Mission Atlantic

Mapping and assessing present and future status
of Atlantic marine ecosystems under climate change and exploitation

H2020 Atlantic Flagship (BG08)
September 2020 – August 2025, Budget 11.5M €

**Under Negotiation**   Coordinator Patrizio Mariani(DTU)
Deputy Mike St. John (DTU)

Toward the Next Generation of Assessment
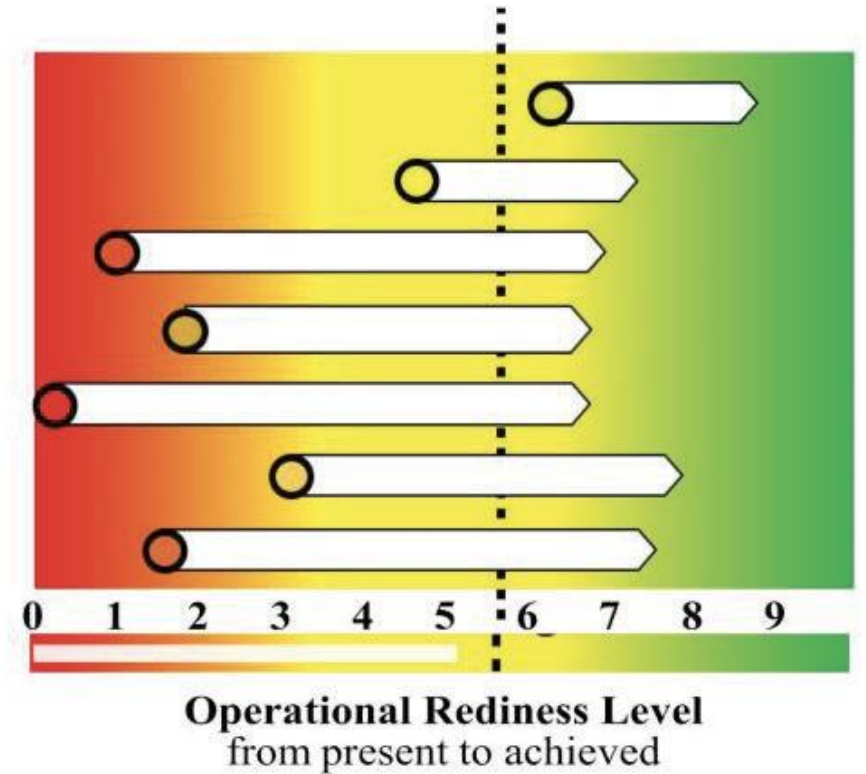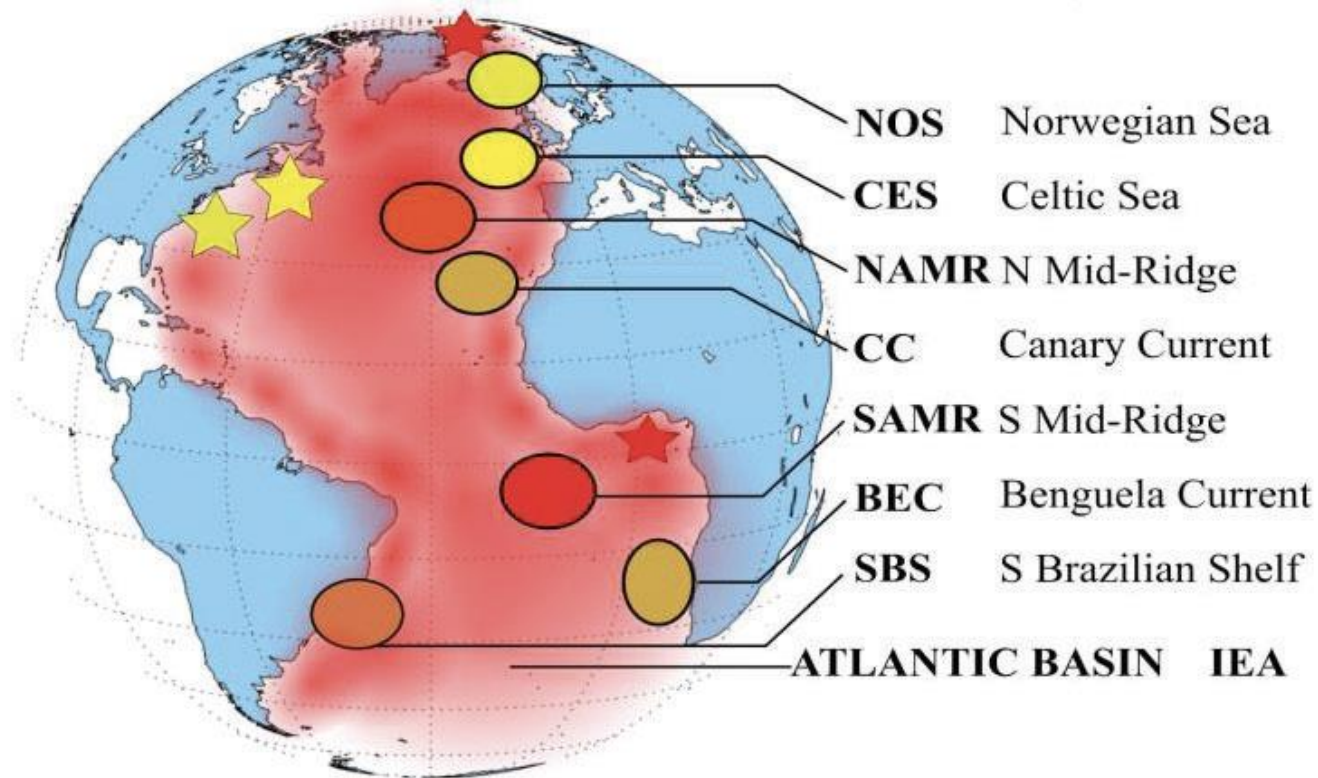
Integrated Ecosystem Assessments
IEAs represent the best strategy towards
implementing marine EBM.

