Chapter 13

Data and Operational Oceanography: A Review in Support of Responsible Fisheries and Aquaculture

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ABSTRACT

Data obtained within the operational oceanography infrastructures denote a possibility of significant analysis of fisheries in the progress of the implementation of the 1995 FAO Code for Responsible Fisheries. Data products for fisheries and aquaculture cater for research needs, thereby ensuring a capacity to meet temporal resolution, time frame, reporting frequency and interoperability formats requirements. The existence of this legislation and the costs of its enforcement make that the present data infrastructures are employed under relatively precarious circumstances. This chapter provides with an overview, not exhaustive but demonstrative, of what has been achieved for data within operational oceanography addressing the needs of fisheries and aquaculture scientists.

INTRODUCTION

Intensive use of the ocean has led to ongoing pollution of marine spaces. Pollution is affecting 60% of the world’s major marine ecosystems, which are increasingly threatened by acidification caused by unsustainable aquaculture practices, pollution, waste, invasive species and climate change (Bijma et al., 2013). Data collection, data analysis and research incorporate the contribution of fisheries and aquaculture to society (and should not be used to expand its metrics to a broader range of industrial activities). Additionally, substantial net benefits can be derived from management of data on responsible fisheries and aquaculture with a focus on economics (World Bank & FAO, 2009, p.81).

The precautionary approach concerning the harvesting, handling, processing and distribution of fish and fishery products has received considerable attention since 1995, when FAO proposed an international Code of Conduct for Responsible Fisheries (Food and Agriculture Organization of the United Nations, 2000). Over the intervening twenty years of progress, fisheries management policies (including those DOI: 10.4018/978-1-5225-0700-0.ch013
for aquaculture) have taken into account the fact that uncertainty (Pontecorvo, 2003) and absence of
data for estimation of fishery parameters (e.g. length at first capture, fishing season) and aquaculture
parameters (alkalinity, carbon dioxide, dissolved oxygen, hardness, pH and salinity) should not justify
a failure to apply rules, especially in the presence of indicators pointing to overexploitation of the fish
stocks. These indicators show that the fisheries and aquaculture sector relies on assumed efficient trace-
ability schemes to determine the origin of wild-caught fish and farmed fish, both because aquaculture
production might lead to environmental challenges and because persistent overexploitation of fish stocks,
and illegal fishing, pose a major threat to adequate future availability of wild fish, an important natural
resource (Saitoh et al., 2011).

Fulfilling the obligations suggested by the Code requires the stage to be set for satellite or In situ-based
operational oceanography applied to fisheries data. Inputting in-situ or altimetry data for the open oceans
and coastal systems require data resources including sea surface temperature, vorticity, and ocean color,
and data products by merging satellite/environment data with catch data and biological data. These are
stored in a variety of different formats and are dispersed across a network of data centres. As fishery
managers integrate more data in the spatial dimension, and data delivery becomes more operational,
product requests are likely to change rapidly (Berx et al., 2011). So the visibility of operational oceano-
graphic data resources for fisheries has a direct influence on the ability of data managers to fulfill the
obligations of the FAO Code that is concerned with responsible fisheries.

Countries are not complying with UN Code of Conduct for Responsible Fisheries (Pitcher et al., 2009).
As an open access resource, any fishery faces the reluctance of States to transfer sovereign powers to the
international level. To improve science for the purposes of fisheries management and to help managers
minimize the adverse effect of aquaculture, data collection has been made a high priority, and economic
data on commercial fish processing and recreational fisheries are now required, a framework that is as
objective as possible for evaluating the quality of by-catch data to support assessments and conservation
of these resources. The 1995 FAO Code legal regime gave coastal States rights on the fishery resources
in the Exclusive Economic Zone, an area that can expand 200 miles from the national coastlines. These
national jurisdictions embrace more than 90 percent of the world marine fisheries. To protect and preserve
the aquatic environment taking into account the best scientific evidence available, the Code establishes
that lack of scientific information should not be used as a reason not to protect target species, associated
or dependent species and non-target species as well as their environment (Articles 6.5 and 7.5.1). So
the Code is intended to change the way in which fishery research and development are approached and
undertaken. Without considerable inter-country collaboration in the collection and processing of data,
fisheries scientists in each coastal country will find it very difficult to monitor and properly analyze the
status of many shared stocks, or the related marine environmental conditions in their seas.

To compare the operational oceanographic data infrastructures of valuable for fisheries and aquacul-
ture with the articles of the Code of Conduct for Responsible Fisheries (CCRF), we searched the Code
for articles and clauses mentioning data and information. Articles were classified into four large data
categories (general principles, fisheries management, aquaculture management and fisheries research)
after their corresponding names in the text of the Code. These categories should be read exactly as they
are included in the respective legal clauses of the Code. Fourteen legal clauses have defined the data
areas covered by the Code (see Figure 1).

The existence of this Directory of Legislation in Force (the objectives of the Code of Conduct for
Responsible Fisheries) is, in fact, reflected in the long-term goals for healthy oceans outlined in NOAA’s
next generation strategic plan. To capture a key understanding of ecosystems with a view to inform re-