Sea Around Us

Bonaire: 90 million years, plus a few days to think

By Daniel Pauly

Bonaire began as an underwater boil of magma 90 million years ago but emerged 30 million years later, when it started to acquire a terrestrial fauna and flora, with many species soon evolving into endemics.

The island appears not to have been peopled prior to the arrival of Europeans. Of these, the Dutch were the most tenacious, incorporating Bonaire into the few specks of land that constitute the Netherlands Antilles, where diving tourism, and resource extraction (marine salt in Bonaire), or transformation (oil refining in Curaçao), have replaced the slave economy of old.

This year, the Pew Fellows in Marine Conservation had their annual meeting in Bonaire. As a member of the Pew Fellows Program's Advisory Committee, I had the privilege of spending a few October days on that isolated island, 80 kilometres north of Venezuela's coast (see map).

The tiny island of Bonaire is located 80 km north of Venezuela

After starting with a tribute to the late Robert Johannes (a 1993 Pew Fellow) and keynote lecture by Jeremy Jackson, based on his much-cited article in *Science* (Jackson et al. 2001), the meeting went on with four concurrent workshops:
1) "Maneuvering the maze of international treaties and agreements", organized by fellow Advisory Member Cyriaque Sendashonga, of the Secretariat of the Convention on Biological Diversity;
2) "Community-based fisheries management", by Kalli de Meyer of The Coral Reef Alliance (www.coral.org);
3) "Communication of results", by Nancy Baron of SeaWeb (www.seaweb.org); and
4) "Action for the ocean", run by Amanda Vincent of the Fisheries Centre (see this month's issue of *FishBytes*), and devoted to identifying potential joint activities by Pew Fellows.

Each of the workshop organizers had brought an interesting group of resource persons. For example, in workshop Number Three, which I attended, Nancy Baron had invited a stellar group of science journalists, including Cornelia Dean, Science Editor at the *New York Times*. It was quite a learning experience to hear the presentations and mock-interviews documenting how our prejudices as scientists, and our inability to see ourselves as others may see us (caveat-ridden and nerdic) often stand in the way of getting a worthy message across.

The plenary reports and discussions, held a day later, showed that the other three workshops had been worthwhile as well. Hence everybody's interest in the subsequent event, meant to address the relation between 'Science' and 'Advocacy.' The speakers featured Ray Hilborn, of the University of Washington's

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Even small fisheries can damage coral reefs ... but nothing of this sort can do the damage that EU fleets would

School of Aquatic and Fisheries Science, and three Pew Fellows including our own Carl Walters. This *séance*, in which we were warned of the perils of commitment, was, however, a bit of a letdown. Colleagues have been too often dismissed as 'advocates' because they were picking up inconvenient issues, while those in favor of the status quo tended to be presented as dispassionate proponents of the facts. One example of an outstanding and committed scientist given the treatment was Rachel Carson, the author of the book after which the *Sea Around Us* project is named. Thus, I am pleased to say that I did not participate in that specific discussion - it reminded me too closely of those debates where the first to employ the rhetorical ploy of calling the other "emotional" wins. This leaves the one so named to scream in rage that he or she is NOT BEING EMOTIONAL!!!

Rather, I joined a group of Pew Fellows who had offered to discuss, with our colleagues from Bonaire, the major issues facing the island's marine park and fisheries:

- The gradual erosion of the live coral cover and (large) fish abundance on the reefs, both key to the success of the SCUBA-diving dependent tourist sector; and
- The current negotiations between Bonaire's local government and the European Union, the result of an EU attempt to acquire access rights for Spanish fishing vessels.

It was a pleasure (but not a surprise) to see Pew Fellow Callum Roberts lay out the case for the creation of a marine reserve as a tool to address the first of these issues, although I must mention that I also made a convincing case for the need to estimate present catches from the reefs (no, the Bonaire Marine Park authorities do not know how much is presently taken out by the commercial and subsistence fisheries from the reefs and marine park surrounding the island, and by recreational fisheries further offshore).

The point is that, one fish at a time, even small fisheries can do great damage to coral reefs. Indeed, the feral goats and donkeys have done just that on land, through centuries of uncontrolled grazing, gradually turning Bonaire's flat countryside into a likeness of an inner-city vacant lot. Similarly, sport-fishing for billfish and marlin can deplete nearby fishing as surely as a commercial long line fishery, though it usually takes longer to get there.

