



Atlantis Course Universidad de Concepción

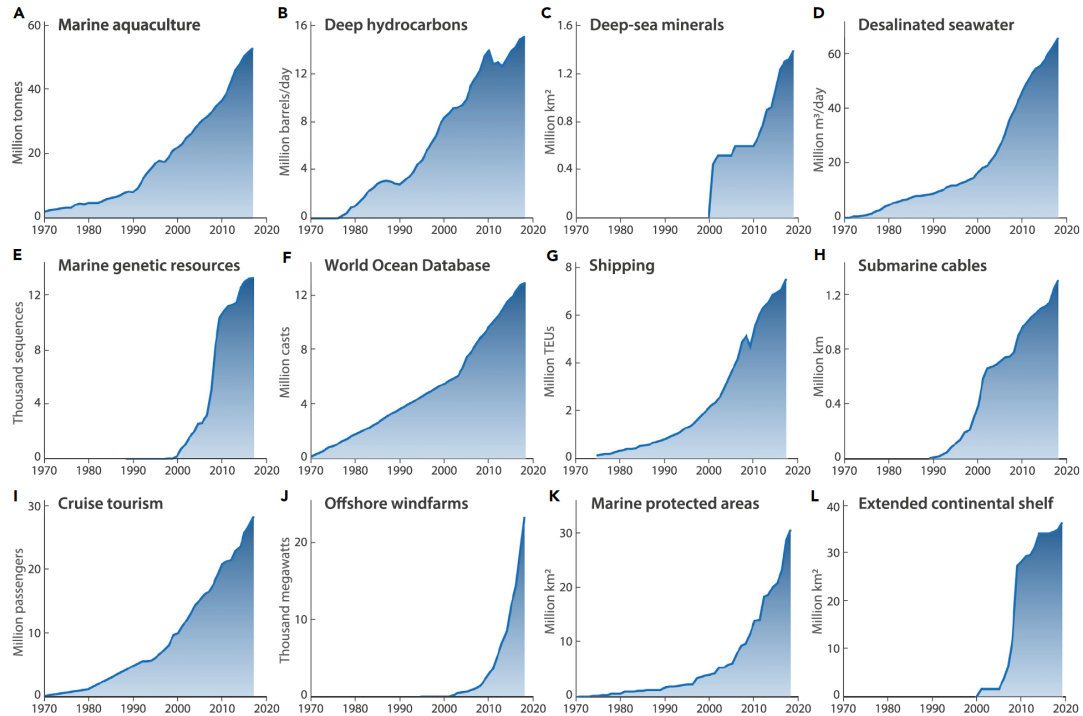
Day 1 - Ecosystem models and EBFM

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CSIRO Ocean & Atmosphere
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Marine Ecosystems under pressure

