IEA in ICES: approaches and experiences

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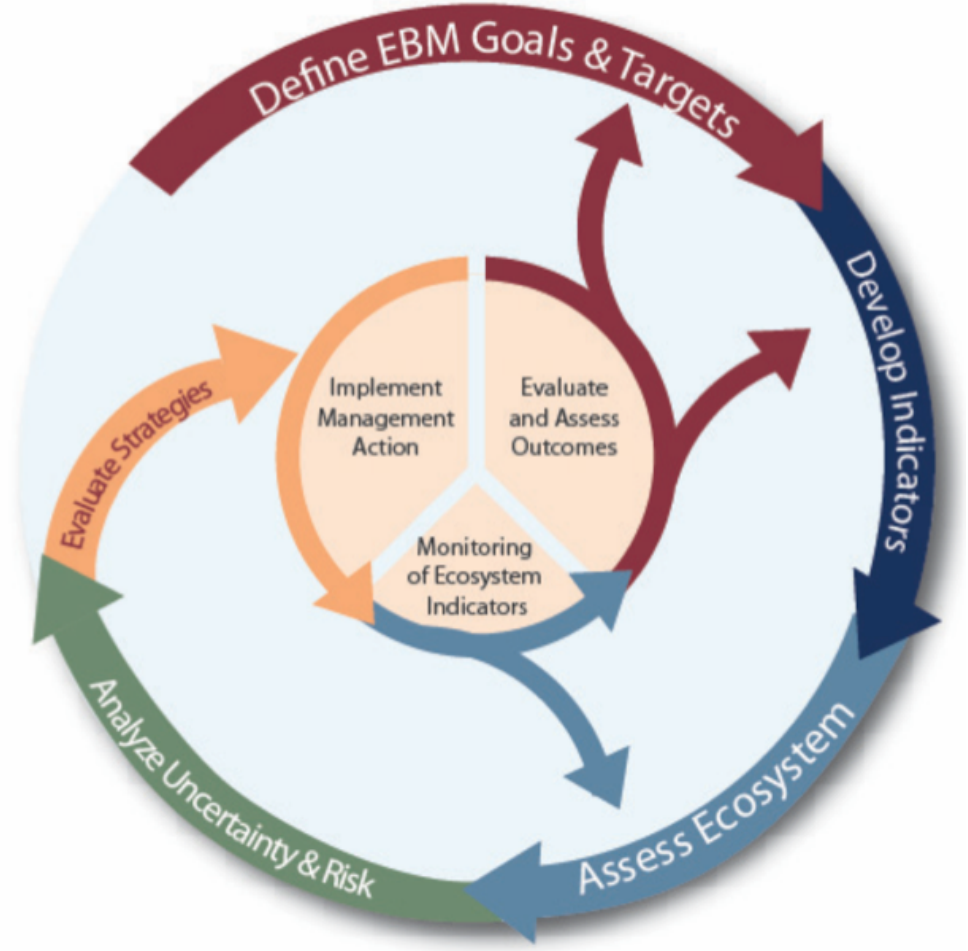
ICES
CIEM
Science for sustainable seas

Implementing the ICES strategy 2014-2018

‘The ***ICES Strategic Plan*** commits ICES to building a foundation of science around **one key challenge**: **integrated ecosystem understanding**. ICES will produce **integrated ecosystem assessments** in regional seas as a fundamental link between ecosystem science and the advice required in applying the ecosystem approach’

Integrated Ecosystem Assessments



NOAA Fisheries, DePiper et al. 2017

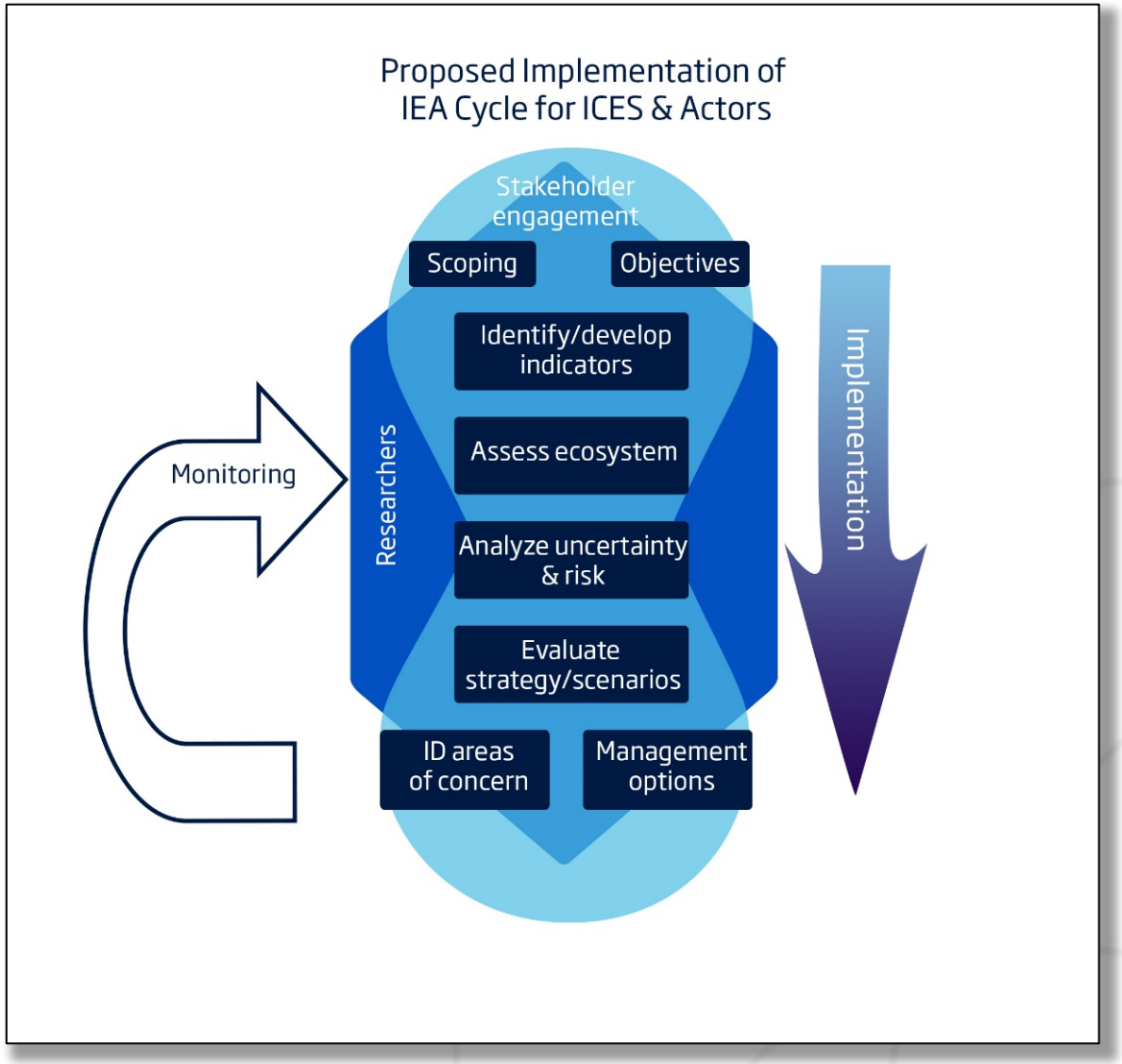
IEA is **"a synthesis and quantitative analysis of information on relevant physical, chemical, ecological and human processes in relation to specified ecosystem management objectives"**. (Levin et al. 2009, ICES 2012 WKBEMIA)

Should encompass

- Full range of ecosystem characteristics (foodwebs, biodiversity, habitats, endangered species etc)
- Full range of sectors (fishing, renewable energy, shipping, oil and gas, tourism etc)
- Full range of pressures (species removals, habitat damage, contaminants, eutrophication, climate etc); including interactions and cumulative impacts

to assess ecological, economic and social sustainability (ICES 2012 WKBEMIA)

