Sea Around Us

An anthropologist in Palau[1]

by Yoshitaka Ota
Department of Anthropology, University of Kent

Palau is well-known among fisheries scientists, especially among social scientists, for having provided the backdrop to Bob Johannes' masterwork, *Words of the Lagoon* (Johannes 1981), which documented and cross-validated the rich marine biological knowledge of the local fishers. I spent 17 months in Palau, in 2000 and 2001, gathering ethnographic data for my PhD research (Ota 2006a), mainly from the local fishers. One of my minor goals was to check how Johannes' research has held up since the late 1970s, as Palau has now become an independent country, whose people are fully exposed to the modern economy and its mass consumption.

Rock Islands, Palau

My main concerns were anthropological and cultural, but set in the fishing practices of the contemporary Palau: the gender, cultural identity and social relations of the people, constructed through their interactions with the sea (Ota 2006a).

However, in contrast to the time of Johannes' study, today people in Palau do not fish for subsistence, i.e., they do not have to fish to live. However, they are still involved in ritual gatherings in which traditional exchanges of gifts, notably fish, play a crucial role. In fact, one of the main reasons that people continue to fish is "to protect their tradition". Here, rather than following up these traditions, as my training as an anthropologist would require me to do, I will take on the challenge of quantification of catch estimates for the reef fishes of Palau, using my local knowledge - a topic that was not addressed by Johannes (1981).

Fish consumption in Palau consists largely of reef fish species, which have a proper "taste of fish", while large pelagic fishes, such as tuna, are generally served to tourists in hotels and restaurants. A survey conducted in 1989 reports the Palauan mean daily consumption of fish as 0.23 kg per person (i.e., 84 kg/year). Other sources report that in Koror, the capital of Palau, where imported food is readily available, approximately 0.7 kg is consumed daily per person (~260 kg/year). Taking the average of these numbers and multiplying by the population of Palau in 1989 leads to a reef fish consumption of 1,000 to 1,200 t/year. This figure was compared with the estimates of catch by major gears (lines, spear-guns, barrier nets, trolling lines and traps) which I was able to obtain, albeit 17 months after the catch surveys were

Continued on page 2 - Palau

[1] *This contribution is adapted from talk given on April 7, 2006, as part of the Fisheries Centre Friday Seminar Series.*

The Sea Around Us Project Newsletter
Issue 35 – May/June 2006

Palau - Continued from page 1

done. Note that there are no fresh reef fish imports to Palau, so catch can be assumed equal to consumption.

Line fishing in Palau is conducted with nylon fishing line, fishing hooks, and weight to keep fish baits at the bottom of the seabed. This form of fishing is often practiced with family and friends, on the occasion of a leisurely weekend excursion at the sea. Large boats are used, which can comfortably carry several men and women, who spend the night fishing larger reef fish, including snappers and groupers. Out of 300 boats that were reported as domestic fishing boats in 2000, probably less than a third of them are used for this form of fishing. Given that each of these boats can be assumed to be used for one excursion per month, I estimate the overall catch taken by this form of fishing as 200 t per year.

[Line] fishing is often practiced with family and friends, on the occasion of a leisurely weekend excursion at the sea

Social evening with fishermen, Koror, Palau (author first from left)

While line fishing is popular among Palauan of both sexes, males dominate the practice of underwater spear-gun fishing, and it is practiced by the largest number of fishers. Men between 18 and 45 years of age free-dive to depths of 20 m, and shoot reef fish, notably parrotfish and rabbit fish, with locally-made spear-guns. A trip can last between 3 and 10 hours, depending on when enough has been caught for supper. A few fishermen use this method for commercial fishing: in this case, they tend to target species that are popular among tourists, including grouper and Napoleon wrasse. The amount of catch varies between trips and individuals, but on average, a fisherman catches 20-50 kg of fish per fishing trip. I have estimated the Palau-wide spear-gun catch at around 350 t/year (Ota 2006b).

Barrier net fishing (*kesokes*) is conducted around spring tides, as it relies on tidal currents as mechanism to aggregate and catch fishes. At high tide, a large net is set across the shallow part of a reef so that the fish cannot move to deeper water as the tide recedes. There are a few groups of fishermen specialised in this fishing method, primarily for commercial purposes, because the method more or less guarantees a large catch of mainly smaller fish, as much as 500 kg per set. I have estimated the total annual catch by barrier reef net fishing at about 150 t.

