

## Sea Around Us Project's climate change project at the 2009 AAAS annual meeting in Chicago

by William Cheung

On 12 and 13 February, I participated as a symposium speaker at the American Association for the Advancement of Science (AAAS) annual meeting in Chicago. I presented the findings from our study on the impact of climate change on marine biodiversity and fisheries. These findings are some of the major products from my two years of exciting and rewarding post-doctoral experience with the *Sea Around Us* Project (see *The Sea Around Us* Project Newsletter Nov/Dec 2008 issue for details about this work). In a sense, it also marked a successful completion of the first phase of this project.

The symposium titled "Facing Our Uncertain Future: The Reality of Climate Change Adaptation in the Ocean" was organized by Emily Pidgeon of Conservation International and Les

Kaufman of Boston University as part of the overall theme of the AAAS annual meeting "Our Planet and its Life – Origins and Futures". The symposium aimed to discuss the latest science in studying current and future impacts of climate change on marine ecosystems and the development of adaptation policy to climate change in marine environments. My contribution to the symposium was through presenting climate change studies that highlight major developments in our ability to project climate change impacts on species distributions, marine biodiversity and fisheries catch. This is obviously an important step towards developing

adaptation policy to climate change impacts in the ocean.

Emily Pidgeon of Conservation International opened up the session by highlighting the overall messages of the session: the effects of climate change on major groups of marine organisms have been observed and tools are available and continuously being improved to make projections of these impacts;



Former *Sea Around Us* Project member William Cheung is interviewed.

Photo by Liz Neely, *Compass*.

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thus we should start incorporating this knowledge and information into the design of marine conservation policies that are adaptable to climate changes.

Dee Boersma, Professor at the University of Washington, presented some stunning results on the impacts of climate change on the Magellanic penguin in Argentina. In her talk titled "Mare Nova: Climate Change – An Adaptive Challenge to Ocean Ecosystems", she showed that penguins are swimming 60 km farther north from their nests during incubation now than they did a decade ago. Some penguins even shifted their colonies which caused them to move from protected to private land. Such changes are likely a result

of shifts in prey distributions because of climate change and fishing. This affects the effectiveness of existing marine protected areas in protecting these penguins.

My presentation showed that marine fishes and shellfishes would face similar problems as the penguins. I presented the projected global shift in species distributions and the large-scale redistribution of fisheries catch potential. Specifically, based on modelling the distributions of 1,066 species of fishes and shellfishes, we predicted that their distributions would shift towards the Poles at a median rate of about 40 km decade<sup>-1</sup>. As a result, a high rate of species invasion may occur in the high latitude region while local extinction may concentrate along the tropics. Species with limited range or at habitat margins (e.g. polar species) may face a high risk of extinction under climate change because of the reduction in available habitats. Also, the combined changes in primary production and species distribution may cause large reduction in catch potential in the tropics, although high latitude countries such as Norway may gain in catch potential. Results like these highlight the need to

incorporate these potential changes when designing fisheries management and conservation policies.

Patrick Halpin, Professor at Duke University, then presented the findings from his latest research which showed that there is a mis-match between ocean areas with high projected climate variability (a proxy of climate change impact) and the existing coverage of marine protected areas. His works suggested the need to consider climate change in designing networks of marine protected areas.

A highlight of our symposium was a press conference on the day before the scientific session. In particular, this press conference coincided with the publication of the paper in *Fish and Fisheries* that reported our study on climate change impacts on marine biodiversity (Cheung *et al.* 2009). Overall, our paper, and the session in general, attracted considerable media coverage.

My participation in this year's AAAS annual meeting highlighted my experience working with the *Sea Around Us* Project over the past years. I enjoyed very much working

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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](mailto: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](http://www.seaaroundus.org) and contains up-to-date information on the project.

**The Sea Around Us Project is a scientific collaboration between the University of British Columbia and the Pew Environmental Group.** The Pew Charitable 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 Group committed over \$235 million to 302 nonprofit organizations.

# Impacts of the oil crisis on commercial fisheries in the Southern Philippines

by *Stuart Green*

In the Philippines, the use of boats exceeding 3 tonnes defines 'commercial', as opposed to 'municipal' fisheries. Municipal fisheries employ over 1.3 million small scale fishers, about 5 times more than the commercial sector, but generate roughly similar catches. A decade ago, the aggregate Philippine commercial fishing capacity

was 2.09 million horse power (HP), 45% above the optimum level of 1.14 Million HP.

The Philippine commercial fleet is highly subsidized by the government. Some of this consists of infrastructure development and tax windows on imported boats and equipment. Also, commercial fishing boat registration fees that

account for about 1/1000th of the value of fish caught by commercial fishers in 2000 (Green et al., 2003) are not reflective of true resource rents for the country's fisheries. Still, the Philippine fisheries suffered from the 2008 oil price increase. Table 1 below highlights some of the reactions within the commercial fishing industry.

