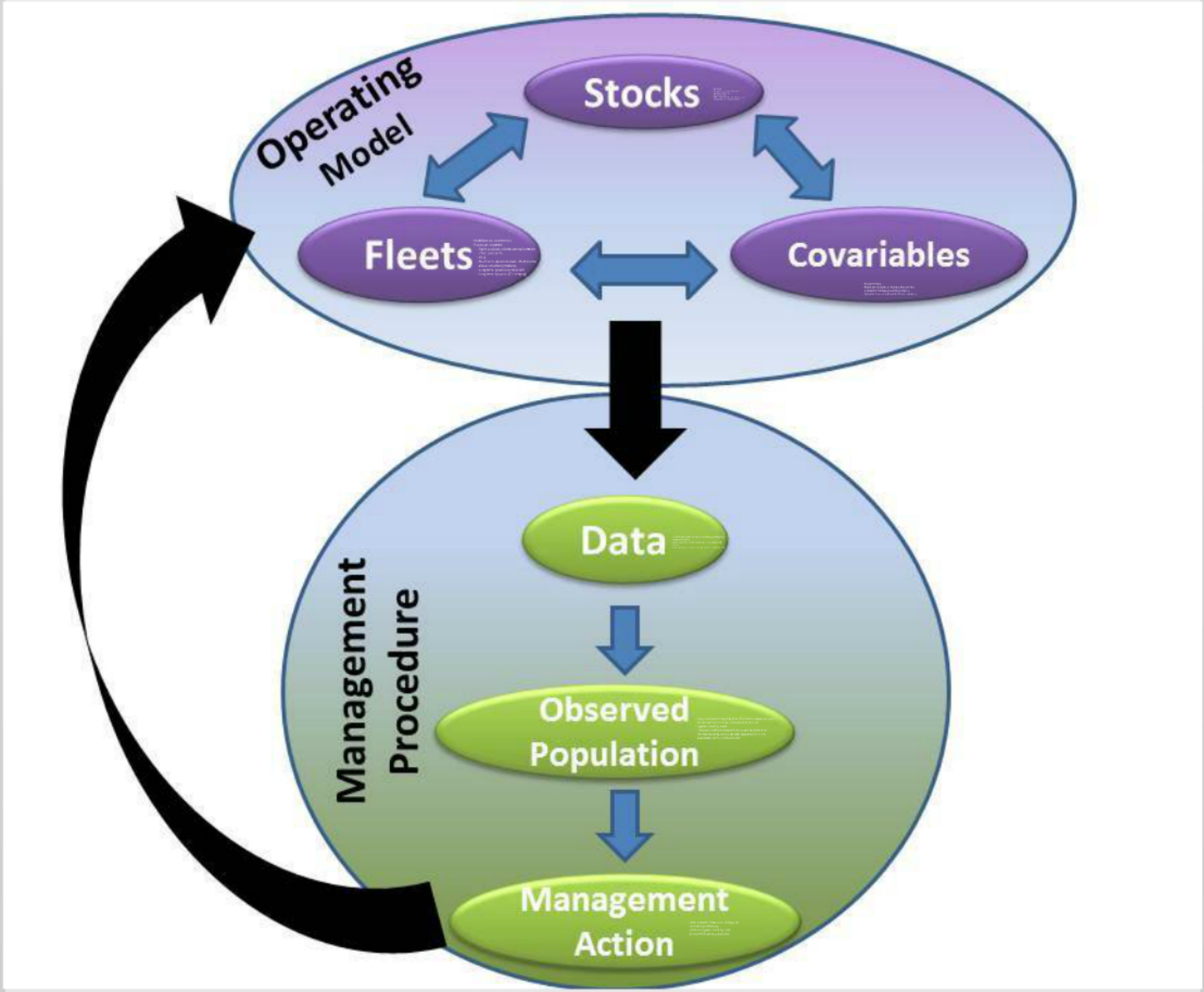


Prezi

- Indeterminate.
- Room for variables of interest that are not included in biological and fleet objects.
- Dynamics can be defined for these variables.

