

## **Assessing biodiversity loss in the oceans: a collaborative effort between the Convention on Biological Diversity and the Sea Around Us project**

*by*  
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**T**he *Sea Around Us* project (SAUP) and the Secretariat of the Convention on Biological Diversity (CBD) will collaborate on assessing trends in biodiversity in the world's oceans. This collaborative effort between the Montreal-based CBD Secretariat and the SAUP, based at the Fisheries Centre, UBC, Vancouver, has its origin in the CBD's need for reliable information on the state of marine biodiversity worldwide, and on how it is impacted by fisheries. The CBD, for example, needs to know what has happened to biodiversity in the oceans during the past 50 years, and what is likely to happen if present trends continue.

Such information can then be used to support global policy decisions addressing the current biodiversity crisis. It is important that such policy decisions are supported by the best available science. However, in many cases, the required scientific information is only available piecemeal, if at all, and its accuracy cannot be verified. The SAUP, in constructing its global databases, offering access to a wide range of marine fisheries and ecosystem-related data (see [www.seaaroundus.org](http://www.seaaroundus.org)), is in the process of addressing this problem.

The CBD was adopted in 1992 at the Earth Summit in Rio de Janeiro. For the first

time in history, the global community decided to address biodiversity issues through a comprehensive, international treaty, and in so doing, explicitly stated that the conservation of biodiversity is a common concern to humankind. The Convention establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from the utilization of genetic resources. The CBD adopts a holistic approach to the conservation and sustainable use of the Earth's entire wealth of living organisms, covering all ecosystems and species,

*Continued on page 2 - CBD*

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*CBD - Continued from page 1*

as well as the diversity within species. Because of this approach, the Convention is broad and ambitious in scope. It is now the largest environment convention, with 188 Parties, and its coverage is almost universal.

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After some twelve years, the CBD is gradually making the transition from policy to implementation. Thus, the Parties to the Convention have set themselves the difficult target of achieving by 2010 a "significant reduction of the current rate of biodiversity loss". This target, the "2010 biodiversity challenge", is meant to inspire practical action resulting in measurable benefits to biodiversity. Although the CBD has yet to define what "significant reduction" means,

there is now increasing momentum towards putting in place measures that will lead to reduction in biodiversity loss. This implies that global indicators are needed to measure progress made towards achieving the 2010 target. It is this need for science-based indicators which catalyzed the collaboration between the CBD and the SAUP. The difficulties of measuring the achievement of a largely inspirational target with real and measurable indicators are considerable. But in an attempt to do just this, the CBD's highest body, the Conference of the Parties, adopted in February 2004 a number of global indicators<sup>1</sup> (Box 1). One of these is the change in trophic level in marine fisheries catches, or in CBD's parlance, the "marine trophic index". This indicator was included as a measure of ecosystem integrity and sustainability of fisheries, and was selected because of its proven relevance and reliability as a measure of human impact on exploited marine ecosystems, i.e., of "fishing down marine food webs".<sup>2</sup> The Parties to the CBD envisioned that this indicator would be calculated globally and regionally from fisheries data, and would be presented as a time series, which would start as far back in time as possible, and forward to 2010.

The calculation of this indicator will require reliable time series

of fisheries catch data at global and regional scales. National level data will also be required, as it is likely that countries will use the indicator for their own monitoring efforts. The separation of high seas catches from those obtained within countries' EEZs is also important, given current international efforts to protect high seas biodiversity. Here, the SAUP's database of geo-referenced fisheries catches will be crucial, as it provides data at each of the required scales for calculation of trophic level changes. The other SAUP databases, such as those on marine biodiversity and biomass trends, will provide a context for assessing marine biodiversity in a more general sense. With this in mind, the Executive Secretary of the Convention on Biological Diversity has formally invited the SAUP to help the CBD in assessing trends in marine biodiversity up to the year 2010.

