

Life in Chesapeake Bay: an animated documentary

by Villy Christensen, Sherman Lai, Mike Pan, Dalai Felinto and Howard Townsend

The Chesapeake Bay is the largest estuary in the continental United States, located midway along the Atlantic coast. Because of its location near Washington, DC, the Chesapeake ecosystem is not only important ecologically, but also the subject of much political concern. Thus, quantitative tools with user-friendly outputs to help understand the implications of management actions and human behaviour on the ecosystem are useful for providing information to a wide-ranging audience. Researchers at the Sea Around Us project and the

US National Marine Fisheries Service are en route to developing such tools using the gaming interface of the new version 6 of the Ecopath with Ecosim approach and software. As an intermediate step, we have developed a 6-minute documentary of life in waters of the Chesapeake Bay. The documentary is developed using a 3D gaming engine, and tells the story of how the oyster populations have plummeted, gives viewers an idea of the current state, and it finishes with a 'dream-scene' expressing how the Bay may look in the future if we were able

to restore it. The power of the animation is that we are able to communicate scientific information to a much wider range of people than what our normal scientific products allow. We believe that this form for communication has a very strong potential in an educational setting, and anticipate that the underlying methodology – which includes linking a scientific ecosystem model of the Chesapeake Bay to a gaming engine – will be a very powerful tool for communicating scientific simulations in a management context.

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Screenshot 'dream-scene' of Chesapeake Bay from the animated documentary.

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Interestingly, on May 12 an Executive Order was issued by President Obama for the US's federal agency, the National Oceanic and Atmospheric Administration (NOAA), "to strengthen scientific support for decision-making on Bay restoration issues" (see www.chesapeakebay.net/news_execorder.aspx?menuitem=36188).

NOAA Chesapeake Bay, a close and long-standing partner to the Fisheries Centre, has included Lenfest Ocean Futures Program's (LOFP) group decision support for stakeholders as one of the solutions to this Executive Order. This is a timely Order, as Sherman Lai will be demonstrating a development concept of the LOFP decision support system during the Ecopath 25 Years conference to be held at the UBC

Fisheries Centre in August.

Viewers of the animated documentary, which can be viewed at www.ecopath.org/LifeInTheChesapeakeBay/, will be treated to life-like animations of the underwater ecosystem, and interesting facts about the Bay. Its vast watershed covers 64 thousand square miles and is shared by six states. It is estimated that over 16 million people live and work in this region. The Bay is one of the country's most valuable natural treasures, offering rich recreational opportunities and supplying millions of pounds of seafood every year.

There is a sizeable menhaden fishery active in and around the Bay. It is believed that the fishery may be removing too much of this prey species that it is impeding the recovery of one of

its main predators, striped bass.

Some surprising species were once abundant in Chesapeake Bay. A seemingly-unlimited supply of oysters once provided jobs and food to many, and the oysters were actually considered a hazard to marine navigation. Today, those oyster beds are virtually non-existent, which has rendered the ecosystem far less productive than it once was.

Marine mammals, such as the manatee and gray whale, as well as sea turtles, also used to call Chesapeake Bay home. Furthermore, sharks and rays, and giant sturgeons used to roam the waters in abundance. It is obvious that the ecosystem has changed, and the combination of gaming visualization with ecosystem modelling will most likely be a valuable tool to decision makers in the area.



The **Sea Around Us** project newsletter is published by the Fisheries Centre at the University of British Columbia. Included with the Fisheries Centre's newsletter *FishBytes*, six issues of this newsletter are published annually. Subscriptions are free of charge.



Our mailing address is: UBC Fisheries Centre, Aquatic Ecosystems Research Laboratory, 2202 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 Megan Bailey, *Sea Around Us* Newsletter Editor.

The *Sea Around Us* website may be found at www.seaaroundus.org and contains up-to-date information on the project.



Screenshot of a degraded Chesapeake Bay ecosystem from the animated documentary.

The Sea Around Us project is a scientific collaboration between the University of British Columbia and the Pew Environmental Group. 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 organizations 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 organizations.