IEA in ICES perspective



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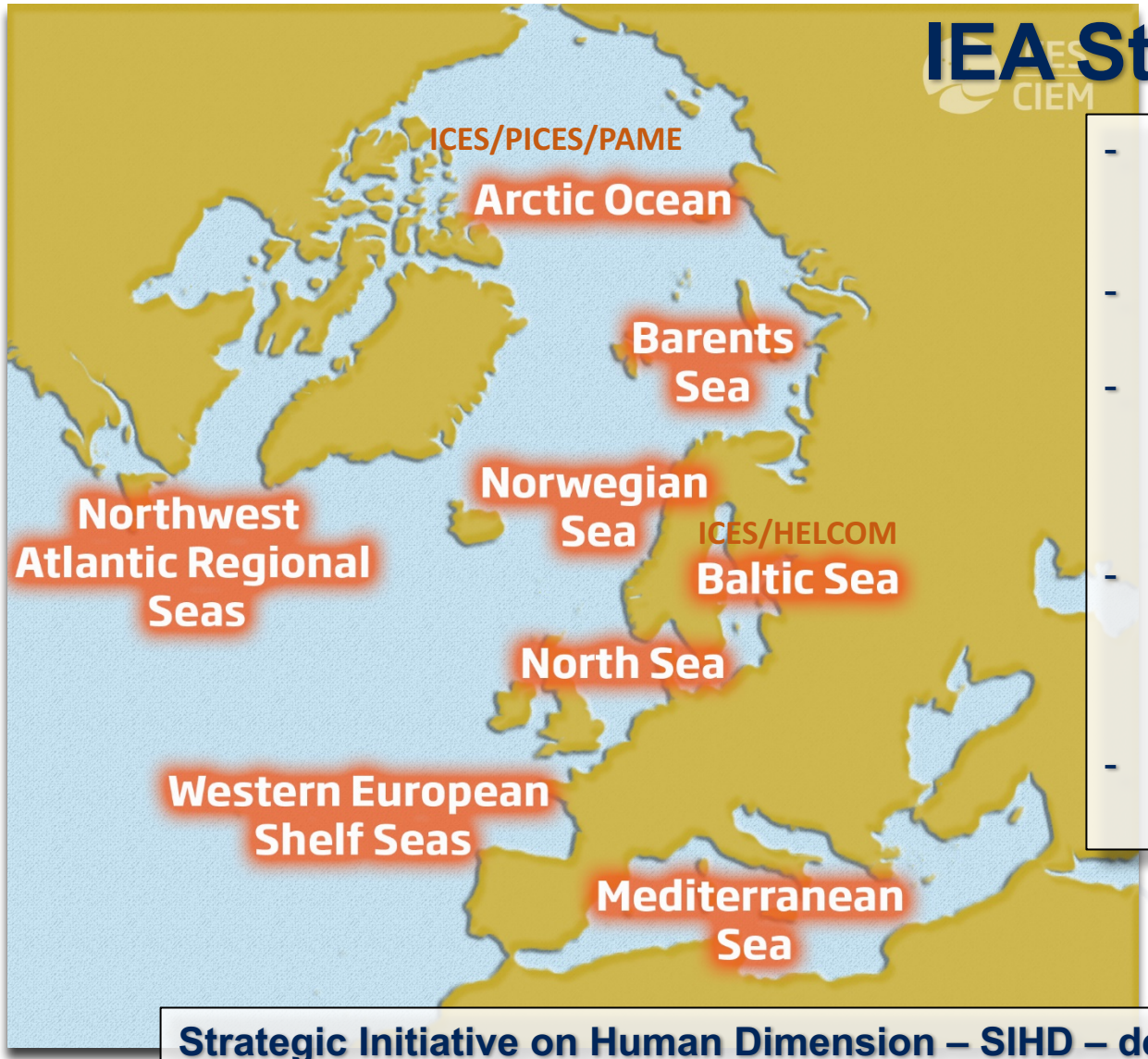
ICES IEA expert groups

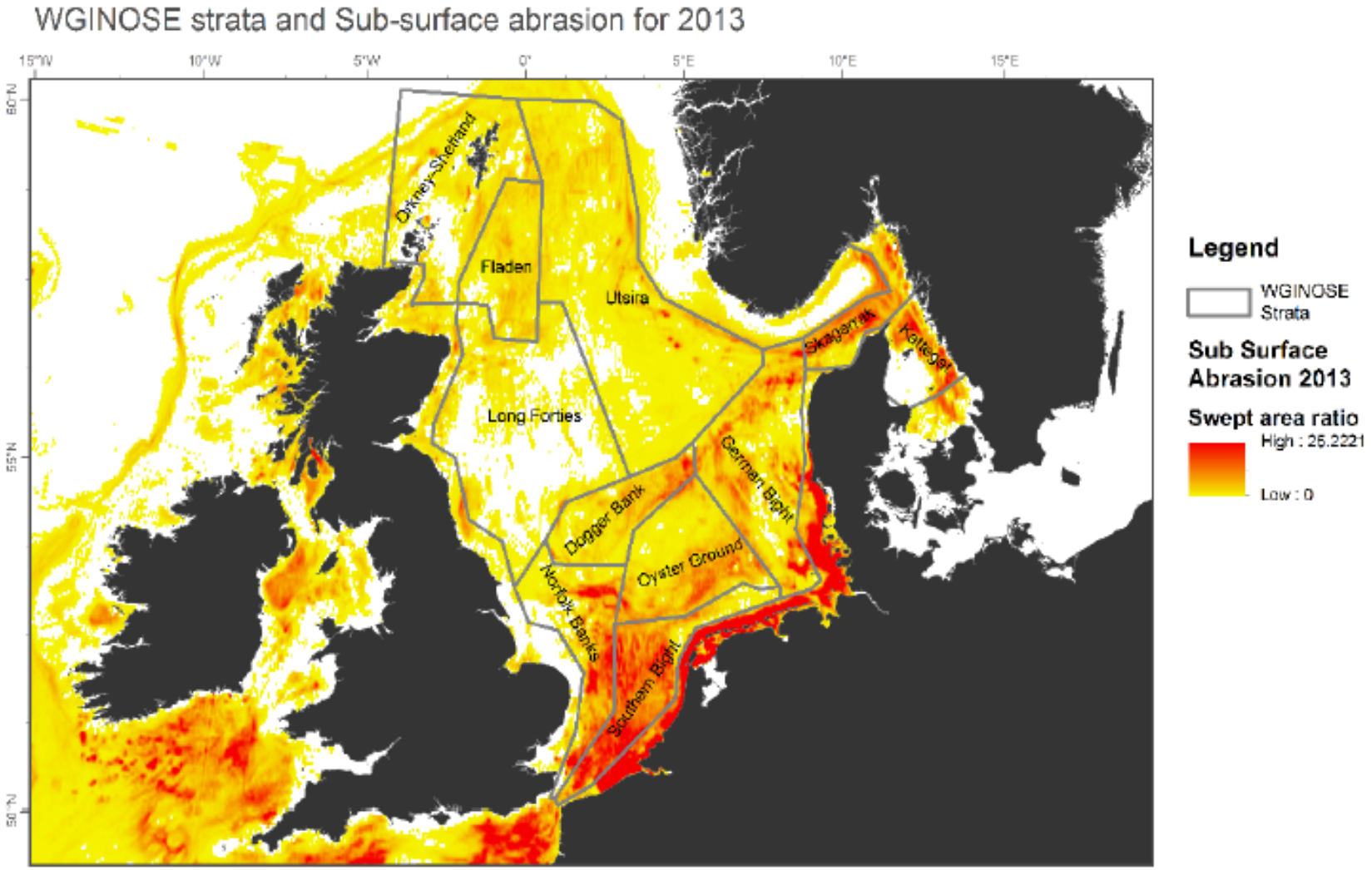


IEA Steering Group

- Working Group on Integrative, Physical-biological and Ecosystem Modelling
- Working Group on Maritime Systems
- Workshop on Developing Integrated Advice for Baltic Sea ecosystem-based fisheries management
- SIHD Workshop on Balancing Economic, Social, and Institutional Objectives in Integrated Assessments
- Working groups on social and economic indicators to be established in 2018