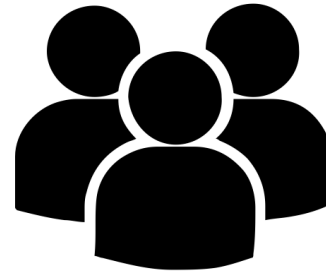


Jouffray et al 2020

Value of Marine Ecosystems



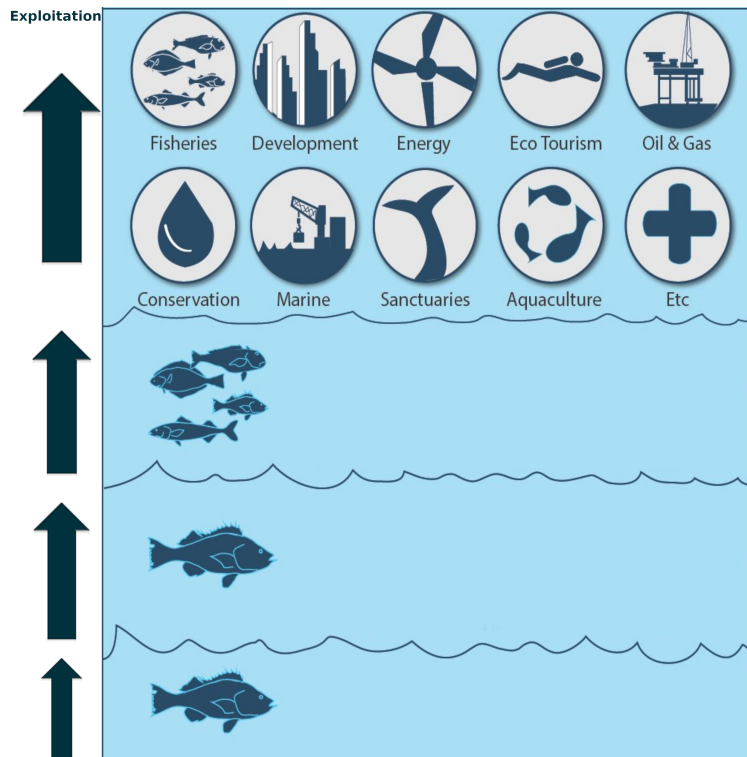
Value of Marine Ecosystems



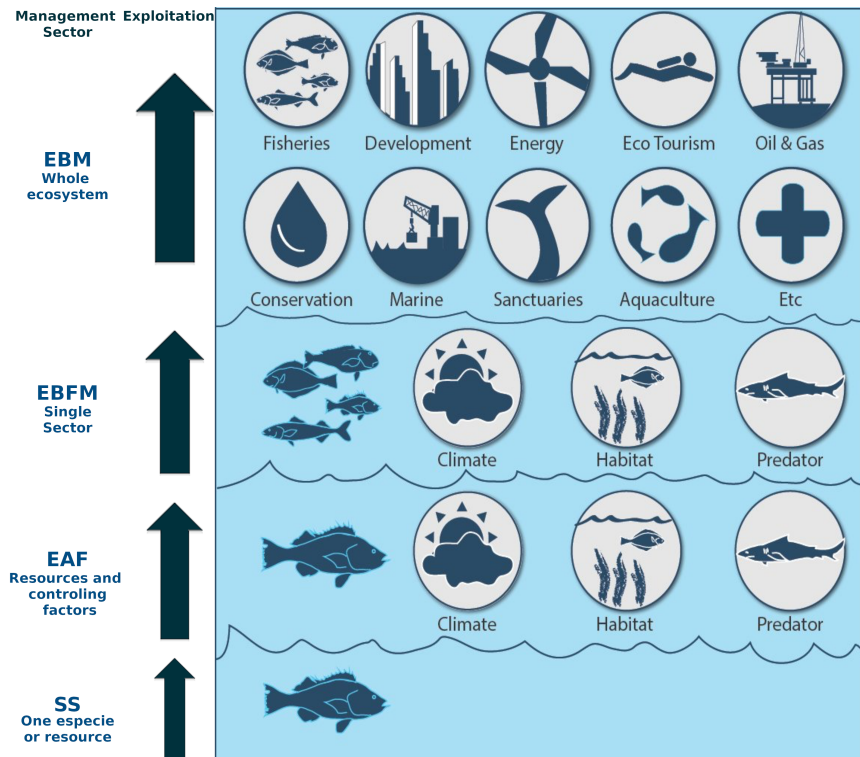
Value of Marine Ecosystems



Ecosystem management



Ecosystem management



Management Objective

- High level

Preserve the structure and function of the ecosystem

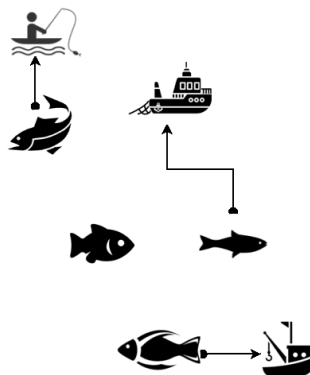
Management goals are a matter of social choice

- Operational

MSY

Avoid overfishing

Single species



Management Objective

- High level

Preserve the structure and function of the ecosystem

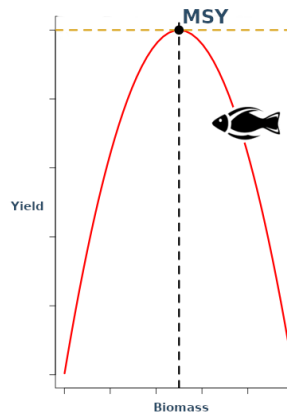
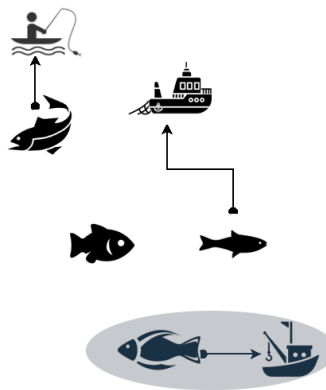
Management goals are a matter of social choice

