



It's not fish you're buying, it's our rights: a case study of the UK's market-based fisheries management system

Emma Cardwell

Jesus College, Oxford

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Abstract

This thesis, submitted for the Doctor of Philosophy in Geography and Environment, presents a case study of the development of the UK's market-based management system for oceanic fisheries. Implemented gradually in the years since 1984, the informal nature of the UK's fisheries management system, which has developed through a number of incremental changes and government-industry "gentlemen's agreements" rather than clear legislative moves, means that few official policy documents (and perhaps consequently, little academic literature) on the subject currently exist.

This thesis traces the material and political processes of market formation, looking at the origin of market-based policies in the theories of bioeconomics and wider economic history. It asks what the implicit assumptions of the economic discipline can – and can't – tell us about the impacts and outcomes of market creation, and using a Foucauldian inspired approach to economic performativity, discusses the role of ostensibly descriptive theories in shaping the world around them. Finally, it calls for a greater geographical engagement with marine issues, and proposes an action-research role for geographers in the politics of the sea.

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Introduction

It's not fish you're buying, it's our rights

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In the 20th and 21st centuries, economic theories have become central to the organisation of human life. Economics is often presented as a science, and in turn its theories are presented as objective truths, presenting human nature and social organisation as it really is. The uncovering of these inalienable truths, or natural economic laws, allows those in power to organise the world around them in the best possible way.

Many people have questioned the scientific nature of economics (Cochoy *et al.* 2014). However, this hasn't stopped economic principles being used with impunity in political decisions to mould social and cultural life and the organisation of production (Harvey, 2005; Graeber, 2009). In the latter part of the 20th century, the application of economics to politics has increased exponentially, with “market based” policy mechanisms finding favour over traditional command and control across the governance sphere.

This shift has been particularly marked in environmental and natural resource policy, which has seen a sea-change in recent years toward market based organisation; the precepts and principles of economics now being applied to human-environment interactions touching on areas as diverse as the pollution in the atmosphere (carbon trading), the hole in the ozone layer (hydrochlorofluorocarbon permit trading) and ecological biodiversity (payments for ecosystem services).

Although in recent decades market logics have spread to numerous different environmental fields, one of the first areas in which market-based environmental management was adopted was the management of fisheries. The applied discipline of bioeconomics - the economics of fisheries management – was introduced in the 1950s, preceding Hardin's famous Tragedy of the Commons (Hardin, 1968) by a number of years (Hubbard, 2014). In the 1970s, these market principles began to be applied in fisheries around the world, and by 2014 had been introduced in 158 large-scale fisheries worldwide (Lynham, 2014), and the management of over 850 species (Carothers & Chambers, 2012).

This thesis presents a study of one such market-based fisheries management system, that of the UK. The UK's market for fishing rights has evolved gradually since 1984 through a series of ad-hoc administrative changes and industry-government agreements. Being largely informal, the UK market-based management system has not so far received the academic attention it deserves, as little official literature exists on its rules, organisation and effectiveness. As such, this thesis presents a unique description of a fascinating and globally relevant environmental management system.

The structure of this thesis is as follows. First, I present a literature review of the growth and dissemination of market-based fisheries management, and the general trends that have accompanied its implementation. I also discuss the conceptual origins of market-based management in bioeconomics, and present a brief genealogy of the discipline and its philosophical foundations. I then go on to present the methodology and methods used to undertake the research for this thesis.

The main body of the thesis, in the form of four papers that form the main research outputs, are then presented. These are as follows:

Chapter 1: Invisible fishermen: The rise and fall of the British small boat fleet

This chapter describes how the UK's fisheries management system developed, the role of EU policy, steps towards a market for fishing rights, how these were distributed, and the impacts of this on the fishing fleet. It also focuses on the differentiation in the UK fleet between large and small-scale boats, the issue of rights allocation, and the political and practical issues around this.

Chapter 2: Transferable quotas, efficiency and crew ownership in Whalsay, Shetland

This chapter looks at an important and unique sector of the UK fishing fleet: the huge pelagic fleet based in the tiny island of Whalsay, Shetland. It describes how such a small island managed to acquire such a large percentage of UK pelagic fishing rights, and talks about the importance of different company ownership structures in the UK fishing fleet.

It then describes the significant changes in company ownership structures (from shared owner-operator ownership, common across fisheries, to more economically-typical shore-based owner-employee relations) on generational change (retirement of fishermen and boat owners) in a market-based system. In economic terms, this suggests a lack of dynamic efficiency that has heretofore been unaccounted for by proponents of fishing-rights markets.

Chapter 3: Power and performativity in the creation of the UK fishing rights market

This chapter engages with the theory of economic performativity and the writings of Michel Foucault to analyse the means by which markets for fishing rights are created. The example of changes in fishing company structure (as introduced in Chapter 2), and the political struggle over small-scale catch statistics (as introduced in Chapter 1), are discussed through this theoretical lens, and the role of economic inscriptions, legal

structures and disciplinary power in the creation of the fishing-rights market are explored.

Chapter 4: Geographical imaginations: a call for more geography in marine management

This final chapter asks what potential geography as an academic discipline has to contribute to future directions in marine and fisheries management. The roles of three disciplinary approaches in current fisheries management are discussed: economics, conservation biology, and anthropology. The ways in which geography could contribute to this field are then explored. This is backed up by an empirical case study that argues for a distinctly place based, territorial, *fisherly imagination* of the sea that means geography is well-placed to contribute to the healthy future of our oceans.

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Survey of the literature

The intellectual origins of market-based fisheries management.