The elder population of Palauan fishermen often practice hand-line trolling, as this gear challenges their knowledge of fish behavior and sea conditions. Contrary to the tourists, who used larger boats overloaded with high technology, local fishermen use only small boats – and no fishing rods. They usually operate close to the shore and target small reef-associated pelagic fish, such as bonito and barracuda. About 15 to 20 fishermen carry out this type of fishing regularly. Among these, two are professionals, who sell their catch in local markets for

Continued on page 3 - Palau

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: *Sea Around Us* project, 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 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.

ISSN 1713-5214 Sea Around Us (ONLINE)

Palau - Continued from page 2

consumption by tourists. The others, who fish for domestic consumption, catch much less than the commercial fishermen, as they prefer "not to waste their money on petrol". Their success depends on the weather and pattern of fish migration, and the amount of the catch varies between individuals. I have estimated the total catch and effort of this fishing at about 100-120 t/year.

Trap fishing has become much less popular due to constant vandalism. However, it is still used to catch mangrove crabs in one region in the northwest part of Palau. More than 100 traps are used to catch those crabs, which are almost all sold to the tourist sector, and whose catch amounts to only a few tonnes.

Adding the whole annual catch estimated by those five fishing methods, in 2000-2001, yields over 800 t/year, which is about 300 t less that the survey figure of 1000-1200 t estimated for 1989. I cannot assess here whether this difference reflects changes that occurred between 1989 and 2000-2001, or errors in my estimates, or both. Elucidating this will be an important topic in the next years, because all is not well with Palauan fisheries. Carl Safina, who interviewed a government fisheries biologist in Palau in the mid 1990s, cites him as saying "I could catch two hundred pounds of fish in one day. Now, you would be lucky if you catch fifteen" (Safina 1997, p. 339). Similarly, Myers (1999, p. 23) writes that "[c]ertain large species such as the giant humphead parrotfish […] that were once common are now rarely seen on Guam and becoming scarce in Palau". For the time being, however, I will elaborate on how the catch is used.

Traditionally, people in Palau hold various ritual gatherings to mark certain life events, including the birth and the death of their kin members. It is obligatory for the host to serve fish to participants at those gatherings, and failure to do so is considered failing the Palauan tradition. For men, providing fish for those gatherings is their obligation to fulfill the male part of gift exchange and a failure would jeopardize their gender identity and kin status to others. For instance, at the gathering of the funeral (*kemeldeel*), a piece of fish is served to each of more than 200 participants, which can total more than 500 kg of fish consumed in one gathering. More than 25 funerals were held during the 17 months of my fieldwork, corresponding to 7 t/year consumed at funerals alone. This, then, is the main reason why Palauan still fish, although they don't need to in terms of subsistence.

Pauly (1998) suggests that what has prevented both social and natural scientists from recognizing the use of each other's knowledge and information originates in our "psychological", rather than academic attributes, a theme he elaborated upon in Pauly (2006). I agree, and also think the two schools of thoughts are ultimately compatible. Anthropologists may say that they do not do 'counting', whereas for natural scientists it is necessary to 'count'. Thus some natural scientists think that ethnographic information given by anthropologists is not 'data'. We need to overcome this. My estimates of catches of Palauan fishers certainly require much more attention to details, but this represents my attempt at building bridges, and I hope that this will be reciprocated.

Acknowledgements
I thank the members of the Fisheries Centre for discussions of small-scale fisheries issues across natural and social scientific disciplines, particularly Daniel Pauly and Dirk Zeller for convincing arguments – and methods for catch reconstruction. This small contribution is adapted from the talk I gave as a result, and illustrates how far a cultural anthropologist can go towards the natural sciences. I now appreciate that 'counting fish' can contribute to insights within my discipline.

It is obligatory for the host to serve fish [...] and failure to do so is considered failing the Palauan tradition

References

Johannes, Robert E. 1981. *Words of the lagoon: fishing and marine lore in the Palau district of Micronesia.* University of California Press, Berkeley. xiv + 245 pp.

Myers, R.F. 1999. Micronesian reef fishes. Coral Graphics, Guam, 330 p.

Ota, Y. 2006a. *Custom and fishing-cultural meanings and social relations of Pacific fishing, Republic of Palau, Micronesia.* Ph.D. Thesis, University of London.