However, nothing of this sort can do the damage that EU fleets roaming in the Bonaire Exclusive Fishing Zone would. The prospect of this happening may have been diminished a bit by Pew Fellow Rodrigo Bustamante's account of foreign fleet activities in the waters around the Galápagos Islands (another national park, by the way). My account of the effects of foreign fleets off West Africa may have also helped there, especially as it came with a

The late Bob Johannes, with Daniel Pauly, at last year's Pew Fellows Annual Meeting in Nova Scotia, and to whom this year's meeting in Bonaire was dedicated. Photo by Amanda Vincent

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Our mailing address is: UBC Fisheries Centre, 2204 Main Mall, Vancouver, British Columbia, Canada, V6T 1Z4. Our fax number is (604) 822-8934, and our email address is SeaNotes@fisheries.ubc.ca. All queries (including reprint requests), subscription requests, and address changes should be addressed to Robyn Forrest, *Sea Around Us* Newsletter Editor.

The *Sea Around Us* website may be found at saup.fisheries.ubc.ca and contains up-to-date information on the project.

The *Sea Around Us* project is a Fisheries Centre partnership with the Pew Charitable Trusts of Philadelphia, USA. The Trusts support nonprofit activities in the areas of culture, education, the environment, health and human services, public policy and religion. Based in Philadelphia, the Trusts make strategic investments to help organisations and citizens develop practical solutions to difficult problems. In 2000, with approximately $4.8 billion in assets, the Trusts committed over $235 million to 302 nonprofit organisations.

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scary Powerpoint presentation featuring Villy Christensen's maps of declining fish biomass off West Africa (see Pauly 2002), and the key points of EU-West African agreements (extracted from Kaczynski and Fluharty 2001).

The people of Bonaire do not want EU fleets in their waters, and the information provided should help support their position in the next round of Bonaire-EU negotiations – which brings us back to the issue of the wall between science and advocacy. Clearly, scientists should not jump over it - there are lots of strong, nasty characters on the other side, and one of them, say Goliath, may decide to cut off our credibility and who knows what else. But nothing should prevent us from passing a few pebbles over to the occasional David. That much I learnt in Bonaire.

References

Anon. 2002. Opinion: good for the Antilles, but bad for Bonaire. *The Bonaire Reporter*. October 11-18, 2002.

Jackson, J.B.C., M.X. Kirby, W.H. Berger, K.A. Bjorndal, L.W. Rotsford, B.J. Bourque, R. Cooke, J.A. Estes, T.P. Hughes, S. Kidwell, C.B. Lange, H.S. Lenihan, J.M. Pandolfi, C.H. Peterson, R.S. Steneck, M.J. Tegner, and R.R. Warner. 2001. Historical overfishing and the recent collapse of coastal ecosystems. *Science.* 293: 629-638.

Kaczynski, V.M. and D. L. Fluharty 2001. European policies in West Africa: who benefits from fisheries agreements. *Marine Policy*. 26.:75-93.

Pauly, D. 2002. A Symposium with Results. *Sea Around Us Newsletter 12*, August/September 2002: 1-4.

Sea Around Us dances with Minister of Fisheries

By Dirk Zeller and Villy Christensen

During the first two-year phase of the *Sea Around Us* project (1999-2000), we focused extensively on the North Atlantic. While the project has since expanded its regional focus, our previous collaborative involvements in the North Atlantic region (Guénette et al. 2001; Zeller et al. 2001) continue to have interesting 'after-shocks'. Thus Villy Christensen and Dirk Zeller received an invitation from the 'Fiskirannsóknarstovan' (Fisheries Laboratory) of the Faroe Island government to participate in a fully sponsored workshop on ecosystem modelling of Faroese waters, held in the Faroese capital Tórshavn in September, 2002. A wide range of people were invited, including representatives from ICES/GLOBEC, Trondhjem Biological Station (Norway), Nansen Environmental and Remote Centre (Norway), University of Rostock (Germany), Station Zoologique de Villefranche-sur-Mer (France), and Department of Fisheries and Oceans (DFO, Canada). The purpose of the workshop was to bring together expertise on ecosystems, modelling, and on the Faroe marine environment. It was also an opportunity to present and discuss Faroese ecosystems, identify gaps in knowledge of importance for modelling the Faroese ecosystems and to formulate projects to fill these gaps.