1. Market based environmental policy

Market based environmental policy uses the logics of economics as the organising principle for environmental management. Traditionally, governments looking to control the environmental impact of any given activity would do so with laws and regulations. These laws would set upper limits for emissions of certain pollutants, or ban the use of certain technologies, in order to protect the environment from certain damages. During the 1990s, a new method of regulation found favour with policymakers. This was the use of economic logics to protect against environmental degradation (Ackerman & Gallagher, 2000).

Economists argued that the manipulation of financial incentives for action is a better method to protect the environment than the setting of hard-and-fast rules for people to follow. Explicit directives could be replaced by structures that allowed pecuniary rewards for not damaging the environment (Stavins, 2003). This would create an incentive for individuals and businesses to improve their environmental behaviours to the extent that it was possible (and rewarding) for them to do so. In many cases, this incentive to improve could go beyond the limits set by an equivalent command and control regulation, leading to greater environmental benefits than a strict directive.

Further to this, a regulation based on financial incentives would allow companies and individuals to profit from environmentally aware behaviour, rather than bear the costs of compliance to strict directives. On a macro level, economists argue, this would lead to a more efficient and competitive national economy. In the long term, because more environmentally friendly companies and individuals were being rewarded and less environmentally friendly companies penalised, the environmentally innovative would thrive, and the environmentally damaging would eventually be priced out of the market and cease to exist (Tietenberg & Lewis, 2000).

Much environmental damage in the industrial era has been an unintended (or intended) consequence of profit making ventures. Traditionally governments tried to deal with these negative outcomes of economic activities (termed by economists as externalities) by using law to force a change in the behaviour of individuals or companies (termed by economists economic agents). Market based environmental policy is subtly different. Rather than trying to force a shift away from selfish profit-maximising behaviours, it attempts to create structures in which the same selfish

profit-maximising behaviours directly lead to an improvement in the environment. Market based environmental policy thus does not attempt to change the structure or activities of economic entities directly, but instead to change the social context within which economic agents work, so that chasing financial incentives and maximising income implicitly leads to agents adopting environmentally responsible behaviour rather than environmentally damaging behaviour.

For a government, adopting market based environmental policy also means adopting the implicit assumptions that it is based upon. These are that economic markets are the most ‘efficient’ way to organise society (with efficiency meaning the least costly and most profitable, in aggregate); that this aggregate efficiency is more important than the distribution of costs and profits; that all agents are motivated purely by profit; that firms and individuals can be compared like for like along the nexus of finance; and that their ability to pay for something is an accurate representation of their efficiency at the micro level (see Stavins, 2003). Across the realms in which market based management has been instituted (including emissions trading, effluent charges, environmental taxes) many criticisms have been made of these assumptions (Robertson, 2004; Arsel & Büscher, 2012; Johnson, 1999). Despite this, market based environmental policy instruments are increasing in popularity (Golub, 2013).

2. Market-based fisheries management

Of all the areas in which market based approaches to environmental management have been implemented, fisheries are one of the most significant. In 2014, 158 large-scale fisheries worldwide are estimated to be managed along market lines (Lynham, 2014). The effects and impacts of market-managed fisheries are hotly debated (see

McCay, 1995). These effects and impacts are significant not just because of the ecosystem importance of global ocean fisheries, but because of this zeitgeist role fisheries management plays in the expansion of economics based environmentalism: the first market-based management schemes were implemented in fisheries in the 1970s, making them among the most developed of market-based environmental mechanisms worldwide. As such, the study of market-based fisheries management can potentially tell us a lot about the future fate of more recently instituted environmental markets.

Market based fisheries management most often takes a form referred to as individual tradable (or transferable) quota, or ITQ. This is a market in which the right to catch fish can be bought and sold. In order for a market to be created, commodities must be created over which transferable (and excludable) property rights can be established (Callon and Muniesa, 2005). As fish in the ocean are highly mobile and largely invisible, it is very difficult to attribute ownership rights to them. Instead, economic approaches to fisheries governance commoditise the right to catch a certain amount of a given species of fish (Scott, 1989). This is done by setting a figure for the total tonnage of fish that can be caught annually (total allowable catch, or TAC). Agents can then buy and sell proportions of this total right to catch. These proportions remain stable as annual permissible catches fluctuate year on year: the buyer buys the right to 20% of the overall annual catch, whatever that may be. These saleable proportions of total annual catch are called 'catch shares' or 'catch quota', and are often referred to simply as 'quota'.

Governments use a whole range of technologies such as GPS, statistical virtual population models and software algorithms to create this quota (St Martin, 2008). In the aggregate, Holm & Nielson (2007) refer to these technologies as the “TACmachine”. It is important to note how central these material technologies are to market based fisheries management. They are the means by which fish, in their relation to humans, are turned from creature into resource, from resource into commodity; and by which the supposedly abstract idea of the ‘market’ is brought into being.

There is a wide literature on the impacts of market based fisheries management, including a number of synthesising literature reviews that will not be repeated here, although the main findings will be summarised (see Carothers & Chambers, 2012; Shotton, 2000; Costello et al. 2008; Chu, 2009; Melnychuk et al. 2011). This vast literature is both complimentary and critical, largely depending on the disciplinary background of the authors. Proponents of market-based management, most often economists, point to increasing fish stocks and a more profitable fishing industry (Costello *et al*, 2008; Árnason, 2005; Grafton et al. 2000; Grainger & Costello, 2011).

