



SWIOFP - INDISEAS

*Evaluating the status of marine ecosystems
in a changing world*



18-19 January 2011

DAFF, Cape Town

OBJECTIVE

Evaluating the ecological status of marine ecosystems:

- with respect to fishing activity
- using a set of ecological indicators
- using a comparative approach across marine ecosystems

STRATEGY

Selecting a common list of indicators, with the following constraints:

- the set of indicators must remain tractable and measurable for an extended range of ecosystems
- must be meaningful to the public at large, and to managers
- ecosystem experts must participate in the diagnosis and comparison across ecosystems to take into account local specifics in the interpretation of indicators – to avoid biases sometimes found in global meta-analysis.

Terms of reference

- cross-system inventory of available data supporting the calculation of indicators
- selection of the list of indicators
- development of common methods to estimate and interpret selected indicators (*statistical tests, trends analyses, standardisation*)
- development of methods for evaluating and comparing ecosystem status (*pie diagrams, decision tree, ranking, reference levels*)
- development of a generic communication tool for the general public and stakeholders (www.indiseas.org)

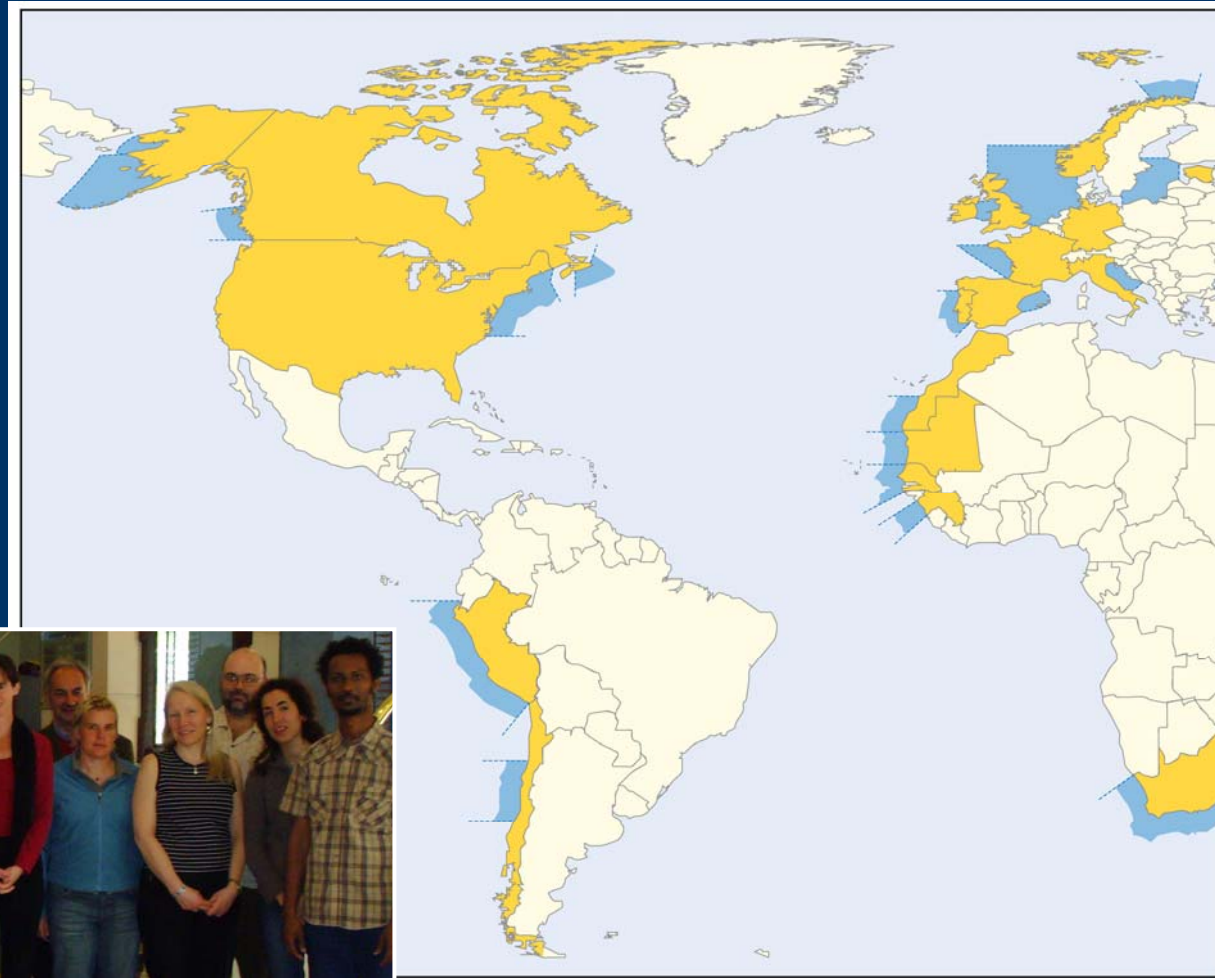
IndiSeas in 2009

19 marine ecosystems

31 scientists

19 countries

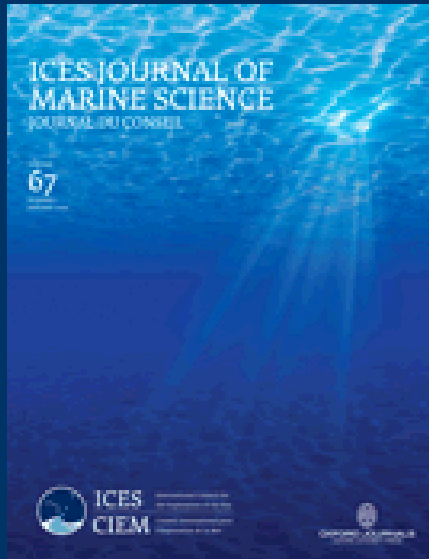
21 research institutes



List of selected ecological indicators

Indicators	Headline label	Used for State or Trend	Calculation, units *	Management objectives **	Management direction
Mean length	Fish size	S, T	$\bar{L} = \frac{\sum L_i}{N} \text{ (cm)}$	EF	Reduction of overall fishing effort
Trophic level of landings	Trophic level	S, T	$\overline{TL}_{land} = \frac{\sum TL_i Y_i}{Y}$	EF	Decrease fishing effort on large fish species
Proportion of under or moderately exploited stocks	% Sustainable stocks	S	Number (under+moderately exploited stocks)/ total nb of stocks considered	CB	Decrease fishing effort on predator fish species Decrease fishing effort on overexploited fish species Diversify resource composition