Ota, Y. 2006b. Fluid Bodies in the sea: An ethnography of Underwater Spear gun fishing in Palau, Micronesia. *World Views: Environment, Culture, Religion* 10(2), 205 – 219.

Pauly, D. 1998. Rationale for reconstructing catch time series. *EC Fisheries Cooperation Bulletin* 11(2): 4-7.

Pauly, D. 2006. Major trends in small-scale marine fisheries, with emphasis on developing countries, and some implications for the social sciences. *Maritime Studies (MAST),* 4(2): 7-22.

Safina, C. 1997. Song for a blue ocean: encounters along the world's coasts and beneath the sea. New York, NY: Henry Holt and Company.

Historic Raja Ampat: recovering early anecdotes of abundance

by Sheila Heymans

Over the past 5 centuries this archipelago was visited and captured by the Portuguese, Spanish, French, Dutch and English

During the past six months, *Sea Around Us* Research Associate, Maria Lourdes (Deng) Palomares and I have been populating a database of historic anecdotes from the Raja Ampat area of Indonesia. This is part of Deng's work towards "shifting baselines" back to historical levels by recovering records of occurrence and abundance of marine organisms from early European expeditions (*see Sea Around Us* Issue 22 (p.8); Issue 23 (p.6); Issue 27 (p. 3-6); and the 'Expedition' section of the *Sea Around Us* website: www.seaaroundus.org). This particular phase of the project was funded by Conservation International (Indonesia) as part of the ongoing global assessment of the Bird's Head Seascape, headed by Dr Mark Erdmann.

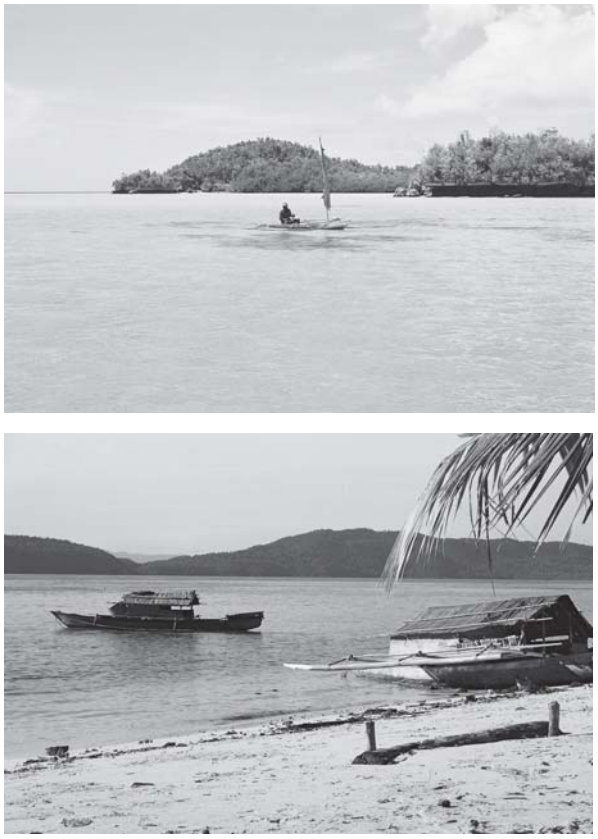

Figure 1. Fishers still go out to fish in outrigger prauws (above); and the Orang Laut or "sea gypsies" still travel and fish where they can (below). Photos by Sheila Heymans

Raja Ampat is a group of islands to the north of the Bird's Head Archipelago in the Papua Province of Indonesia. Over the past 5 centuries this archipelago was visited and captured by the Portuguese, Spanish, French, Dutch and English. It only became independent from The Netherlands in the 1960s and has since been part of Indonesia. In the 1500s Papua was visited by the Portuguese, French and Spaniards (Utrecht 1978), but it was the Dutch and British that really tried to conquer the East Indies. By the early 1600s the Dutch were settled at Amboina and Ternate in the Banda and Halmahera Islands east of Raja Ampat, and were extending their explorations towards New Guinea and Australia. The Dutch met with substantial resistance from the Papuans (Robequain 1958) and stayed away from New Guinea between 1636 and 1824 (Utrecht 1978). The English East Indian Company claimed the eastern part of New Guinea in 1773 and, in 1824, the Dutch and the English decided to divide New Guinea in two (Jansen-Weber et al. 1997).