- Operational

MSY

Avoid overfishing

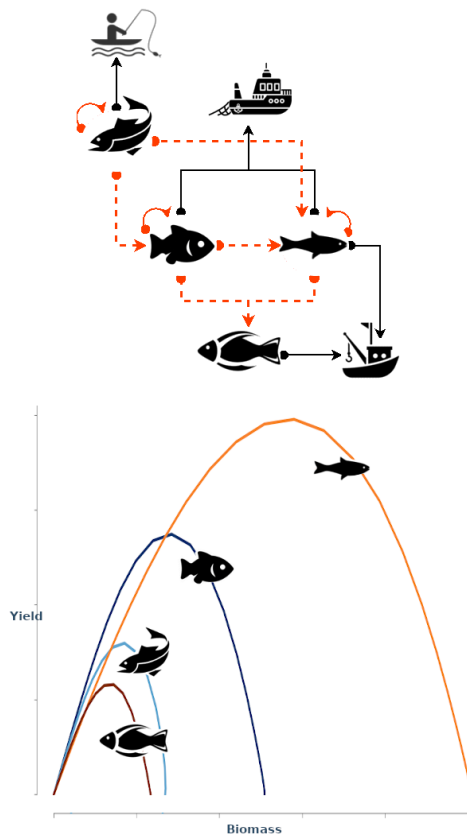
Single species



Management Objective

- High level
 - Preserve the structure and function of the ecosystem
 - Management goals are a matter of social choice
- Operational
 - MSY
 - Avoid overfishing

Multi-fleet & Multi-species



Understanding the ecosystem



Unknown future



Unknown future: looking at the past



Highly sophisticated models



Highly sophisticated models : looking the entire picture

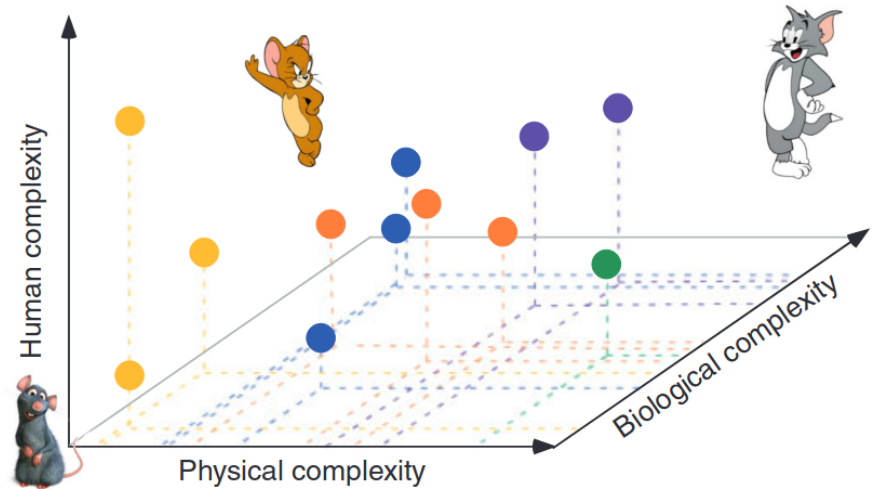


Highly sophisticated models : looking the entire picture



Supporting tools for EBM

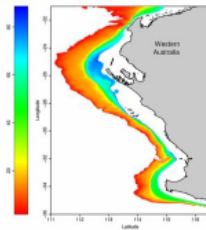
- RATS models
 - Relegate All Top Species
- MICE models
 - Models of Intermediate Complexity for Ecosystem assessments
- CATS models
 - Complex Assess Tools



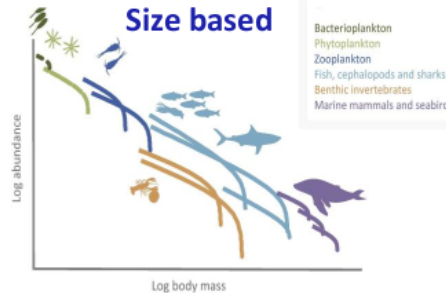
Plaganyi *et al.* 2011 Mar. Freshw. Res.