The SAUP will also contribute to another important global assessment need of the CBD, on the status of marine protected areas (MPAs). As described in a previous issue of the SAUP Newsletter, the PhD project carried out, with the support of WWF and the UNEP World Conservation Monitoring Centre (WCMC), by Ms Louisa Wood at the Fisheries Centre, devoted to a global assessment of MPAs,<sup>3</sup>

*Continued on page 4 - CBD*

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The *Sea Around Us* website may be found at [saup.fisheries.ubc.ca](http://saup.fisheries.ubc.ca) and contains up-to-date information on the project.

**T**he *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.

**Box 1. Provisional indicators for assessing progress towards the CBD 2010 biodiversity target. The 'marine trophic index' is the CBD name for mean trophic level, as used by SAUP to document fisheries impacts on ocean ecosystems.**

A: Focal area	B: Indicator for immediate testing	C: Possible indicators for development by SBSTTA or Working Groups
<b>Status and trends of the components of biological diversity</b>	Trends in extent of selected biomes, ecosystems and habitats  Trends in abundance and distribution of selected species	Change in status of threatened species (Red List indicator under development)  Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance  Coverage of protected areas
<b>Sustainable use</b>		Area of forest, agricultural and aquaculture ecosystems under sustainable management  Proportion of products derived from sustainable sources
<b>Ecosystem integrity and ecosystem goods and services</b>	Marine trophic index      Water quality in aquatic ecosystems	Application to freshwater and possibly other ecosystems  Connectivity/fragmentation of ecosystems  Incidence of human-induced ecosystem failure  Health and well-being of people living in biodiversity-based-resource dependent communities  Biodiversity used in food and medicine
<b>Status of traditional knowledge, innovations and practices</b>	Status and trends of linguistic diversity and numbers of speakers of indigenous languages	Further indicators to be identified by WG-8j
<b>Threats to biodiversity</b>	Nitrogen deposition	Numbers and cost of alien invasions
<b>Status of access and benefit-sharing</b>		Indicator to be identified by WG-ABS
<b>Status of resource transfers</b>	Official development assistance provided in support of the Convention (OECD-DAC-Statistics Committee)	Indicator for technology transfer

*global indicators are needed to measure progress made towards achieving the 2010 target*

# Reconstruction of coral reef fisheries catches for U.S.-associated islands in the Western Pacific Region

by Dirk Zeller

*Reconstructing historic catches, especially for the generally unreported small-scale coral reef fisheries, is crucial for establishing baselines for fisheries management and conservation*

Fisheries resources have played a fundamental role in shaping Pacific island communities for centuries. While pelagic fisheries are the commercially most important fisheries in the U.S.-associated islands managed by the Western Pacific Fishery Management Council (WPFMC, see Figure 1), inshore coral reef fisheries are generally of more fundamental social and cultural importance. However, while catches for the large-scale pelagic fisheries tend to be documented, catches for the small-scale, artisanal fisheries often are not, or are incompletely reported. Hence, extractions of these marine resources usually remain

unaccounted for in regional and global statistics (Pauly, 1998).

Reconstruction of historic catch time series often requires interpolation and bold assumptions, justified by the unacceptable nature of the alternative, i.e., accepting catches of fisheries known to exist to be zero (Pauly, 1998, Zeller et al., 2001). Without accounting for fisheries catches for all sectors, we cannot obtain a measure of the true value of these resources to the communities, or of the risks their loss through overfishing may represent for Pacific island societies. This is especially a concern, given that human

population growth rates in some areas of the Pacific (e.g., American Samoa) are among the highest in the world and natural resources in the small Pacific islands are limited and declining (Craig, 1995). It is thus evident that reconstructing historic catches, especially for the generally unreported small-scale coral reef fisheries, is crucial for establishing baselines for fisheries management and conservation, and the maintenance of the livelihoods and cultures of island societies.