During my work on this project, I traveled to Sorong and Kri Island (one of the small islands in the Raja Ampat Archipelago) to meet with Conservation International scientists and with Max Ammer, the owner of Papua Diving on Kri Island, and ex-Dutch-navy, with extensive knowledge of the Dutch historic documents on Indonesia. During my stay on Kri Island, I obtained many documents, references on Papua and the names of knowledgeable scientists in the Netherlands and England. I also saw first-hand the native Papuan population and fishers whose lifestyle seems to be little changed from the earlier pre-European times. Fishers still go out to fish in outrigger prauws and the Orang Laut or 'sea gypsies' still travel and fish where they can (Figure 1).

On my return from Papua, I traveled to France, where I met up

Continued on page 5 - Raja Ampat

Raja Ampat - Continued from p. 4

with Deng, who had been working with French and Spanish observations and collaborating with the historians from the Museum of Natural History in Paris, to coordinate our data collection efforts before I moved on to The Netherlands to collect historical documents about Raja Ampat. In the Netherlands I visited the Dutch Archives in The Hague, the Naturalis and Royal Netherlands Institute of Southeast Asian and Caribbean Studies (Koninklijk Instituut voor Taal-, Land- en Volkenkunde, KITLV) in Leiden and the Royal Tropical Institute (Koninklijk Instituut voor de Tropen, KIT) in Amsterdam, with a very fruitful day visit to the Papua Bibliotheek en Studiecentrum run by Phia de Groot-Licher in Amstelveen. In London I visited the Linnean Society, the Maritime Museum and the Natural History Museum. During these visits, I obtained over 100 historical documents to add to the more than 100 references that were available in the UBC Library or through Interlibrary Loans. Many of the documents available in the various libraries were too old to be copied and could only be photographed, which was an interesting and new methodology for me. It also increased my knowledge and proficiency in Dutch, although I had an advantage in the fact that my first language, Afrikaans, is closer to old Dutch than modern Dutch.

Finally in May, I met up with Deng once again, this time in Los Baños, Philippines, to finalize the database and begin writing the report for the project.

The database is now populated by observations from various scientists, freebooters, ships' captains, etc. who traveled to the area during the past five centuries.

For example, between 1843 and 1861, the Dutch Ichthyologist Pieter Bleeker collected and described thousands of fish species from the Dutch East Indies and specifically from Raja Ampat, and he also voyaged to the Moluccas (Bleeker 1856). William Dampier sailed past the north coast in 1700 and James Cook sailed past the south coast through the Torres Strait in 1770 (Utrecht 1978). The *H.M.S. Samarang* visited the area between 1843 and 1846 to do an oceanographic study (Adams 1848) and, between 1854 and 1862, Alfred Wallace traveled through the Malay Archipelago to collect specimens and stayed in Raja Ampat (Wallace 1869). The *H.M.S. Challenger* undertook their major study of the area between 1874 and 1875 (Tizard et al. 1885), and the *Siboga* visited the area between 1899 and 1900 (Weber 1902-03).

Unfortunately, not all of these observations could be included in the database. However, we hope to continue populating it, using the more than 200 documents that still need to be encoded.

References

Adams, A. 1848. Chapter V. The Sooloo and Molucca Archipelagoes. In: Adams, A. Notes from a journal of research into the Natural History of the countries visited during the voyage of the H.M.S. Samarang, under the command of Captain Sir E. Belcher, C.B. Pages 223-574 *in* E. Belcher, editor. Narrative of the voyage of H.M.S. Samarang, during the years 1843-1846; Employed surveying the islands of the Eastern Archipelago. Accompanied by a brief vocabulary of the principal languages. Published under the Authority of the Lords Commissioners of the Admiralty. With Notes on the Natural History of the Islands by Arthur Adams. In Two Volumes, volume 2. Reeve, Benham, and Reeve, London.

Bleeker, P. 1856. Reis door de Minahassa en en Molukschen archipel. Gedaan in de maanden September en October 1855 in het gevold van den gouverneur generaal Mr. A.J. Duymaer van Twist. Lange & Co, Batavia.