Help the *Sea Around Us* improve:

A questionnaire



The *Sea Around Us* project is currently reviewing how project information is communicated to the public. This review includes evaluating this newsletter, including decisions regarding print versus electronic format. Below we have prepared 6 questions for our readers. We would greatly

appreciate reader input, in an effort to provide a valuable and enjoyable news source. Please respond to these 6 questions by filling out the printed questionnaire and mailing it to Jennifer Jacquet, *Sea Around Us* Project, Fisheries Centre, 2202 Main Mall, University of British

Columbia, Vancouver, BC, V6T 1Z4, Canada. Alternatively, readers can respond online at www.seaaroundus.org/news.htm. The *Sea Around Us* project appreciates your support of and participation in this review process. We hope you continue to read and enjoy our newsletter.

1) Over the past year, have you read at least one issue of the *Sea Around Us* newsletter in its entirety?

2) Would you prefer to read the *Sea Around Us* newsletter online or in print?

3) Would you continue to read/examine the newsletter if it was only available electronically?

4) In the newsletter, what do you enjoy most (please rank)?

- _____ articles about project members
- _____ articles about project research
- _____ articles about conferences
- _____ small blurbs on recent happenings/additions to the project

5) Are there types of articles you would like to see more of?

6) Please list other types of media (digital or print) and/or specific newsletters you read:

THANK YOU!

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Toward a conservation ethic for the sea: Steps in a personal and intellectual odyssey¹

by Daniel Pauly

Since 1971, when I did my first intercontinental travel (from Germany, where I was studying, to Ghana, to do the field work for my Masters), I have had the privilege of experiencing a multitude of countries, cultures, and modes of exploiting aquatic ecosystems in Africa, Asia, Oceania and the Americas. (This came along with a huge carbon footprint, as I now know.)

As a student, I learnt that we can 'manage' fisheries, and hence I saw my role as fisheries scientist (but also as a citizen of the world) and contributing to the progressive mastery that such management implies. Such mastery, one should think, should lead to a mosaic of management outcomes, depending on the local culture, and hence management choices. The resource declines I saw in various countries were boringly similar between countries, however, except for the fact that they sometimes

were lagging in time, depending on the country's level of development.

The 1980s and 1990s were also the period when science established the recent emergence of *Homo sapiens*, along with the descent of all non-Africans, from a small group which left Africa some 70,000 years ago. This re-enforced my belief in a basic similarity of the way humans interact with nature ("eat it if you can"), beyond superficial differences due to local constraints.

Now that our technology has essentially removed all constraints (distance offshore, depth, unpredictable storms, perishability of the catch, inability to accumulate capital, etc.) which earlier, along with limited markets, limited fisheries, the way we interact with nature has been simplified ("eat it"), and we are at the onset of a catastrophic decline of marine biodiversity.

We are, however, a species that

believes in and acts on myths (as evidenced by those that define our tribal, 'racial' or religious identity), and I believe that we will get out of the biodiversity crisis we are in only if we embed the fauna and flora around us into a mythology, a shared ethics of the sea, one that could be shared among all people on Earth, and which also could motivate political action (as myths generally do). This, I suggest, has the potential to reach beyond narcissistic consumers in rich countries, the present targets of our 'market-based' initiatives. This is where I am now.

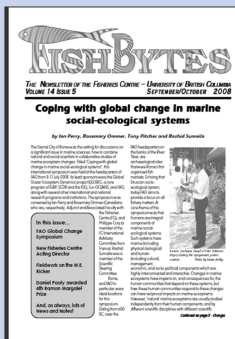
Footnote

¹ This is the abstract of a Keynote address from the International Marine Conservation Congress, given at the, Baird Auditorium, Smithsonian Museum of Natural History, May 20, 2009. I did it without PowerPoint for a change, and the result was fun. Try it! (See also: http://scienceblogs.com/guiltyplanet/2009/05/daniel_pauly_keynote_imcc.php.)