IEAs go beyond observing system states.
They are means towards evaluating the status of
knowledge on complex problems relevant to society.


Match and Field, Annual Reviews 2017
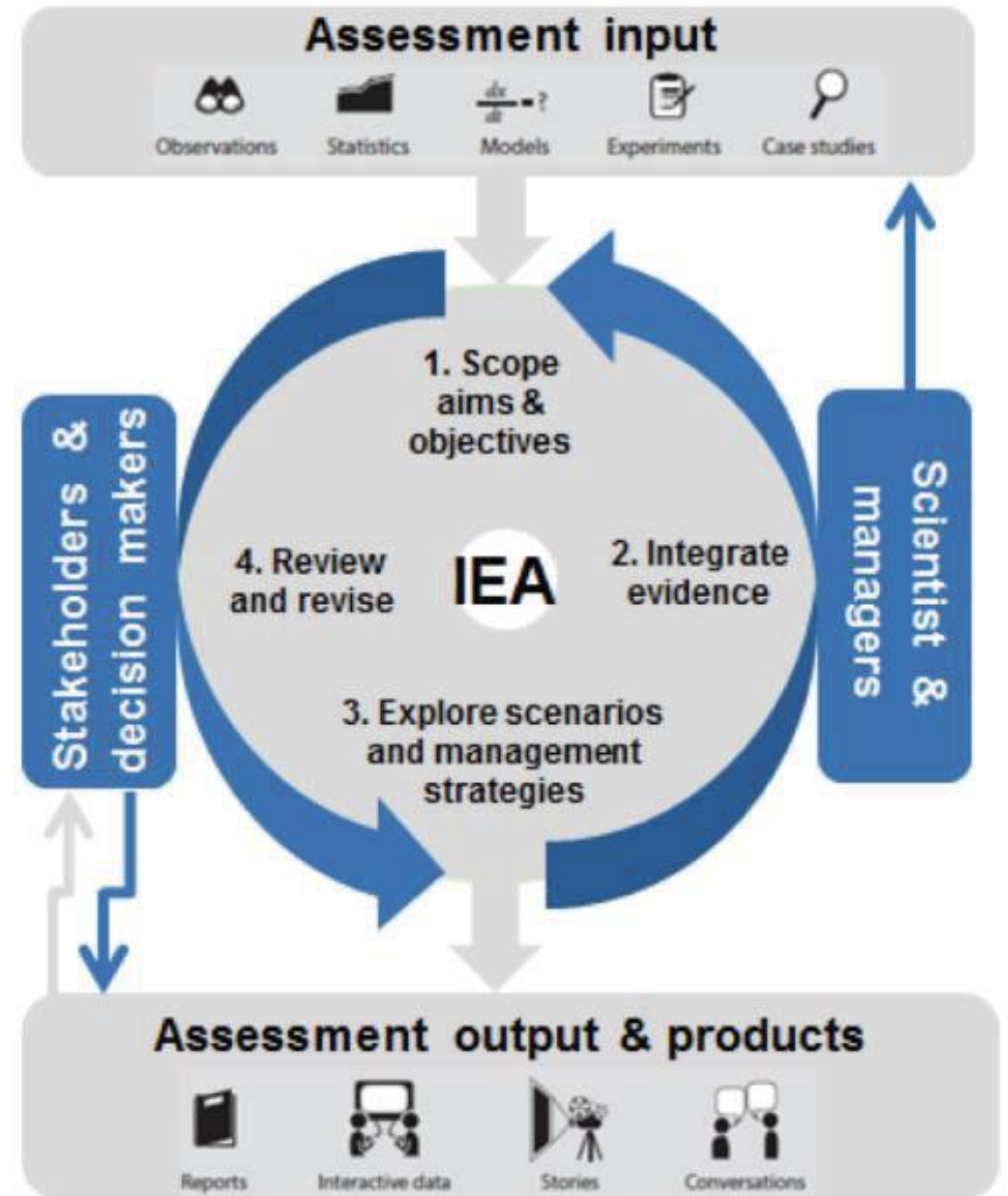
7 Case Studies

- Across a large latitudinal gradient
- Contrasting biogeogaphical regions
- Data-poor and data-rich systems

NOS — Norwegian Sea
CES — Celtic Sea
NAMR — N Mid-Ridge
CC — Canary Current
SAMR — S Mid-Ridge
BEC — Benguela Current
SBS — S Brazilian Shelf
ATLANTIC BASIN — IEA

