IndiSeas Workshop

Performance and reference points of ecosystem indicators: a multi-model approach

1-5 June 2015, UNESCO, Paris

Objectives

The workshop aims at scoring the performance of ecosystem indicators in assessing the status of marine ecosystems and in building decision rules in fisheries Management Procedures (MP). This is one important gap that needs to be filled to make ecosystem indicators useful for EBFM. Specifically, we will (1) evaluate the performance of ecosystem indicators to track ecosystem effects of fishing in a context of changing environment, and make specific recommendations for the adoption of headline indicators by international bodies; (2) establish guidelines for future simulation work aiming at determining reference points at the ecosystem level to trigger appropriate decision rules into current MPs. The originality of the proposal lies in a comparative evaluation of an extensive suite of indicators from different marine ecosystems, using a range of state-of-the-art ecosystem models as virtual laboratories (EwE, OSMOSE, Atlantis, MS size spectrum).

The WS will be a mixture of hands-on analyses of simulation output, sharing of expertise across a range of various ecosystem models, establishing a strategic roadmap of research activities related to the use of ecosystem indicators to achieve EBFM, and drafting research papers compiling the results produced by the models. To be able to achieve our goals, the WS will require a series of modelling tasks to be undertaken prior to the meeting.

Testing the performance of indicators

We aim to explore systematically three attributes of indicator performance: **sensitivity** (does the indicator vary significantly under fishing pressure?), **specificity** (does the indicator respond primarily to fishing or to environmental forcing?) and **responsiveness** (Does the indicator respond rapidly to changes in fishing?). The simulations will be based on the use of multiple ecosystem models in different case studies to be able to evaluate the robustness of indicators response. The IndiSeas WG has already:

(a) Agreed on final selection of ecosystem indicators to test (in relation to main MSFD descriptors, CBD and IndiSeas indicators)

(b) Defined common fishing strategies to test and standardized their implementation across different ecosystems and using different models. This makes use of fisheries management reference points such as MSY.

(c) Established detailed and generic simulation plan for each model and each indicator performance attribute (sensitivity, specificity, responsiveness), to be applied directly in all ecosystem case studies.

The detailed guidelines can be found in the file "IndiSeas Modelling guidelines-performance-jan2015.pdf" (email yunne-jai.shin@ird.fr).

The list of tasks to be achieved by participants and coordinators before the WS:

(d) Run simulations using EwE, Osmose, Atlantis, size spectrum (possibly Isis-Fish) in different ecosystems. **Before 31st March**, all participants must have run the simulations, and must have sent simulations output to yunne-jai.shin@ird.fr and laure.velez@ird.fr. The completion of the simulations conditions the attendance to the workshop and co-authoring of the papers.

(e) Generate standardized and comparable indicators plots for all ecosystems/models addressed (resp.: Yunne Shin, Laure Velez, Sylvain Bonhommeau).

At the workshop, we will:

(f) Compile all results, score indicators performance, generalize across ecosystems, make recommendations of headline indicators.

(g) Draft a synthetic paper reporting all results across ecosystems/ models/ indicators/ performance criteria.

(h) Draft a paper reporting results on LFI indicator.

Reference points (RPs) and tipping points

The determination of reference points (RPs) of ecosystem indicators is of particular importance for a successful implementation of EBFM. In reference to single-species RPs, we aim to reconstruct multispecies yield to the fishing mortality curves and identify a range of plausible multispecies maximum sustainable yield (MMSY) for each ecosystem and under different fishing strategies. The value of each ecosystem indicator at MMSY provides RPs associated with particular fishing strategies and climate conditions. Indicators can thus be scaled relative to their potential level and can be compared across ecosystems. Further, using the same modelling framework, limit RPs corresponding to tipping points in the ecosystem dynamics triggered by simulated changes in fishing pressure and strategy will be explored.

We envisage the following tasks:

(i) start to run a core group of models to test case the experimentation plan

(j) learn from this preliminary set of simulations, write precise guidelines and protocol of simulations to be run by the larger group, to define target and limit RPs for ecosystem indicators.

(k) define a roadmap of how to use these RPs into decision support tools.

(i) must be done prior to the WS; (j) and (k) will be achieved collectively at the WS.

Tentative agenda

Monday 1st June 2015: Report back on performance of indicators

- discussion of models limitations and technical problems
- results on the sensitivity / responsiveness / specificity of indicators to fishing
– discussion by indicator, by model, by ecosystem
- drafting scientific papers: structure of papers, distribution of writing tasks

Tuesday 2d June 2015: Synthesis across models/ecosystems: Scoring indicators performance

Writing scientific papers

Wednesday 3d June 2015: Writing scientific papers, continued

Thursday 4th June 2015: Report back on test-case simulations to determine reference and tipping points

- discussion of preliminary results
- discussion on improving the simulation protocol

Friday 5th June 2015:

- drafting precise guidelines for future simulation experiments on reference points
- drafting method and opinion paper on determining reference points

Provisionary list of attendance (max. 30 participants)

Scientist	Affiliation	Country	Model/expertise	Ecosystem
AKOGLU Ekin	OGS	Italy	EwE	Black Sea
BANARU Daniela	U Aix Mars.	France	EwE	Gulf of Lions
BLANCHARD Julia	U Sheffield	UK	Size spectra	North Sea
BONHOMMEAU Sylvain	IFREMER	France	Statistical analyses	
BUNDY Alida	DFO	Canada	EwE	Scotian shelf
CHIFFLET Marina	AZTI	Spain	Osmose	Bay of Biscay
COLL Marta	IRD	France	EwE	Adriatic Sea
FU Caihong	DFO	Canada	Osmose, Stat.analyses	West Coast Canada
FULTON Beth	CSIRO	Australia	Atlantis	SE Australia
GASCUEL Didier	Agro-Campus	France	EwE	Guinea
GRUSS Arnaud	U Miami	US	Osmose	Gulf of Mexico
HALOUANI Ghassen	INAT	Tunisia	Osmose	Gulf of Gabes
HEYMANS Sheila	SAMS	UK	EwE	W Coast Scotland
LEHUTA Sigrid	IFREMER	France	Isis-Fish, Stat.analyses	Bay of Biscay
LELOC'H François	IRD	France	EwE, Osmose	Gulf of Gabes
LYNAM Chris	CEFAS	UK	EwE	North Sea
MARSHALL Kristin	NOAA	US	Atlantis	California Current
OLIVEROS Ricardo	IMARPE	Peru	Osmose, Stat.analyses	N Humboldt
PIRODDI Chiara	JRC	Italy	EwE	Ionian Sea
SALIHOGLU Baris	METU	Turkey	EwE	Black Sea
SHANNON Lynne	UCT	South Africa	EwE	S Benguela
SHIN Yunne	IRD	France/SA	Osmose	S Benguela
TRAVERS Morgane	IFREMER	France	Osmose	English Channel
TSIARAS Kostas	HCMR	Greece	Osmose	Aegean Sea
VELEZ Laure	IRD	France	Osmose	Adriatic Sea