Prezi

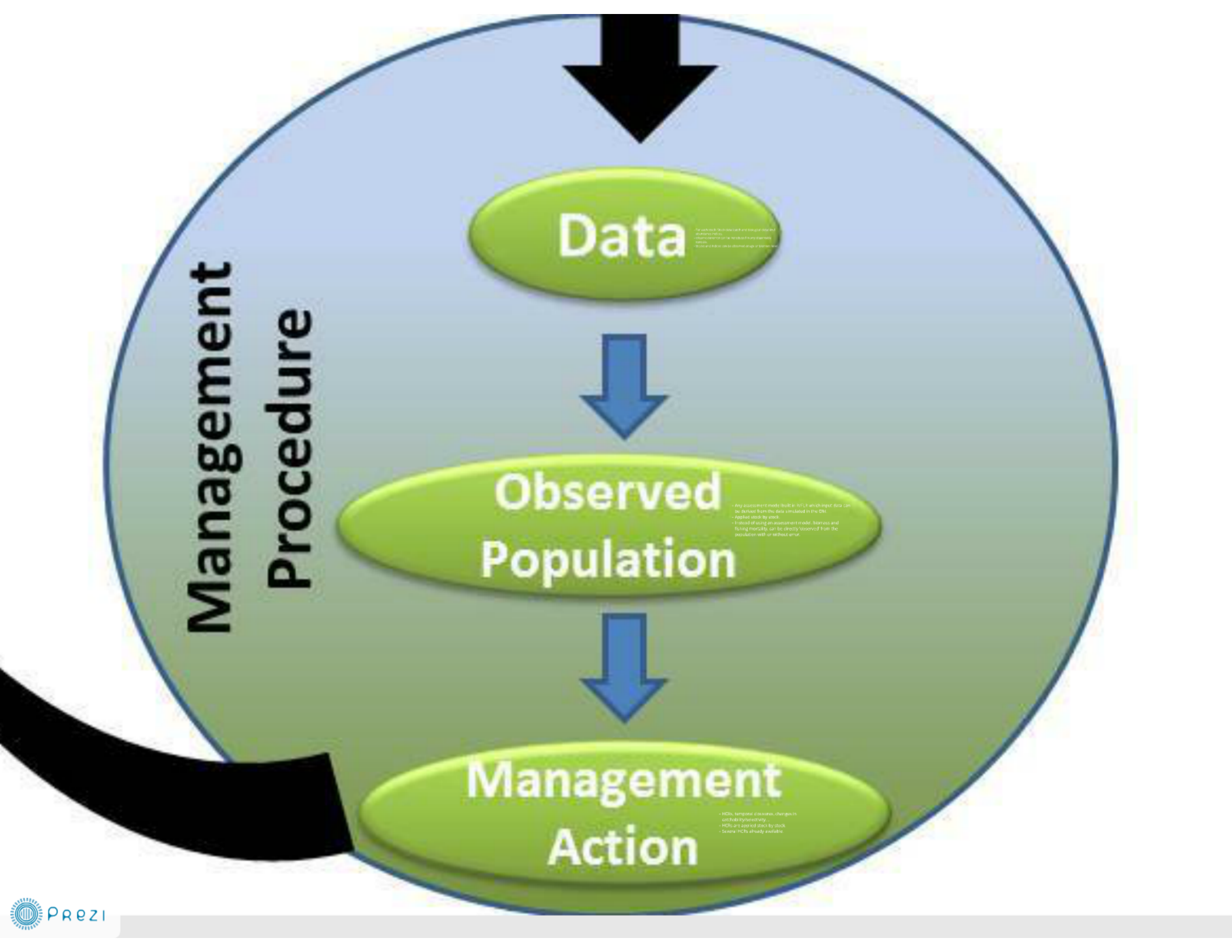
Diagram



Prezi

- For each stock: Stock data (catch and biological data) and abundance indices.
- Observationerror can be introduced in any observable variable.
- Stocks and indices can be observed at age or biomass level.

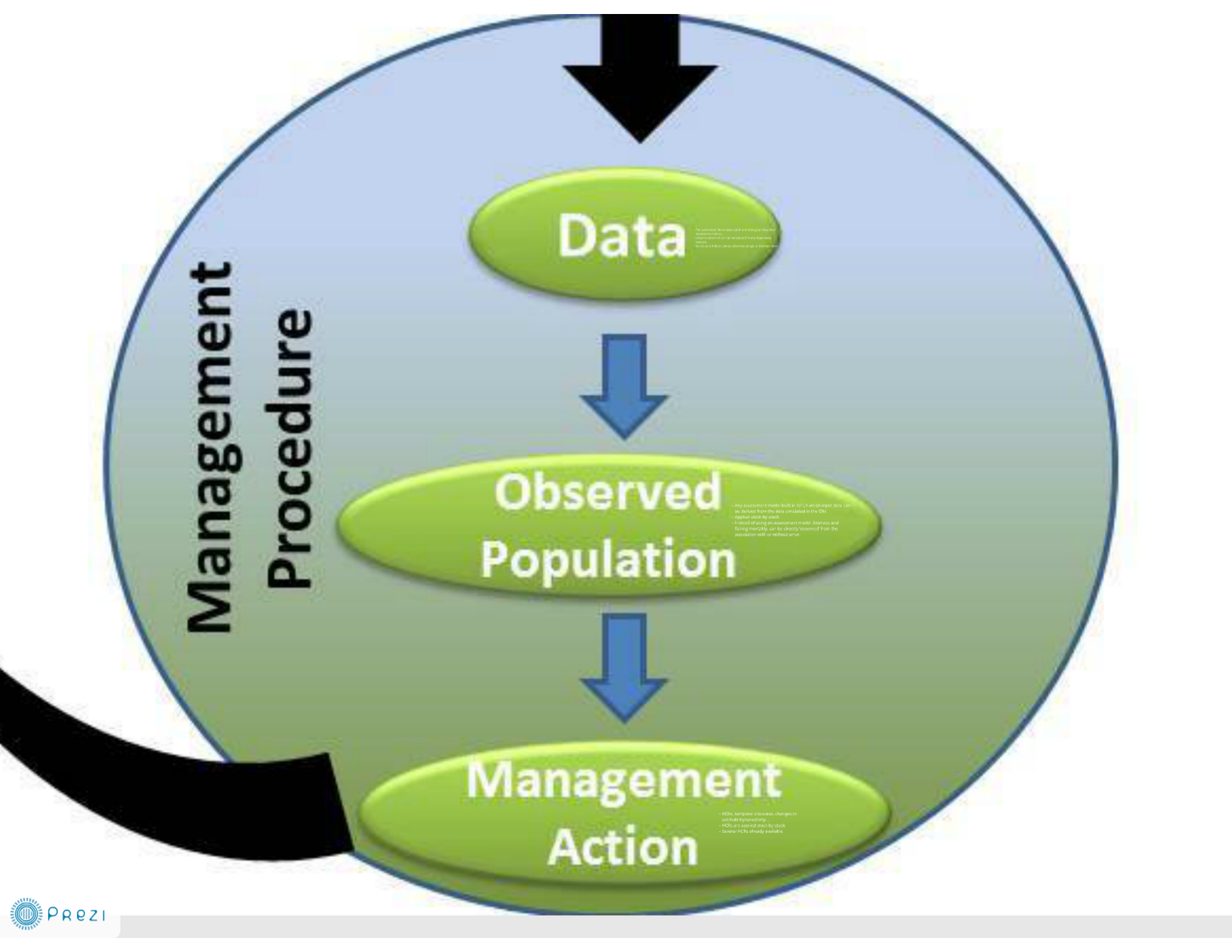
Prezi


Management Procedure
Data
Observed Population
Management Action

Prezi

- Any assessment model built in R/FLR which input data can be derived from the data simulated in the OM.
- Applied stock by stock.
- Instead of using an assessment model, biomass and fishing mortality, can be directly ‘observed’ from the population with or without error.

