

Assessment and Mitigation of Fisheries Impacts on Marine Ecosystems

By Daniel Pauly and Tony Pitcher

Below is the abstract of: Pauly, D. and Pitcher T.J. (2000) Assessment and Mitigation of Fisheries Impacts on Marine Ecosystems: A Multidisciplinary Approach for Basin-Scale Inferences, Applied to the North Atlantic. In Pauly, D. and Pitcher T.J. (eds) Methods for assessing the impact of fisheries on marine ecosystems of the North Atlantic. Fisheries Centre Research Reports 8(2): (in prep).

The aim of the Sea Around Us Project is to quantify, in ecological and economic terms, the impact of fisheries on the marine ecosystems of the North Atlantic, and to evaluate the costs and benefits of various scenarios of mitigation, such as the status quo, rebuilding of depleted resources and implementation of closed areas. Dealing with these issues requires a methodological package related to, but different from, that typically used in fisheries management, notably because of its ecosystem focus and the much larger temporal and spatial scales, relative to

standard fisheries assessments. This paper summarises the methodology deployed by the project by introducing a suite of papers in which the rationale and details are provided.

First, we review the relationships between scale and methodology choices in marine science. Then, the principle modules of the Sea Around Us project methodology are described as follows:

- 1) The North Atlantic as study area, where we report a new ecosystem classification scheme that is compatible hierarchically with previous work and with all statistical divisions;
- 2) North Atlantic fisheries catches in time and space, where we present the project's catch and effort database, discuss the problems in estimating total extractions, and

outline methods used to overcome them;

- 3) Fish distribution transects, where the biology and migrations of key commercial North Atlantic species are used to link catches by shallow-water and offshore fisheries;

- 4) Bio-economic analyses of fisheries sectors, where the effect of competition between small and large – scale fisheries are quantified using multi-species, multi-gear yield per recruit and a bio-economic Nash equilibrium analysis;

- 5) Ecosystem modelling, discussing the use of ECOPATH with ECOSIM and ECOSPACE to represent present and past North Atlantic ecosystems with their embedded fisheries, to evaluate ecosystem status, and to simulate likely response to change;

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The Sea Around Us Project Newsletter

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Sea Around Us Project: Methodology Review Workshop

By Nigel Haggan

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The Sea Around Us Project methodology workshop will be held at Dunsmuir Lodge on Vancouver island during the first week of May. This is a key contract stipulation. Reviews of the original project proposal were harsh, indeed sceptical due to the newness of the approach. Rather than abandon a concept that the Pew Charitable Trusts saw as valuable, it was agreed that the North Atlantic pilot project would include a rigorous methodology review in year one.

Accordingly, the project team has been in a ferment of

creative writing, with no less than 11 review papers in the last stages of gestation as this goes to press. (The abstract on pages 1 and 3 of this issue briefly presents the papers.) Each paper will be reviewed by a minimum of two international experts. The papers and comments will then be addressed singly, and in the context of overall project objectives, at a May 1-6 workshop at Dunsmuir Lodge on Vancouver Island. We will be helped in this by five visiting scientists, Dr Lee Alverson, former Director of the National Marine Fisheries Service Northwest and Alaska Fisheries Center, Dr Kevern Cochrane, United Nations Food and Agriculture Organization, Mr Poul Degnbol, Director, Inst. for Fisheries Management, North Sea Centre, Denmark, Dr Paul Fanning, Director, Stock Assessment, Fisheries and Oceans Canada and Dr Richard Grainger of FAO. We will also be joined by Jay Maclean, a science writer from Manila who, we hope, will assist with the major project report in year two.

In all, some 23 participants will converge on Dunsmuir Lodge, some by air from distant parts of the globe, the rest of us by water, entrusting ourselves to the tender mercies of the BC Ferry Corporation. The plan is to arrive in time for a welcoming (and welcome) dinner on the evening of April 30. After that, the work begins in earnest, with three papers reviewed per

day. Day one opens with a presentation on the 'Overview paper' by the Principal Investigator. All reviews will follow a standard format: lead authors get 20 minutes to present, co-author(s) have a further 20 to present referee comments. Content and comments are then addressed in a 90 minute panel discussion. Evenings will be 'free' for authors to incorporate comments and for rapporteurs Amy Poon and Yvette Rizzo to catch up on the day's questions and discussion.