Uses of Marine ecosystems

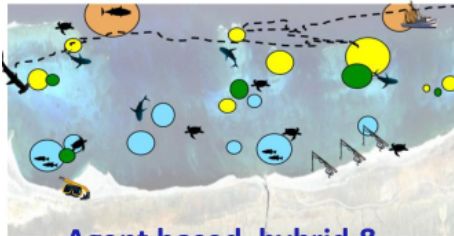
Species distributions



Size based



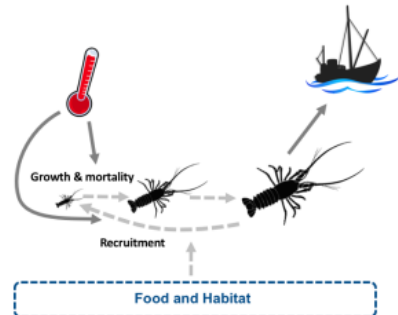
Trophic (EwE)



Agent based, hybrid & end-to-end models



Bayesian networks



Minimum realistic (MICE)

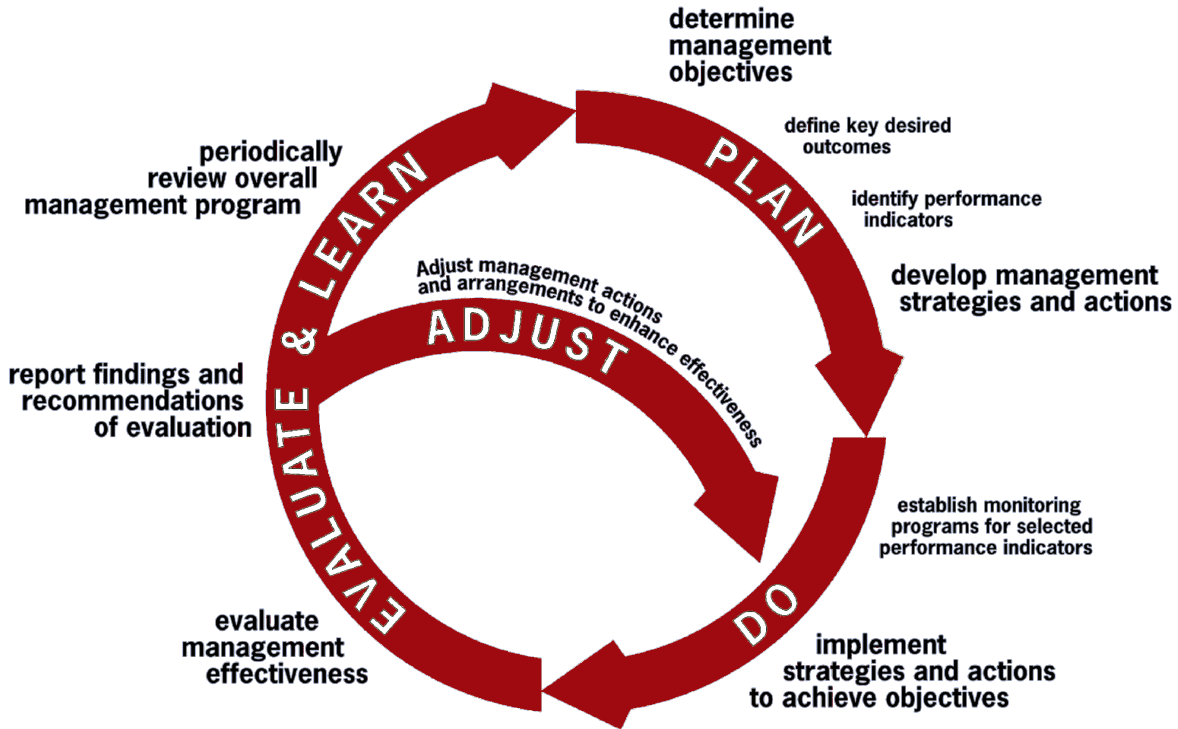
Christensen & Walters 2004, Travers *et al.* 2008, Fulton 2010, Dunstan & Foster 2011, Blanchard *et al.* 2017, Anthony *et al.* 2013, WWF