The Faroes, located in the northeastern Atlantic between Scotland and Iceland, consist of a group of 18 islands inhabited by approximately 46,000 people and covering about 1,400 km^2. However, the Faroe Islands have responsibility for the marine resources in an EEZ of over 270,000 km^2. Fishing represents the major commercial activity, accounting for over 95% of exports and over 44% of GDP. Furthermore, both commercial and subsistence fisheries play a significant role in Faroese culture and society. The government utilizes a spatial- and effort-based system of management for their demersal fisheries, and explicitly incorporates ecosystem considerations in their policies. Given the importance of fishing to the Faroe economy and culture, considerable interest has been expressed in the evaluation of these management measures at the ecosystem level, and hence this event.

Commercial and subsistence fisheries play a significant role in Faroese culture and society

The workshop consisted of two days of presentations, followed by one day of working subgroup sessions and forum discussion. On the first day, local scientists presented general overviews of Faroese waters and their ecosystems, and the available data sets. These presentations covered topics ranging from physical oceanography, planktonic and benthic studies, through

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summaries of fish assemblages, all the way up the marine food web to seabirds and marine mammals (both of which are hunted for local consumption). On the second day, the invited experts gave presentations on their area of expertise, with emphasis on the Faroe Island ecosystems. These presentations included topics such as: fronts and frontal dynamics (Ken Drinkwater, DFO); primary production in the Nordic Seas (Egil Sakshaug, Trondhjem Biological Station); a review of modelling zooplankton dynamics to represent matter flow to higher trophic levels (Francois Carlotti, Station Zoologique); three dimensional modelling of zooplankton distribution (Wolfgang Fennel, University of Rostock); climate change in the Atlantic-Arctic region (Helge Drange, Nansen Environmental and Remote Center); review of ecosystem linkages that may matter in management (Jake Rice, DFO); and environmental influences on the Faroe cod stock and comparisons with other cod stocks (Keith Brander, GLOBEC). The *Sea Around Us* presentations focused on our use of and experience with *Ecopath with Ecosim* as an ecosystem modelling tool. Villy Christensen presented an overview of the use of *Ecopath with Ecosim* modelling approaches for ecosystem based management of fisheries, based on our work in the North Atlantic (Guénette et al. 2001; Christensen et al. 2002). Dirk Zeller presented his experiences in modelling the Faroe marine ecosystem using the *Ecospace* routine based on his collaborative work with the Faroe Fisheries scientist Jákup Reinert (Zeller and Freire 2001; Zeller and Reinert in review).

The local organizing committee undertook an excellent effort in exposing we visitors to as many local customs, delicacies and vistas as possible

Images from the Faroe Islands. The harbour at Torshavn (top) - small boats nearly outnumber the population on the Faroe Islands. The islands are renowned for dramatic landscapes such as this (bottom), with villages depending on a mix of fishing and farming. Photos by Villy Christensen

The outcome of this workshop was very positive from the perspective of the *Sea Around Us* project, as the Director of the Faroe Fisheries Laboratory, Hjalti Jákupsstovu, expressed a strong interest in continuing and possibly expanding a collaboration devoted to further refining the existing *Ecopath*, *Ecosim* and *Ecospace* model applications to the Faroe Islands.

Besides the interesting and diverse presentations and professional interactions among all participants, the local organizing committee undertook an excellent effort in exposing we visitors to as many local customs, delicacies (including whale meat!) and vistas as possible, through an excellent after-hours social program. Clearly, the social highlight of this workshop was a memorable dinner followed by lessons in traditional Faroe dances and songs, held in one of the oldest houses in the Faroes (dating back to well before 800 A.D.). This evening was well attended by participants and workshop sponsors, as well as the Faroe Minister of Fisheries. Indeed, rarely do scientists get the opportunity to dance traditional dances arm in arm with a cabinet member, especially one who can sing!

