

Publications

5 **Easy Pieces: The Impact of Fisheries on Marine Ecosystems** by Daniel Pauly (2010), 236 pp., Island Press, Washington, DC, USA. ISBN 9781597267199 (pbk), GBP 15.99/USD 25.00

Up until the 1990s global fish stocks appeared to be growing but, in fact, global fisheries landings were declining by c. 500,000 t per year from a peak of 80–85 million t in the late 1980s. How did this critical misunderstanding occur? Daniel Pauly aims to explain this and other misconceptions relating to fisheries science and management to show, as he describes it, 'the transition from the first, initially contested realization that the crisis of the fisheries and their underlying ocean ecosystems was global in nature, to its broad acceptance by mainstream scientific and public opinion'. He does this using five of his own articles originally published in *Science* and *Nature* between 1995 and 2003, each followed by the immediate responses to his findings from scientific colleagues and the media.

The chapter arrangement can feel as if it is rather labouring the point but this is because he wants to demonstrate two things: firstly, the intensity of opposition to his original findings and, secondly, his realization that by interacting with the popular media scientists are less likely to lose control of how a story is described and better able to shape the reception of their results. This led Pauly, who was initially wary of journalists, to start to work closely with them as part of the Sea Around Us project, which analyses the impacts of fisheries on the marine ecosystem.

He suggests that this book is for environmental activists (to inform advocacy), marine biology/fisheries graduates (to understand the core of their subject), and undergraduates who would benefit from understanding how science is debated. Although he hopes to provide an unbiased view, that is not possible and the outcome is a textbook with a worthy agenda and a very passionate tone. None of the pieces are simple and each is backed by years of number crunching.

Firstly, he demonstrates the importance of fisheries management, taking account of the impact of fishing on the whole ecosystem rather than just individual species. He worked out that humans were using much more of the primary productivity of the ocean than the 2% previously thought. In

fact, 8% of primary productivity was required to sustain global fisheries (when discard is accounted for, which in the 1990s was 27 million t of a global catch of 100 million t). This equated to only 2% of open oceans but 24–35% at the continental shelf, an area crucial to fish production.

Secondly, he explains that globally fisheries are fishing down the food web, a concept for which he is well known (although new research indicates that in certain areas, such as the Gulf of Thailand, fisheries may actually be fishing up the web). Fishing down the food web can occur as fisheries pinpoint a lower trophic level species (such as prawns) or can occur because of the target species being overfished (such as cod). Fishing down the food web simplifies it, making it more difficult for predators to switch between prey species. This means that if fishery quotas are set wrongly, species not only become overexploited but, eventually, extinct.

Thirdly, he explains why Chinese fish stock reporting was, until recently, flawed, and the impact this had on global fishery statistics. Pauly and colleagues discovered that promotions for Chinese officials were wholly dependent on reporting increasing fish stocks in their sector. The impact of this was that global fisheries statistics had been greatly inflated for many years, and instead of increasing, global fish stocks had actually been decreasing by 0.7 million t per year since the late 1970s.

His fourth point is that humans have never managed their natural marine resources sustainably. For example, during the 1950s and 1960s increase in fishing effort led to huge increases in catches. The first collapse was of Peruvian anchoveta in 1971–1972. This was attributed to an El Niño event and so fishing continued unabated. The declining trend was next seen in the North Atlantic with cod, with the New England and eastern Canada stocks collapsing in the early 1990s.

These all build up a worrying picture. So what can we do about it? Pauly suggests that predictions of the future of fisheries are best undertaken using a series of scenarios to demonstrate possible outcomes from different management options. He uses the four scenarios developed by the Millennium Ecosystem Assessment to describe what may happen to fishing fleet structures and biodiversity. The scenarios that appear to provide the best outcome for biodiversity require positive policy change as well as a complete change of philosophy towards adherence to sustainability, both far from current practice.

He makes a number of pertinent reflections on management, noting that fisheries are part of a global enterprise that is undermining its supporting ecosystems rather than being species-specific and benefiting local fishers. Aquaculture is not a panacea, with current practices further threatening wild fish because they are fed to farmed fish. Perverse incentives and subsidies continue to ensure fisheries can continue to operate after they have depleted their resource base. Industrial fisheries and agriculture depend on cheap subsidised fossil fuels; if prices rose energy intensive industrial fisheries would fold. Decommissioning of vessels can allow fleets to modernize. Fleet reduction must occur, with those still fishing paying a rent to those that have stopped.

Pauly recommends that reducing fishing effort, taking a precautionary approach to fisheries policy and developing marine protected areas that conserve a representative set of marine habitats, including no-take fishing zones, are the only methods that will take the pressure off depleted fish stocks. Overall, I found this book hard work but fascinating and it is disappointing that the majority of it is still necessary—that Pauly still needs to bang home the message that we are overexploiting our marine resources. As this is the case, the final section on management felt rather thin and the reader is left wanting more of Pauly's wisdom on the next steps.

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Ecosystem-Based Fisheries Management: Confronting Tradeoffs by Jason Link (2010), 224 pp., Cambridge University Press, Cambridge, UK. ISBN 9780521762984 (hbk), GBP 45.00/USD 72.00

Marine fisheries are generally regarded to be in fairly poor shape, with blame placed squarely on the way fish stocks are managed. This so-called fisheries issue, commonly regarded as a global crisis, has been broadcast well outside conservation and fisheries science circles, largely thanks to a recent series of newsworthy publications in high impact journals. Consequently, the way fisheries are managed has fallen under greater academic and public scrutiny than