Prezi


Management Procedure
Data
Observed Population
Management Action

Prezi

- HCRs, temporal clousures, changes in catchability/selectivity....
- HCRs are applied stock by stock.
- Several HCRs already available.

Prezi

Dorleta Garcia, Raúl Pre

Seabream of Gulf of Cadiz

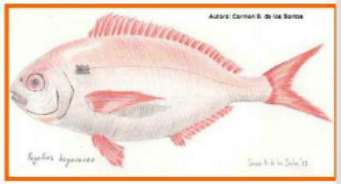
Population
- Age Structured.
- Growth uncertainty introduced using random ALKs.
- Random ALK parameterized from a Von Bertalanffy Bayesian model fit.
- Initial population obtained adjusting XSA to:
  - Random CAA obtained using random ALKs.
  - Random abundance index (30% CV).
- Random effort.

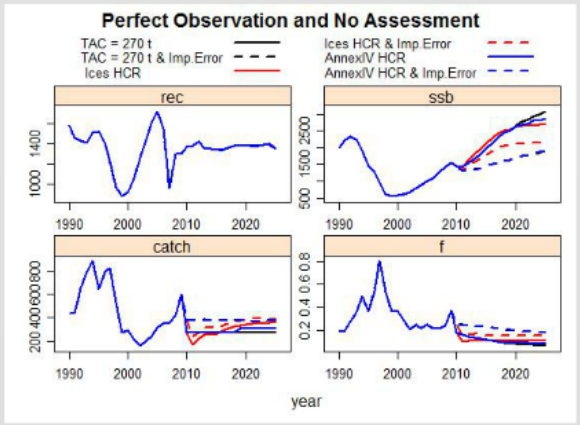
Harvest Control Rules
- TAC = 270 t (current management)
- Ices MSY framework HCR.
- AnnexIVHCR (CPUE based HCR).

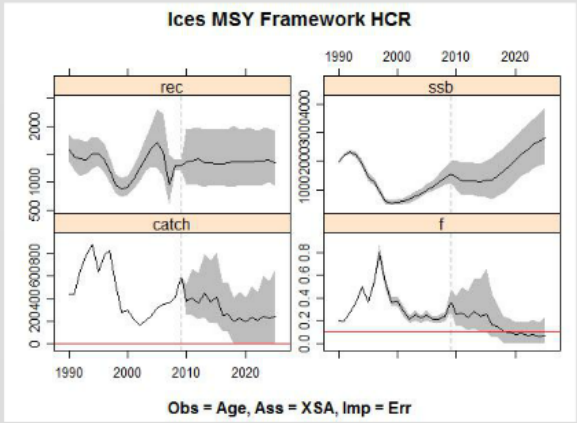
Scenarios

HCRs combined with:
- Perfect Implementation + Perfect Observation.
- Implementation Error + Perfect Observation. .
- Implementation Error (observed) + Observation error in age + XSA.

Seabream - SBR







Prezi

Assessment

Sonia Sanchez, Marina Santurtun

French Deepwater Mixed Fisheries

Fleets

- FL01 and FL02:
  - Mixed Fisheries
  - French fleets with 10 metiers.
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- Fixed Effort.
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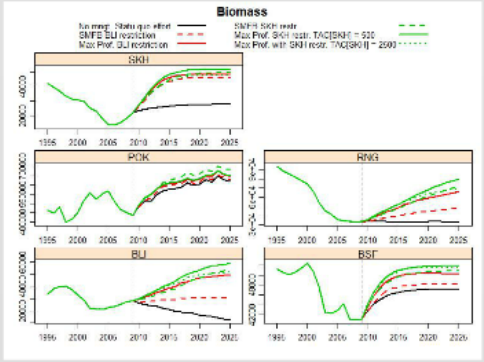

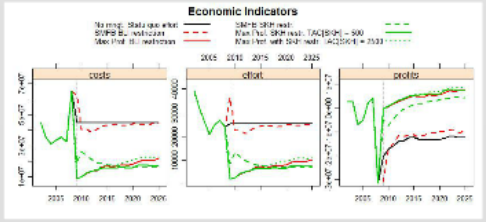

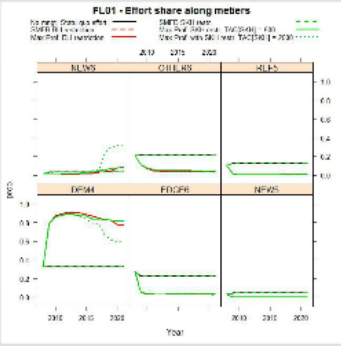

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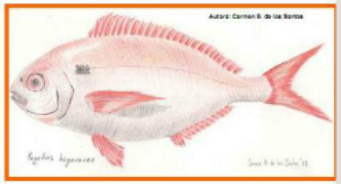