References

Christensen V., Guénette S., Heymans J.J., Walters C.J., Watson R., Zeller D., Pauly D. 2002. Hundred-year decline of North Atlantic predatory fishes. *Fish and Fisheries*, in press.

Guénette S., Christensen V., Pauly D. 2001. *Fisheries Impacts on North Atlantic Ecosystems: Models and Analyses.* Fisheries Centre Research Reports 9(4). Fisheries Centre, University of British Columbia, Vancouver, 344 pp.

Zeller D., Freire K. 2001. A preliminary North-East Atlantic marine ecosystem model: Faroe Islands and ICES Area Vb. In: S.Guénette, V. Christensen, D. Pauly (eds) *Fisheries Impacts on North Atlantic Ecosystems: Models and Analyses*. Fisheries Centre Research Reports 9(4), pp 207-212.

Zeller D., Reinert, J. (in review) Modelling spatial closures and fishing effort restrictions in the Faroe Islands marine ecosystem. *Ecological Modelling.*

Zeller D., Watson R., Pauly D. 2001. *Fisheries Impacts on North Atlantic Ecosystems: Catch, Effort and National/Regional Data Sets* Fisheries Centre Research Reports 9(3). Fisheries Centre, University of British Columbia, Vancouver, 254 pp.

Update on the Millennium Ecosystem Assessment

By Jackie Alder

In the last newsletter (Issue 13) Daniel Pauly introduced the Millennium Assessment (MA) and its activities. Needless to say it has not taken long for the *Sea Around Us* project to quickly involve itself in MA activities. The Second Global Scenarios Workshop for the Millennium Assessment was held in Bangkok from October 7 to October 11, with me attending on behalf of the *Sea Around Us* project. The workshop had an auspicious start with a deluge of morning rain combined with a king tide creating flood conditions around our hotel and reinforcing what might happen in the future if policy makers do not take action to maintain our ecosystems globally.

The "Scenarios" working group's role is to assess the impact on ecosystem service delivery in the coming decades, under different sets of intervention options. The second meeting was:
i) to define the different intervention scenarios;
ii) to identify the models that could be used to assess these scenarios; and
iii) to determine how these scenarios could be quantified using key indicators.

The three objectives of the meeting sound very daunting. However, the members of the group that assembled in Bangkok were experts in their fields and they came with a commitment to further the working group's efforts. The workshop broke into two major camps: the scenario-builders and the model-builders – with both camps exchanging ideas and discussing issues in plenary sessions. This proved to be a very efficient approach.

The number of scenarios was reduced to four, based on the time and resources available to members of the working group. The four scenarios represent the spectrum of plausible future storylines ranging from "Learn and Leap" (where adaptive learning dominates and traditional knowledge is incorporated) at one end of the spectrum to "Techno-garden" (where technology dominates and the role of the environment is weakened) at the other end. In between we have "Economic Optimism" (where ecosystem management is crises-driven and reactive, not proactive, but there is a high capacity to respond) and "Elites" (where developed nations protect their interest through inequitable policies and property rights and with little regard for the needs and interests outside of their own region). The workshop also identified some key assumptions such as human populations will continue to grow but will level out later this century. The number of assumptions was kept small to allow greater flexibility within the groups to explore the scenarios presented.

Model-builders spent much of the week identifying the drivers and ecosystems that could be modeled and what modeled outcomes are needed to provide key indicators for quantification of the scenarios. It was interesting to learn about the range of models and their applications currently in use throughout the world. It was also interesting to note what is currently modelled (e.g. food consumption for a range of cereal crops and water flows) and what is not modelled (e.g. water quality).

A small group of the model-builders developed a concept to link biodiversity, area and ecosystem services. We are now developing the concept and will test it over the next few months, so watch this space for an update on its progress. In the meantime, the *Sea Around Us* project will be attending the "Conditions and Trends" working group meeting in Sao Carlos, Brazil in November and I hope to report on that in the next newsletter. Plans are also underway for the *Sea Around Us* project to host a Millennium Assessment workshop for the "Marine and Coastal Conditions" working group in April of next year.

The group were experts in their fields and they came with a commitment to further the working group's efforts

Stop the Press!

