



Catching some needed attention

Reg Watson*, Jackie Alder, Adrian Kitchingman, Daniel Pauly

Fisheries Centre, University of British Columbia, 2259 Lower Mall, Vancouver, British Columbia, Canada V6T 1Z4

Accepted 15 June 2004

Abstract

Globally, the most basic need of policy makers and fisheries managers is to know what catch was taken within their jurisdictional boundaries, and which countries took it. Surprisingly, for many countries this has not been possible. We introduce a web site devoted to making this and related information available to everyone via the internet.

© 2004 Elsevier Ltd. All rights reserved.

Keywords: Fisheries catch; Internet; Exclusive economic zones

1. Introduction

If ‘better knowledge’ means ‘better policy’ in the field of marine resource management then surely a wide dissemination of information means an informed constituency, one better prepared to make changes and adapt to change. Some of world’s oldest and grandest fisheries like the Atlantic cod have faltered, closed and, with time, will fade from memory [1,2]. Examination of global fisheries suggests that considerable change is required to avoid the failures of the past [3,4].

It is our opinion that in order to investigate what impacts fishing is having on the marine environment, requires amongst other things, time-series of catch data with a spatial precision suitable for use in standard ecosystem models [5]. At the very least, interested parties should be able to easily examine what catch has been extracted from a given stretch of coastline or from a country’s exclusive economic zone that currently delimit a nation’s marine capital. Various logbook and observer programs have been initiated in recent years in an effort to improve catch data, however, we cannot sit back and wait for these to bear fruit. We urgently need to examine sufficiently long time-series to assure ourselves of what

the longer-term trends are. Moreover, we do not require this only for a few selected fisheries, but rather we need this for the majority of the world’s oceans. For, as we have been shown recently, massive change is upon us—global fisheries are declining rapidly [6,7]. Perfect information is a goal to strive for but we must use existing data in new and admittedly braver ways. We must collect supporting evidence across disciplines such as biology, economics and the other social sciences to help decipher what some of the vague catch records of the past really mean. In situations where the location of catches was left intentionally vague we must use all means at our disposal to probe deeper into the statistical records [8].

2. The catch challenge

The Sea Around Us Project has taken such an approach to look at the impacts of fishing on the marine environment. To facilitate this we have assembled databases of the global distribution of all commercial marine species. An even greater challenge was assembling a database of fishing access agreements and observed fishing way back to 1950 building upon what the Food and Agriculture Organization of the UN had assembled [9]. Our database document agreements

*Corresponding author. Tel: +1-604-822-0226; fax: +1-604-822-8934.

E-mail address: r.watson@fisheries.ubc.ca (R. Watson).

that control the access of fishing fleets to the waters of other countries and includes observations of such activities even when no agreement is known, or when fishing occurred before EEZs had been established. Taken together, these two databases, one describing where commercial species can be found, and the other where fishing fleets actually fished, allow existing catch data to be ‘reverse engineered’ to determine with much greater precision where the catch was taken, and by whom.

This new form of catch data is a powerful tool for uncovering large spatial trends that cannot be seen in the context of standard catch statistics or which reach beyond the geographic scales that restrict the interest of most agencies. We have been able to show, for example, that global distortions in catch statistics fuelled our optimism about future catch increases [10]. We have also shown worrying reductions in the mean size and trophic level of global catches [6,7].

So how are we to begin reversing these trends? First we would argue that to create a constituency which has easy access to the fisheries statistics in a way that allows them to interpret for themselves, to correct them where they might be in error, and to eventually ‘own’ them. With wide support, action becomes more likely. One obvious constituency is the scientists and informed public that use the worldwide web. Thus, a major goal for the Sea Around Us Project has been to make our information available to this diverse audience as rapidly as possible.

It is our belief that even though excellent information has been made available, from websites maintained by FAO [11] and others, it does not allow viewers to see what catch was actually taken from the waters claimed by various countries. Nor does it present the information by the most widely accepted, ecologically-based divisions of the world’s oceans, and the large marine ecosystem. We created web pages to provide an easy interface to access this information with a wealth of cross-links to maps, taxonomic lists and other useful information.