Detractors, in comparison, tend to focus on the negative social impacts of ITQ (see Lowe and Carothers 2008; Olson 2011; McCay 1995, 2004; Pálsson and Pétursdóttir 1996; Copes 1986). Where ITQ fisheries management has been introduced, the ownership of rights is concentrated into the hands of a small number of large companies, a distribution that is considered more economically efficient (Árnason, 2008), and countries where ITQ management is implemented often report distributional conflicts (Yandle & Dewes, 2003; Eythórsson, 1996; 2003).

These criticisms are often dismissed by economists as lacking in pragmatism, with the argument that rights are only concentrated in the hands of a small number of large companies, and jobs lost, because this is the most efficient organisation of the industry, and therefore produces the maximum social good, regardless of short term or local impacts (Hentrich & Salamon, 2006). As such, by appealing to the ‘objective’ values of the market and its ‘apolitical’ process of allocation, economists can shut down political debate with a claim to scientific neutrality.

As a research agenda, it is thus interesting to try and understand if there are any areas in which the operation of the market has not developed according to economic norms, and to study the internal logics of market economics in order to question their naturalness. In Iceland, for example, which is often presented as the poster-child of successful market-based fisheries management, ITQs have led to intensive political conflict (Helgason & Pálsson, 1998). In the 1990s and early 2000s, the achievements of the Icelandic ITQ system were being widely celebrated. The Icelandic fishing fleet had increased exponentially in value and was attracting extremely high-levels of investment. By 2007, however, the gold of ITQs had begun to tarnish. A case was brought to the United Nations Human Rights Committee against the Icelandic government by a group of fishers in 2003, claiming that the widespread dispossession under the market-based ITQ system had violated their human rights. This case was upheld in 2007, supporting the multiple claims by social scientists of the serious problems with the distributional impacts of market-based management.

Interestingly, these Icelandic social problems were also concurrently being compounded by an unpredicted economic impact of ITQ. The economic ‘miracle’ that had led to ballooning fishing rights prices (and extremely rich Icelandic banks) began to turn. By 2008 the Icelandic economy was in crisis, and a number of banks collapsed. Taking into account the small population of Iceland, this crisis was the largest national banking collapse in history (The Economist, 2008). The severity of this boom-and-bust cycle that led to this crisis can be explicitly linked to the widespread speculation on the market for fishing-rights (Einarrson, 2012): something that was certainly not predicted by the proponents of the market.

Work on the social impacts of the introduction of markets is vital, and this is why it is so widespread. Studies drawing attention to such ‘misfires’ (Callon, 2010), where markets do not work as the economic theory claims they will, are however less prevalent. Such studies are important because through close attention to the unexpected and unintended consequences of the application of markets – those aspects that work against, or cannot be explained by the logics of economic theory – we can de-naturalise the assertion that market-based management is simply a means of properly aligning governmental laws and incentives with a pre-existing structure that is waiting to be set free of cumbersome, inefficient command-and-control laws, allowing it to smoothly and naturally function.

Such an undertaking can help make it clear to practicing environmental managers that the creation of a market is a far more complex process than economic textbooks may suggest, that it can have many and wide-ranging unintended consequences, and that large-scale governance experiments should be undertaken with caution. In short, close

study of the failings of economic theory to ‘describe’ a pre-existing reality could potentially prevent significant future mistakes. Scholars that are worried about the incursion of markets into life should not only question the economic logics that drive this process on an ethical basis, but a substantive one as well.

When it comes to fisheries management, there are notable examples of studies that outline the unintended consequences and failures of economic logics to play out as they should (such as Højrup, 2012; Einarsson, 2012; Gilmour *et al.* 2012; Crilly & Esteban, 2013). However, this is a far smaller literature than that exploring the social impacts of market creation. With national governments currently enthusiastically implementing market based policies in a range of environmental situations, this is an important area of study that needs to be extended. This thesis therefore aims to develop this area of the literature with close study of the basis, and impacts, of the economic suppositions that format market organisation.

3. The intellectual origin of market-based fisheries management: bioeconomics

The exploitation of fisheries is recognised within economics as an iconic example of applied economic theory. Fisheries papers such as H. Scott Gordon’s *The Economic Theory of A Common-Property Resource: The Fishery* (1954) and Anthony Scott’s *The Fishery: The Objectives of Sole Ownership* (1955) were seminal in the creation, and remain key to the teaching, of resource economics, going on to influence economic policies across a range of natural resources. The theoretical bases laid by Scott and other mid-twentieth century economists form the fundamentals not just of fisheries economics and management, but mediate how economists and governments (and thus society as a whole) approach a wide range of organised human-environment

interactions. The economic theories invented specifically for thinking about fisheries are vital in the canon of modern economic thought about natural resource use, and the thinking created for the economics of fisheries is a keystone in the notion of ‘sustainability’ as currently understood. Therefore fisheries economics is important not just because of the significance of the global fisheries crisis, but also because of the way in which fisheries economics has influenced economic organisation, and particularly natural resource management, beyond the marine environment.

Economics has always had a close relationship with the management of fisheries. In a recent paper charting the origin and development of fisheries biology, Hubbard (2014) describes how both pragmatic state interest and economic ideology were foundational in the formation of the fisheries biology field in the early 20th century. This close relationship was cemented in the 1950s with the emergence of a distinct subfield of economics, termed bioeconomics, which explicitly combined recent developments in the mathematical modelling of fish populations with economic theory. Based on original work by economists with close links to government, and explicitly designed for management, the economics of fisheries combines the high theory of Hayek (2007 [1941]) with the explicit intention of state intervention and market guidance.

Bioeconomics ostensibly aims to use the complementary regimes of biology (to describe and predict the behaviours of fish) and economics (to describe and predict the behaviour of fishers) in order to model and manage their maritime interactions (Anderson & Sijo, 2010). Its origins lie in the work of a small number of men in the 1950s. In 1954, Milner Baily Schaefer, a US Government Fisheries Biologist, and H.