The final product, due by June 30, will be a Fisheries Centre 'Blue Book' report edited by Daniel Pauly and Tony Pitcher. (See page one of this issue for the bibliographic details.)

The workshop agenda and a list of attendees will be posted on the website <http://fisheries.com/projects/saup/INDEX.HTM> as soon as our Webmaster returns from his travels in the Philippines and Indonesia.

One way or another, it'll be a busy little week.

Nigel Haggan is a researcher at the Fisheries Centre and Project Co-ordinator for the Sea Around Us project.

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The Sea Around Us website may be found at www.fisheries.com/projects/saup, and contains up-to-date information on the project.

How Many Fish Have Been Taken from the Sea?

By Sylvie Gu  nette

What is the real catch of fish from the Sea? In the Sea Around Us project we have to estimate the total fish extractions so that the impact on marine ecosystems can be fully evaluated. But where do we get the data from?

The Fisheries Centre is very pleased to announce that Sea Around Us project and the Department of Fisheries and Oceans (DFO, Halifax, Nova Scotia) have signed a Memorandum of Agreement to collaborate on reconstructing the total extractions from Canadian waters. Dr Paul

Fanning, (Bedford Institute of Oceanography), our contact at DFO, is facilitating access to their databases. He is also contributing his vast knowledge of the database and the fisheries system in Canadian waters.

In the last few months, we have assembled the catches of all species for the years 1960-1998, using two database sources, NAFO (Northwest Atlantic Fisheries Organisation) and DFO Zonal Interchange File (ZIFF). The most time-consuming process was to encode and verify for data consistency, especially for rare

species and gears that are infrequently used. Compatibility with on-board vessel observer data was taken into account in building the new database structure. The observer data is now being analysed to estimate discard rates for each type of fishery, e.g. groundfish trawl, pelagics midwater trawl. Changes in skippers' behaviour and hence discard rates in the absence of on-board observers would likely be the next source of adjustments.

Sylvie Gu  nette is a post-doctoral fellow with the Fisheries Centre's Sea Around Us project.

The SAU Puzzle

In this issue, the Sea Around Us project proudly presents our new logo (shown opposite, on page 2, in the information box). The new logo, designed by Ms Mary Boone (who also designed the Fisheries Centre logo, shown on the back page of *FishBytes*), consists of three segments representing marine life - fish, mammals/reptiles, and plants. The fish segment is moving toward the other three puzzle pieces, and the counterclockwise motion represents rebuilding.

In full colour, the fish segment is in UBC Gold, as a metaphor for the lasting value of fish. The remaining segments are in marine blue. These colours are also present in the Fisheries Centre's logo.

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6) Evaluating alternative ecosystem-based management regimes to quantify the benefits of different ecosystem-based management scenarios;

7) Energy consumption and the ecological footprint of North Atlantic fisheries, to contrast the energy incorporated in landed fishes to that required to catch them;

8) Rapid interdisciplinary appraisal of fisheries status and compliance analyses using RAPFISH, to compare and characterise North Atlantic fisheries in terms of their sustainability (in ecological economic technological and social fields), analysis of their ethical status, and to score their compliance with the FAO Code of Conduct for Responsible Fisheries, together with the compliance of North Atlantic countries vis-  -vis their

internationally agreed commitments.

9) Mapping the fate of fisheries landings from the North Atlantic, to identify possible pressure points for intervention by fish product consumers;

We anticipate that the synthesis to emerge from integrating the results of these modules will contain many surprises, both in terms of the ecological damage and economic waste presently generated by the North Atlantic fisheries, and in clarifying the foregone benefits that could be regained, were these economic and ecological issues to be addressed.

Figure 1 (page 4) presents a schematic of the approach being taken in the Sea Around Us project.