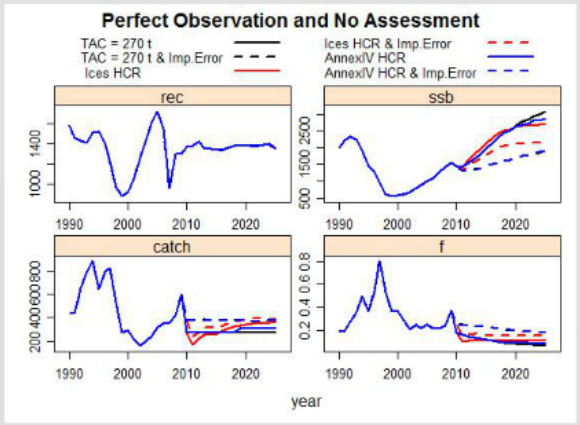

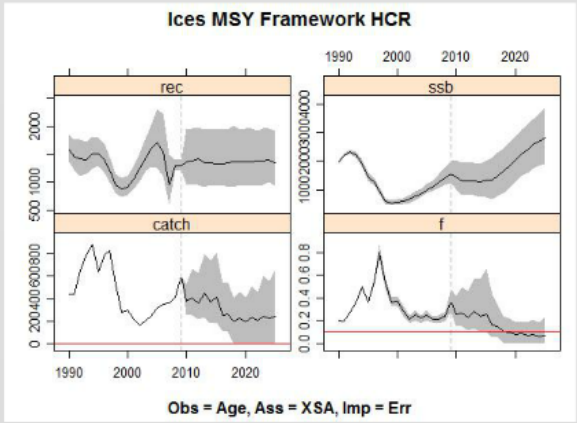

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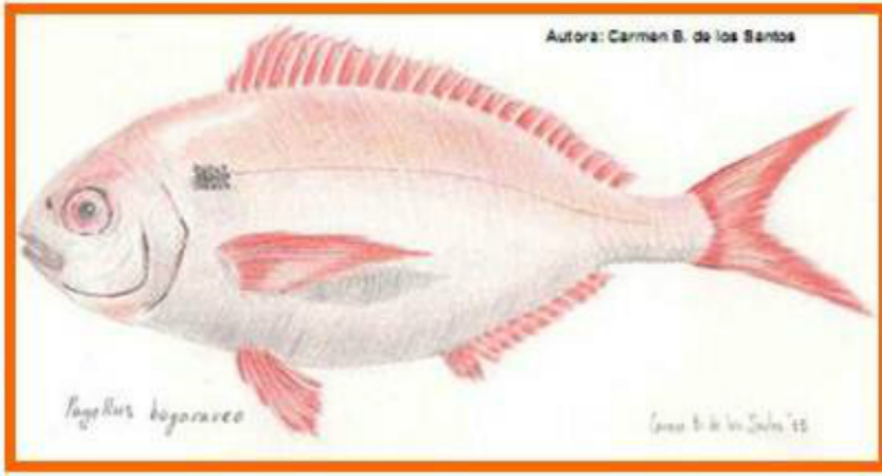