Scott Gordon, an American economist, simultaneously produced a model of fish populations in an open access fishery (Schaefer, 1954; Gordon, 1954). This *Gordon Schaefer model* represents the theoretical foundation of bioeconomics.

A key principle of the Gordon Schaefer model was the idea of the maximum sustainable yield: that a certain equilibrium exists that will allow a maximum harvest of fish over repeated years. Importantly, the most sustainable yield is not 'zero'. The Gordon Schaefer model argues that if only a very small number of fish are taken, high population levels within a fish species will increase competition for food. Gordon-Schaefer therefore postulates that fish stocks (and potential future catches) will increase as present exploitation increases up to a certain level (e.g. at half the population carrying capacity, if growth is logistic). If catches go above this level, however, the breeding stock will be diminished and stocks (and potential catches) will decrease. This means that a 'maximum sustainable yield' can be set as the most economically efficient, and productive, target catch in a fishery.

Although the bioeconomic concept of MSY received extensive criticism in the 1970s (Smith & Punt, 2001), by the 1980s it had become a primary management target for fisheries around the world, with its use written into international law in the United Nations Convention on the Law of the Sea (UNCLOS). Interestingly, most people now characterise MSY as a conservation measure, when it is rather a uniquely economic concept (Hubbard, 2014). The international popularity of the bioeconomic concept of MSY can be traced specifically to Cold War era political manoeuvring by the US state department, whereby fisheries policies were tailored to support geopolitical objectives: to allow access to resources for highly developed industrial

fleets, while fostering domestic protectionism and spreading the gospel of capitalist organisation (Finley, 2011).

A central aspect of bioeconomics is the normative argument as to how MSY should be achieved: through the allocation of private property rights. This principle was laid out by Anthony Scott a year after the publications of Gordon and Schaefer, in *The Fishery: The Objectives of Sole Ownership* (Scott, 1955). Together, the Gordon Schaefer model and Scott's sole ownership thesis set the foundations both for the academic theories of bioeconomics and much of the modern system of global fisheries management. The practical application of bioeconomics was made possible by the statistical methodology of virtual population analysis (VPA). VPA is founded on methodology established by Gulland (1965) drawing on the theoretical work of fish population modellers such as Beverton and Holt, published in the 1950s (Beverton & Holt, 1954). VPA predicts the abundance of different age cohorts of fish alive in a given year, and allows modellers to estimate biomass abundance in order to set the requisite values for MSY.

4. The assumptions of bioeconomics

Although the integration of the lives of fish into bioeconomics makes it a particular form of economics in itself, as an economic discipline its assumptions rest within the general normative and theoretical corpus of economics. Despite its presentation as an interdisciplinary field, Bioeconomics tends to be primarily used only by economists, not biologists. It is a specifically numerical and statistical economic approach, a notable example of the distinctly mathematical turn in mid-twentieth century

economics that Blaug (2003) terms the ‘formalist revolution’. Bioeconomic textbooks are largely technical in tone, and built around models and equations (see Clark, 1976).

These numerical models and equations are however built on a corpus of wider economic principles and assumptions, broadly based within the assumptions of neoclassicism. These include: the nature of human beings as self-serving individuals; the ordering value of commensurable preferences; the characterisation of a number of non-human organic entities as resources; the acceptance that markets will produce equilibrium; the centrality of competition to inter-human relations; the inherent correctness of the price-value relationship; and the importance of the concept of utility.

For the assumptions of bioeconomics, the economic theory of capital and investment is vital. In this, all things can be thought of as a form of capital, meaning an input to production, or a potential source of revenue. Importantly, these capital forms are rendered fungible and can be judged using the same economic terms applied to financial capital, with the decision between exploitation and investment based on expected future outputs, taking into account the marginal rate of interest (Scott, 1983). This allows the total alignment of heterogeneous goods based on their productive potential, and reduces all forms of life and its residues to their potential, commensurable returns.

This basis in capital and investment means that the key activity of the equations and models employed in bioeconomics is to insert a representation of the lives of fish, inexorably unfolding in another element, into the schemata of capital asset portfolio

management. The models of Gordon and Schaefer, and those that followed these, apply these hypothetical principles to our relationship with fish, not as living beings or aspects of an ecosystem, but a capital resource: the optimal reproduction promised by MSY being the level of fishing that produces the best interest rate (Bjørndal, 1990; Ackley, 1978).

The economic framework employed by bioeconomics is also connected to other, linked fundamentals. These include the normative importance of capturing resource rent and the instatement of private property rights that are necessary to create and ‘capture’ this rent; the principle of desirable and achievable equilibrium; the desirability of efficiency (as a function of productive inputs and outputs) and the focus on the self-interested individual as the primary unit of collective human action. These principles are of course not self-evident but based upon the ideas of other economists: Frederick Hayek and Ludwig von Mises on capital, David Ricardo and Lewis Gray on scarcity and rent, and Adam Smith on individuals and economic organisation.

As such, we can see that the intellectual world of market-based fisheries policy – and associated tools such as MSY and ITQ - is much larger than is usually stated in the overtly technical fisheries management literature. It is based not only on the bioeconomic models and theories outlined above in section 3, but also a whole set of wider economic assumptions, a preliminary sketch of which was provided in section 4. These assumptions usually go unstated in discussions of the pros and cons of market-based fisheries management. In the following thesis, close attention will be paid to the role of these underlying logics in formatting the market system.

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Methods

The rationale for this thesis and how the research was carried out.

