Marine Policy 69 (2016) 121–123

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Balanced harvesting: The institutional incompatibilities

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ARTICLE INFO

Article history:
Received 11 December 2015
Received in revised form
1 April 2016
Accepted 1 April 2016

Keywords:
Balanced harvesting
Selective fishing
Threatened species
Whaling
Sealing

ABSTRACT

Balanced harvesting is the name of a newly proposed approach to fishing which promises the extraction of high and sustainable fisheries yields while maintaining the structure of the ecosystem from which those yields could be obtained. This is to be achieved through exposing all components of ecosystems (from zooplankton to top predators, including seals, sea birds and marine mammals) to a fishing mortality proportional to their size-specific productivity. This study briefly analyses the incompatibility between balanced harvesting (and its implications) and the stated missions of two major organizations, FAO (which stresses the need of selective fishing in its *Code of Conduct for Sustainable Fisheries*) and IUCN (which maintains the *Red List of Threatened Species*), but which have issued reports or organized conferences promoting balanced harvesting. The study also demonstrates the incompatibility of balanced harvesting with the recently reformed Common Fisheries Policy of the European Union. While balanced harvesting appears partly compatible with declared fisheries policies of a few countries, e.g. with regard to whaling, sealing, and indiscriminate biomass fishing, it is not only incompatible with the basic tenets of fisheries science, but also with the vision, gradually emerging globally, that marine organisms such as marine mammals, sea turtles, sea-birds and other fauna have an intrinsic value and right to life that should not be undermined by more of the indiscriminate fishing which currently shapes much of our interactions with the oceans.

1. Introduction

Balanced harvesting is a proposed new approach to fishing defined as "[..] distributing a moderate mortality from fishing across the widest possible range of species, stocks, and sizes in an ecosystem, in proportion to their natural productivity, so that the relative size and species composition is maintained" [1]. This suggestion by various authors [2–8] to sustain and even augment fisheries yields has been published in leading scientific journals and was the topic of two international conferences [2,3]. Only a few publications have so far criticized balanced harvesting, mainly on biological and economic grounds [9–11]. They found balanced harvesting wanting, because "[..] evolutionary theory, population dynamics theory, ecosystem models with realistic assumptions and settings, and widespread empirIndependent scientistcal evidence do not support the balanced harvesting proposal" [10]. This contribution analyzes the incompatibility between balanced harvesting and the stated goals of two major organizations which have published reports or organized conferences supporting balanced harvesting [2,3]. It then highlights the incompatibility of balanced harvesting with the recently reformed Common Fisheries Policy (CFP) [12] of the European Union. Finally, it examines aspects of the fisheries policies of Japan and Norway that resemble balanced harvesting, in contrast to an emerging ethics that includes nature, as described by Singer's [13] "circle of empathy" and also reflected in, e.g. the Encyclica *Laudato Si*, recently issued by the Vatican [14].

2. FAO and the 'Code of Conduct for Responsible Fishing'

Since its inception in 1945, the Food and Agriculture Organization of the United Nations (FAO) has been at the forefront of sustainable fishing initiatives in both the developed and the developing world. These efforts were supported by widely-used stock assessment manuals [15,16], and guidelines focused on various regions and taxa. With the emergence of the call for ecosystem-based fisheries management [17], FAO proposed various approaches to take ecosystem processes into account [18], which culminated in the mid-1990s in the formulation of the voluntary 'Code of Conduct for Responsible Fishing' [19], now endorsed by

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http://dx.doi.org/10.1016/j.marpol.2016.04.001
0308-597X/

most FAO Member states and translated into many languages. In this important document, there is a section which reads as follows:

"8.5 Fishing gear selectivity.

8.5.1 States should require that fishing gear, methods and practices, to the extent practicable, are sufficiently selective so as to minimize waste, discards, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species and that the intent of related regulations is not circumvented by technical devices. In this regard, fishers should cooperate in the development of selective fishing gear and methods. States should ensure that information on new developments and requirements is made available to all fishers.

8.5.2 In order to improve selectivity, States should, when drawing up their laws and regulations, take into account the range of selective fishing gear, methods and strategies available to the industry.

8.5.3 States and relevant institutions should collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies.

8.5.4 International cooperation should be encouraged with respect to research programmes for fishing gear selectivity, and fishing methods and strategies, dissemination of the results of such research programmes and the transfer of technology."

This section of FAO's 'Code of Conduct for Responsible Fishing' is in direct contradiction with the balanced harvesting proposal, as illustrated by the following quotes from Garcia et al. [1]:

- "[..] more selective fishing neither maximizes production nor minimizes impacts [..]"
- "As each ecosystem component is to be caught in appropriate amounts, by-catch ceases to be an operational nuisance to be minimized and becomes part of the management strategy."
- "Markets and the processing sector will need incentives to accommodate a wider range of catch components, including many not currently utilized in Western countries [..]: for example, (i) enhancing industrial processing for animal feed or human consumption, (ii) status change from by-catch to target, and (iii) consuming less-utilized fish species."

3. IUCN and its Red List of Threatened Species

One of the major activities of the International Union for the Conservation of Nature (IUCN) and perhaps the one for which it is best known, is its rigorous and expanding 'Red List of Threatened Species', of which over 7000 are marine and of which over 1300 are threatened or near threatened (www.iucnredlist.org). The maintenance of this list requires the work of hundreds of scientists and volunteers, i.e., specialists on multiple taxa, many of which are threatened by the indiscriminate fishing that has become prevalent throughout the world ocean [20]. The major criteria to determine the level of threat of extinction used by IUCN are rapid decline of biomass or distribution range, both processes of which fisheries are often the main drivers.