During these visits I obtained over 100 historical documents to add to the more than 100 references that were available in the UBC Library

Continued on page 8 - Raja Ampat

Number of abundance records in database

Papua: 118
Waigeo: 103
Misool: 82
Ambon: 57
Sulawesi: 48
Halmahera: 45
Makassar: 34
Marokwari: 32
Salawati: 29
Moluccas: 28
Sorong: 28
Gebe: 27
Ternate: 26
Buru: 25
New Guinea: 21
Biak: 20
Raja Ampat: 26
Seas surrounding Indonesian Archipelago: 151

U.S. Western Pacific fisheries catches part III: reconstruction completed

by Dirk Zeller

The purpose of the catch reconstruction was to estimate likely total catches [...] and thus provide a more comprehensive baseline picture of catch trends

The historic catch reconstruction that the *Sea Around Us* project undertook for the U.S. flag island areas in the Western Pacific (American Samoa, Guam, Northern Mariana Islands, Hawaii, and the so-called 'other' islands), for the Western Pacific Regional Fishery Management Council (WPRFMC) in Honolulu, was concluded at the end of 2005. As previously reported (Issues 23 and 28 of this newsletter), the results of this project were presented at a regional Ecosystem Science and Management Planning workshop. This work has now been released as the final report (Zeller *et al.* 2005a; available at: www.wpcouncil.org). Also, the first in a series of peer-reviewed papers has been published (Zeller *et al.* 2006). Extension of the catch reconstructions to incorporate economic aspects of small-scale fisheries are also in progress (Zeller *et al.* 2005b). Here, I would like to present a brief summary and overview of the key findings of the final report. The purpose of the catch reconstruction was to estimate likely total catches (excluding large pelagic species such as tuna and billfishes) taken between 1950 and 2002 for each island entity, and thus provide a more comprehensive baseline picture of catch trends over time than can be obtained by relying on the subsets of catches that form the reported data. The catch reconstruction undertaken by this project indicated:

1. The reconstructed catches for all islands combined suggested a likely 41% decline in total catches between 1950 and 2002, largely driven by declines in recent years. This contrasted with the pattern observed from the data officially reported by individual countries, which suggested a slight increasing trend (Figure 1);
2. The official reported data may have under-represented the reconstructed likely total catches for this time period by a factor of 4.3 (Figure 1);
3. Excluding the U.S. state of Hawaii, the reconstructed data for the three other U.S. flag island areas (American Samoa, Guam, CNMI) suggested a decline of about 77% in total catches between 1950 and 2002. This contrasted with the pattern observed from the data officially reported by the three individual countries, which suggested an increase in catches of about 45% between the start of reported data in 1965 and 2002 (Figure 2); and
4. The predominantly non-commercial fisheries sectors (shore-based, subsistence, recreational) were likely larger than commercial fisheries in terms of estimated catches.

For American Samoa (Zeller *et al.* 2006), the reconstructed total catches suggested a decline of about 79% in catches for non-pelagic species between 1950 and 2002. Significant also was the 17-fold difference between the reconstructed catches and the reported data (representing only the predominantly commercial small-boat bottom-fish catches, but excluding large pelagic species).

For Guam, the reconstruction of historic catches suggested a decline of 86% over the 52 year time period. Also important was the 2.5-fold difference between the reconstructed catches and the reported statistics for the 1965-2002 period for which reported data exist. Noteworthy is Guam's commitment to and consistent application of creel surveys to estimate total catches for the last few decades, resulting in what may be the most reliable estimates of total catches for any of the islands considered here.

For the Commonwealth of the Northern Mariana Islands (CNMI), the reconstruction suggested a decline of about 50% in catches between 1950 and 2002. Comparing the non-pelagic catches reported by CNMI with the reconstructed total catches for the 1983-2002 period where the two data sets overlap, indicated a 2.2-fold under-reporting of likely total catches by the reported data.

For Hawaii, our reconstruction suggested that the estimated total commercial catches were between 28% and 130% higher than the reported commercial catches. Reconstruction also suggested that non-commercial

Continued on page 7 - Islands

Islands - Continued from page 6

catches may have increased between 1950 and 1990, but have declined since, and ranged from a low of approximately 931 t·year^{-1} to a high of approximately 3,000 t/year. Summed over 1950-2002, non-commercial catches were approximately 1.8-fold higher than reported commercial catches, and reported data may have underestimated likely total catches of non-pelagic species by a factor of 3.7.

For the so-called "other islands" (Midway Atoll, Johnston Atoll, Palmyra Atoll, and Wake, Jarvis, Baker and Howland Islands), only Johnston, Midway and Wake have small resident populations of contractors and military personnel, with data not reported in the fisheries statistics. Reconstruction of catches suggested that an estimated 435 t was likely extracted around Johnston Atoll between 1950 and 2002, while the small population of military and civilian personnel based on Wake Island were thought to catch on average approximately 890 kg/year.