Most literature on ITQ management is based around studies of the ITQ systems in Iceland, New Zealand, Norway, Denmark, Canada and the United States (see Árnason, 2005; Eythórsson, 1996; 2003; Stewart & Callagher, 2011; Holm & Nielson, 2007; Højrup, 2012; . McCay *et al.* 1995). Very little critical study exists of the UK ITQ system (exceptions include Goodlad, 2000; Gray *et al.* 2010). In large part, this is because the UK ITQ system is largely informal in its structure. This informality means that despite being relatively advanced, little academic analysis takes the UK system into account when studying ITQ (such as Costello *et al.* 2008).

The UK ITQ system evolved gradually into a quota market through iterative legislative steps that culminated in the granting of fixed quota allocations (FQA) in

1999. Prior to this, quota had been set each year by the government, but the introduction of FQAs created a stable commodity that could be bought and sold. Alongside other legislative steps, such as the 1993 granting of the permission to trade quota, the 1996/1997 separation of catch rights from physical vessels and licences, this led to an extensive yet largely informal quota market. The iterative, informal way that this quota market was established led to some confusion as to the legal status of UK quota holdings: who could legally hold quota - fishers, or any investors? UK or international interests? Were quotas officially private property? Could they be used as collateral for loans? The answers to these questions were unpublished and widely unknown.

Initial Research Questions

At the onset of this research, no official data existed on the exact standing of the UK's market-based fisheries management system, which, despite its relatively advanced nature, was largely opaque. Thus, the most important aim of this research at its origin was to build some understanding of the parameters of the ITQ system - to establish how exactly it worked, the rules it followed, and the form it took. The first research question was thus:

1) What is the legal and economic organisation of the UK quota system?

The second aim of the thesis was to study the impacts of this market-based policy on the structure of the UK fishing fleet, and the everyday practice of fishers. How had the industry changed since the introduction of a market-based system in the 1990s?

Who had ‘won’ from these changes, and who had ‘lost’? This meant that the second research question was:

2) What impact has the ITQ system had on the structure of the UK fishing industry, and the way people fish? Who has benefited from the system and who has been disadvantaged?

The third aim of the research was to ask what, if anything, a comprehensive study of the UK ITQ system could tell us about ITQ more widely, and market based management overall. I was thus interested to see if a study of the UK system could contribute anything to the international debate about the strengths and weaknesses of market based management. This led to my third wide research question, which was:

3) Can a study of the UK ITQ system contribute any new perspectives on market based environmental management, or the rationales and impacts of ITQ?

Methodology and Methods

The research is based on a constructivist, grounded theoretical approach, conducted through iterative collection and analysis of data, and an inductive use of theory (Charmaz, 2006). The main research method was in depth, semi-structured interviews. As the research aims were relatively broad, and consisted not of answering predefined questions, but searching for questions (and their answers) that offered potentially new perspectives on market-based management, qualitative research methodology was chosen as it allowed greater potential for emergent research questions and directions to be established. Interviews were chosen as the

primary methodology. These interviews were as open ended as possible, with the aim that the interviewee should set the tone and direction of conversation based on what they considered the most important aspects of the UK's ITQ management. Thus all interviewees were asked:

- *What do you think is the most important issue in UK fisheries today?*
- *What do you think are the strengths of the UK fisheries management system?*
- *What do you think are the weaknesses of the UK management system?*
- *How would you change the UK fisheries management system?*
- *Who else do you think I should talk to?*

Beyond this, the interviewee dictated the subject matter of the interview. Because I was looking for an overview of the UK management system as a whole, in sampling it was most important to me that all the stakeholder bodies in UK fisheries management were adequately represented. These bodies were: fishers from all sectors (small scale, large scale, whitefish, shellfish, pelagic) using a variety of gears (trawl, pots, nets, purse-seine, dredge, hand-line) and in different geographical and ecological areas (North Sea, Minch, English Channel, Rockall, nearshore and distant water); quota managers and fishermen's associations; local and national fisheries managers and enforcement officers; European MEPs and commission bureaucrats; and industry and environmental campaigners.

Eighty-four interviews, all of between thirty minutes and two hours duration, were undertaken. Theoretical perspectives were then applied according to a pragmatic paradigm, based on their fit and potential usefulness for “problem-solving” (Lipman, 2003; Jones, 2008). The interviews took place in 35 locations around the UK (see figure 1). As figure one shows, one weakness of the research is the lack of coverage of Northern Ireland, which was due to time and resource constraints. This is something that future work on the UK fisheries management system could seek to address.

Interviewees were grouped as follows: Forty-one fishermen (six of these interviews were conducted in the interviewee’s home, four in a pub, two via email, the remainder onboard fishing boats or at the dock. Twenty-five were voice-recorded and sixteen manually transcribed during interview), six ex-fishermen (one recorded and three manually transcribed in own home, two interviewed via email), ten quota managers (all recorded, all interviewed in place of work), five fishery agents (all recorded, all interviewed in place of work), one fisherman’s wife (recorded in a cafe), one quota trader (recorded in his place of work), one boat builder (recorded in the dry dock), four fishery representatives (three recorded, one manually transcribed, one interviewed in his home, three in their place of work), three fisheries scientists (all manually transcribed, two interviews undertaken in the interviewee’s place of work, one by telephone), one historian (recorded in his place of work), three fishery officers (one recorded in place of work, one manually transcribed at a dock, one manually transcribed by telephone), three fish processors (all recorded in their place of work), two harbourmasters (both recorded in their place of work), three Scottish government officials (all recorded in their place of work), one European fisheries advisor and one

Dutch vessel owner (interviewed by telephone, manually transcribed) and one European Commission Fisheries Group representative (interviewed by telephone, manually transcribed).