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FishBytes print version will cease



In 2010, FishBytes, a newsletter published by the Fisheries Centre, will be going fully electronic. We want to thank all of our readers for their continued support over the years. We kindly request those readers who are receiving hard copy versions of our FishBytes and *Sea Around Us* newsletters to email the editor, at FishBytes@fisheries.ubc.ca, with their electronic address, if they wish to continue reading FishBytes. The *Sea Around Us* is also reviewing their newsletter distribution. Please see the questionnaire on page 3. Having a fully electronic newsletter will allow us to use colour for visual aides to communicate with our readers, such as photos and graphs. We appreciate your cooperation and patience as we make this transition. We hope you will continue to read and enjoy FishBytes! If you have any comments or suggestions for us regarding this transition, please email the editor at FishBytes@fisheries.ubc.ca.

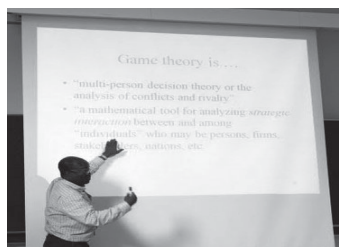
Global games: FAME hosts game theory workshop

by Megan Bailey

In fisheries economics, game theory came onto the scene in 1979...since then, over 150 articles have appeared...

Game theory is a tool for analyzing strategic interaction. The famous John Nash, a Nobel Prize winner (1994) for his work on cooperative and non-cooperative games in the 1950s, brought this theory from the depths of esotericism, to the light of the practical day. Well kind of. It has been applied to military planning, business situations, political science, evolutionary biology and economics, including resource economics. But like most theories, it has required time to be accepted by the general public as a worthy approach to be taken seriously.

In fisheries economics, game theory came onto the scene in 1979, when Gordon Munro, Professor Emeritus in the Economics Department at UBC, and Associate Professor at the Fisheries Centre, published the first application¹. Since then, over 150 articles have appeared that apply game theory, both analytically and empirically, to many fisheries worldwide (see www.mm.helsinki.fi/~mjlindro/gamefish.html for a list of these publications). Game theory is a valid tool to apply to fisheries because many of the world's fisheries are targetted by more



Rashid Sumaila (left) and Megan Bailey (right) give talks at the FAME Game Theory and Fisheries workshop in Esbjerg, Denmark. Photo by Thong Tien Nguyen.



than one country, and the fishing actions of one country affect the the actions taken by other countries. This is known as dynamic externality.

In June, the Fisheries and Aquaculture Management and Economics group (FAME), based in Denmark, hosted a game theory and fisheries workshop that brought together some of the leaders in the field to share their work and methods with students. The *Sea Around Us* project's Rashid Sumaila gave a keynote lecture outlining the general ideas behind the application of game theory to fisheries. Other keynote presentations were given by Lone Kronbak (University of Southern Denmark), and Pedro Pintasilgo (University of Algarve), both of whom, along with Marko Lindroos from the University of Helsinki, and our own Gordon Munro, are really pushing the field forward. These individuals are combining forces with game theorists in other fields, to find better approaches to facilitate cooperative management of internationally-shared fish stocks.

All workshop attendees were encouraged to give presentations of their work. It was during these talks that we learned just how global the application of game theory to fisheries is. I presented

on our work, funded by World Wildlife Fund and Pew Charitable Trusts, which is applying game theory to skipjack, yellowfin, and bigeye fisheries in the Western and Central Pacific Ocean. We heard how game theory could be applied to studying egalitarian fisher cooperatives in Japan. Two presentations focused on applying the theories to the use of territorial use rights in fisheries (TURF) schemes in Europe and in Chile. We also saw a presentation outlining an analytical model of applying game theory to the effective use of marine protected areas (MPAs) by multiple countries. Game theory has also been applied to fisheries in Canada, the US, in the Baltic and Barents Seas, in the Patagonian ecosystem, and to the Northern Atlantic bluefin tuna and Norwegian spring-spawning herring fisheries, among many others. It is truly a theory that has been picked up by fisheries economists and applied to some of the biggest challenges in fisheries management: namely how to cooperatively share a joint a resource.

Footnote

¹Munro, G. 1979. The optimal management of transboundary renewable resources. *The Canadian Journal of Economics* 12: 355-376.



Workshop attendees are treated to a boat trip around Ho Bay.

Photo by Thong Tien Nguyen.