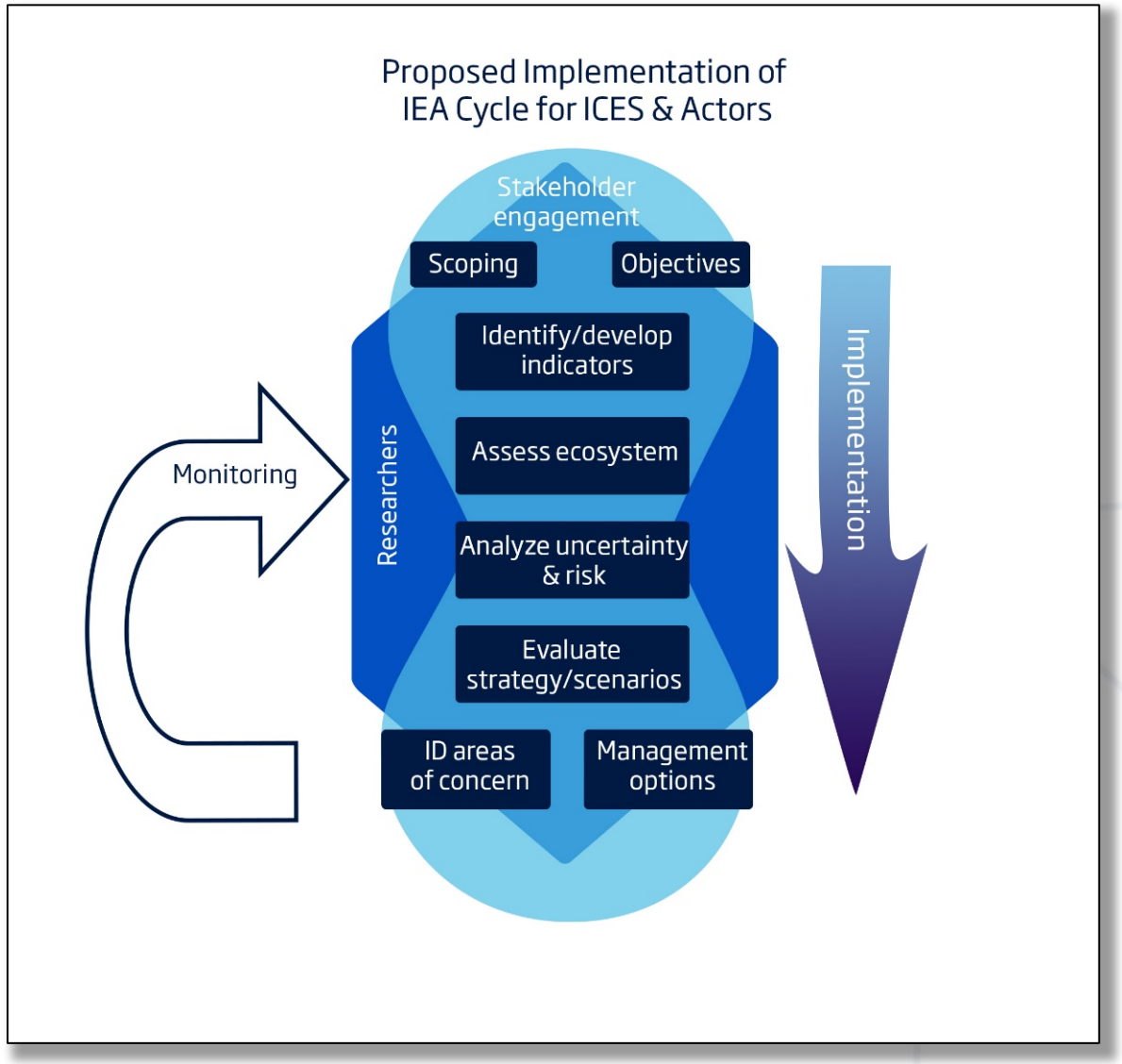
Strategic Initiative on Human Dimension – SIHD – develop strategies to support the integration of social and economic science into ICES work

Multiple spatial and temporal scales



Science for sustainable seas

IEA in ICES perspective



Stakeholder involvement

- A challenge

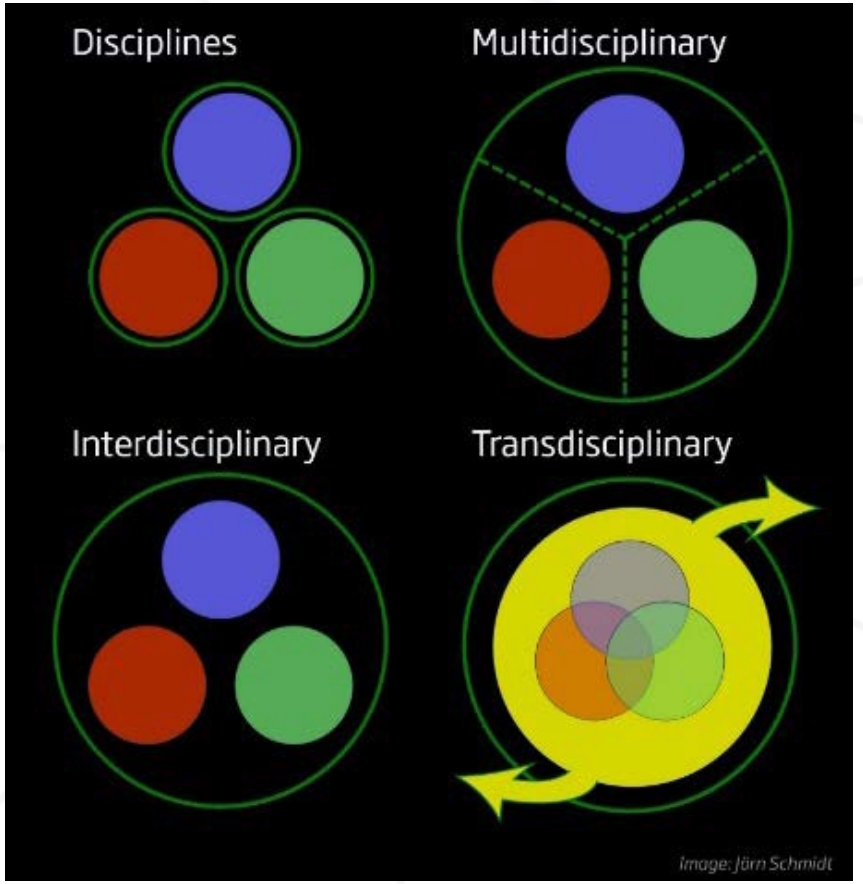
Scoping – currently much focus

Scoping ecosystem management objectives

- Legislations, international agreements, managers, other stakeholders….

- Focus on externally defined objectives
  - Effectively bridging disciplines;
  - From negotiation to considering how collective disciplines contribute to solving the problem
  - Overcome barriers - individual discipline's priorities, communication and culture (DePiper et al. 2017)

⇒ moving IEAs beyond multidisciplinary assessments of ecosystem state; advice beyond disciplinary boundaries



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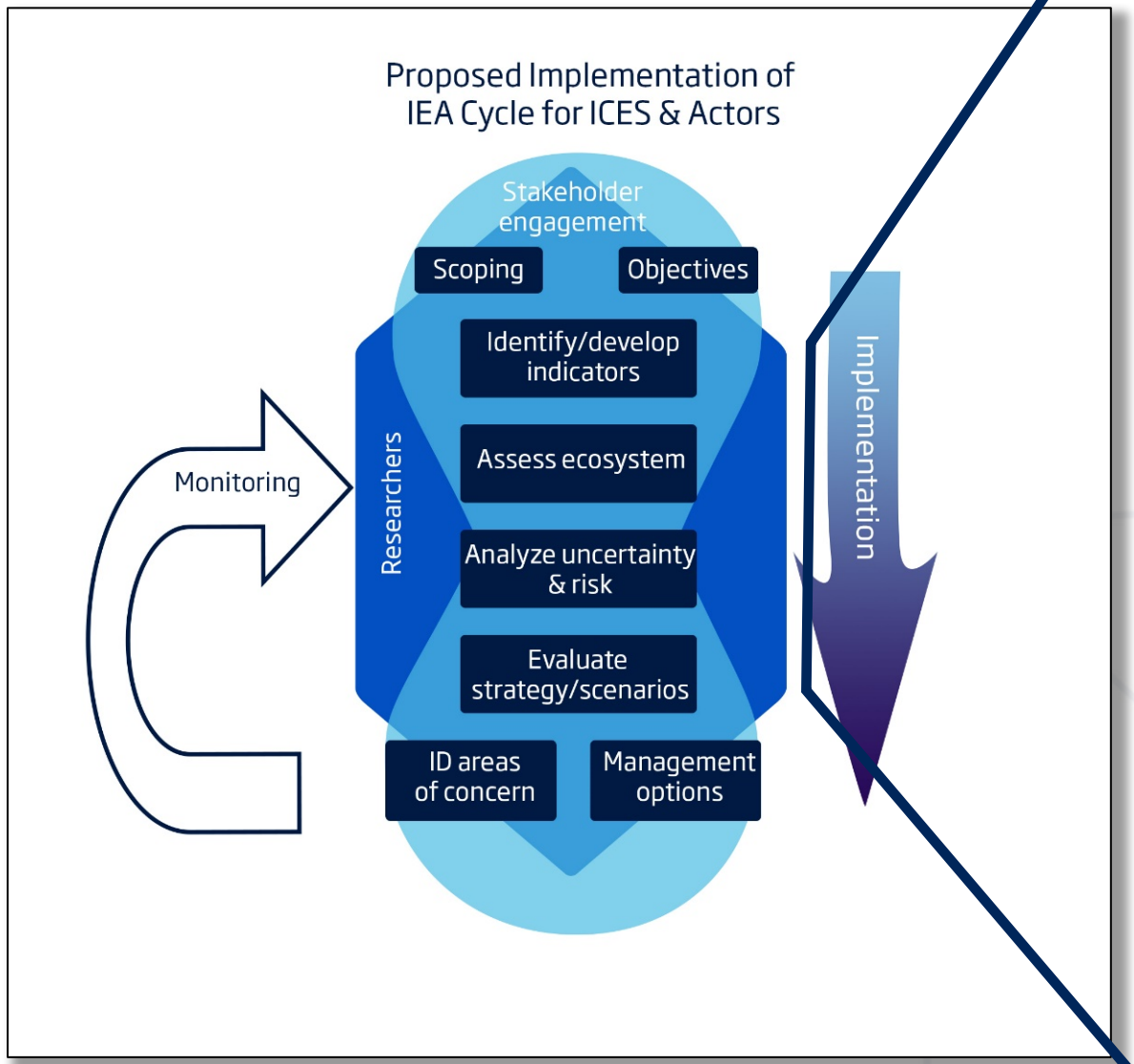