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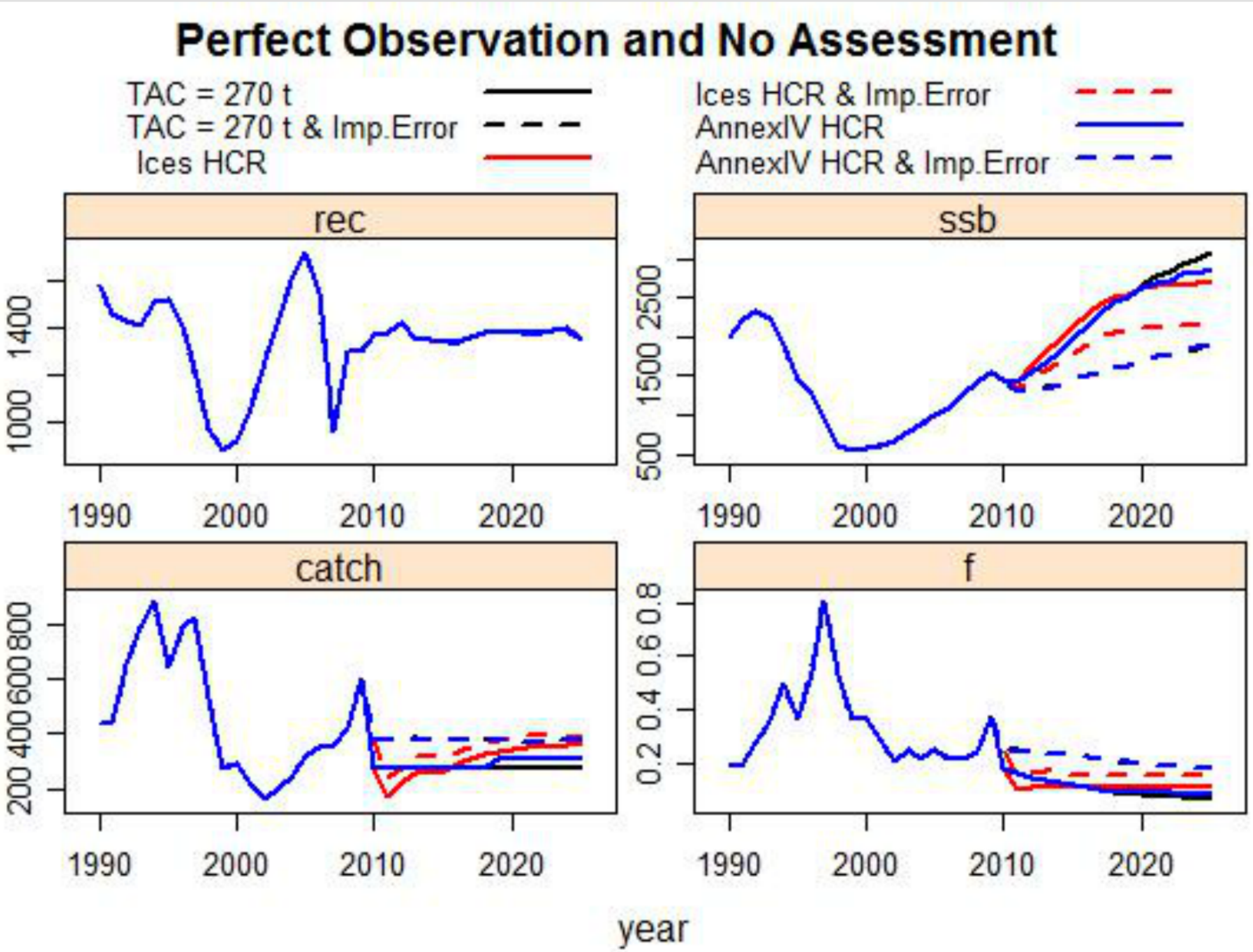
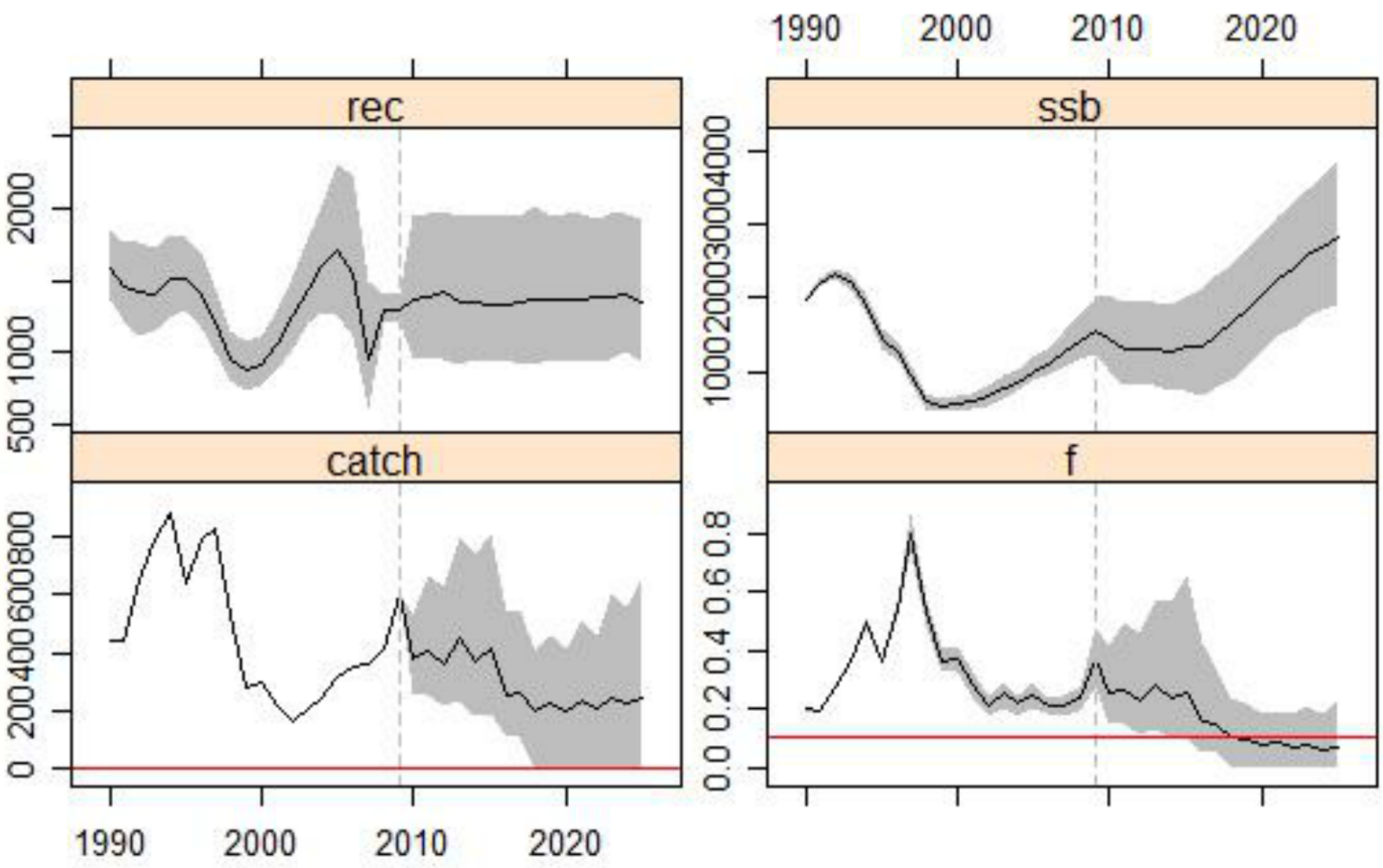

Perfect Observation and No Assessment
TAC = 270 t
TAC = 270 t & Imp.Error
Ices HCR
Ices HCR & Imp.Error
AnnexIV HCR
AnnexIV HCR & Imp.Error
rec
ssb
catch
f
1000
1400
500
1500
2500
200
400
600
800
0.2
0.4
0.6
0.8
1990
2000
2010
2020
year