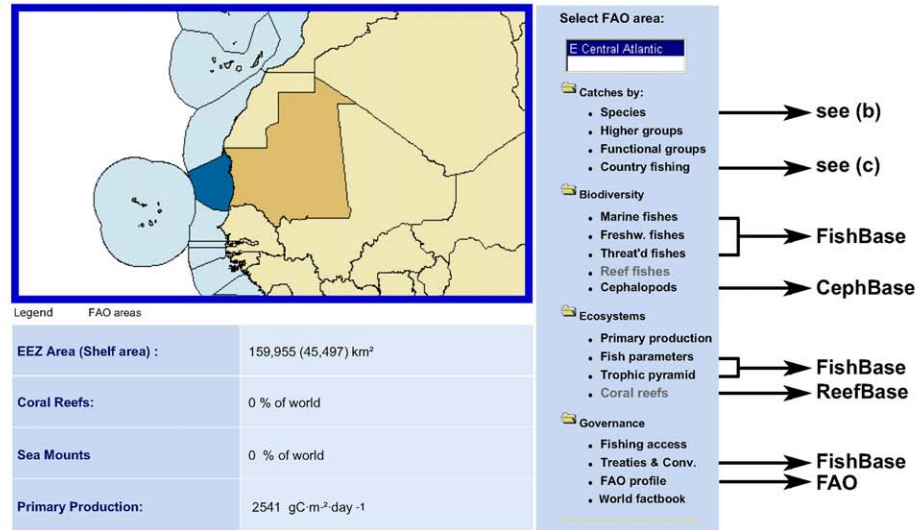
Fig. 1 shows an example of the page (available via www.seaaroundus.org) that allows access to information on any coastal country by a few mouse clicks. Other pages exist for the large marine ecosystem, the high seas and various themes such as information by species, marine catch maps, etc.

Here, we use an example where we are seeking information on the waters of Mauritania. Once chosen, a page opens such as shown in Fig. 2a. There is a simple table showing the area of Mauritania’s EEZ and its shelf area. Its percentage of the world’s known coral reefs and seamounts is shown, as is the average primary productivity of its waters (important attributes of its marine production potential).

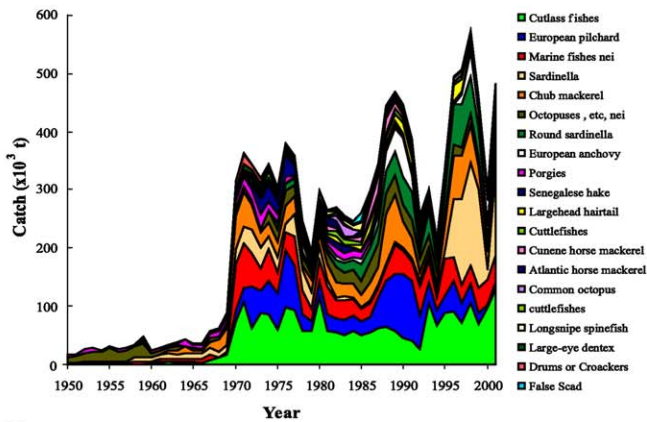
In the section called ‘Catches by’ there is easy access to graphs of fisheries catch for the Mauritania from 1950 to 2001 (the last year for which data is currently available). What is unique here, is that this graph shows the catch taken from within the dark blue area of the



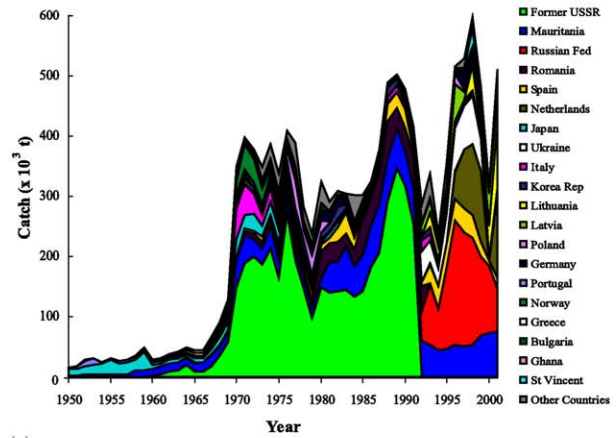
Fig. 1. Selecting a country from the webpage shown will allow access to a range of statistics including graphs showing catch since 1950 for the EEZ selected.



(a)



(b)



(c)

Fig. 2. An example of information available for a few selected countries exclusive economic zone (EEZ), in this case Mauritania, including: (a) general statistics and links, (b) a graph showing catch since 1950 by species, and (c) a graph showing catch by country, taken in the EEZ of Mauritania.

map in Fig. 2a, that is, the catch taken from within the EEZ of Mauritania. Most data sources can only show what catches were reported for ‘Mauritania’ regardless of where these catches were taken. These graphs are not only available for species (Fig. 2b) but also for other useful groupings of species. The graph in Fig. 2c shows which countries have taken this catch. Tables supplied with the graphs allow links to other data on the biology of the species involved and offer maps of global distributions, notes on data quality by FAO and other sources. You can even toggle between common and scientific names.