Daniel Pauly is Project Leader for the Sea Around Us Project. Tony Pitcher is Chair of the project's Steering Committee.

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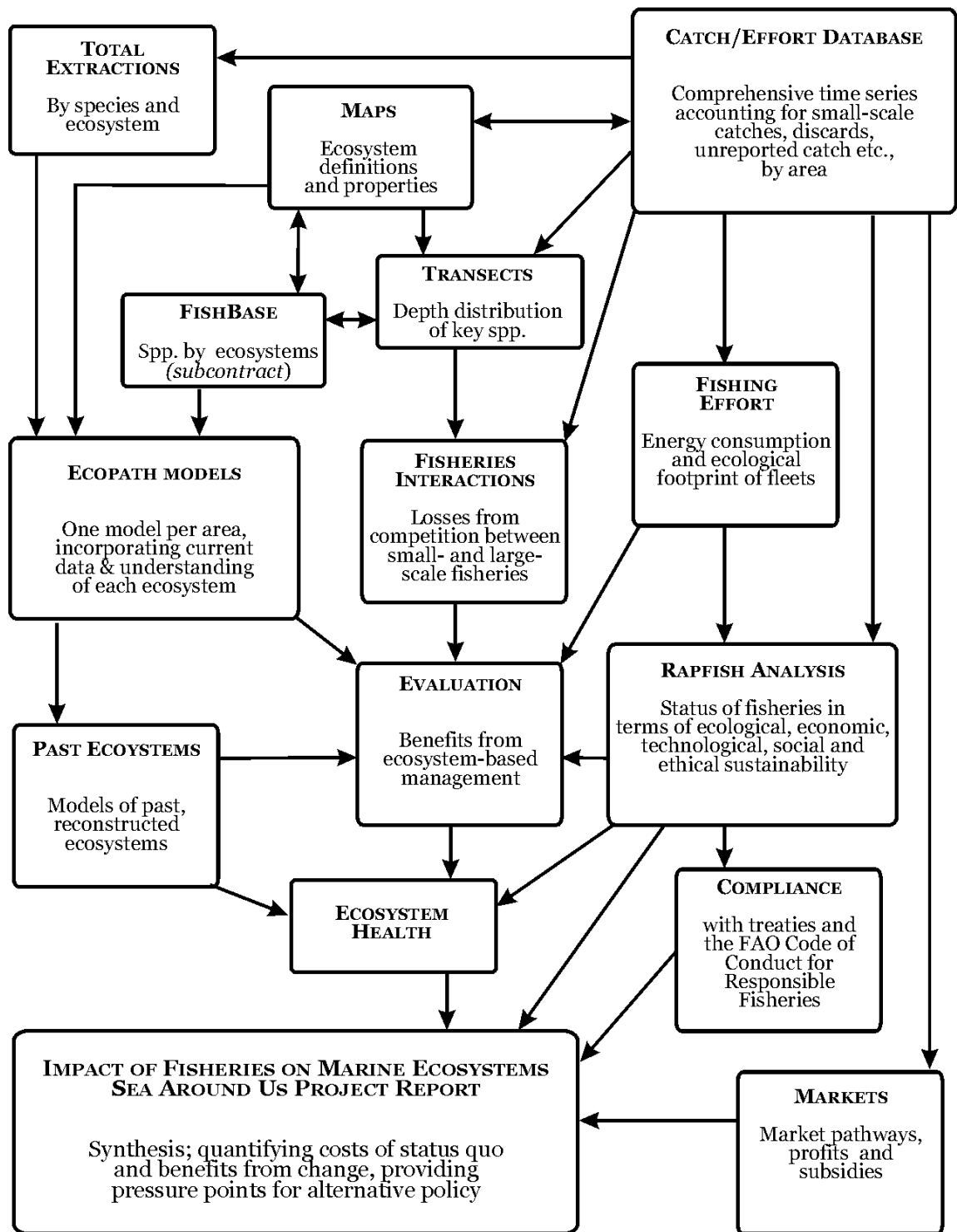


Figure 1 - Key elements of the Sea Around Us project, with basic data on top, and derived elements further down.