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Building a knowledge base for management of a new fishery: Boarfish (*Capros aper*) in the Northeast Atlantic

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ABSTRACT

This paper examines recent collaborative efforts by fisheries scientists and representatives from the pelagic fishing industry in Europe to generate a knowledge base to support management of a new fishery for boarfish (*Capros aper*) in the Northeast Atlantic. The forms of knowledge used and produced in the collaborations were investigated by applying a conceptual framework developed to help understand the detailed dynamics of knowledge exchange in mixed-actor settings. The collaborative initiatives studied were informal and efficient, and they benefited from financial support and co-ordination efforts by the industry actors. Generation of scientific knowledge was given high priority. Tangible collaborative outputs produced between 2010 and 2013 included new scientific insights into boarfish maturity and aging, initiation of an annual boarfish-specific acoustic survey, data to underpin a stock assessment, and two management plan proposals. The study highlights the information requirements that apply for fish stocks managed under the European Common Fisheries Policy and illustrates that the fishing industry can fill important roles in collaborative processes that aim to generate new scientific knowledge to support fisheries management.

1. Introduction

The fishing industry has during the last 20 years become increasingly involved in European fisheries management (Dreyer and Renn, 2011; Linke et al., 2011; Coers et al., 2012; Fitzpatrick, 2014; Linke and Bruckmeier, 2015). Representatives from the fishing industry hold a majority of the seats in the Advisory Councils,[1] the stakeholder groups established under the Common Fisheries Policy (CFP) to provide the European Commission and European Union (EU) Member States with recommendations on issues related to fisheries management (European Council, 2004; European Union, 2013). Advisory Councils, as well as individual fishermen and their representatives, regularly participate in large-scale research projects of the European Union's Research and Innovation funding programmes that aim to generate knowledge to support fisheries management.[2] Such projects exemplify arenas where different forms of knowledge interact (Röckmann et al., 2012; Mackinson et al., 2011; Jacobsen et al., 2012).

Fishermen, scientists and managers operate within different domains and acquire their knowledge in different information environments (Verweij et al., 2010). These differences influence the way information is interpreted and used by the various actors. Based on a review of knowledge exchange processes in environmental management projects, Raymond et al. (2010) draw attention to the importance of specifically addressing how different forms of knowledge will be identified, engaged, evaluated and applied. Fazey et al. (2013) call for an integrative research agenda to enhance our understanding of knowledge exchange. There is a growing body of literature that addresses fishermen's knowledge (see review by Hind, 2015); however, the detailed dynamics of knowledge generation in settings where the fishing industry interacts with science and management is less studied. Garrett et al. (2012) investigated interactive learning processes in four stakeholder forums in the United Kingdom where fishermen were engaged in dialogues to generate common visions and improve decision-making. Their study highlighted the need to better understand the processes involved, including the role of leadership, group dynamics and knowledge transfer.

Insights from research within organisation management contribute to a better understanding of the specific challenges related

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[1] With the reform of the Common Fisheries Policy in December 2013 the Regional Advisory Councils (RACs) were renamed Advisory Councils.

[2] Recent examples of EU-funded research project with industry participation are GAP2 (http://gap2.eu/), MYFISH (http://www.myfishproject.eu/) MAREFRAME (http://www.mareframe-fp7.org/#) and EcoFishMan (http://www.ecofishman.com/). (Link last accessed 20.08.15.).

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to knowledge exchange in settings when there is little overlap in knowledge between the various actors involved (Carlile, 2002, 2004). This paper aims to enhance our understanding of knowledge exchange processes in settings where the fishing industry engages with science and management by applying these insights from organisation management. In this paper, a conceptual framework introduced by Carlile (2004) is applied in a qualitative case study of collaborative efforts by Irish and Danish scientists and fishing industry representatives to build a knowledge base to support management of a new fishery for boarfish (*Capros aper*) in the Northeast Atlantic. The case was chosen opportunistically to allow in-depth investigation of knowledge exchange processes in a recent mixed-actor collaboration where one of the aims was to produce a long-term fisheries management plan. Such plans are used as management instruments to achieve the objectives of the CFP (European Union, 2013; European Commission, 2014). The following question guided the study: How was knowledge used and produced within and between actor groups (stakeholders, scientists and managers) in the process that led up to the 2012 Pelagic Advisory Council recommendation for a long-term management plan for boarfish in the Northeast Atlantic?

The groups of people involved are in this paper referred to as stakeholders, scientists and managers, reflecting terminology commonly used in Europe for actors with an interest in the CFP. The stakeholders in this study are the fishermen who catch boarfish, their representatives in Producer Organisations (here referred to as industry representatives), and members of the Pelagic Advisory Council. The scientists are fisheries biologists employed by national marine research institutes or universities who do work related to pelagic fish stocks. The managers are civil servants in the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE) and in government offices in the EU Member States who are involved with implementation of the CFP. These groups of actors contribute with different forms of knowledge. Following Edelenbos et al. (2011), stakeholder knowledge can be characterised by its social validity, scientific knowledge by its scientific validity, and bureaucratic knowledge by its usefulness for the policy process.

