

VANISHING FISH

**Shifting Baselines
and the Future of
Global Fisheries**

**DANIEL
PAULY**

Foreword by JENNIFER JACQUET

DAVID SUZUKI INSTITUTE



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FOREWORD

MANY PEOPLE FIRST meet Daniel Pauly during one of his frequent speaking or film appearances, efforts he wryly refers to as his “fieldwork.” My first impression of Daniel came through his writing. In 2003, when I was taking a course in marine ecology, I read his article “Fishing down the marine food web,” published in *Science* in 1998, and with the first sentence, I became fascinated by the way Daniel thinks. The article begins: “Exploitation of the ocean for fish and marine invertebrates, both wholesome and valuable products, ought to be a prosperous sector, given that capture fisheries—in contrast to agriculture and aquaculture—reap harvests that did not need to be sown.” The premise—that fish and invertebrates are products with which to make an economic sector prosperous—seems a little suspect to me now, and, as a pioneer in ecosystem-based approaches to fisheries, Daniel most likely would not write that line the same way today. But there is nonetheless something in his writing, as there is in all the essays in this book, that indicates Daniel has something to say and it matters to him how he says it.

Daniel’s style can be partly attributed to the fact that, unlike most fisheries biologists, he has embraced both the humanities and the social sciences. He is especially fond of

history, probably because of his tendency toward big-picture thinking. Daniel is also a man of many countries, and it is with some embarrassment for all of us native English speakers who have been closely edited by him that he spoke French and German well before he spoke English, which he wields with greater precision than we do. When he returned the first draft of the first paper he and I worked on together, he had written “good” on it but then crossed that word out and written “This will be good” below it. There is much to admire in the exactness of his observations and his writing.

Daniel no longer uses the term “harvest” to refer to fisheries catches, just as he has recently abandoned the term “stock” (see the preface). If we were to press him on this decision, he would have something clever to say, as he did when I once accused him of changing his mind about some issue, and, unfazed, he responded: “It’s the best proof I still have one.” We all shed our conditioning and become willing to see the world in new ways at different rates, and Daniel is faster than most. That is also the benefit that a collection like this affords—a chance to see how its writer has evolved over time. In these essays, Daniel refers to the threefold expansion of fisheries that he and his research team have identified and quantified: fishing farther offshore, fishing deeper, and fishing for new species. Similarly, the threefold expansion of Daniel’s own thinking has fundamentally changed the fields of fisheries science and marine conservation, as well as the broader, public conversation.

First, Daniel expanded fisheries in space and time. He moved fisheries from a parochial endeavor in which every element is context- and species-specific and connected the dots to show us the benefits of considering fisheries as a

global system. Because he had seen a lot of the world, Daniel was well positioned to think on a global scale, but he was also brave and tenacious enough to try to work that way too. I spent seven years with Daniel's Sea Around Us project and saw firsthand that the ability to do quality work on a global level requires not only intellect but also mettle, as well as serious endurance for drudgery. Daniel also shifted fisheries research from its all-too-convenient baselines of 1980 or 1970 and challenged researchers to think about fisheries over longer time frames. When his colleagues hosted a celebration at the University of British Columbia for Daniel's sixtieth birthday, ecologist Jeremy Jackson credited Daniel's single-page essay on shifting baselines (see "The Shifting Baseline Syndrome of Fisheries") with persuading him to pursue historical ecology (and as the impetus for Jackson et al.'s influential 2001 paper, published in *Science*, titled "Historical overfishing and the recent collapse of coastal ecosystems").¹

Second, Daniel expanded fisheries science from a discipline dominated by industry concerns to one that considers multiple stakeholders. Instead of representing the interests of only the fishing industry, he works most closely with civil society groups. He pushed for the inclusion of small-scale fishers both in the global dataset and at fisheries negotiations. (At a talk where Daniel was asked why government subsidies favored industrial fisheries over small-scale fisheries, he responded: "Because small-scale fishermen don't play golf.") Through ecosystem modeling and other scientific work, he also fought to include marine animals in the conversation. He has, for example, repeatedly defended whales against the accusation by whaling country representatives that "they eat all of our fish" (and therefore that we should

kill them to increase global fisheries catches) with scientific evidence demonstrating that the distribution and consumption patterns of whales do not significantly overlap with the operating areas of, and the species exploited by, fisheries.