Ices MSY Framework HCR



Obs = Age, Ass = XSA, Imp = Err

Prezi

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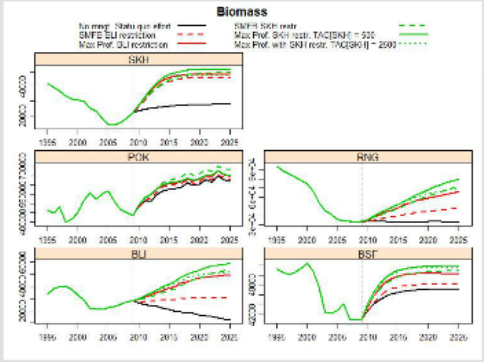
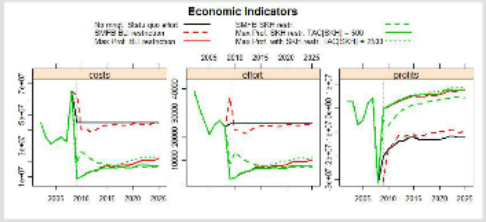
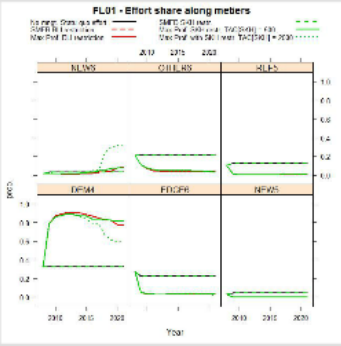
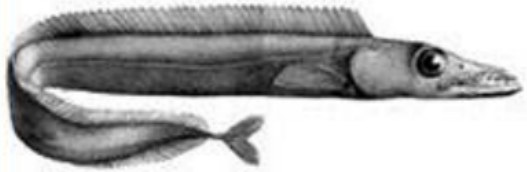