Figure 1: Fieldwork sites.

One focus group of ten small-scale fishermen was undertaken in a fisherman's social club and recorded. Two trips were taken on working fishing vessels (one large scale, one small scale), skippers gave eight tours of docked vessels, and four fish markets were attended.

Most participants had had little contact with student or academic researchers in the past, and were keen to discuss the changes in, and their experiences of, fisheries management. The notable exceptions to this were the UK government body DEFRA (Department for the Environment, Food, and Rural Affairs) who consistently refused interview requests. Similarly, the central offices of the MMO (Marine Management Organisation) were similarly reticent. Fortunately, two local MMO officers agreed to be interviewed under conditions of anonymity. Marine Scotland, the Scottish Government department responsible for marine and fisheries management, were extremely amenable, allowing access to a large amount of information.

Parallel to this, statistical data published by the Marine Management Organisation (MMO, the UK governmental body responsible for fisheries) was analysed. Information gathered during fieldwork showed that these data were often inaccurate (some boats, for example, would be missing from certain species-based licensing lists), so before use it was cross-referenced with data provided by Fish Producer Organisations, local Inshore Fisheries and Conservation Authorities, and Regional Fishermen's Associations.

Four Freedom of Information (FoI) requests were submitted to the MMO, requesting access to data that were not publicly available. The first of these was to query a

common claim made by fishermen that UK fishers would benefit from having a delineated UK fishing territory (an exclusive economic zone – EEZ – as described by the United Nations Convention on the Law of the Sea), rather than belonging to the European “common pond” which allows all members of the EU equal access to European waters based on historic catches and quota purchases (depending on the national management regimes of the EU state in question). I therefore requested a spatial disaggregation of catches by British vessels in order to establish the percentage of total UK landings that were caught within what would be the EEZ boundary. This was provided in August 2012. These data were not used in the final thesis.

The second FoI request was for a list of UK vessels currently licensed to fish for pelagic species, so a statistical analysis of the size of the pelagic fishery, which is run under a more rationalised market-based system than the demersal fishery, could be carried out. This was provided in October 2012, and was used to inform paper 2.

The third FoI request was for the number of vessel owners prosecuted for illegal fishing since 2005 (when a regulation requiring every fish is recorded at point of first sale was introduced), the size of their vessels, and the quantity of the illegal catch. This was refused on the grounds of catch quantity being too onerous for MMO staff to transcribe, and a revised request asking for only the number of persecutions and the vessel size was submitted. This was again refused on the grounds of data protection.

The fourth FoI request was for a list of active small-scale vessels fishing against quota species, in order to query the claim made by small-scale fishers that they were allocated an unworkable amount of UK quota (to inform paper 2). This request did

not receive a response, but an interviewed quota manager provided a similar dataset (created by the MMO) for one year only (2010).

Emergent research themes and outcomes

Bearing in mind the original aims of the research were to understand the mechanics and impacts of the UK market based management system, and to establish what this could tell us about ITQ and market-based management more widely, four research themes emerged from the research process. These were based on the attitudes of interviewees as to the most pressing aspects of ITQ management, and their originality and significance as potential contributions to the wider literature. These were:

- 1. The disjoin between the economic theories that informed the creation of the market and fishers' experience of market-based management.**
- 2. The problems of centralised governance.**
- 3. The unintended and unexpected consequences of the application of market-based management that had as yet been unrepresented in the academic literature: particularly the change in firm structure, issues of allocation, dynamic efficiency and new entry and intergenerational change.**
- 4. The disjoin between the economic foundations of market-based policy and the way fishers conceived of the sea and conservation.**

These four emergent research themes informed the four papers that now follow.

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Chapter 1

Invisible fishermen: The rise and fall of the British small boat fleet

Chapter originally published in the book Schriewer, K. and Højrup, T. (eds.) *European Fisheries at a Tipping Point*. Universidad de Murcia, Murcia (2012).

Market-based fisheries management strategies such as individual transferable quota (ITQ) have been celebrated as a panacea for falling stocks and fisheries collapse in marine ecosystems around the world (Costello et al. 2008). By applying the principles

of economic theory to fisheries policy, market-based management is argued to work with fishers' preferences and values, not only leading to the most efficient exploitation of marine resources, but also contributing to stewardship, sustainability and conservation (Grafton *et al.* 2000; Rogers, 2000). A wide body of research exists, however, that disputes this claim, usually from social and environmental perspectives (Carothers and Chambers, 2012).

This thesis chapter is an updated version of a paper originally published by Editum, the University of Murcia, in 2012 in the volume *European Fisheries at a Tipping Point*, edited by Klaus Schriewer and Thomas Højrup. At the time of the book's publication, the European Union Common Fisheries Policy was being reformed (the reform was completed and implemented in January 2014). One of the primary proposals for reform presented by the European Commission was the introduction of mandatory individual transferable quotas (ITQs) across the European Union. In response to this key proposal for reform, the editors of *European Fisheries at a Tipping Point* compiled a selection of papers presenting national experiences from a range of European nation states focusing on the effects and impacts of market-based management, either actual or potential.

In *Tipping Point*, the chapter looked at the combination of two central proposals for reform of the CFP: the introduction of mandatory ITQ for larger vessels and the attempts to stymie the well-recorded social impacts of market-based management by creating a differentiated regime for small-scale fleets. Since the introduction of logbooks in the 1980s, the UK has operated a differentiated regime for large- and small-scale boats. The 2009 CFP reform proposals suggested that such a

differentiated regime be made compulsory for European member states. This differentiation, however, alongside the particular nature of market-based fisheries management, led to a number of issues for UK fisheries management that were not predicted by economic theory.