Proportion of predatory fish	% Predators	S, T	Prop predatory fish = B predatory fish/B surveyed	CB	Decrease fishing effort on predator fish species
Mean life span	Life span	S, T	$\frac{\sum (age_{max} B_S)}{\sum B_S} \text{ (year)}$	SR	Decrease fishing effort on long-living species
I/CV of total biomass	Biomass stability	S	Mean (total B for the last 10 years)/sd (total B for the last 10 years)	SR	Short term: Adapt fishing effort to natural fluctuations of marine resources. Decrease fishing effort when low recruitment levels. Long term: decrease fishing effort on long-living species
Total biomass of surveyed species	Biomass	T	B (tons)	RP	Reduction of overall fishing effort and quotas
I/(Landings/Biomass)	Inverse fishing pressure	T	B/Y retained species	RP	Reduction of overall fishing effort and quotas

Deliverables Indiseas 1



Special Series of papers for *ICES Journal of Marine Science*

Online: February 2010

Published: May 2010

The image is a screenshot of the Indiseas website. The top left corner features the "Indiseas" logo with the tagline "Indicators for the seas". The main content area is titled "What will you find in Indiseas project?" and contains three paragraphs of text. The first paragraph states: "The present state of marine exploited ecosystems and recent evolutions are evaluated through indicators of fishing effects". The second paragraph states: "The state is represented by a pie diagram with 7 indicators. The larger the surface of a pie, the better is the corresponding indicator." The third paragraph states: "The evolution of an ecosystem is represented through time series of indicators. General features of ecosystems (functioning, exploitation), key species and illustrations are also provided". The right side of the page shows a collage of various fish species. At the bottom left, there is a "ENTER" button with a globe icon. At the bottom right, there is a footer with the text "Copyright | Contacts | Partnership | Site map".