Bonaire reverses position on EU fleets

We have just received correspondence from Mr G. DeSalvo, of the Bonaire Nature Alliance, informing us that the statistics and advice provided by the participants of the Pew Fellows meeting has been an important factor in the Bonaire majority party's decision to reverse its stand on allowing foreign fishers into the Netherlands Antilles Exclusive Fishery Zone. Mr DeSalvo hails this as "a victory for our environment" and thanks us on behalf of the Bonaire Nature Alliance and all supporters of sustainable fishing in Bonaire's waters. *Daniel Pauly*

A CD-ROM on the Marine Ecosystems of the Northwest African Subregion

By Maria Lourdes (Deng) Palomares

Comprehensive regional and national lists of marine fishes, Ecopath models, time-series of FAO catches, Guinean Trawl Survey ...

We are pleased to announce the completion of our CD-ROM, *The Marine Ecosystems of the Northwest African Subregion*, which was designed to help implement findings of the *International Symposium on Marine Fisheries, Ecosystems and Societies in West Africa: Half a Century of Change* (see *Sea Around Us* newsletter, Issue 12). The CD-ROM was prepared by me, Deng Palomares, with the assistance of other members of the *Sea Around Us* project and funding from the EU-Northwest African 'SIAP Project'. Among the important features of this bilingual (French/English) CD-ROM are:

i) Comprehensive regional and national lists of marine fishes, incorporating the results of the 'FishBase Module' of the SIAP project (i.e., covering the seven member countries of the NW African subregion, and providing common names in various local languages);

ii) Ecopath models, incorporating the results of the 'Ecopath Module' of the SIAP project, for the continental shelves of the member countries, most covering two time periods with different ecosystem structures and biomasses;

iii) Time-series of FAO catches (1950-2000) allocated to EEZs of West African countries from Morocco to South Africa, using a procedure developed by Dr Reg Watson and colleagues of the *Sea Around Us* project, as a contribution to the 'StatBase Module' of the SIAP project;

iv) The raw data and full documentation of the 'Guinean Trawling Survey' (1963-1964), as a contribution to the 'TrawlBase Module' of the SIAP project;

v) Powerpoint presentations of selected contributions presented during the *International Symposium on Marine Fisheries, Ecosystems and Societies in West Africa: Half a Century of Change;* and

vi) Selected documentation of the fisheries of the subregion, in both French and English.

This CD-ROM went through an exhaustive pre-distribution testing cycle (S. Booth, M.L.D. Palomares and D. Zeller for the English version, and L. Morissette and D. Pauly for the French version) and multimedia production phase (Cindy Young).

For a copy of this CD-ROM, please contact me (m.palomares@fisheries.ubc.ca). For more information about the Dakar Symposium, please see http://saup.fisheries.ubc.ca/Dakar/index.htm.

Sea Around Us in *Nature* again

Continuing on a wave of recent high-profile publications, including two co-authored papers in *Nature* (Watson and Pauly 2001; Pauly *et al* 2002) and a personal profile in *Science* (Malakoff 2002), Daniel Pauly has once again brought the *Sea Around Us* project and its goals to the attention of the world. This time, his perspectives on issues of marine conservation appear prominently in a special feature in *Nature* (Schiermeier 2002), which highlights the current failure of the world's fisheries scientists and managers to halt the unsustainable practices of today's fishing fleets. Drawing on the opinions of fisheries experts from around the world, the article covers the key issues facing contemporary fisheries decision-makers, including the need to reduce effort and set aside protected areas, while fostering better dialogue between fishers, scientists and the public. The current global debate and growing awareness about the state of the world's fisheries has been fuelled in part by the work of the *Sea Around Us* project and we are glad that *Nature* has chosen to pick up the issue in recent months. We hope that this is a continuing trend that will eventually lead to action on the part of those with the power to bring about change.

References

Malakoff, D. 2002 Going to the Edge to Protect the Sea. *Science* 296, 458-461.

Pauly, D., V. Christensen, S. Guénette, T. J. Pitcher, U. R. Sumaila, C. J. Walters, R. Watson, D. Zeller 2002. Towards sustainability in world fisheries *Nature* 418, 689-695.

Schiermeier, Q. 2002. How many more fish in the sea? *Nature* 419, 662-665.

Watson, R. and D. Pauly 2001. Systematic distortions in world fisheries catch trends *Nature* 414, 534-536.