Blueling BLI
Age structured



Black Scabbarfish BSF
Aggregated in biomass

Saithe POK
Age structured

Sikis SKH
Aggregated in biomass

Roundnose Grenadier RNG
Aggregated in biomass

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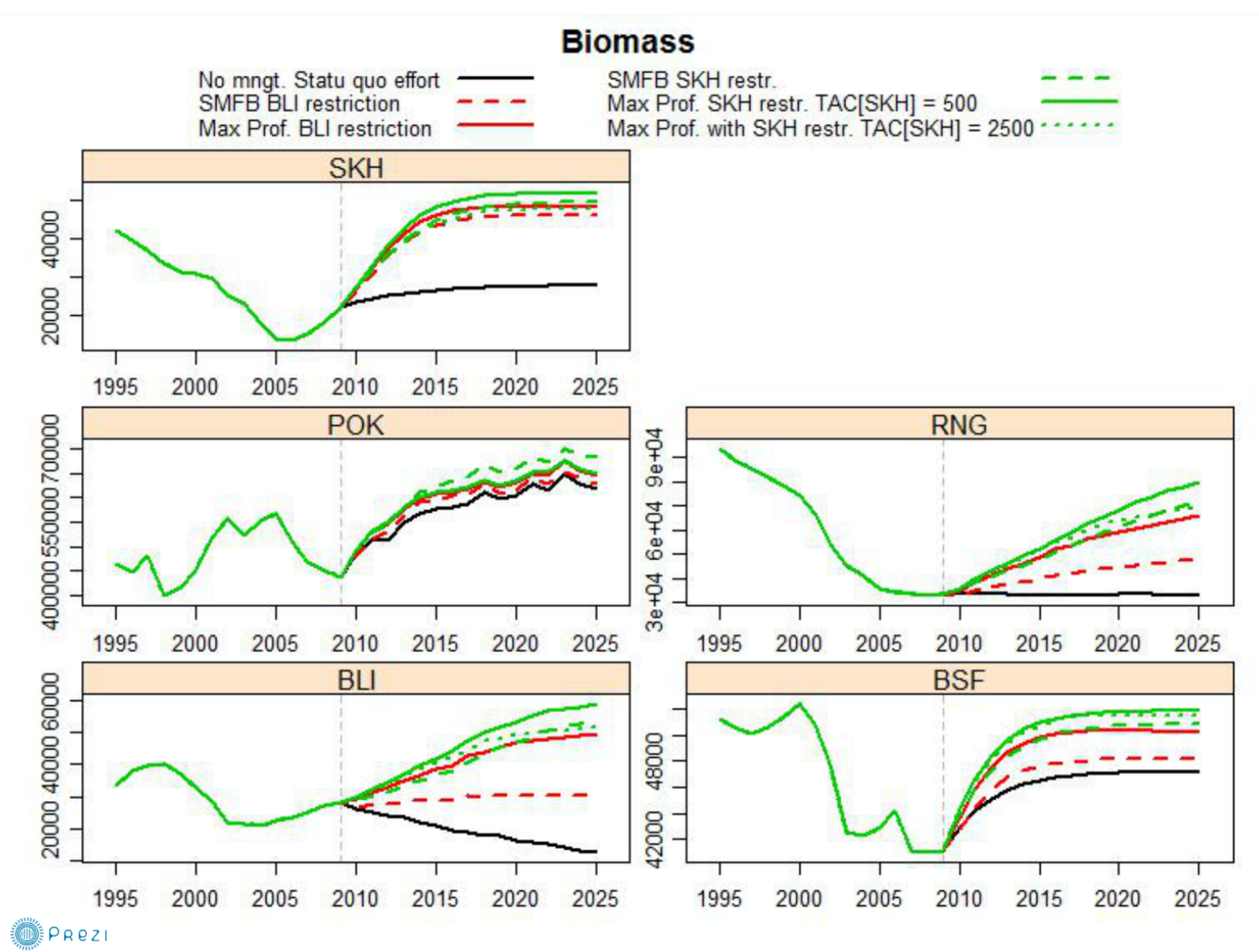
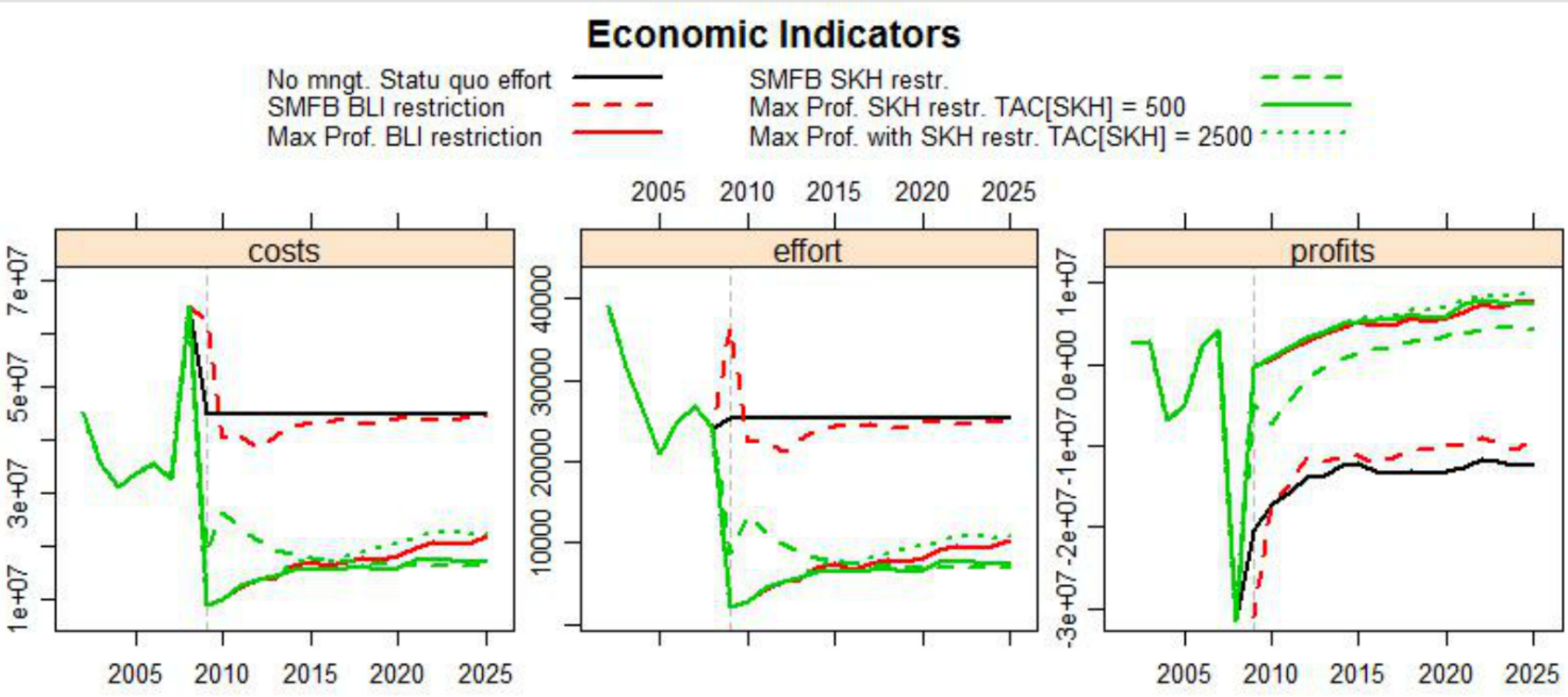
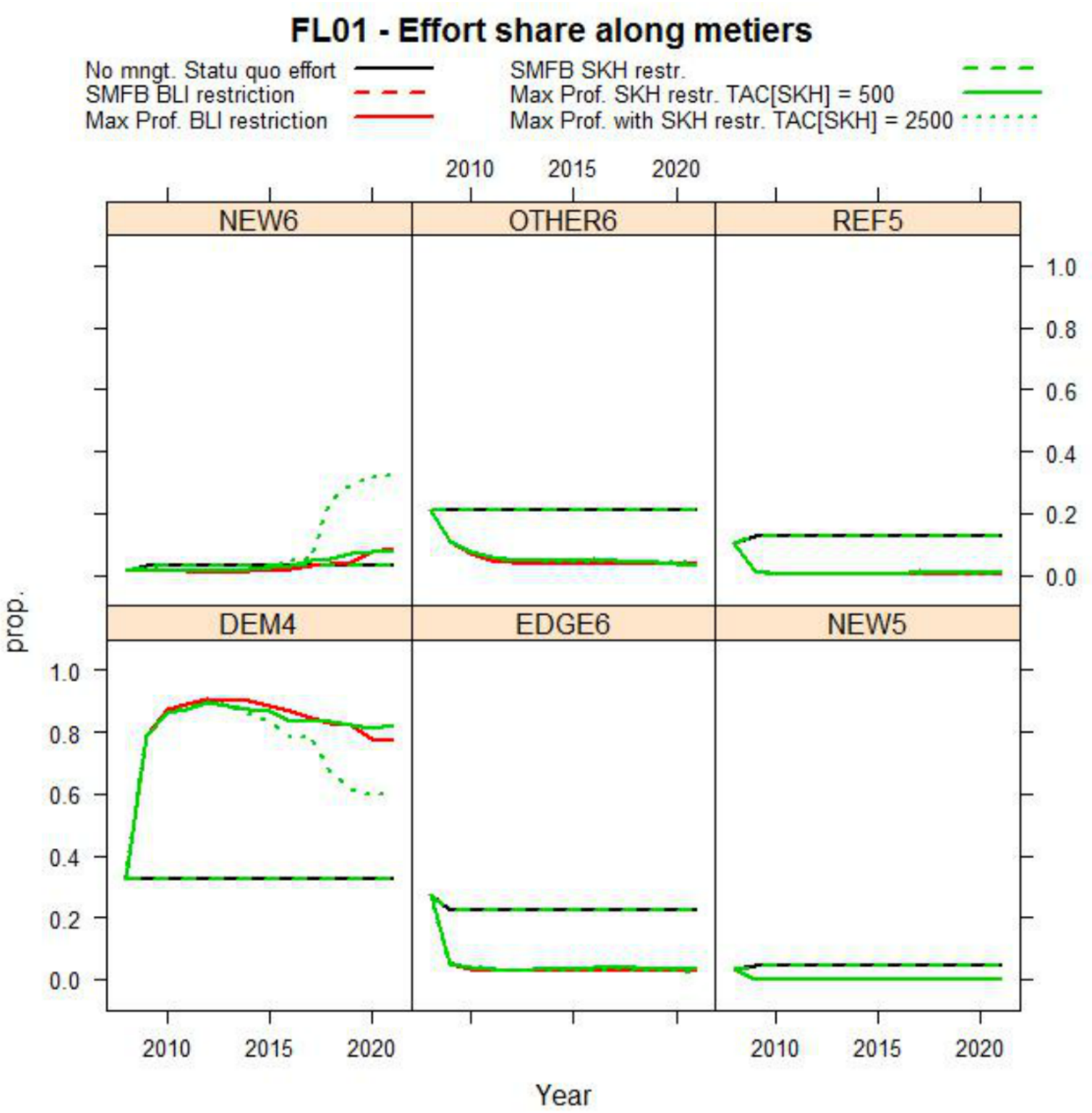
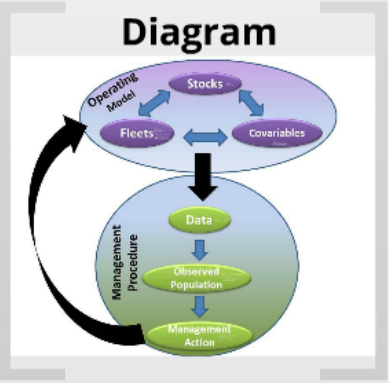