Operational Rediness Level
from present to achieved

Observations at sea

Data and models
- Wavegliders (Azores, Ascension, East Brazilian Shelf)
- Deep sea gliders
- Oceanographic cruises
- Size spectra, acoustic, CPR, etc.
- End-to-end model at basin scale 1980-2070
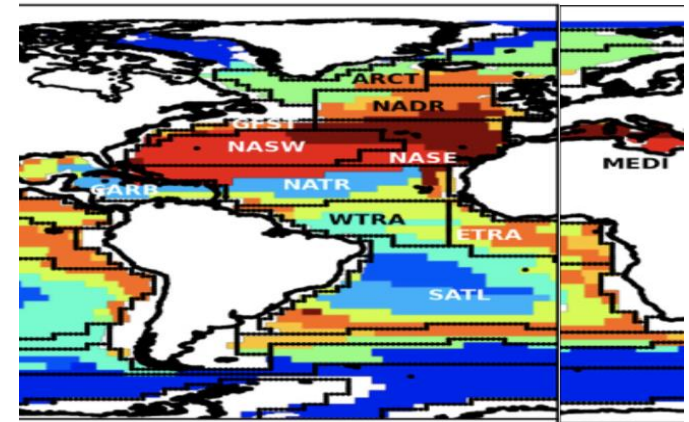- Artificial Neural Network for risk assessment and indicators
- More…
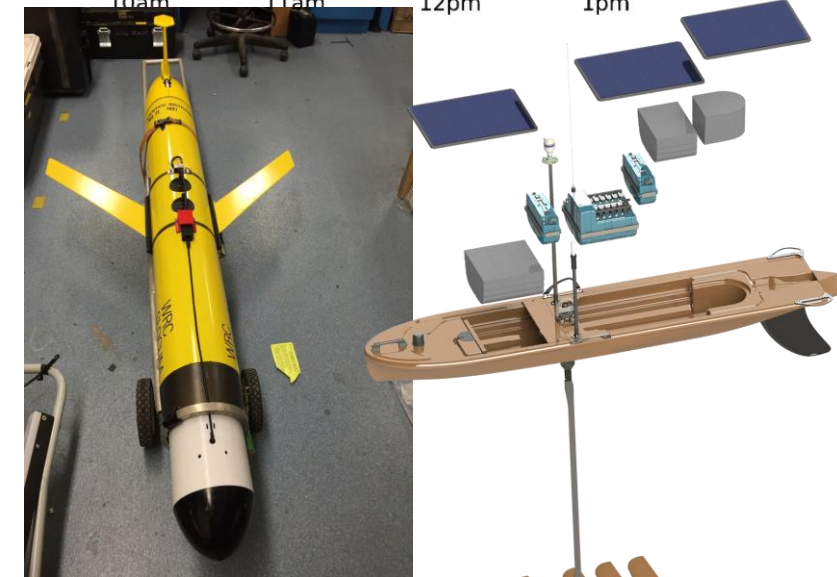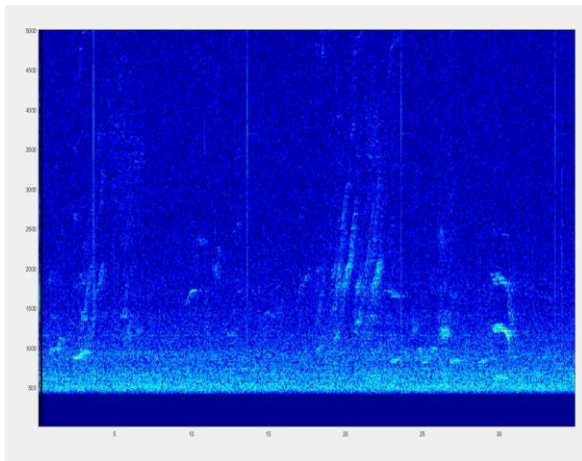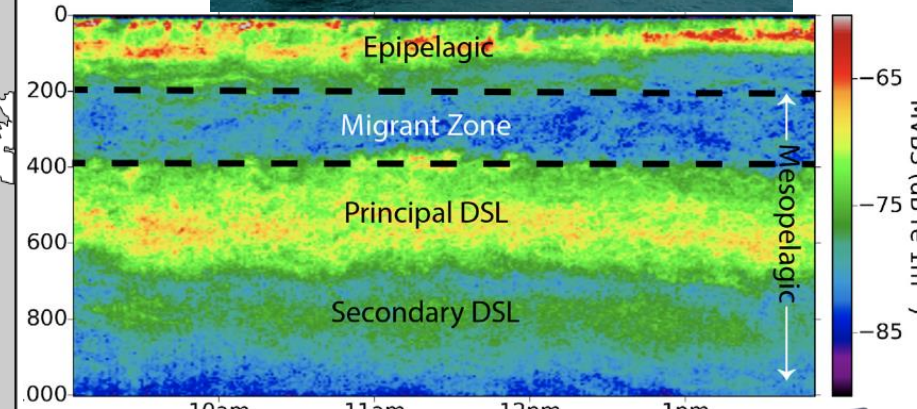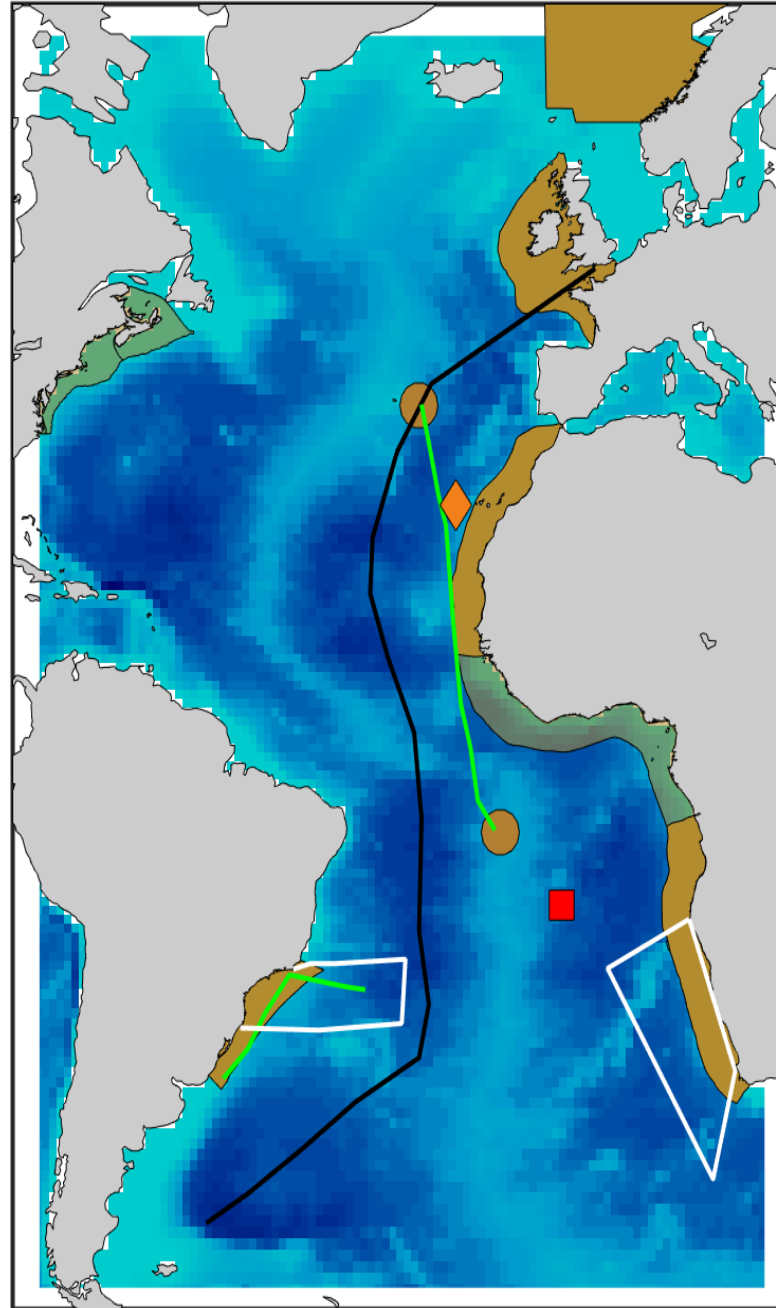
Modified Hybrid Underwater Glider (Slocum Type)