Hence, following a visit to Honolulu and presentation by

*Continued on page 5 - Pacific*

**CBD - Continued from page 2**

will not only provide information towards another indicator identified by the CBD (coverage of protected areas, see Box 1), but also fulfills a direct mandate of the CBD to improve available data on MPAs globally. This mandate originates from the last meeting of the Conference of the Parties in Kuala Lumpur, Malaysia, which recognized that the documentation of existing MPAs was insufficient, and that a new global MPA database should be developed.<sup>4</sup>

We anticipate that other areas of overlap between the CBD and the SAUP will emerge, leading, in the future, to an even closer collaboration between the CBD and the SAUP.

## Footnotes

<sup>1</sup> Decision VII/30 of the Conference of the Parties to the Convention on Biological Diversity (<http://www.biodiv.org/decisions/default.aspx>)

<sup>2</sup> Pauly, D., Christensen, V., Dalsgaard, J., Froese, R. & Torres Jr., F. 1998. Fishing Down Marine Food Webs. *Science* 279: 860-863.

<sup>3</sup> Wood, L. 2004. A Global Assessment of Marine Protected Areas: A New Sea Around Us Initiative. *Sea Around Us Newsletter Issue No. 21* (January/February 2004)

<sup>4</sup> Decision VII/5 of the Conference of the Parties to the Convention on Biological

Diversity ([www.biodiv.org/decisions/default.aspx](http://www.biodiv.org/decisions/default.aspx)).



## Erratum: Sea Snakes

In a recent article ('*The marine reptile database*,' *Sea Around Us* Issue 21, p. 6), we stated that there are 175 species of sea snakes. Actually, two of these are freshwater species, even though they are commonly referred to as sea snakes (*Hydrophis semperi* and *Laticauda crockeri*). *L. crockeri* is the IUCN red listed species mentioned in the article.



Figure 1: Area managed by the Western Pacific Fishery Management Council, showing the EEZs of the U.S. associated islands. Main areas of coral reef fisheries interest are the inhabited islands of American Samoa, Guam, Northern Marianas and Hawaii.

#### Pacific - Continued from page 4

Daniel Pauly, in early 2004, the *Sea Around Us* project signed a research agreement with the WPFMC to undertake a catch reconstruction exercise for the U.S.-associated islands in the western Pacific, specifically American Samoa, Guam, the Northern Mariana Islands (CNMI) and Hawaii. The project will assemble and utilize all available data and information on coral reef fisheries between 1950 and the present, and derive estimates of total removal of coral reef fisheries resources for this period.

Thus, in March 2004 I visited the WPFMC where I consulted with Dr Paul Dalzell (Senior Scientist) and Jarad Makaiau (Habitat Coordinator). I took the opportunity to search the Council library for existing reports and reference material, and also received material kindly provided by Paul from his personal collection. Furthermore, I met with Walter Ikehara and

Reginald Kokubun from the Hawaii Division of Aquatic Resources, and with David Hamm from the Western Pacific Fisheries Information Network (WPacFIN) at the Pacific Islands Fishery Science Centre, NOAA Fisheries. The support and assistance I received from all sides was greatly appreciated. Walter Ikehara and Reginald Kokubun will send us the official Hawaiian landings statistics, which will form the foundation for the Hawaiian reconstruction, combined with several case studies that will form anchor points for extrapolations of missing data. David Hamm has responsibility for catch databases for American Samoa, Guam, the Northern Mariana Islands and Hawaii. He provided excellent explanations on the scope and limitations of the WPacFIN databases for the islands under his area of responsibility. Extensive literature searches and data searches, with the assistance of council staff located on the islands (John Calvo – Guam; Fini Aitaoto –

American Samoa; Jack Ogomuro – CNMI) has already resulted in extensive data for anchor points and extrapolations. Additional valuable assistance, information and feedback is provided by others, including Peter Craig (National Park Service, American Samoa), Kimberly Lowe (Hawaii Division of Aquatic Resources) and Nancy Daschbach (NOAA, American Samoa). We anticipate that by the end of 2004 the coral reef fisheries catches for these islands can be better accounted for than at present. This will provide the Council with a better understanding of total historic catches, and the *Sea Around Us* project with a foundation for extending this approach to other coral reef islands.