Website www.indiseas.org

Live to public: June 2009

INDISEAS 2 (2010-2013)

Chairs: Y. Shin, L. Shannon, A. Bundy



Main lessons IndiSeas 1:

- Difficult to discriminate fishing from environmental effects
- ecological indicators only tell part of the ecosystem story

Key questions IndiSeas 2:

- Which complementary indicators (climate, biodiversity, human dimension indicators) should be used to refine ecosystem status and to inform fisheries decision-makers?
- What additional methods (integration, ref levels, performance testing, modelling) would be effective for analysis of the suite of indicators?
- How can we compare the status of exploited marine ecosystems under multiple drivers (fishing, climate, and the human dimension)?
- How well do indicators help decision-makers make better decisions about keeping fisheries sustainable (performance testing of decision support)?

TASK GROUPS *IndiSeas 2*

Indicator Selection TGs

TG I Climate and Environmental Indicators
(chairs: Link, Hutchings)

TG II Biodiversity and Conservation-based Indicators
(chairs: Coll, Shannon)

TG III Human Dimension Indicators (Social & economic Indicators)
(chairs: Bundy, Allison)

Methods TGs

TG IV Reference Levels for Indicators
(chairs: Mackinson, Shin)

TG V Performance of Indicators and Links to Management
(chairs: Rice, Blanchard)

TG VI Integration of Indicators
(chairs: Shin, Shannon, Bundy)

IndiSeas2 in 2010

34 marine ecosystems (19 in 2009)
56 scientists (31)

32 countries (19)
44 research institutes (21)



IndiSeas2: 1st meeting 29 nov-2 dec 2010, Paris, Unesco

Deliverables

2011

- Updated IndiSeas website (www.indiseas.org), time series of ecological indicators to 2010, addition of new ecosystems
- Synthesis paper on Indiseas1: Bundy, Coll, et al.
- Database of indicators for at least 27 marine ecosystems

2012

- > 6 papers (TG1-TG6)
- website: addition of time series of new categories of indicators (climate, socio-economic, biodiversity indicators)
- Conference presentations of intermediate results

2013

- 1 - 2 high impact papers
- website: diagnosis of ecosystem status
- IndiSeas hosted session at major international congress

Time lines

Before 28 February 2011:

- Final excel spreadsheet for TG1-2-3 and IndiSeas1 indicators, guidelines for indicators estimations, and guidelines for website information will be circulated to all ecosystem experts.
- TG4 to circulate models and data requirements for definition of reference points
- TG5 to circulate data requirements for performance testing

30 June 2011:

- Deadline for submission of indicator time series (ecological, biodiversity, environmental, human dimensions) from 1950 to the most recent year (2009/2010) for all ecosystems

31 July 2011:

- Data validation deadline for TG 1, 2 and 3 leaders

Time lines (continued)

Late Oct/Nov 2011: **SECOND MEETING OF INDISEAS2**

- Presentation of indicator states and trends per TG (1-2-3)
- Preliminary inter-system comparisons
- Preliminary results testing TG4 and 5 methodologies
- Analyses of interactions between ecological/biodiversity indicators and ecosystem drivers (fisheries, human, environmental)
- Update of Workplans for TG1-TG5, Workplan for TG6

Late Oct/Nov 2012: **THIRD MEETING OF INDISEAS2**

- Present analyses to be finalized over the next year, ready for presentation at a symposium in 2013
- Preparation of high impact papers synthesizing results of IndiSeas2