In general, while local and regional fisheries experts and agencies may be aware of the limited nature of much of the official data (e.g., commercial sectors only), our reconstruction makes the potential scale of the likely under-reporting of total extractions of marine resources evident (Figures 1 and 2), and can be useful, e.g., as baselines of likely historic patterns and trends in fisheries catches.

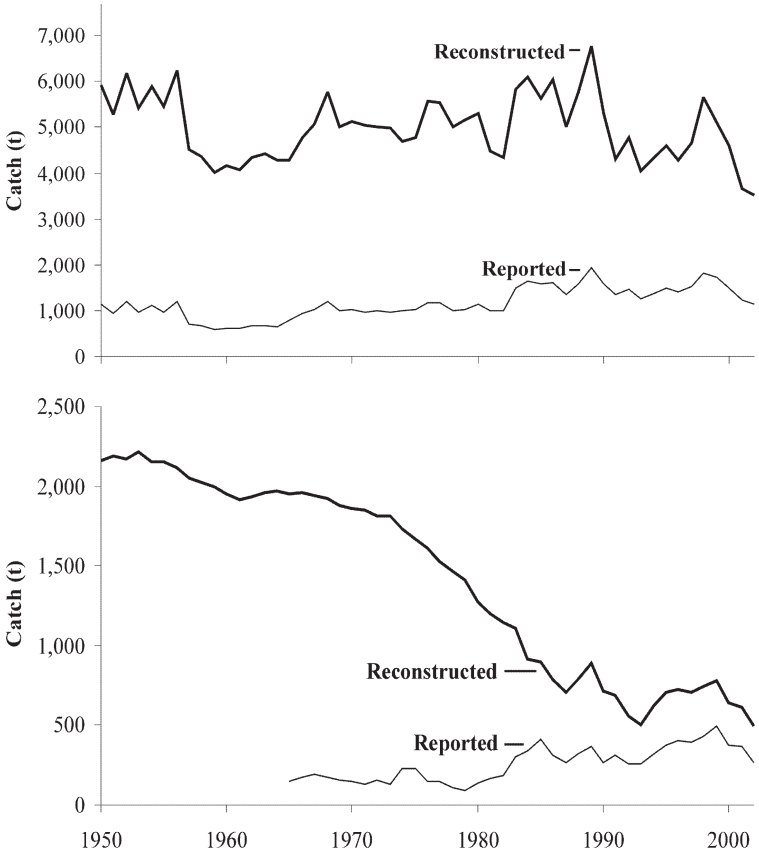

Figure 1 (above) Total reconstructed catches of coral reef-, bottom- and reef-associated fisheries for the four main U.S. flag islands of the Western Pacific combined, versus the reported statistics. The under-representation of likely total catches is evident.

Figure 2 (below) Total reconstructed catches of coral reef-, bottom- and reef-associated fisheries for three of the four U.S. flag islands of the Western Pacific considered here (excluding Hawaii), versus the reported statistics. Both the under-representation of likely total catches, as well as the missed decline in catches is evident.

Considering the distinctly different baselines of past catches presented by this project (Zeller *et al.* 2005a; Zeller *et al.* 2006), may shed new light on issues and concerns for fisheries sustainability and ecosystem conservation. Furthermore, reconstructions, as documented by the present project, illustrate the importance of small-scale and non-commercial fisheries sectors, and suggest an urgent need to account for all fisheries catches in official statistics.

Significantly, this work is now beginning to draw attention to likely different historic baselines and likely levels of catches, and is being considered within a broader stock assessment being undertaken via NOAA NMFS in Honolulu.

In general, while local and regional fisheries experts and agencies may be aware of the limited nature of much of the official data, our reconstruction makes the potential scale of the likely under-reporting [...] evident

References

Zeller, D., Booth, S. and Pauly, D. 2005a. *Reconstruction of coral reef- and bottom-fisheries catches for U.S. flag island areas in the Western Pacific, 1950 to 2002*. Report to the Western Pacific Regional Fishery Management Council, Honolulu, 110 p.

Zeller, D., Booth, S. and Pauly, D. 2005b. Underestimating small-scale fisheries: contributions to GDP. *Fisheries Centre Working Paper* # 2005-02, UBC, Vancouver [Available at: www.fisheries.ubc.ca/publications/working/2005/series5.pdf], 21 p.