Observations

Aggregated data & indicators

Model output

Publications

Integrated analyses
Identifying scenarios
Modelling & scenario testing
Expert judgements

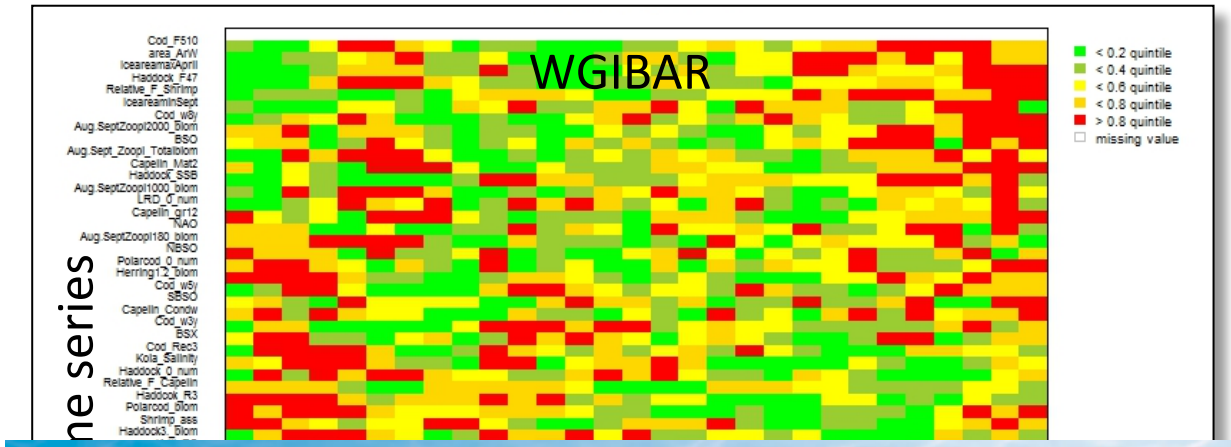
Ecosystem state and change

Main drivers

Cumulative effects

Vulnerability
Risks
Sustainability

Management strategies & options



ICES Journal of Marine Science

ICES CIEM International Council for the Exploration of the Sea / Conseil International pour l'Exploration de la Mer

ICES Journal of Marine Science (2017), doi:10.1093/icesjms/fsx223

Principal component analyses for integrated ecosystem assessments may primarily reflect methodological artefacts

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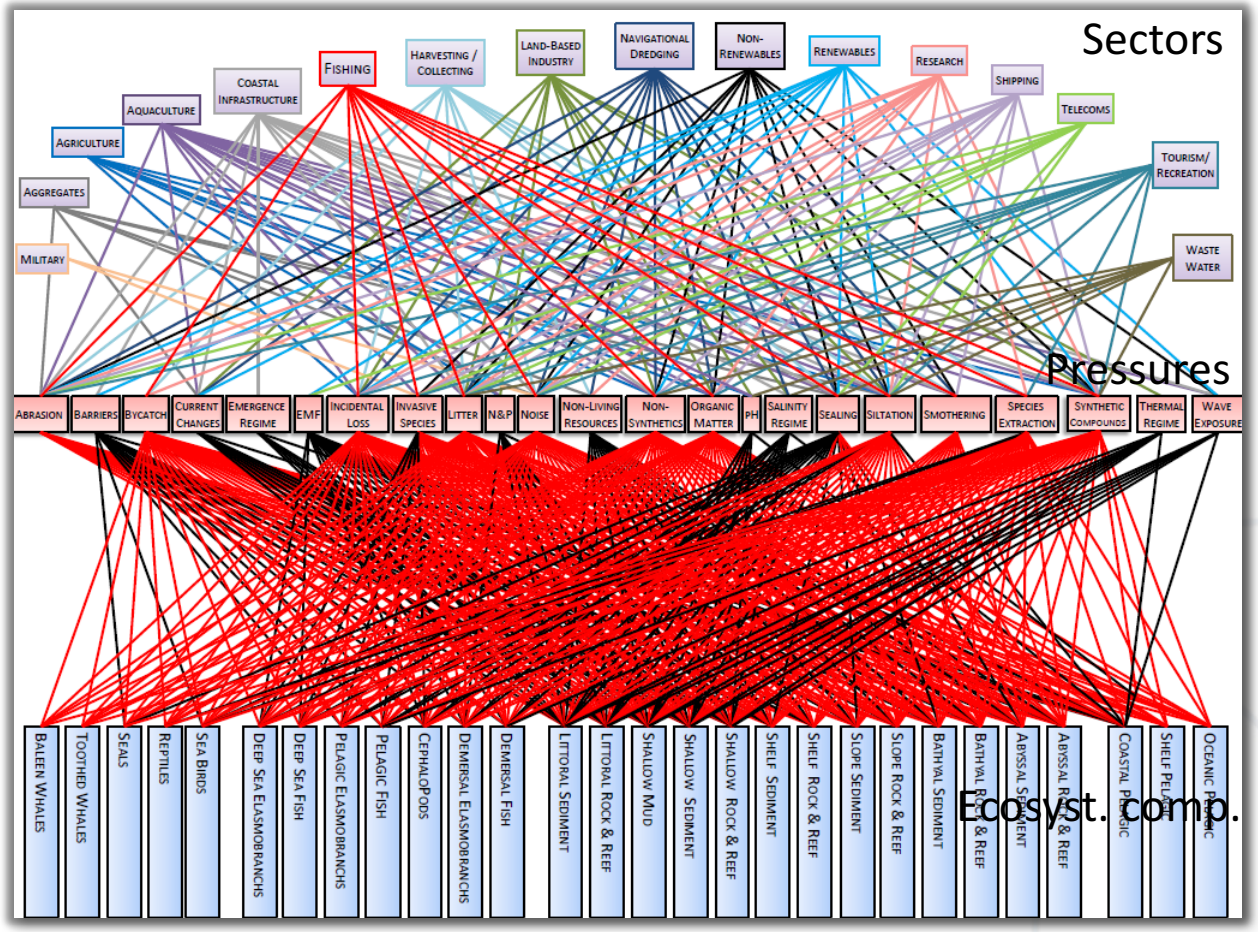
Sectors, pressures and states