Biogeography and pressures

generate 3D information on essential ocean variables (physical, chemical and biological) over the whole water column, and the seafloor

Bioregionalization of the Atlantic Ocean (CPR, acoustic, etc.)
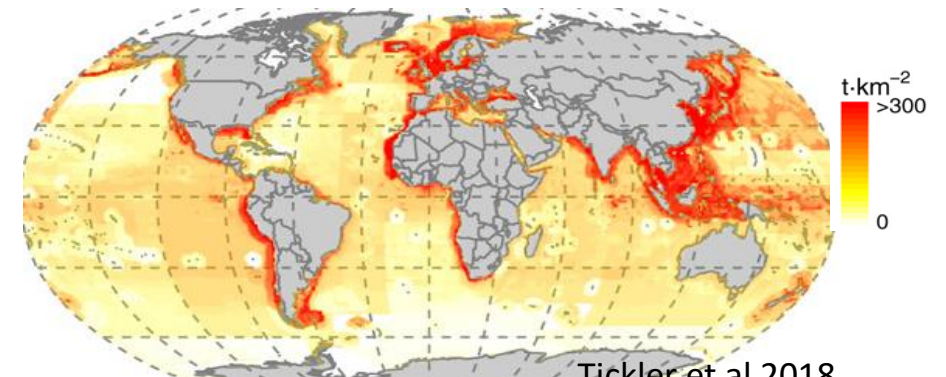

Proud et al 2017

Habitat modeling including 30 main commercial fish communities in the Atlantic

Albacore PRESENT distribution model

AZTI
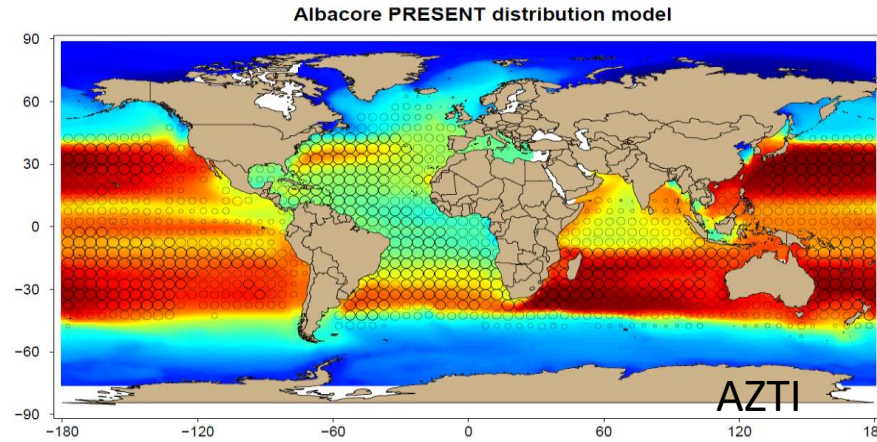
Mapping anthropogenic pressures

t·km^{-2}
>300

0

Tickler et al 2018

Dynamic models and connectivity

Simulate the past and project the future of physical, chemical and living components of the Atlantic ecosystem