Biomass
No mngt. Statu quo effort
SMFB BLI restriction
Max Prof. BLI restriction
SMFB SKH restr.
Max Prof. SKH restr. TAC[SKH] = 500
Max Prof. with SKH restr. TAC[SKH] = 2500
SKH
POK
RNG
BLI
BSF
1995
2000
2005
2010
2015
2020
2025


Economic Indicators
No mngt. Statu quo effort
SMFB BLI restriction
Max Prof. BLI restriction
SMFB SKH restr.
Max Prof. SKH restr. TAC[SKH] = 500
Max Prof. with SKH restr. TAC[SKH] = 2500
costs
effort
profits
1e+07
3e+07
5e+07
7e+07
10000
20000
30000
40000
-3e+07
-2e+07
-1e+07
0e+00
1e+07
2005
2010
2015
2020
2025


020
2025


FL01 - Effort share along metiers
No mngt. Statu quo effort
SMFB BLI restriction
Max Prof. BLI restriction
SMFB SKH restr.
Max Prof. SKH restr. TAC[SKH] = 500
Max Prof. with SKH restr. TAC[SKH] = 2500
NEW6
OTHER6
REF5
DEM4
EDGE6
NEW5
prop.
Year
2010
2015
2020
0.0
0.2
0.4
0.6
0.8
1.0

Prezi

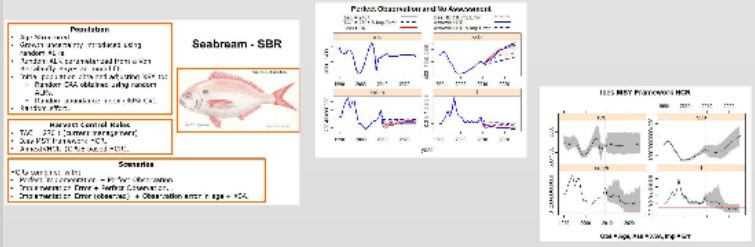


FLBEIA
Bio-Economic
Impact Assessment

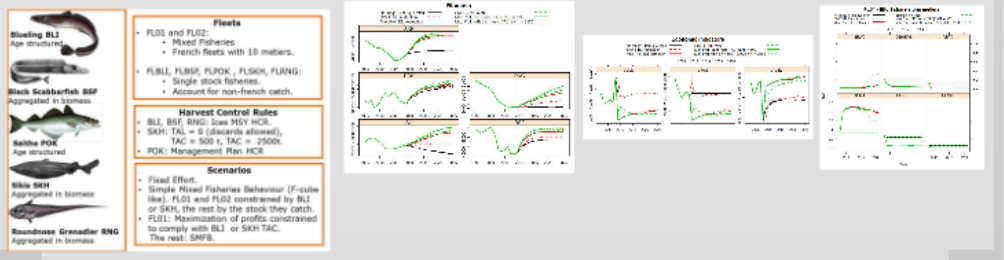
Dorleta Garcia, Raúl Prellezo, Sonia Sanchez, Marina Santurtun

azti tecnalia

Seabream of Gulf of Cadiz

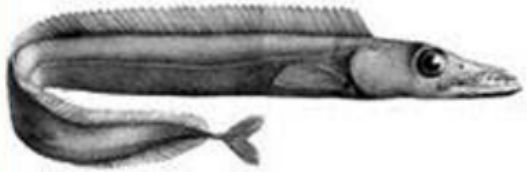


French Deepwater Mixed Fisheries



Prezi

Blueling BLI
Age structured



Black Scabbarfish BSF
Aggregated in biomass

Saithe POK
Age structured

Sikis SKH
Aggregated in biomass

Roundnose Grenadier RNG
Aggregated in biomass

Fleets

- FL01 and FL02:
  - Mixed Fisheries
  - French fleets with 10 metiers.
- FLBLI, FLBSF, FLPOK , FLSKH, FLRNG:
  - Single stock fisheries.
  - Account for non-french catch.

Harvest Control Rules

- BLI, BSF, RNG: Ices MSY HCR.
- SKH: TAL = 0 (discards allowed), TAC = 500 t, TAC = 2500t.
- POK: Management Plan HCR

Scenarios

- Fixed Effort.
- Simple Mixed Fisheries Behaviour (F-cube like). FL01 and FL02 constrained by BLI or SKH, the rest by the stock they catch.
- FL01: Maximization of profits constrained to comply with BLI or SKH TAC. The rest: SMFB.

Prezi