Purpose What-if sandbox

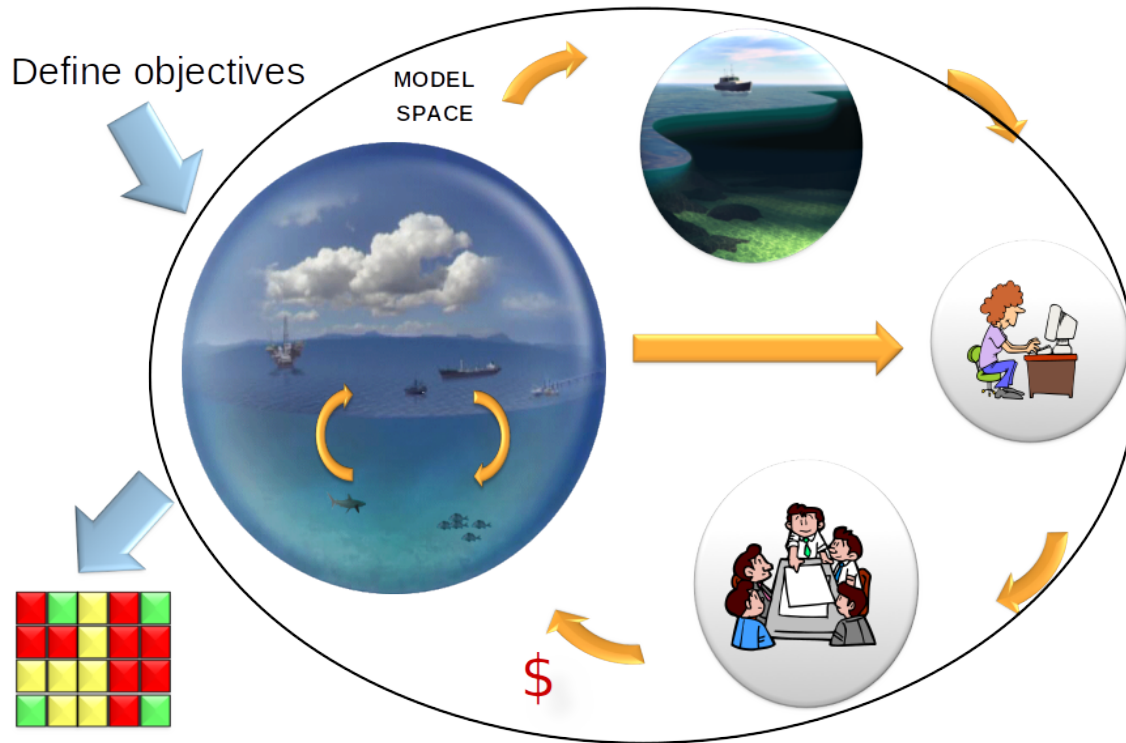
- model complexity
- ecological understanding
- whole of system understanding
 - fisheries
 - management systems
 - social and economic behaviour
 - cumulative (climate) impacts