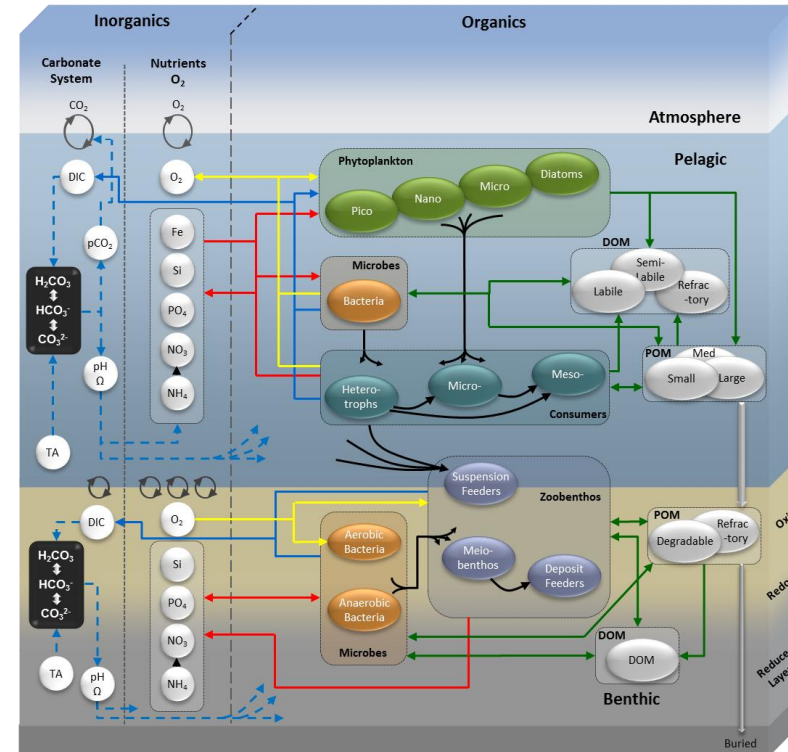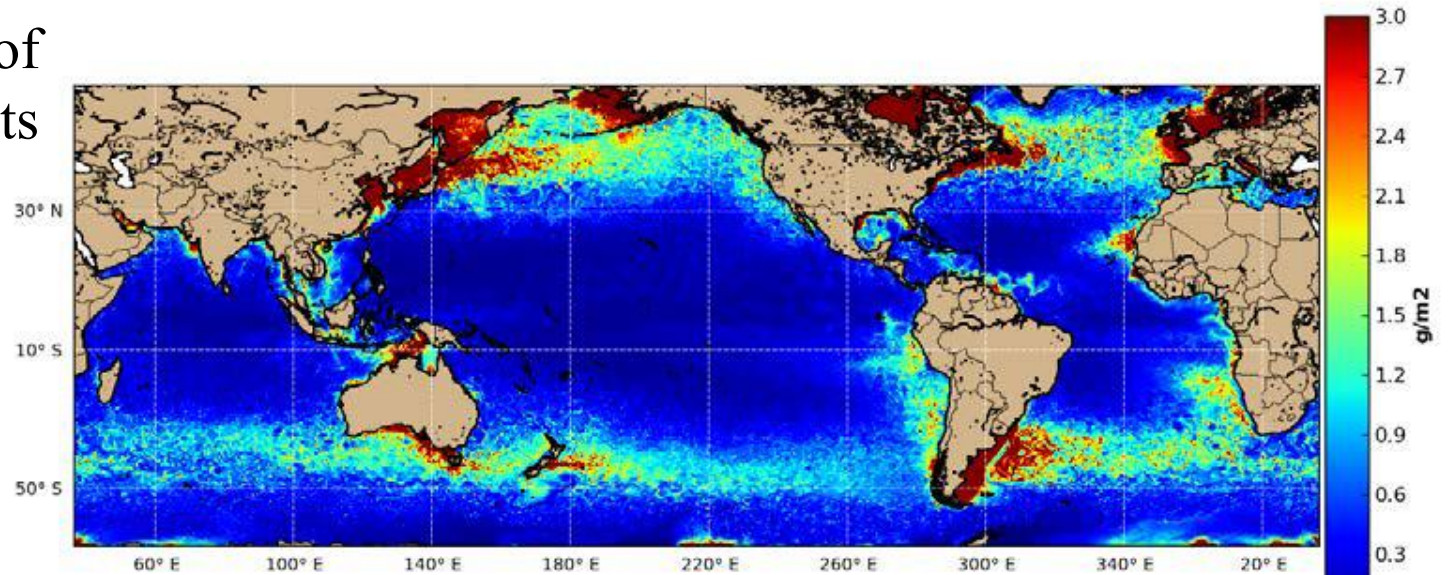Nemo – ERSEM
1980 – 2070, global ¼ deg
Four climate scenarios