#### Literature cited

- Craig P.C. 1995. Are tropical nearshore fisheries manageable in view of projected population increases? South Pacific Commission and Forum Fisheries Agency workshop on the management of South Pacific inshore fisheries. SPC, Noumea (New Caledonia). Tech. Doc. Integr. Coast. Fish. Manag. Proj. S. Pac. Comm. 11 (Vol. 1): 197-208.
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- Zeller D., Watson R. and Pauly D. (eds.) 2001. Fisheries Impacts on North Atlantic Ecosystems: Catch, Effort and National/Regional Data Sets. *Fisheries Centre Research Reports* 9(3), 254 pp.

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## Two Sea Around Us members win Mia J. Tegner Memorial Research Grants

**C**ongratulations to Research Fellow, Dr Maria Lourdes (Deng) Palomares and SAUP PhD student, Colette Wabnitz, who have both been awarded a Mia J. Tegner Memorial Research Grant in Marine Environmental History and Historical Marine Ecology.

These grants are among the first in the world awarded specifically to help scientists document the composition and abundance of ocean life before humans altered marine ecosystems. This information is important for helping lawmakers, regulators, managers and conservationists set appropriate targets for marine conservation efforts.

In 2004 the Marine Conservation Biology Institute (MCBI) awarded 11 of these grants (out of 86 applications).

Dr Mia J. Tegner, a marine biologist at Scripps Institution of Oceanography, lost her life in January 2001 while carrying out research off Southern California. She studied the ecology of kelp forest communities and abalone populations, and was particularly interested in understanding how marine populations and ecosystems have changed as a

result of human activities. This pioneering research earned her appointments as a Pew Fellow in Marine Conservation and as a Fellow of the American Association for the Advancement of Science.

Mia J. Tegner Memorial Research Grants were started by MCBI to honour her memory with funding from the Oak Foundation, the Christensen Fund and the Weinstein Family Foundation.

The title of Deng's proposal, "Shifting the baseline: a knowledge-base of fish abundance anecdotes from early European explorations", reflects her ongoing research in recovering 'lost' biogeographic information about fish, stored in museum records and collections from early scientific expeditions (see *Sea Around Us*, Issue 22, p. 8). Records of observations indicating abundance of fish species at a given time and location will be gathered and structured in a database to be used for analysis of biodiversity trends (e.g., abundance of fish species in French Polynesia from the time Magellan discovered the islands of Tahiti). It is hoped that this database will provide valuable 'baseline' information dating back to the start of European exploitation of marine

resources. The searchable database will be made available through [www.seaaroundus.org](http://www.seaaroundus.org).

Colette will use her award to look at the "Ecological functions, seagrass distribution and the conservation biology of green turtles in the Caribbean (*Chelonia mydas*)". Specifically, she will (1) develop a model to improve our current knowledge of the 'ecological role' of *Chelonia mydas*; (2) derive estimates of carrying capacity of present distribution of seagrass beds in the Wider Caribbean region from synthesised and updated habitat maps in ArcGIS; and (3) compare estimates obtained under (2) to carrying capacity estimates derived from past seagrass distribution in the region. As a result, the model derived will allow her to evaluate how many green turtles are required in the Wider Caribbean region in order to fulfil their ecological role, given the present areal distribution of seagrass estimated.

MCBI ([www.mcbi.org](http://www.mcbi.org)) is a nonprofit science organization, founded in 1996 and based in Washington State, dedicated to advancing the science of marine conservation biology and promoting cooperation essential to protecting, restoring and sustainably using the living sea.

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## Seaaroundus.org gets write-up in Science

**T**he *Sea Around Us* web products page ([www.seaaroundus.org](http://www.seaaroundus.org)), which we launched in the last issue of this newsletter (*Sea Around Us* Issue 22), has

received attention in *Science* magazine's NetWatch (*Science* 305, 9 July 2004, p. 157). This is a welcome piece of publicity that we hope will help increase awareness of our extensive

online resources among fisheries practitioners around the world, particularly those with data-limitations or limited access to fisheries-related information.