Zeller, D., Booth, S., Craig, P. and Pauly, D. 2006. Reconstruction of coral reef fisheries catches in American Samoa, 1950-2002. *Coral Reefs* 25: 144-152.

The Marine Trophic Index in Europe

by Reg Watson

Overall, this was a useful meeting which illustrated that our products are increasingly used in policy settings, as they should be

In February 2004, the Conference of the Parties to the Convention on Biological Diversity (CBD) identified a number of indicators to monitor progress toward reaching the target to "achieve by 2010 a significant reduction in the current rate of biodiversity loss" (CBD 2004). The "Marine Trophic Index" (MTI), i.e., the mean trophic level of fisheries catches, is one of the eight indicators that the Conference of the Parties of the CBD identified for "immediate testing" of their ability to measure progress towards the 2010 target.

The member states of EU being parties to the CBD, European institutions are confronted with implementing the MTI. This is the context of an invitation I received to participate at an expert meeting convened by the Rania Spyropoulo of the European Environment Agency in Copenhagen 27-28 June 2006. I relied on a PowerPoint presentation, prepared with Daniel Pauly, which illustrated the concepts in our paper on the topic (Pauly and Watson 2005). This, and the other presentations to this meeting, are now available at: http://biodiversity-chm.eea.europa.eu/information/indicator/F1090245995/fol689706/ .

Of these other presentations, one, by John Pinnegar from CEFAS, in Lowestoft, U.K., was most interesting, as it showed numerous approaches through which the MTI can be made more sensitive, i.e., better reflect what is happening in the ecosystem. In fact, some of the ideas expressed therein are worth investigating for their potential usefulness to our website. This will allow us to better respond to the increasing number of queries on the MTI we get from users in Europe and elsewhere.

In this context, I should mention that the Institut français de l'environnement (IFEN), of France's Ministry of the Environment, has included the MTI on its list of indicators (D. Pauly, pers. comm.). Also under consideration at this short meeting were various possible indicators based on seagrass. Several presentations available at the above URL helped put this and other work in the European context.

Overall, this was a useful meeting which illustrated that our products are increasingly used in policy settings, as they should be.

References

CBD, 2004. Annex I, Decision VII/30, p. 351 *In:* The 2020 Biodiversity Target: a Framework for Implementation. Decisions from the Seventh Meeting of the Conference of the Parties of the Convention on Biological Diversity, Kuala Lumpur, 9-10 and 27 February 2004. Secretariat of the CBD, Montreal.

Pauly, D. and Watson, R. 2005. Background and interpretation of the 'Marine Trophic Index' as a measure of biodiversity. Philosophical Transactions of The Royal Society: Biological Sciences 360: 415-423.

Raja Ampat - Continued from p. 5

Jansen-Weber, A., L. F. Jens, and P. A. Jens. 1997. Zaaien in zoo barren grond. Uit het dagboek van Willem Leendert Jens, zendeling op Nieuw Guinea 1876 - 1899. Stichting "Uit Barren Akker", Wassenaar.

Robequain, C. 1958. Malaya, Indonesia, Borneo, and the Philippines, 2 edition. Longmans, Green and Co Ltd., London.

Tizard, T. H., H. N. Moseley, J. Y. Buchanan, and J. Murray. 1885. Narrative of the cruise of the H.M.S. Challenger with a general account of the scientific results of the expedition. Volume I. Second Part, volume 1. Published by Order of Her Majesty's Government, Edinburgh.

Utrecht, E. 1978. Papoeas in opstand (De tweede kwestie Nieuw Guinea). Het verzet van de Papoeas tegen het Indonesiese bewind in West Irian. Uitgeverij Ordeman, Rotterdam.

Wallace, A. R. 1869. The Malay Archipelago; the land of the orang-utan, and the bird of paradise. A narrative of travel, with studies of man and nature. Macmillan, London.

Weber, M. 1902-03. Siboga-Expeditie: Introduction et description de l'expedition. Monographie I de: Uitkomsten op zoologisch, botanisch, oceanographisch en geologisch gebied verzameld in Nederlandsch Oost-Indië 1899-1900 aan boord H.M. Siboga onder commando van Luitenant ter zee 1e cl. G.F. Tydeman. E.J. Brill, Leiden.