*...Tuna Reps: Government fuel subsidy would be very much welcome during these difficult times.*

Table 1: Chronology of events related to fuel price increase in the Philippine commercial fishery, July – September 2008

Date (2008)	Event	Additional information
July	Members of largest commercial fishing group in western Mindanao (which accounts for 90% of the supply of sardines in the region) stop operating.	Dispute with canning firms over higher fish prices that commercial fishers are demanding due to increasing fuel prices, with canneries unwilling to pay.
Last week of July	Staff of the Bureau of Fisheries and Aquatic Resources argue with industry representatives to reinstate fishing. Industry gives its recommendations on what is needed for it to go back to fishing.	Industry representatives have 3 demands: (1) Exemption from 12% value added tax on fuel; (2) Discount on diesel bought from Government owned company; (3) Agreement between canneries and fishing firms on linking fish and diesel price.
Early August	Tuna fishing industry representatives stated a Government fuel subsidy would be very much welcome during these difficult times..	Tuna fishers: "it is not only the sardine industry that is reeling from the skyrocketing prices of fuel products. The tuna industry is also feeling its effect".
Mid August	Increase in sardine price agreed upon between catchers and canneries.	Further adjustments planned to compensate for rising prices of inputs.
September 4th	10 <sup>th</sup> National Philippine Tuna Congress in General Santos City, Mindanao.	To help the tuna industry through difficult times, the government is considering a plea by fishing operators to directly import cheaper fuel from Malaysia.
September 5 <sup>th</sup> onwards	Oil prices have decreased and operations are currently back to normal	The Government agrees to pay the Philippine tuna industry's membership in the Western and Central Pacific Fisheries Commission (US \$130,000).

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... a return to sailing or even row-boats by small scale fishers has been seen of late.



Tuna fishing boats docked at port in the city of Davao, Philippines. Photo by Megan Bailey.

The commercial fishers have tried to save fuel costs by fishing closer to shore in those grounds which are reserved for small scale fishing. In response, the fuel costs for fisheries enforcement vessels, i.e., to keep commercial fisheries out of the inshore 'municipal' fishing grounds, have increased significantly for small scale fishers and the municipal governments.

On the other hand, in some parts of the country, small scale fishers appear to be benefitting from the increased fuel prices, if indirectly: as their operating costs have increased, some commercial fishers have temporarily docked their boats,

or fished less frequently, giving both fish stocks and small scale fishers a temporary reprieve. Also, a return to sailing or even row-boats by small scale fishers has been seen of late

Although the worst of the oil price increase is temporarily over, it did bring into focus some fundamental problems in Philippine fisheries. The strong lobbying position of the commercial fishers and the subsidies that the industry gorges on, have led to huge overcapacity and have accelerated stock declines.

Fortunately, the Government did not heed the call for more

fuel subsidies. Subsidies for commercial fishers to decommission their boats and leave the fishery may be more helpful, as may fuel subsidies for the law enforcement patrols needed to keep commercial fishers out of small scale fishing grounds and manage the no-take areas of the country.

The world's financial crisis and the respite it offers (via reduced fuel prices) is an opportunity to find a solution to the structural problems of Philippine fisheries.

Notably, subsidies to commercial fisheries must cease, emphasis being instead given to law enforcement and to strengthening and expanding the existing network of marine protected areas. Otherwise, noodles will be all that people will have to eat, and sardines will be unavailable.

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with every colleague at the *Sea Around Us* Project. Particularly, working with Prof. Daniel Pauly and learning from his teaching widened my horizons and accelerated my growth, both academically and personally. In my new position at the University

of East Anglia, I will continue to collaborate with the *Sea Around Us* Project on climate change studies as well as other projects. So, you may see me again in the *Sea Around Us* Project newsletter in the future.

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# Re-visiting international fisheries subsidies

By Andrew J. Dyck

Since 2002, the Fisheries Economics Research Unit (FERU) has been busy investigating the economic incentives that lead to overfishing. While there are many economic factors at play, one issue that has been central to FERU and, in part, the *Sea Around Us* Project, is the impact of government subsidies on the fisheries sector. Subsidies are important to the study of marine capture fisheries because they can directly affect and alter the economic incentives faced by fishers, and therefore, the level of fishing they might take.

The aim of fisheries subsidies is, in the most general sense, to improve the livelihoods of fishers. Governments attempt to do this by increasing the total revenue that fishers receive, reducing their fishing costs, or both. Unfortunately, these programs, which are often designed to help fishers through tough times can create an incentive to overfish – likely the reason why incomes are low for fishers to begin with – and exacerbate the financial problems faced by fishers. Quite simply, when a government chooses to reduce fishing costs through subsidies, total catch will be even higher than without government intervention.

Many recognize that fisheries subsidies are not only harmful for biological stocks but can also hinder international trade. This places subsidies to the fishing sector within the World Trade Organization's (WTO) guidelines on actionable subsidies – those that have adverse effects on a

nation's trading partners. For this reason, the *Sea Around Us Project* and FERU's work on subsidies has drawn a great deal of attention from the international community, with the result that our research outputs (e.g., Khan et al., 2006) have been used by parties at the ongoing Doha Round talks.