Under the ‘Biodiversity’ section you can find lists of fish (freshwater and marine) found in Mauritanian waters (see link to FishBase [12]), lists of cephalopods (squids, octopus, etc., via a link to CephBase [13]). There are also links to lists of threatened species from these waters (via FishBase).

In a section called ‘Ecosystems’, there are links to important habitat and ecosystem related information for the waters of Mauritania including animated maps of primary productivity, key biological parameters for the fishes found here (including mortality and growth rates as required useful for ecosystem models), and even a trophic pyramid which through FishBase shows fishes at different levels in the food web for this area. For all tropical countries with coral reefs, there is also information on the key features of the reefs via ReefBase [14].

Under the ‘Governance’ section, we provide links to our database of fishing access agreements, which also includes observations of countries fishing in the waters of other countries. There is a section on treaties and conventions relevant to each country including Mauritania, our example here. We also provide access to online country profiles provided by FAO and others.

3. Future features

In the near future, the biodiversity links will include additional groups including marine reptiles, marine plants, echinoderms and others. Our ecosystems links will include links to estuaries, seagrass, seamounts, mangrove and other habitats relevant to the country of interest.

Currently, throughout the pages are opportunities to feedback corrections, suggestions and additions to these pages. In addition, we have begun to methodically contact experts in all countries to ask for their help in reviewing and improving our coverage of their countries' marine fisheries and ecosystems. Sometimes these exchanges reinforce the need for these pages because local experts admit that there is simply no information available that can be used to check our lists and figures. Our efforts have been well received by a global constituency that needs information to assess what has been going on in their oceans. This is the first step in advocating change.

Acknowledgements

The authors acknowledge the support of the Pew Charitable Trusts, Philadelphia for their support of the Sea Around Us project, Dirk Zeller, Shawn Booth and our colleagues at the Fisheries Centre.

References

- [1] Walters CJ, McGuire JJ. Lessons for stock assessment from the northern cod collapse. *Reviews in Fish Biology and Fisheries* 1996;6:125–37.
- [2] Christensen V, Guénette S, Heymans JJ, Walters CJ, Watson R, Zeller D, Pauly D. Hundred-year decline of North Atlantic predatory fishes. *Fish and Fisheries* 2003;4:1–24.
- [3] Pauly D, Christensen V, Guénette S, Pitcher TJ, Sumaila UR, Walters CJ, Watson R, Zeller D. Towards sustainability in world fisheries. *Nature* 2002;418:689–95.
- [4] Pauly D, Alder J, Bennett E, Christensen V, Tyedmers P, Watson R. World fisheries: the next 50 years. *Science* 2003;302:1359–61.
- [5] Pauly D, Christensen V, Walters C. Ecopath, ecosim, and ecospace as tools for evaluating ecosystem impact of fisheries. *ICES Journal of Marine Science* 2000;57:697–706.
- [6] Pauly D, Watson R. Counting the last fish. *Scientific American* 2003; 42–7.
- [7] Watson R, Tyedmers P, Kitchingman A, Pauly D. What's left: the emerging shape of the global fisheries crisis. *Conservation in Practice* 2003;4:20–1.
- [8] Watson R, Kitchingman A, Gelchu A, Pauly D. Mapping global fisheries: sharpening our focus. *Fish and Fisheries* 2004; in press.
- [9] FAO, FAO's fisheries agreements register (FARISIS), Committee on Fisheries, 23rd Session (COFI/99/Inf.9E), Rome, Italy, February 15–19, 1999. 4pp.
- [10] Watson R, Pauly D. Systematic distortions in world fisheries catch trends. *Nature* 2001;414:534–6.
- [11] FAO www.fao.org/fi.
- [12] Froese R, Pauly D editors. *Fishbase 2000, Concepts, design and data sources*. Los Baños, Philippines, 2000 [Distributed with 4 CD-ROMs; updates on www.fishbase.org].
- [13] Wood JB, Day CL, O'Dor RK. CephBase: testing ideas for cephalopod and other species-level databases. *Oceanography* 2000; 13: 14–20, www.cephbase.utmb.edu/.
- [14] Reefbase www.reefbase.org/.