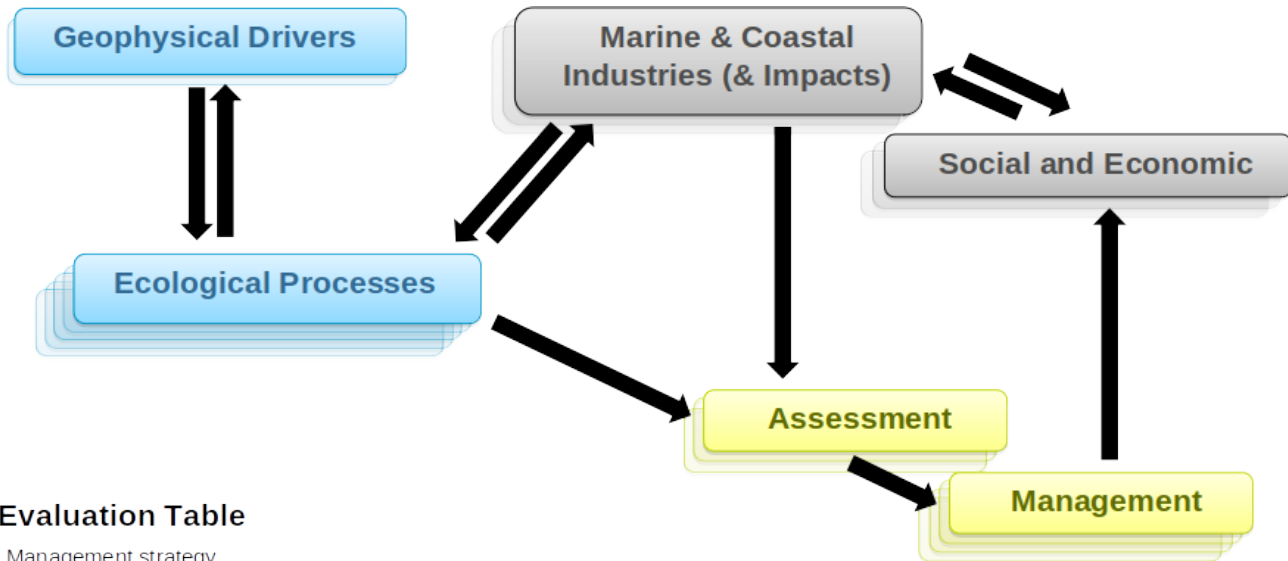
Adaptive Management Cycle



Playout Alternative Futures



Management Strategy Evaluation

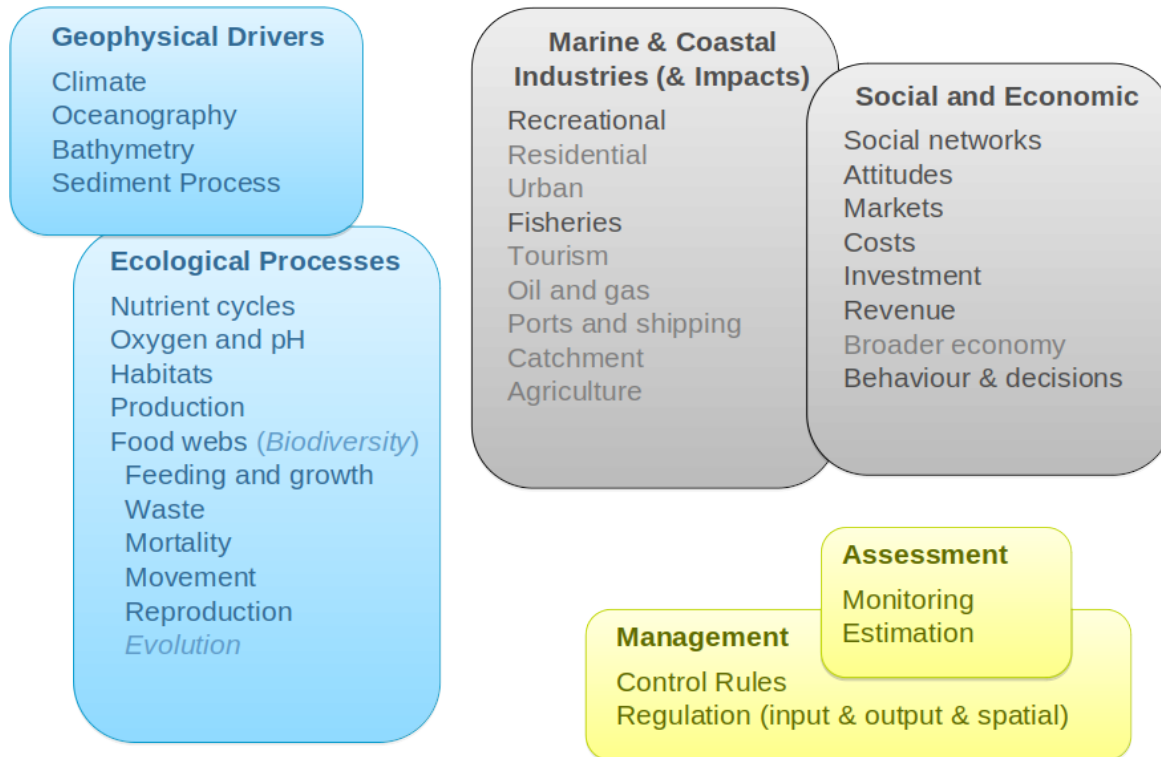


Evaluation Table

Management strategy

Objectives					

Management Strategy Evaluation



Data, data ... it's always about data!



Thébaud *et al.* 2017. ICES Jour. Mar. Sci.

Thank You

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