The problems of fleet differentiation in practice are presented in detail here. Alongside this is a detailed description of the evolution of the UK market-based management system. This is something that, due to the informal nature of UK fisheries management (and subsequent lack of official literature), required extensive fieldwork to compile. Because of this, little literature currently exists on the UK system. An example of this lack of official data is the deficiency of accurate information about the UK in the world's most comprehensive online global database of market-based management, EDF's Catch Shares Design Centre¹.

The version of this chapter that was published in *Tipping Point* in 2012 has, for this thesis, been updated to include key political developments occurring in the two years since 2012. These include devolution of management within the UK, and a significant court case on quota allocation. As such, this chapter presents a complete history to the present day of the evolution of the UK's market-based fisheries management system, providing a thorough background for the issues discussed in the remainder of this thesis. It also presents an original critique of the theoretical basis of market-based environmental management that is relevant both to fisheries worldwide and other environmental fields.

¹ see <http://catchshares.edf.org/database>. Last accessed 17th September 2014.

Contributions to the literature and original arguments

- *First thorough explanation of the development of the UK's market-based fisheries management system from the 1970s until the present day.*
- *Original critique of the use of fleet differentiation policies to mitigate the social impacts of market-based fisheries management.*
- *Original critique of application of Coase theorem to market-based environmental management, and the implications of human rights and case law for this.*

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Invisible fishermen: The rise and fall of the British small boat fleet

Emma Cardwell

School of Geography and Environment, University of Oxford

According to economic theory, the initial allocation of fishing rights should not matter, as over time the market mechanism will ensure optimum allocation. In the face of evidence from market-based fisheries management systems, economists have argued that jobs and businesses have been lost and fishing rights consolidated in a small number of hands simply because this is the most efficient structure for the industry. In the lead up to the latest reform of the Common Fisheries Policy, the European Commission accepted this argument and supported market-based management with the suggested addition that smaller operators be protected from the vagaries of the market (and their own inefficiency) by creating a differentiated, non-market system for smaller boats. The United Kingdom presents an important case study for this management approach, as it has operated a market-based fisheries management system with a differentiated, non-market regime for smaller boats since the turn of the 21st century. This chapter discusses how this differentiated regime originated, the consequences it has had for the UK fishing fleet and national fisheries management, and what this can teach us about implementing market based environmental policy.

Key Words: Fisheries; Common Fisheries Policy; Britain; United Kingdom; Individual Transferable Quota; Rights Based Management; European Union.

1. An allocative case study: the United Kingdom

In the United Kingdom of Great Britain and Northern Ireland, the vast majority of the commercial fishing fleet is small boats. In 2010, approximately 78% of the fleet (5,047

licensed vessels) were registered as under ten metres long (MMO 2010). These small boats, commonly referred to as “under-tens”, usually fish in inshore areas close to the coast, and employ over half of United Kingdom (henceforth referred to as UK) fishers, along with providing a number of onshore jobs (MMO 2010; EFRA 2011). Despite this under-ten sector making up the best part of UK fishing vessels and fishing jobs, the vagaries of the UK management system deny these vessels the right to catch all but a tiny proportion of the UK’s annual fish landings.

Fisheries in the UK are managed under the European Common Fisheries Policy total allowable catch (TAC) regime. The UK government allocates the total allowable catch assigned by Europe among fishers using a fixed quota allocation (FQA) system. This quota system grants temporarily stable rights to the owners of fishing boats to catch a certain proportion of the TAC of a given fish species in a given area of sea. Small fishing vessels, despite being the UK majority, have a much smaller proportion of the UK TAC than larger boats. The amounts in question are significant: in 2011, the 78% of vessels under ten metres long were given the right to catch approximately 1.2% of the UK catch in ICES area IV (the North Sea) and about 7% of the UK catch in ICES area VII (the English Channel, Western approaches, Celtic sea and Irish sea): the areas where they are most numerous. The remaining 98.8% and 93% of fishing rights in these areas all go to a small number of larger boats.²

To further compound these differences, unlike larger vessels, the management system for fishers operating from smaller boats is extremely inflexible. The UK government sets

² UK quota allocation data from the UK Marine Management Organisation, Quota Allocations 2011. Available from Internet: www.marinemanagement.org.uk/fisheries/management/quotas_allocations.htm [date of access 12-5-2012].

under-ten quota limits on a monthly basis, with no input from fishers. Any quota that remains unused at the end of the month cannot be carried over for future use. Under-ten fishers are subject to criminal punishment if they break the strict terms of their quota allocation. For most of the over-ten metre sector, however, quota is organised in a far more sympathetic way. Management is devolved to industry associations (Producer Organisations, POs) that allow flexible annual take-up of quota. Within the PO system, individual vessels are dealt with internally, and rarely subject to criminal prosecution for exceeding quota allocation.

Those in the small-scale under-ten sector complain that this fleet differentiation illegally and unfairly discriminates against smaller boats, denying small-scale fishers the right to work, and subjecting them to an excessively punitive and unjust management system. They argue that the Government quota allocations to small-scale fishers ignores their historic rights, prevents them from earning a living wage, yet concordantly grants fishing rights for free to their larger scale contemporaries.

This chapter presents the story of how this conflict-of-scale in UK fisheries management developed, and provides a cautionary tale about potential perils of allocation in a rights based fishery. This questions the economic orthodoxy as to the non-importance of allocation in a newly created market. It also flags up some of the issues with what should be a simple protective mechanism in a market-based fishery: the creation of a differentiated non-market regime for small-scale fleets.