Third, Daniel has pushed—to a lesser extent, but one that should not be overlooked—for fish and invertebrates not to be seen exclusively as seafood or commodities. He has asked that, as with whales, we consider fish not just as species but also as individual animals. Throughout his career Daniel has increasingly veered from the views held by many of his scientific colleagues who endorse a status quo—one that Daniel, as scientist and as citizen, thinks is pernicious both for his discipline and for society at large. May we all aspire to this kind of critical thinking and courage.

On a final note, in Western society, particularly in the United States, science and scientists bear most of the burden of proof regarding the potential for negative impacts of new developments. Although, in theory, we should operate under a precautionary principle, in practice, scientists must demonstrate harm to the ecosystem, but extractive industries need not demonstrate their lack of negative impacts. Daniel has repeatedly shouldered this burden for all who believe that the interests of civil society, small-scale fishers, and the animals in the ocean should also be considered. This book is a tribute to his willing and adept work on behalf of this disparate group.

JENNIFER JACQUET
NEW YORK UNIVERSITY, 2017

PREFACE AND ACKNOWLEDGMENTS



BOTH FISHERIES SCIENTISTS and the general public often perceive fisheries science as the study of localized activities—the catching of specific freshwater or marine fish at specific places (a stretch of a river, a bay, or a sea), using a specific gear. However, fisheries nowadays, especially marine fisheries, are all part of an expanding, global system, interconnected by powerful market forces and the range of modern distant-water fleets, which operate everywhere there are fish, undeterred by distance, water depth, storms, or ice cover. Many fisheries can now even operate where fish have ceased to be abundant, as they rely on government subsidies, which, along with the increasing use of semi-enslaved crew, enable them to eke out a profit from depleted fish populations.

Except for the epilogue, written in January 2017, and two new essays also written in 2017, this book consists of previously issued, single-authored essays of which the earliest—on shifting baselines—was published in 1995, and all the others between 1996 and 2016. As some of their topics overlap, readers are free to skip repetitious paragraphs. The text of the original essays has not been updated except for the occasional removal of single words such as “recently”

and the deletion of a few paragraphs dealing with issues of no present interest. The book has been made more current, however, via the addition of detailed endnotes (identified as N.N. for new notes) linking the ideas proposed in its earlier essays with references to current information and debates. One exception is the word “stock,” which I previously held to be roughly synonymous with “exploited fish population,” but which I know realize is part of the technocratic ideology that isolates us from nature. I have thus deleted or replaced this word whenever it could be done without loss of understanding.

Also included, in spite of unavoidable overlap due to their subject matter, are three decidedly autobiographical essays, because the paths that my life and career took were weird enough to be of interest to the reader. Also, I was a very observant, if horrified, witness to the depletion of marine life that occurred in the later part of the 20th century, and so I have something to say about that.

Most of the contributions presented here were assembled in the fall of 2016, while I was on a mini-sabbatical at the Department of Environmental Studies of New York University, whose members, notably Drs. Dale Jamieson and Jennifer Jacquet, I thank for making me feel welcome. In addition, I thank Jennifer for her generous foreword. I also thank Sandra Wade Pauly for converting my disparate PDFs and other files into a coherent whole and standardizing their references to endnotes, work without which the collection of essays would not have seen the light of day.

Finally, I thank the Natural Sciences and Engineering Research Council of Canada for support in the late 1990s, and I thank the Pew Charitable Trusts, notably Ms. Rebecca

Rimel and Dr. Joshua Reichert, and the Paul G. Allen Family Foundation for their support of the Sea Around Us project from mid-1999 to mid-2014 and mid-2014 to mid-2017, respectively.