Within the realm of international subsidies, the fishing industry can be overshadowed by other industries, like agriculture, that are thought to have very high levels of subsidies. However, year 2000 estimates of Khan et al. (2006) and Sumaila et al. (2008) suggest that fisheries subsidies total between \$US 30 and 34 billion per year. Not only is this a staggeringly large number in absolute terms, but the problem is even more apparent when we consider that this represents roughly forty percent of the total landed value of ocean-caught fish. In simple terms, 40% of each fish caught is, on average, subsidies.

Visitors to the FERU section of the *Sea Around Us* Project website, [www.seaaroundus.org/](http://www.seaaroundus.org/), will find that subsidies have been re-estimated for the year 2000 using the most recent catch allocation from the *Sea Around Us* Project reflected in the column reporting subsidies proportionate to the landed value of catch. Furthermore, the subsidy re-estimation has allowed us to disaggregate subsidy data that was previously estimated for a geo-political entity such as France, among its dependencies like Crozet Island, Guadeloupe, or St. Pierre et

Miquelon. This disaggregation is simply based on an entity's catch relative to total catch for the larger geo-political entity. So, in the above-mentioned cases, Crozet Island is assigned a share of France's previous subsidy estimate based on its contribution to France's total landed value.

In pursuit of increasing our knowledge of fisheries subsidies, we are currently expanding the database of government financial transfers to include spending from the year 1989 to the present. This will result in a new re-estimation of the data for the year 2000 using the upcoming catch allocation as well as an estimate for the year 2003, which is the base year for the Global Ocean Economics Project\*. To compile subsidy data for the year 2003 and, with continued work, for additional years, we have relied on information from various sources including a world-wide campaign directed at collecting data from fisheries ministers, WTO negotiators, and other governmental figures.

Publishing data on the extent of government subsidies to the fishing sector is just one step toward building a climate where fisheries management can be discussed with transparency. Given the extent of government spending in the fishing sector mentioned above, we feel that building the subsidies database is a very important part of advancing the discussion on fisheries management at the global level, now and in the future.

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## Billfish conflicts in recreational and commercial fisheries in Mexico

by **Andrés M. Cisneros-Montemayor and Gakushi Ishimura**

... It is undeniable that a collapse of billfish resources would result in a negative impact on the entire tourism industry.

Fishing is one of the main economic activities in Baja California Sur (BCS), Mexico. The Gulf of California has always been a very important area for fisheries, and the tropical climate and short travel distance make the Gulf of California a popular destination for vacations by Americans and Canadians. Recreational fishing, mainly targeting billfish, has grown along with tourism in the region and has developed into a large industry with a significant role in the local economy and relatively stable catches since the mid-1980s (DOF, 2004). Most recreational fishing effort takes place on the eastern coast of BCS, mainly in the Los Cabos region and in Buenavista.

Billfish are regarded as prize fish by sport fishermen, with international tournaments held every year, marlin and sailfish being the most targeted species. Billfish captures total to around 23,000 fish a year (DOF, 2004). Billfish are exclusively reserved for recreational fishermen, but due to by-catch in commercial fisheries, these two sectors in BCS have been in conflict over billfish resources. Revenues from recreational fishing licenses alone in BCS increased to 1.5 million USD in 2006 and the government of Mexico estimated the total value of recreational fishing direct expenditures in BCS at around 8 million USD in 2007. A separate study initiated by the Billfish Foundation used input-output analysis to estimate the effects of recreational fisheries on the local economy, suggesting a total of 1.12 billion USD in total economic activity was generated by the recreational fishing industry


(Southwick Associates, 2008).

A critical issue of the Mexican recreational billfish fishery is the ongoing conflict with commercial shark fisheries over billfish resources. Recently, these conflicts have been brought to a head by the approval of a new fisheries law, NOM-029 (2007), in which objectives are set to improve the management of commercial shark fisheries in Mexico. The law's main points are to limit the type and use of shark-fishing gear and to regulate by-catch of marine mammals, birds and sea turtles. The government's rationale is that, while not perfect, the law will do much for the management of shark fisheries and it can be improved over time to protect other fish species. The recreational billfish fisheries sector has very strongly opposed the law (see [www.billfish.org/new/news/article.asp?ArticleID=66](http://www.billfish.org/new/news/article.asp?ArticleID=66)), stating that, by neglecting the explicit by-catch limit on billfish resources, by default this law will allow shark-fishing vessels to capture billfish 'incidentally', then sell them on the market.

After much political debate, a 30% billfish by-catch limit was set for the commercial shark fishery, with varying region-specific by-catch rates for different billfish species. This by-catch limit is based on data from on-board observers, but it is unclear how the limit will be enforced, or what the consequences of exceeded by-catch limits would include. It is undeniable that a collapse of billfish resources would result in a negative impact on the entire

tourism industry, which is key for the BCS economy. However, if our aim is to improve the state of fisheries and ecosystems, management policy should be shaped around sound scientific advice and not around the most influential stakeholder.

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