SEAPODYM including tunas and mackerel

Basin scale connectivity

Extreme events

Epipelagic Micronekton Potential Biomass

Ecosystem state and tipping points

Assess and compare status, trends and response to cumulative impacts (climate, fishing, extreme events)

Multivariate statistics

ANN methods

Identification indicators

Resilience attributes and early warning signals

Open Ocean Islands
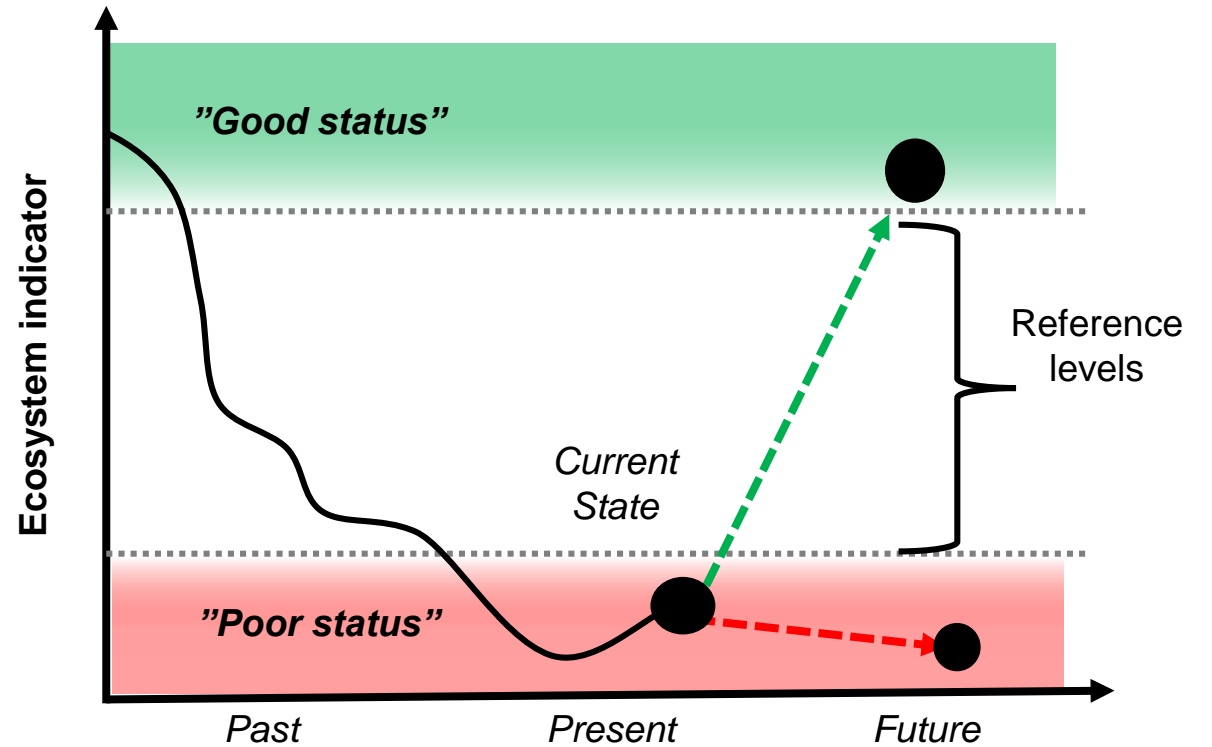
Evolution of indicators over time. The non-equilibrium relations between drivers and ecosystem state is generally non-linear and critical transitions might occur.

Risks and vulnerabilities and scenario management

Assess the vulnerability of Atlantic Ocean ecosystems to human activities, climate, and natural hazards