Thus, a commonly used measure to protect threatened species is the reduction of mortality caused by fishing, notably through the use of highly selective gears that avoid the catching of threatened species, such as turtle-excluding devices integrated in shrimp trawls [21]. Yet, IUCN has organized conferences and published reports [2, 3] promoting an approach to fishing that demands the exploitation of "all groups historically fished or hunted (including whaling, sealing, etc.)" (see page 2 of the Online Supplement of Garcia et al. [1]), and thus the resurrection of targeted killing of turtles, seabirds, manatees, dolphins, whales and whale sharks, with exceptions for "charismatic species" regarded as "problematic" to the concept of balanced harvesting [3]. Fig. 1 shows the results of current indiscriminate biomass fishing and gives an impression of how future fish markets may look like if balanced harvesting were to succeed.

Fig. 1. Catching all species in an ecosystem irrespective of their size and age leads to only small fish and invertebrates being left to exploit, as exemplified by the fisheries along the Chinese coast. This image shows the sorting of such catch at a Chinese fish market. It gives an impression of how future fish markets may look like if balanced harvesting were to succeed. (Photo by Alice Liu, Stanford University).

4. The reformed Common Fisheries Policy of the European Union

The European Parliament and the Council of Ministers have recently reformed their Common Fisheries Policy [12], which is now in force since December 2013. According to Article 2.2, the CFP shall "ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels which can produce the maximum sustainable yield." This implies exploitation below the maximum sustainable yield which is, however, used as target by balanced harvesting [1]. According to Article 2.3, the CFP shall "[..] ensure that negative impacts of fishing activities on the marine ecosystem are minimized [..] and fisheries activities avoid the degradation of the marine environment." The balanced harvesting vision of "fishing the widest possible range of species" [1] so that "everything is less abundant" [4] is clearly incompatible with this agreed European policy. Article 4.1(17) of the CFP describes the "minimum conservation reference size" which takes into account maturity and is applied in the context of restrictions or incentives aiming to avoid capture through fishing activity. The balanced harvesting proposal of fishing all sizes according to their size-specific productivity [1], i.e., imposing very high fishing mortality rates on early juveniles [6], is incompatible with this policy.

5. Other states of interest (Japan and Norway)

For several years, Japan funded through the FAO a series of events (conferences, workshops) devoted to the analysis of fisheries that would exploit "all trophic levels of the ecosystem" [22,23] (see also www.fao.org/fishery/topic/16700/en), including whaling. These events misguided fisheries research in West Africa [23] and may also have created some level of habituation to the notion that whaling could be part of a strategy to address food security issues. This notion, however, has been thoroughly refuted: whales do not compete for food with humans [24–26] and their

renewed exploitation could not contribute to feeding humanity because of significant human health risks [27].

The view that whales can and should be exploited commercially, however, is still widespread in Norway, which was among the sponsors of the balanced harvesting conferences (see acknowledgements in Garcia et al. [2,3]). Also widespread in Norway is the conviction that zooplankton such as *Calanus* spp. or "red-feed" [28], and Antarctic krill, *Euphausia superba* should be increasingly exploited as feed for Norwegian salmon farming.

6. The expanding circle of empathy

What the concept of balanced harvesting and the attempts by Japan and a few other countries to resurrect whaling and sealing are missing is that the animals in question are, in most western countries, included in a growing "circle of empathy" [13]. This circle of empathy has expanded historically from the members of one's clan to tribes, to nations, to all human beings, to the great apes, elephants and other animals with a sense of self-awareness that humans can recognize. For those animals currently not under that umbrella, such as sea turtles, the widely agreed moral objective is to reduce anthropogenic causes of mortality as much as possible [21]. This is already implicit in the FAO 'Code of Conduct for Responsible Fishing' and in the IUCN 'Red List of Threatened Species', but also well expressed in the recent Encyclica [14], addressed to the 1.2 billion members of the Catholic Church and to the members of other faiths and to non-believers.

Notably, this Encyclica says that *"[a]lthough it is true that we Christians have at times incorrectly interpreted the Scriptures, nowadays we must forcefully reject the notion that our* [..] *dominion over earth justified absolute domination over other creatures. The biblical texts are to be read in their context, with an appropriate hermeneutic, recognizing that they tell us to 'till and keep' the garden of the world [..] [,where] 'keeping' means caring, protecting, overseeing and preserving. This implies a relationship of mutual responsibility between human beings and nature. [..] Clearly, the Bible has no place for a tyrannical anthropocentrism unconcerned for other creatures*."

Deliberately increasing anthropogenic mortality "across the widest possible range of species" [1] would be a huge backward step in this context, and one, moreover that would be taken for questionable reason [9–11]. As documented in the Code of Conduct [19] and in the reformed Common Fisheries Policy of Europe [12], there is a broad consensus for selective, moderate fishing of resilient species for human consumption. Clearly, the societal goal is to restore marine ecosystems and to minimize the impact of fishing [12,29]. In contrast, the balanced harvesting proposal of more indiscriminate fishing is, in the 21st century, quite untenable.

Acknowledgements

Daniel Pauly's research is partly supported by the *Sea Around Us*, a research initiative at the University of British Columbia and funded by the Paul G. Allen Family Foundation. This is FIN contribution number 194.

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