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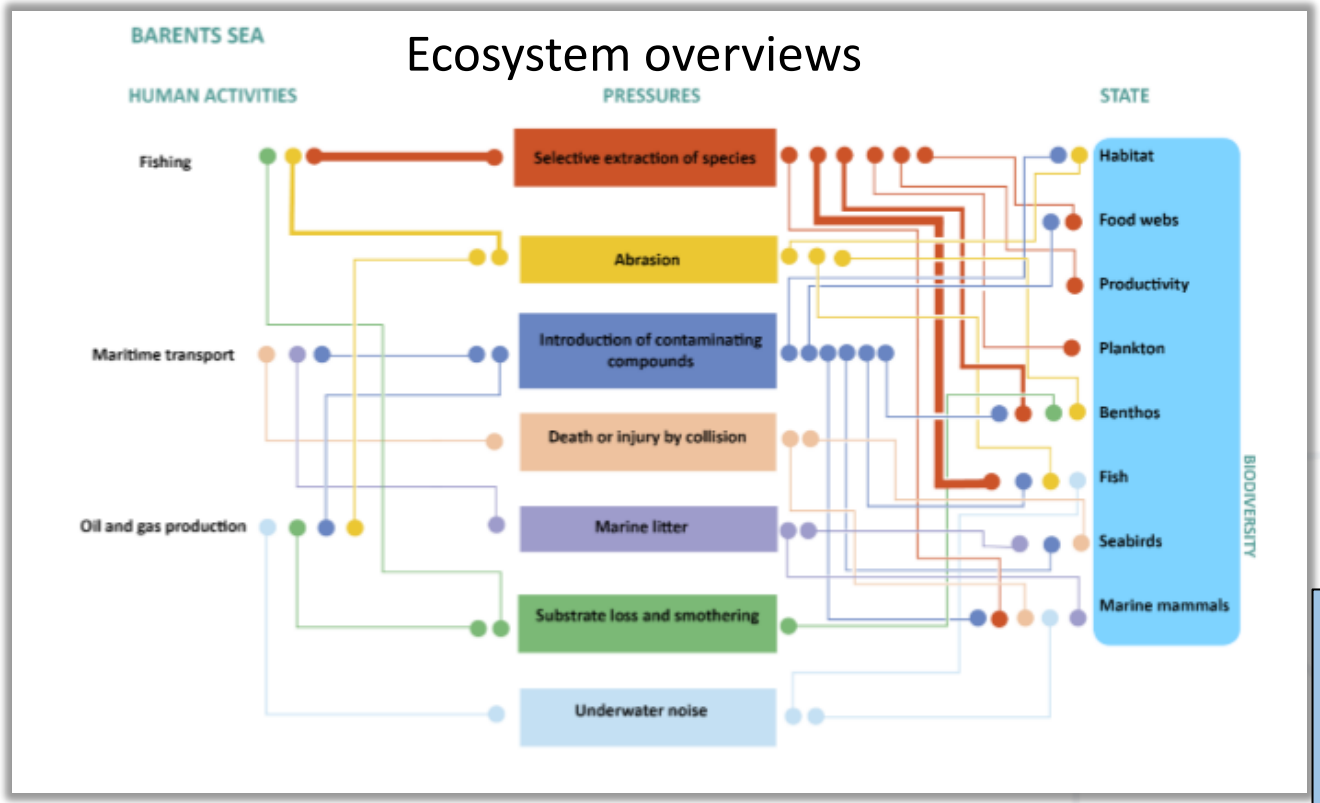

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