Bayesian Belief Network

Management options:
STRATHE2E

Uncertainties: ANN
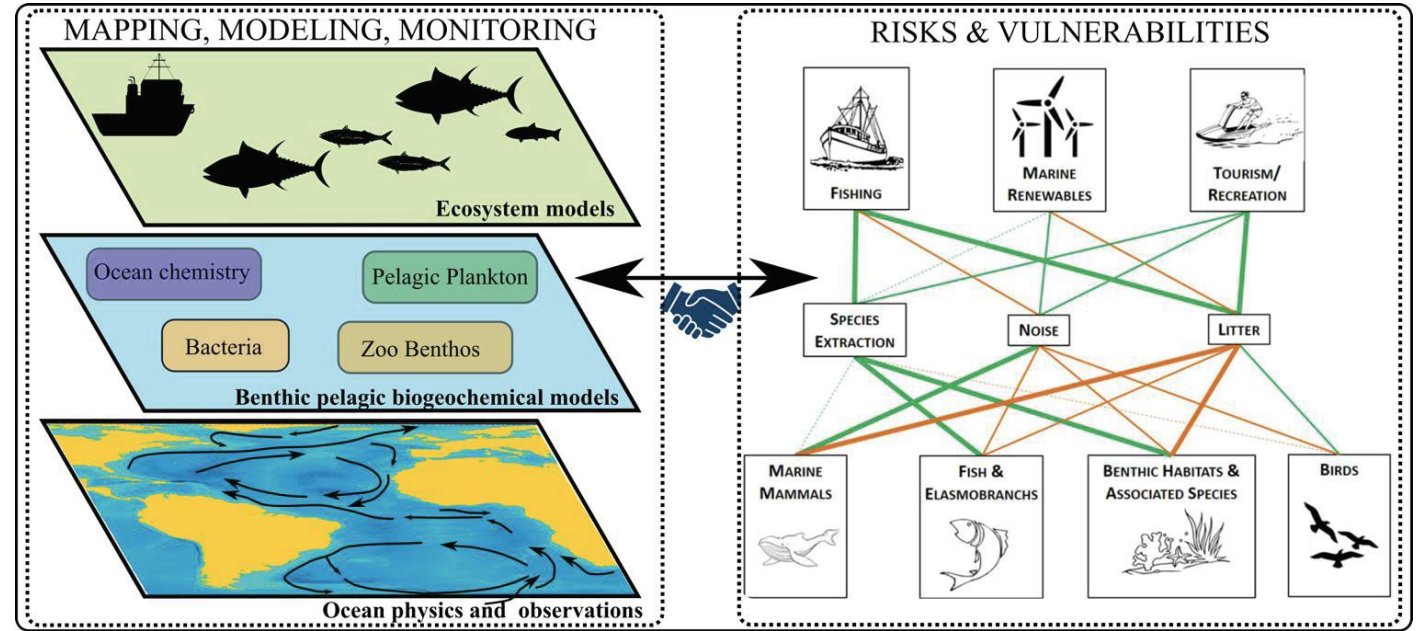
IEA cycle in each CS area
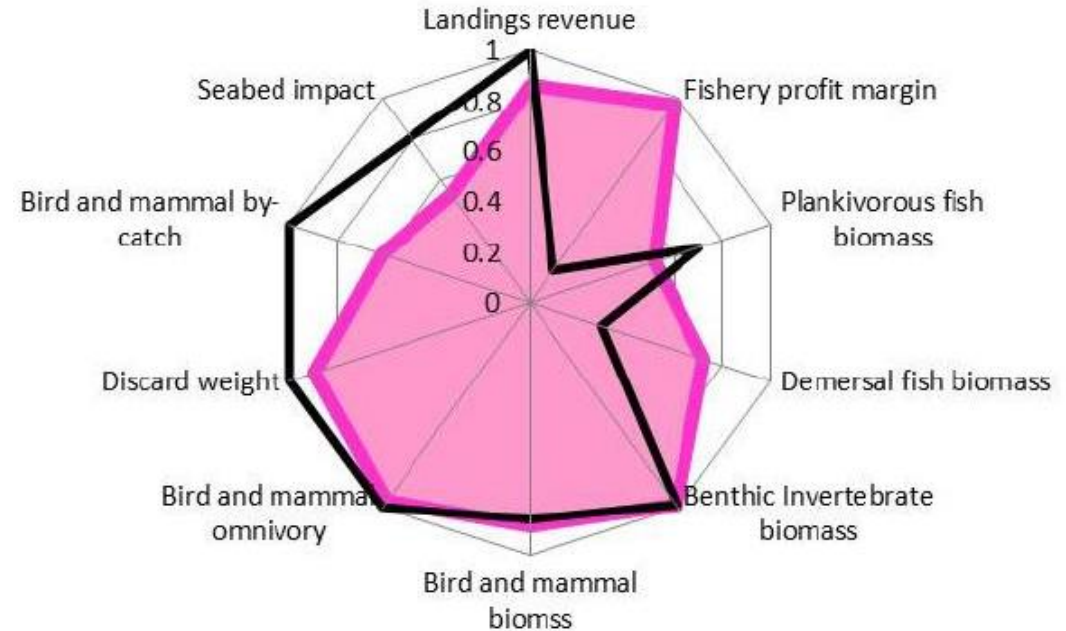- Scoping mng. Objectives, Identify and evaluate indicators (tipping points), Scenarios and risk analyses, Synthesis
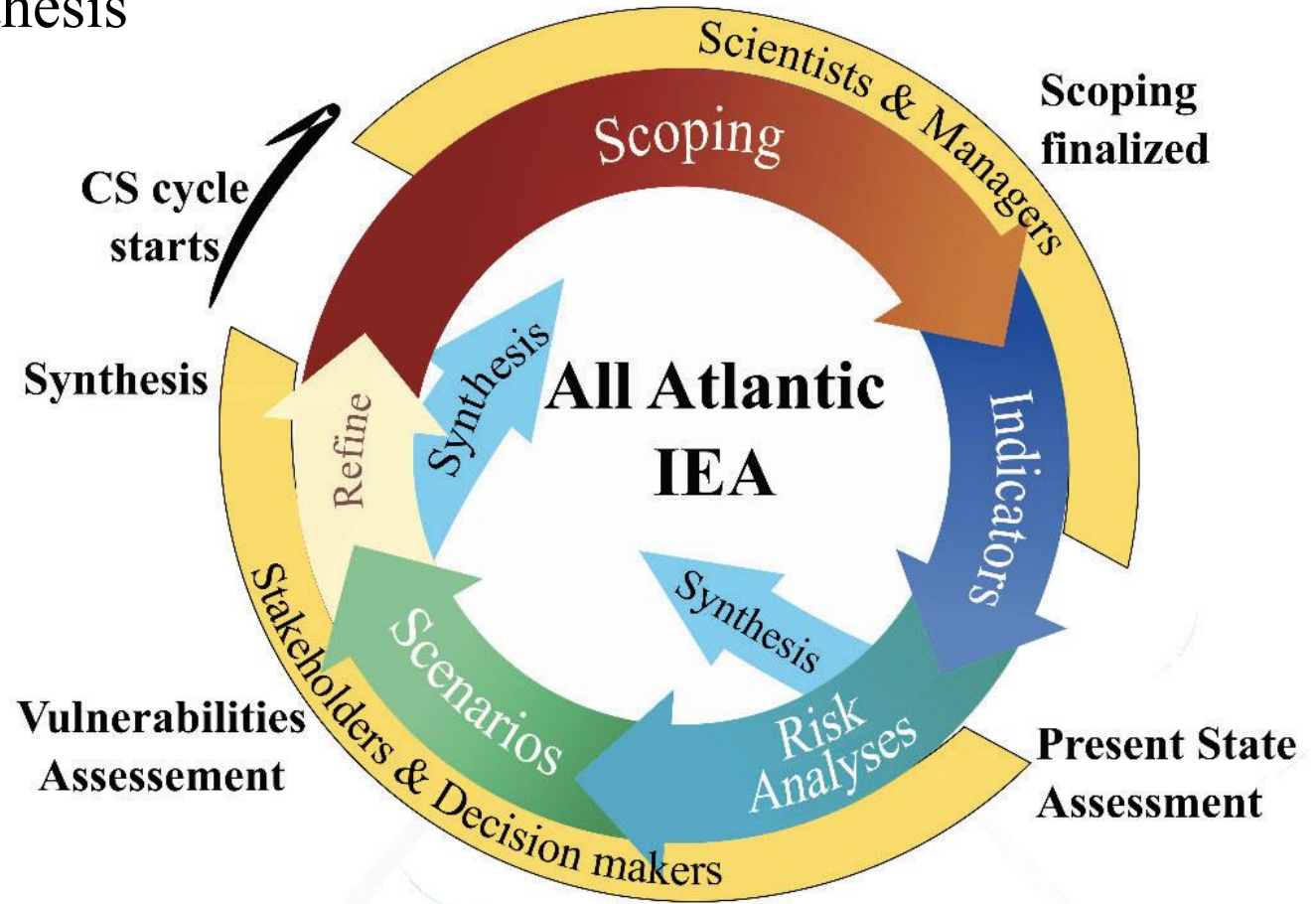
Building Capacity