The rest of this paper is structured as follows: Section 2 introduces the conceptual framework applied to analyse processes of knowledge exchange in mixed-actor settings. Section 3 presents the qualitative research methods used for data collection and analysis. Section 4 starts with a short overview of the boarfish fishery. This is followed by narrative descriptions of how scientific knowledge was advanced and two management plan proposals were produced between 2010 and 2013. The implications of the findings for our understanding of knowledge exchange are discussed in Section 5, and in Sections 6 conclusions are drawn.

2. Knowledge exchange in mixed-actor settings

Carlile (2004) proposed a conceptual framework for investigating the dynamics of mixed-actor knowledge exchange in organisational management settings. An application, modified to the context of collaborations within fisheries management where the knowledge and interests of stakeholders, scientists and managers come together, was described by Stange et al. (2015) and is briefly summarised here. The conceptual framework, see Fig. 1, draws attention to that people need to share and access each other's knowledge for common understanding to develop and new knowledge to emerge. Such knowledge-sharing processes become increasingly challenging if the actors have high stakes in the issue, and if there is novelty involved. High stakes and high degrees of novelty contribute—separately or simultaneously—to complexity, because the gap to be bridged between actors, who need to access each other's knowledge, gets wider. The gap between the actors is here referred to as a boundary.

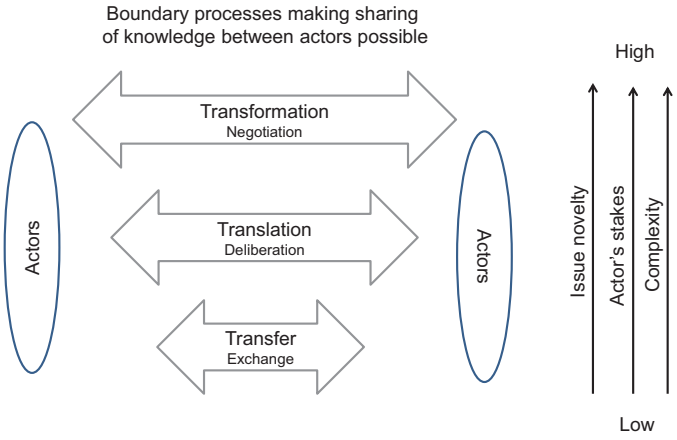

Fig. 1. Framework for analysing knowledge exchange in mixed-actor settings. Source: Stange et al. (2015), modified from Carlile (2004).

The framework distinguishes three knowledge exchange processes; transfer, translation and transformation. At the low end of the complexity scale, knowledge is transferred between actors through the communicative process termed exchange. As stakes or novelty increases, knowledge needs to be translated in deliberation between the actors. When stakes are high, and novelty contributes to the challenge of knowledge exchange, the actors' existing knowledge needs to be transformed. This requires negotiation around perceptions and knowledge claims. By distinguishing three knowledge exchange processes, the framework draws attention to the need to mobilise resources that match the challenge at hand; more resources are needed to enable actors to connect in complex settings. Examples of resources that enable people to connect across boundaries can be a shared vocabulary, a facilitator, funding, or infrastructure that allows face-to-face interaction. Another example of a resource is boundary objects. Star and Griesemer (1989) introduced the idea that boundary objects can play a key role in connecting different communities who work on a common task, and the concept of boundary objects has become widely applied (Zeiss and Groenewegen, 2009; Wilson, 2009). In this paper, boundary objects refer to collaborative products that work to establish a shared context between different actors (Star and Griesemer, 1989; Carlile, 2002; Clark et al., 2010). The conceptual framework is in this study used as a lens to identify resources that allowed knowledge exchange between collaborating actors in the process of building a knowledge base for the new boarfish fishery.

3. Methods

A case study approach (Yin, 2009) was used to investigate how a knowledge base to underpin management of a new fishery for boarfish in the Northeast Atlantic emerged 2010–2013. Qualitative data were collected through document review, observations in meetings, and semi-structured interviews. Combining the three methods gave opportunities for cross-checking and verification of data assembled from several sources (triangulation).

Key sources examined as part of the document review were minutes from meetings of the Pelagic Advisory Council (available via http://www.pelagic-ac.org), reports from the International Council for the Exploration of the Sea (ICES) Expert Group meetings (available via http://www.ices.dk), and newsletters from Killybegs Fishermen's Organisation (KFO) (available via http://www.kfo.ie). The document review focused on establishing the time line for the evolution of the boarfish fishery and for the development of man-