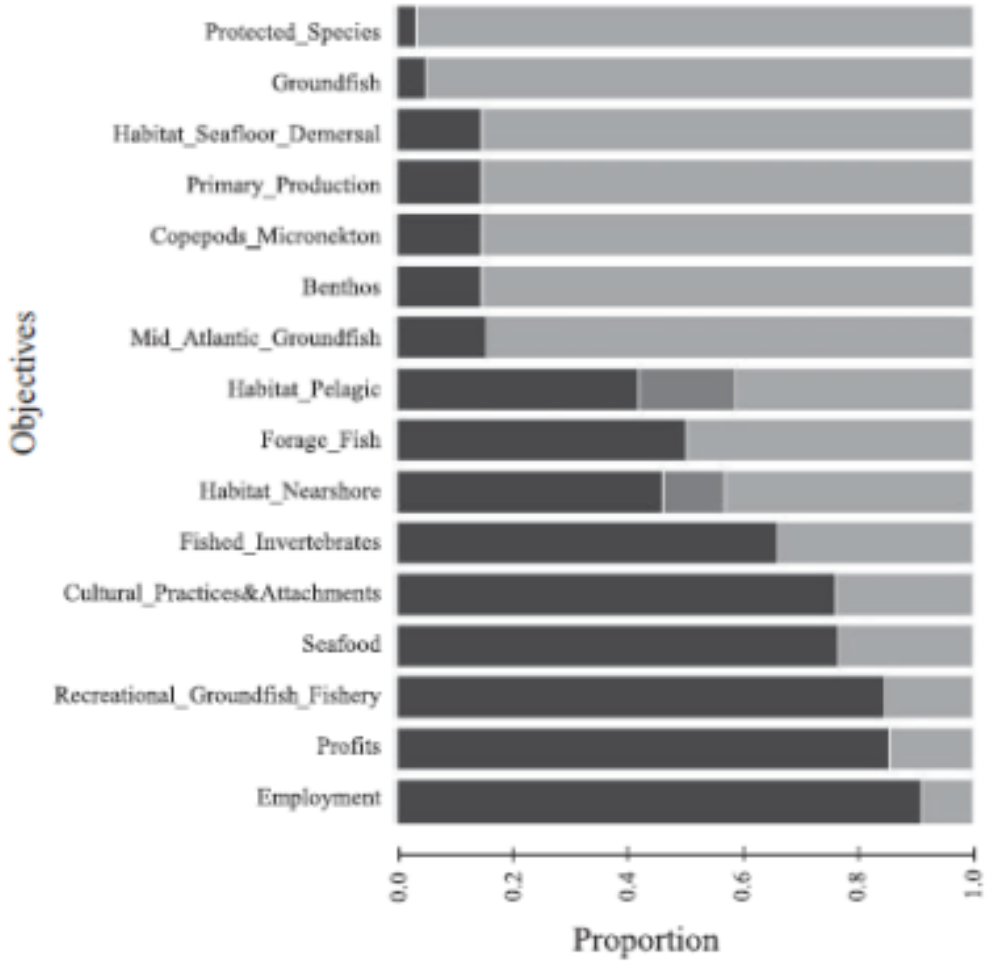
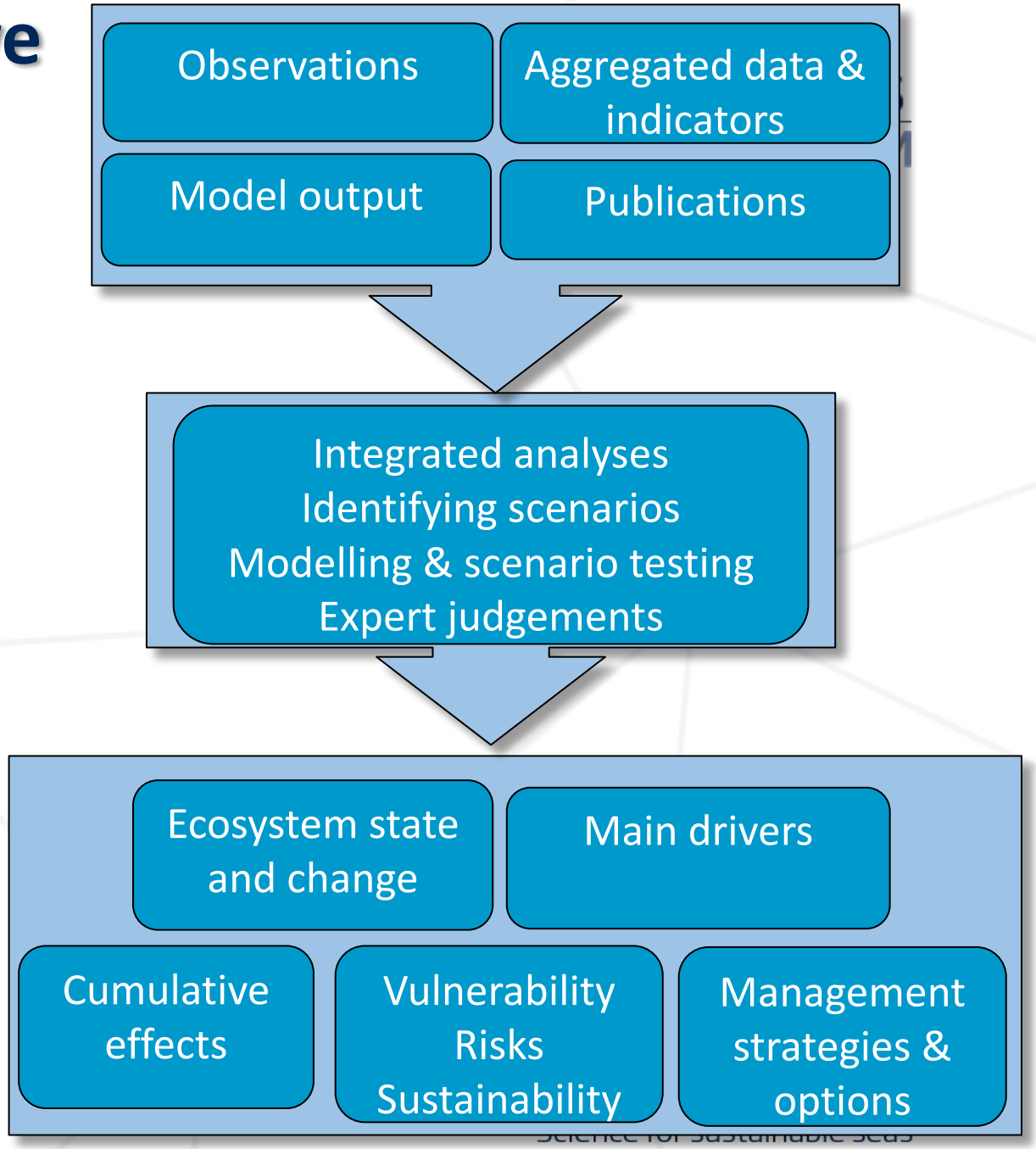
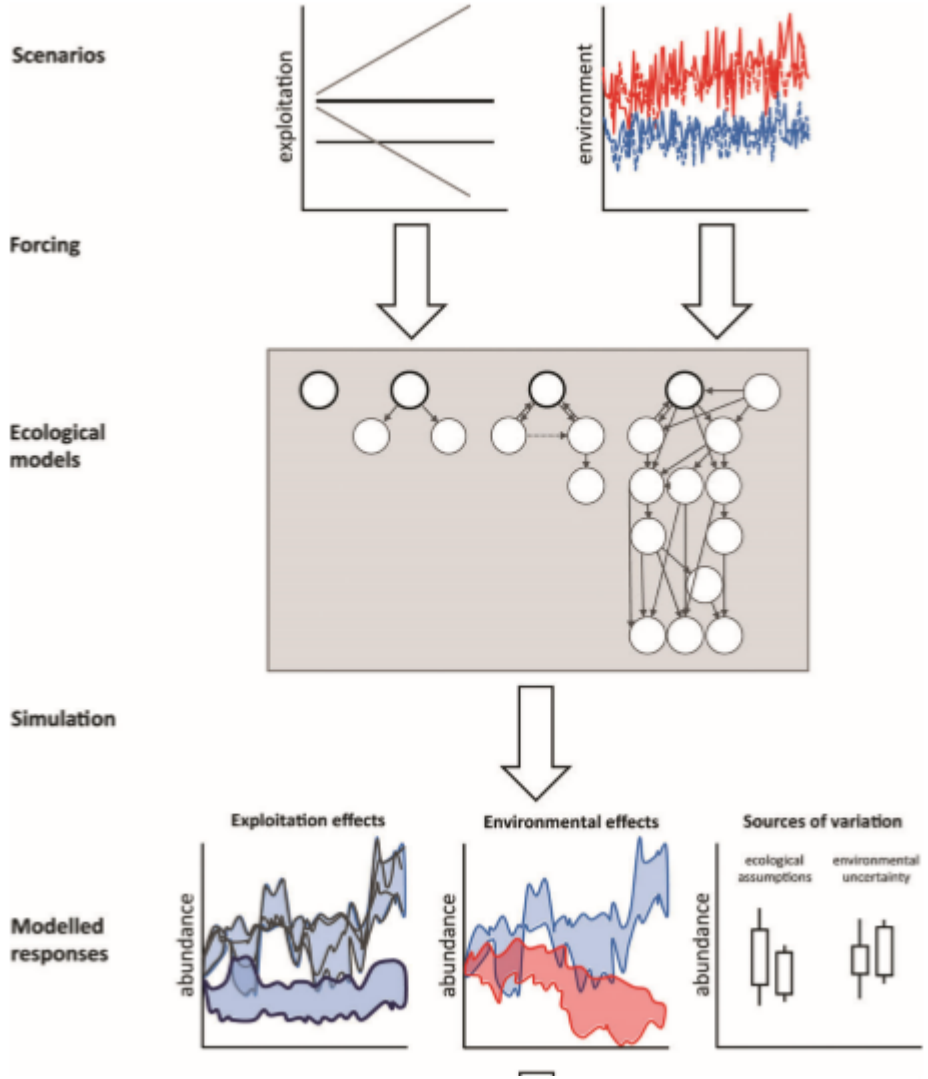
Conceptual and semiquantitative models