Improve professional skills and competences across the Atlantic in support of an integrated ecosystem approach

Future human capacity & Learning Objectives for IEA

All Atlantic master program on IEA at World Maritime University

Mobility & PhD Network to enable IEA

Mission Atlantic

- 34 partners
- 11.5M €
- 5 years (4 +1)

https://www.youtube.com/watch?v=17X1caTXzX8

Consortium Members:

Nº	ORGANIZATION NAME	ACRONYM	COUNTRY
1	DANMARKS TEKNISKE UNIVERSITET	DTU	DK
2	UNIVERSITAET HAMBURG	UHAM	DE
3	FUNDACION AZTI	AZTI	ES
4	HAVFORSKNINGSINSTITUTTET	IMR	NO
5	MARINE BIOLOGICAL ASSOCIATION	MBA	UK
6	VLAAMS INSTITUUT VOOR DE ZEE	VLIZ	BE
7	PLYMOUTH MARINE LABORATORY	PML	UK
8	UNIVERSIDADE DO PORTO	UPOR	PT
9	COLLECTE LOCALISATION SATELLITES SA	CLS	FR
10	STOCKHOLMS UNIVERSITET	SU	SE
11	UNIVERSITY OF STRATHCLYDE	STRA	UK
12	UNIVERSITY OF ST ANDREWS	USTA	UK
13	UKRI-NATURAL ENVIRONMENT RESEARCH COUNCIL	UKRI	UK
14	INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPL. DE LA MER	IFRE	FR
15	CONSORCIO DE LA PLATAFORMA OCEANICA DE CANARIAS	PLOC	ES
16	INSTITUTO DO MAR	IMAR	PT
17	UNIVERSITY OF CAPE TOWN	UCT	SA
18	UNIVERSITY FEDERAL DE SANTA CATARINA	UFSC	BR
19	MARINE & FRESHWATER RESEARCH INSTITUTE	MFRI	IS
20	MINISTRY OF DEFENCE	MD	BR
21	MARINE INSTITUTE	MI	IR
22	INSTITUTO ESPANOL DE OCEANOGRAFIA	IEO	ES
23	SEASCAPE BELGIUM	SSBE	BE
24	FONDACION UNIVERSITY DE SAO PAULO	USP	BR
25	INT. COUNCIL FOR EXPLORATION OF THE SEA	ICES	DK
26	UNIVERSITY PLYMOUTH	UPL	UK
27	SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE	SANB	SA
28	MEMORIAL UNIVERSITY	MUN	CA
29	UNIVERSITY OF NEW HAMPSHIRE	UNH	USA
30	AIR CENTER	AIRC	PT
31	MARITIME ROBOTICS AS	MROB	NO
32	UN BREMEN	UBH	DE
33	WORLD MARITIME UNIVERSITY	WMU	UN
34	INTRIGO LTD	INTR	IE

All Atlantic IEA