

DIRECTOR'S FOREWORD

How much fish has been caught? This is the most fundamental question for all concerned with fisheries: fishers, managers, researchers, the public and the income tax authorities. Like most such simple but widespread items, there is never an exact answer, but because of the fundamental importance of catch data, vast amounts of time and effort are expended in sampling, counting, weighing, monitoring, filling out forms and databases, analyzing and indeed arguing over the results. Under-reporting of catch, through unreported unmandated and illegal catches is a serious and world-wide problemⁱ. In this report, the reverse situation, in which catches are over-reported, is described. Using the wrong figures affects the accuracy not only of stock assessment, but also the evaluation of the impacts of fishing on aquatic ecosystems and how they might be mitigated.

As a nation, the People's Republic of China takes one of the largest catches of fish in the world and hence the accuracy of its data can greatly affect the interpretation put upon any trends in the world figures.

This report contains the calculations and back ground material for a paper to be published in *Nature* in fall 2001ⁱⁱ. It consists of two parts. First, Ms Lillian Pang and Dr Daniel Pauly detail the social and political background against which massive over-reporting of fish catch has occurred in China. Second, Dr Reg Watson applies a spatial catch allocation algorithm to Chinese waters in order to estimate expected catch amounts. His work highlights anomalies in the 1990s of as much as 10 tonnes/km² /year when compared to reported amounts for Chinese waters. Taken together these two pieces of work establish the case for large over-reporting of catches. The paper published in *Nature* expands the statistical model for estimating annual catches and improves on these estimates. The implication of this finding for the world fish catch is that in fact the total has probably been falling for over a decade.

Had it been detected, this signal of decline in the world fish catch would likely have alerted us to the impact of serious fishery depletions almost a decade ago. In fact the lack of change in the total world fish catch seems to have contributed to complacency about the status of world fisheries, with, until very recently, only a

few voices being raised, often arguing for a serious problem despite the stable world total masking serious serial depletionⁱⁱⁱ. But in fact, then, this analysis means that the fisheries situation is much worse than we had thought, and has been so for longer than we had thought, underscoring the need for radical change in the way that fisheries go about their business.

The Fisheries Centre at the University of British Columbia supports research that first clarifies, and then finds ways to mitigate, the impacts of fisheries catches on aquatic ecosystems. Only with such insight of how whole aquatic ecosystems function can management policies aim to reconcile the extraction of living resources for food with the conservation of biodiversity, with the maintenance of ecosystem services, with amenity and with other multiple uses of aquatic ecosystems. Indeed, the present dire state of marine ecosystems and their fisheries around the globe signals a pressing need for what may be termed the "ecosystem imperative". Correct values for catches are hence essential for this kind of analysis.

Although ecosystem agendas of this kind have recently become embodied in the legislative goals of many nations, and are an integral part of the *FAO Code of Conduct for Responsible Fisheries*, in practice there have been few attempts to work out how it might actually be done. In sponsoring the *Sea Around Us* project, the Pew Charitable Trusts of Philadelphia, USA, have devoted a significant amount of funding to a project that aims to address this question. The research team^{iv} of senior scientists, postdoctoral research assistants, graduate students, consultants and support staff commenced work in late 1999. Members of this team have been excited and challenged by the unprecedented scope of the research work. Most of the methods used to tackle the problem are new^v (see Pauly et al. 2000), and many of the measures developed by the team have been translated into the revolutionary new mapping system used in this report.

This report is the latest in a series of *Fisheries Centre Research Reports* published by the UBC Fisheries Centre. A full list is shown on our web site at <http://fisheries.ubc.ca>, and the series is fully abstracted in the *Aquatic Sciences and Fisheries Abstracts*. The Research Report

series aims to focus on broad multidisciplinary problems in fisheries management, to provide a synoptic overview of the foundations and themes of current research, to report on research work-in-progress, and to identify the next steps and ways that research may be improved. *Fisheries Centre Research Reports* are distributed to all project or workshop participants. Further copies are available on request for a modest cost-recovery charge. Please contact the Fisheries Centre by mail, fax or e-mail to 'office@fisheries.ubc.ca'.

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References and Notes

- ⁱ Pitcher, T.J. and Watson, R. (2002) "Estimating Illegal and Unreported Catches From Marine Ecosystems: A Basis For Change." *Fish and Fisheries (in press)*.
- ⁱⁱ Watson, R. and Pauly, D. (2001) "Systematic distortions in world fisheries catch trends." *Nature (in press)*.
- ⁱⁱⁱ Pitcher T.J. (2001) "Fisheries Managed to Rebuild Ecosystems: Reconstructing the Past to Salvage The Future." *Ecological Applications* 11(2): 601-617; Pauly, D. (1996) "One hundred million tonnes of fish and fisheries research." *Fisheries Research* 25: 25-38.
- ^{iv} A list of team members may be found in Annex A of Zeller, D., Watson, R. and Pauly, D. (Editors). (2001) *Fisheries Impacts on North Atlantic Ecosystems: Catch, Effort, and National/Regional Data Sets*. Fisheries Centre Research Reports 9(3).
- ^v Pauly, D. and Pitcher, T.J. (2000) "Assessment and Mitigation of Fisheries Impacts on Marine Ecosystems: A Multidisciplinary Approach for Basin-Scale Inferences, Applied to the North Atlantic." Pages 1–12 in Pauly, D. and Pitcher T.J. (eds) *Methods for assessing the impact of fisheries on marine ecosystems of the North Atlantic*. Fisheries Centre Research Reports 8(2): 195pp