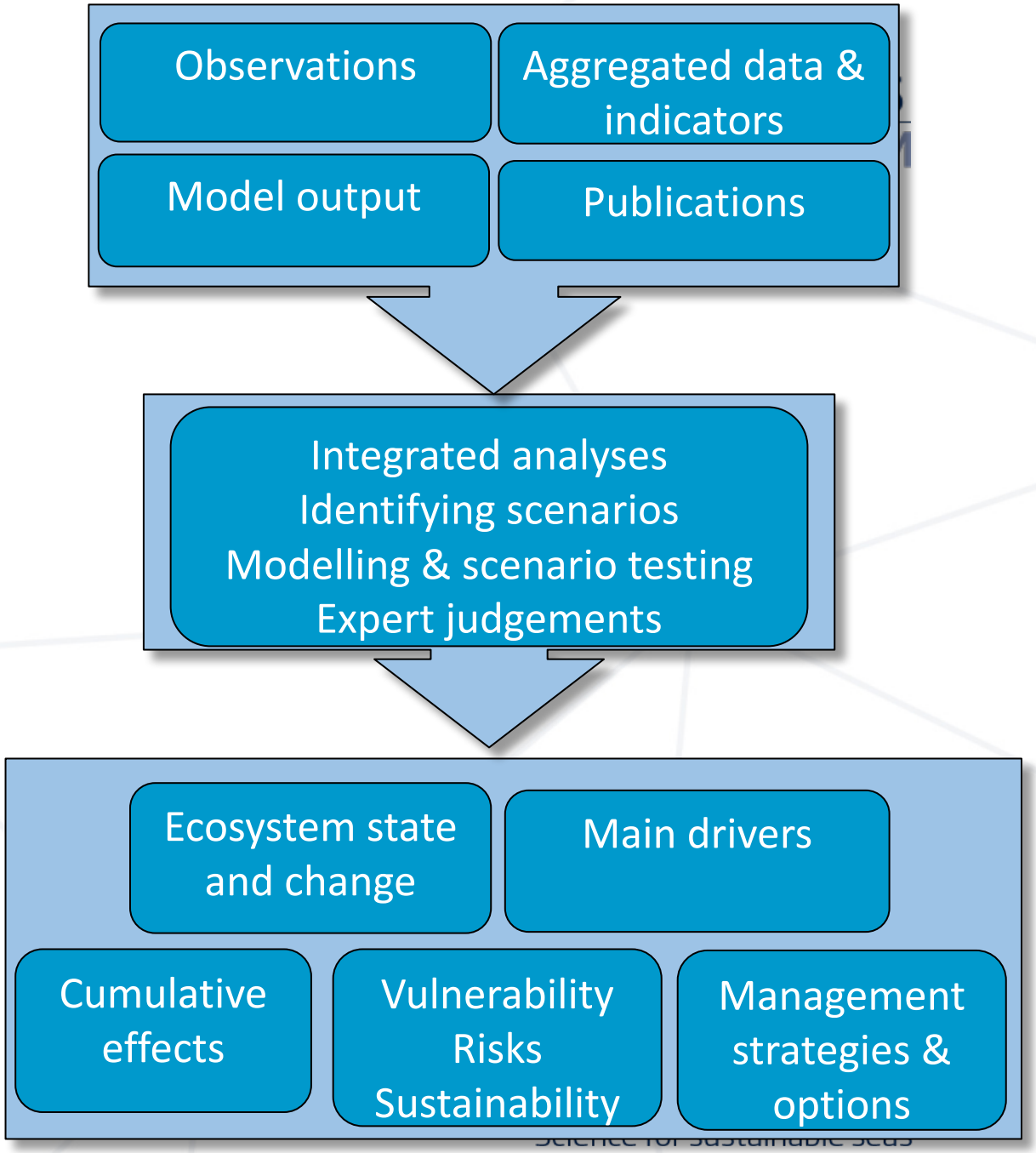
ICES 2017 WGNARS, DePiper et al. 2017



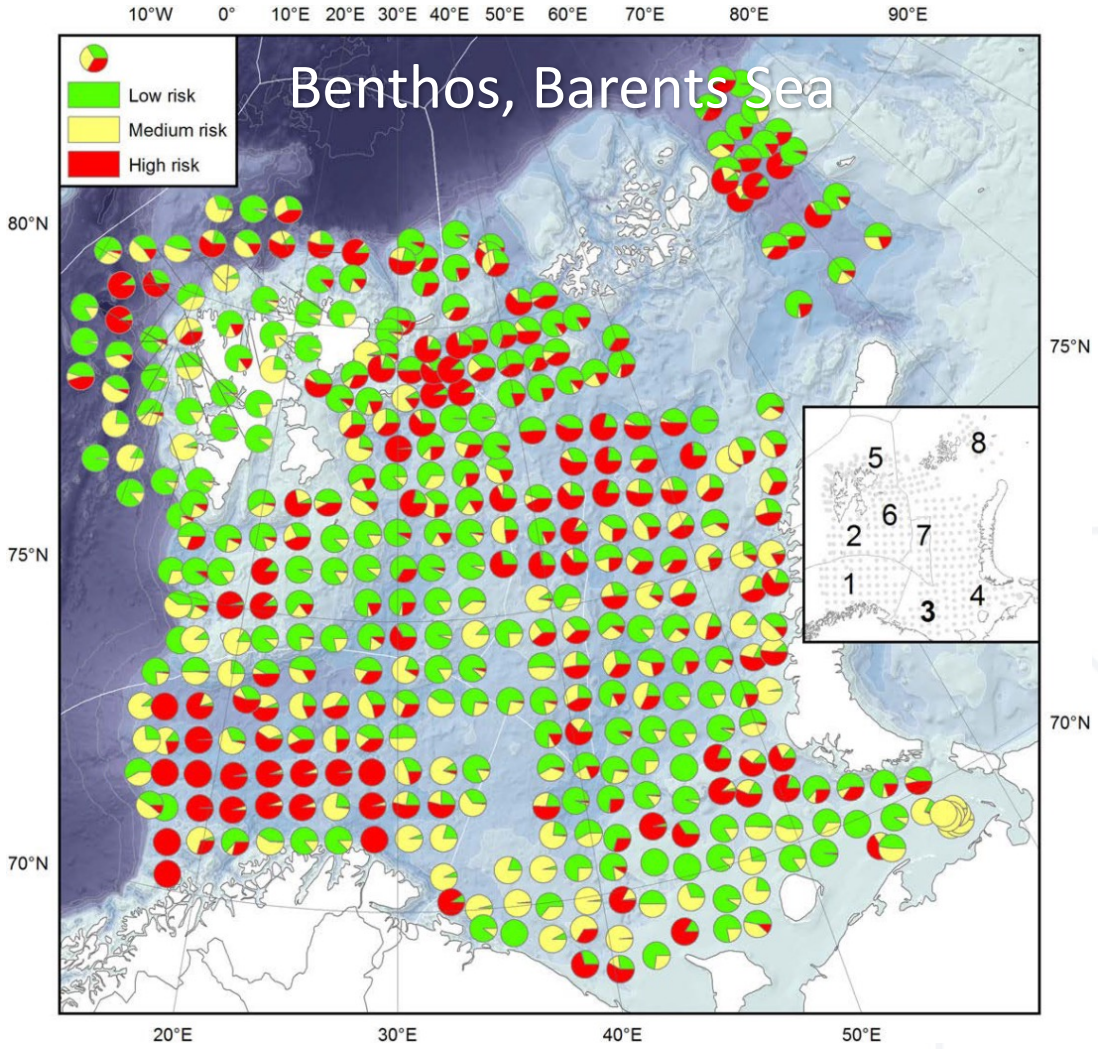
Quantitative models



Möllmann et al. (2014)



Biodiversity, traits, functional diversity and vulnerability



ICES 2017. WGIBAR

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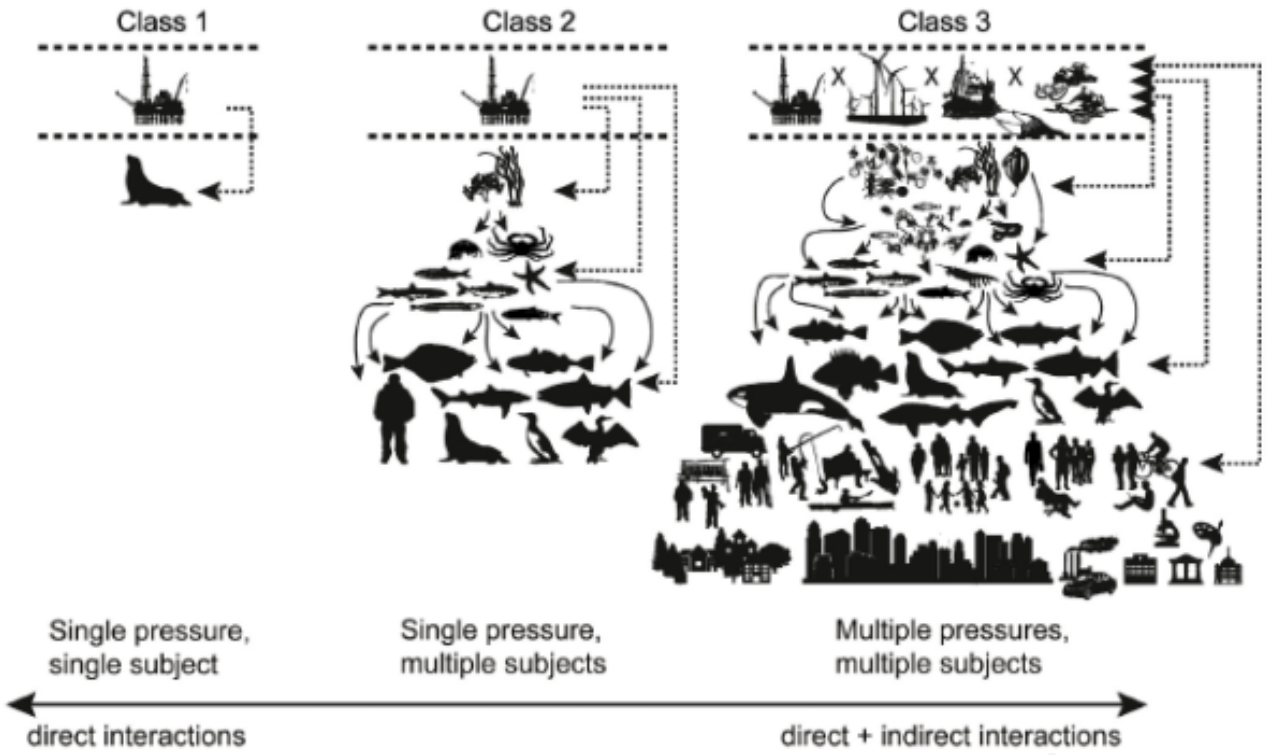
Risk assessments



Holsman et al. 2017

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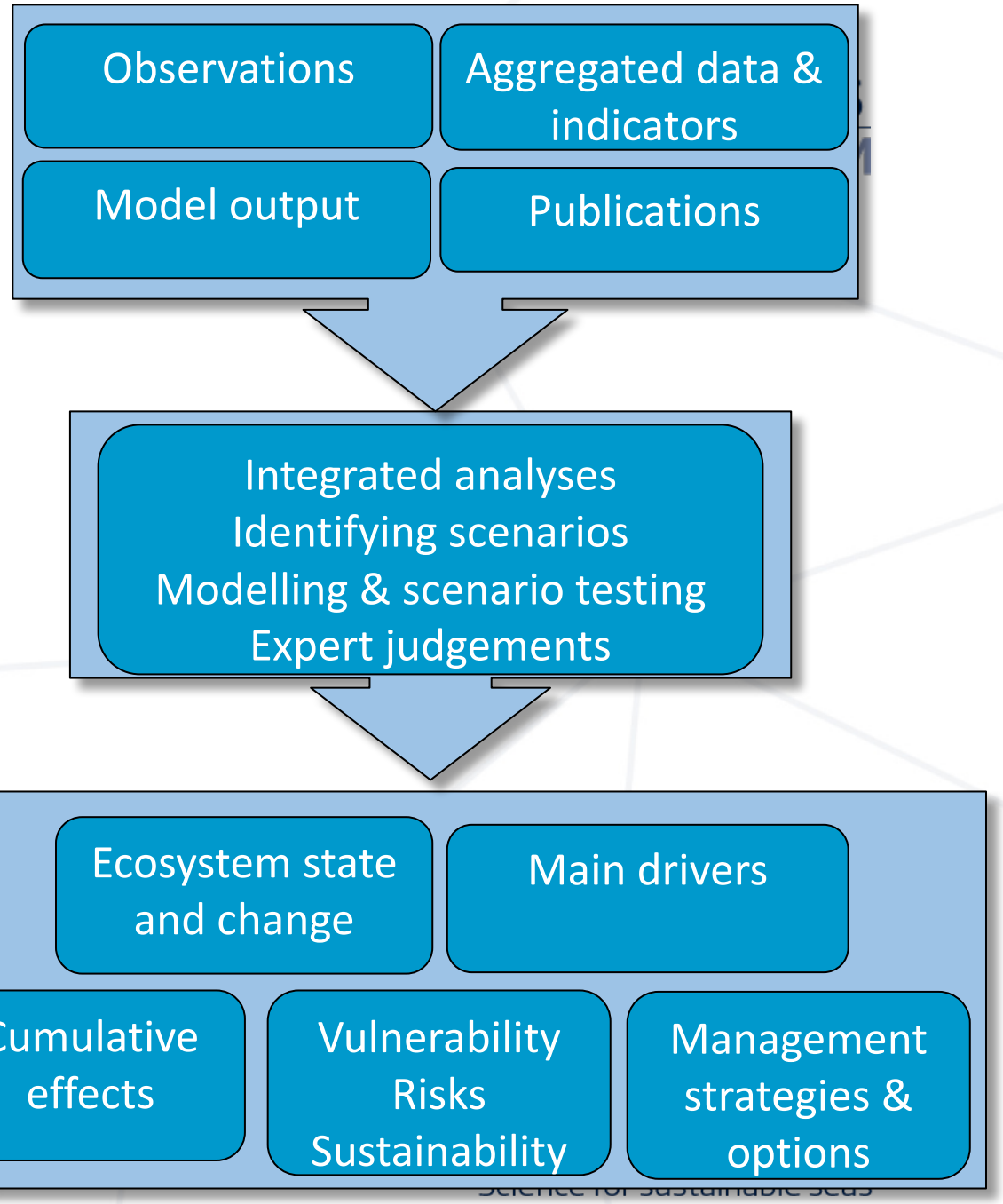
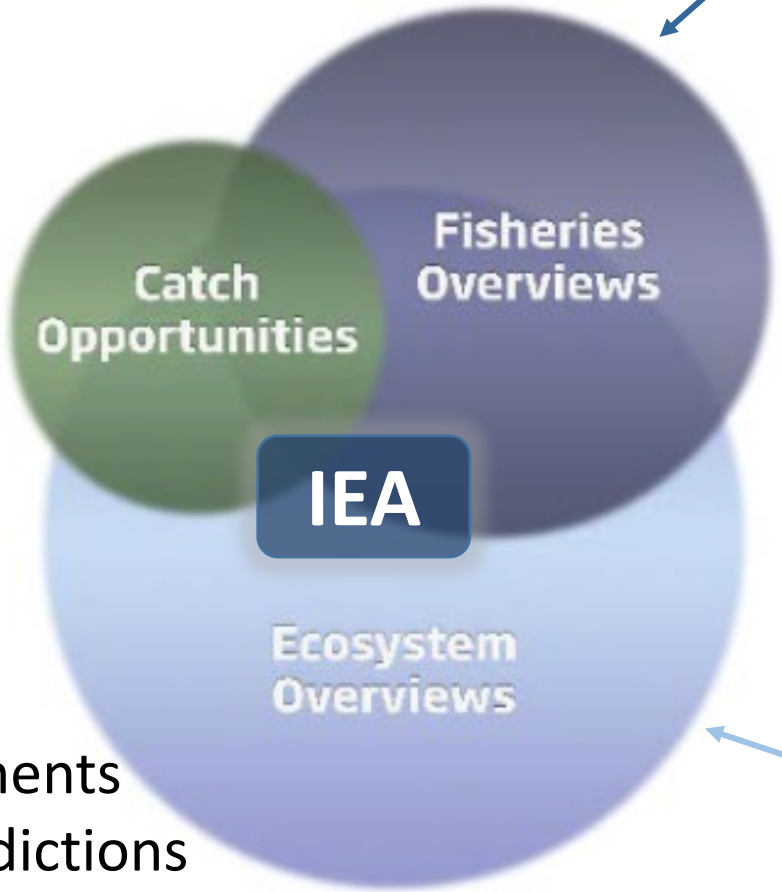


All IEA groups, varying approaches

Varying effort, varying approaches

IEAs and ICES advice

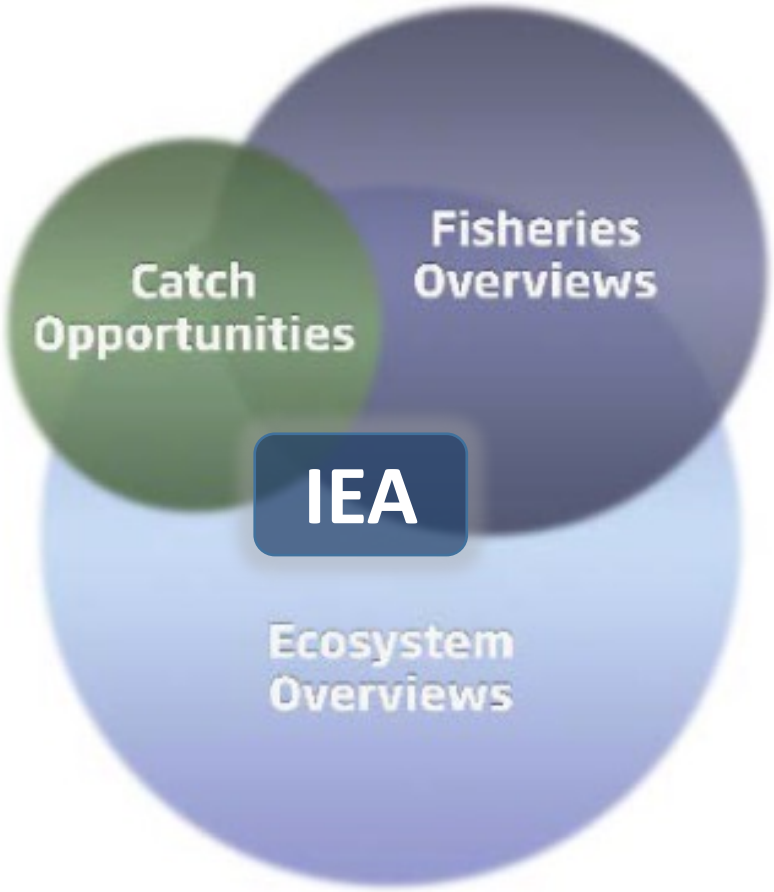
EBFM
- Environmental impacts on stocks
- Multispecies interactions and management
- Ecosystem effects of fisheries



Single stocks
- Ecological processes
  - impacting stock developments
  - improving short term predictions
- Benchmarks and HCRs; relevant scenarios

EBM
- Multisector impacts on ecosystems
- Cumulative impacts, trade-offs

IEAs and ICES advice



Reports

Papers

Telling stories

…

IEA in ICES perspective

- Flexible approach
  - Diverse input
  - Diverse approaches; qualitative expert judgments to quantitative approaches
  - Diverse output
- No one size fits all! Depending on
  - data availability
  - system and pressures
  - interests, capacity and competence of people involved

⇒ Collectively much experience on diverse approaches

- Scoping => development of more and targeted approaches relative to EAM objectives
- SIHD => more focus on socio-economic aspects