First, I present the economic theories that inform the accepted narrative of efficient allocation in a market-based system. I then move onto the case study, explaining the origins of the UK quota system in the Common Fisheries Policy (CFP), and the

statistical record keeping introduced for fishing boats by Europe. I discuss the gradual devolution of UK management to industry bodies in the large-scale fleet, and how this impacted on the small-scale fishers still subject to centralised planning. The regulatory approaches to the under-ten fleet are discussed, and what these meant for the changing structure of the industry and fortunes of its members. Finally, recent government attempts to ‘correct’ the problems of quota allocation – and the legal challenges these prompted - are outlined. The problems faced by the UK government in quota allocation, and the lessons these provide for other fisheries administrations implementing a rights-based management system, are then discussed.

2. Market-based management and efficient allocation

Market-based environmental management approaches, such as individual transferable quotas (ITQs) in fisheries, are uniquely economic in their approach to the world. Economists argue that to manage fisheries in line with economic principles will increase the efficiency, productiveness and value of the fishery, as well as promoting stewardship, rewarding the most efficient (and thus most deserving) fishers, and allowing for long-term sustainable use of a renewable resource (Hannesson, 2013). Of course, these concepts can be critiqued: increasing the value of a fishery essentially means extracting a ‘rent’ (a price on exclusive use) from the resource, and someone, somewhere must pay this rent: rent is thus both an input and an output, depending on your position in the exchange. Increasing the efficiency of a fishery, in economic terms, simply means a shift in the ratio of inputs to outputs. In a market-based fisheries management system, the primary input to be effected is hands-on-deck employment, with a large number of people losing work while the increased wealth of the fishery accrues in a few hands.

A decrease in employment, and a consolidation of small businesses into a small number of larger companies, has been well reported in fisheries where ITQ have been implemented (Yandle & Dewees, 2003). Considering these issues, it is no surprise that the social impacts of market-based fisheries management have been widely criticised (McCay, 1995). Economists, however, have often brushed off these criticisms with the argument that high employment in fishing communities simply represented an inefficient use of resources, and thus negative social impacts are a crucial part of the rationalisation and modernisation of the industry. These arguments suggest that these negative social impacts were not only predicted by the economic theory, but are a necessary evil on the path to improved economic productivity, suggesting fears for jobs and traditional industrial organisation in coastal communities are nothing more than soft-headed sentimentalism (Hentrich & Salamon, 2006).

The economic argument behind these assertions is explicitly ethical. It is a claim that although fishing rights tend to concentrate in the hands of only a small number of people, these people are justly deserving of their new found wealth, as the market rewards those who operate best and most efficiently. This moral stance is vital for the justification of market-based management, and the corresponding dismissal of fears about the privatisation of the sea and destruction of coastal communities. But what is this moral stance on efficient market allocation, which is so important in the defence of market-based management against its critics, based upon?

According to economic theory, the market will allocate the right to fish (or pollute, or exploit biodiversity) in the most efficient and just manner. This is because under a market based system, those fishers working most efficiently – and thus making the most profit – will be best able to purchase more fishing rights and consolidate their holdings.

The ‘worse’ fishers, in comparison, will be forced to sell their holdings, as their lack of profit from this fishery is a direct proxy for their poor performance. In its allocation, the market mechanism thus rewards good fishers and punishes bad.

However, a market does not spring up from nowhere, and the creation of a new market-based system usually necessitates the creation of an exclusive property right where none existed before. This exclusive right must then be *initially* allocated before the market takes over. Common sense would suggest that this initial, non-market allocation may have some impact on the later distribution of rights, negating the ethical justification of market-based management as a purveyor of ‘fair’ allocation to the deserving, and providing a windfall profit to whoever is rewarded an initial allocation (McCay, 2004).

The knotty problem of allocation was recognised by economists decades ago, then ostensibly solved by Ronald Coase in a seminal paper published in 1960 and acknowledged by a Nobel prize for economics in 1991 (Coase, 1960). In ‘The problem of social cost’, Coase gives as example a number of legal cases delimiting rights between two conflicting parties in cases where the activity of one causes nuisance to the other. Coase argues that the best allocation of liability (and thus the best allocation of rights) is a purely economic one: whichever allocation of rights or liability produces the greatest profit (termed by Coase as the optimum ‘value of production’), regardless of to which actor the profit accrues, should be chosen.

Coase does provide a brief caveat (in a line on page 43) that consideration of wider effects beyond the market-set value of production would be desirable, and that the allocation of rights is essentially a moral choice. He also discusses the difficulties in assigning rights and liabilities in detail. However, the ‘Coase theorem’ (Stigler, 1966) that

grew from this paper and is now an integral part of undergraduate economics courses departs drastically from this nuanced proposition. The Coase theorem as widely recognised today simply states that in the absence of transaction costs (so on a perfect market) it doesn't matter where rights are initially allocated, as the market will ensure the most efficient allocation in the long run. Thus the Coase theorem is commonly taken as 'proof' in economics that the allocation of resources is independent of the initial assignment of property rights (McCloskey, 1998).

The Coase theorem was perhaps so popular in its revised form as it allowed the difficult ethical problems of allocation to be disregarded, setting a 'value-free' (and easy) guideline for allocation. This has been vital in the creation of markets for previously common environmental goods, such as fishing rights. Based on the Coase theorem, economists can argue that primary allocation of fishing rights is essentially irrelevant to the impacts of the creation of a new market, and that regardless of allocation, the outcomes of a market-based policy will be optimal (Montgomery, 1972).

In the face of this 'optimal' allocation, economists can argue that it is a sad necessity that smaller, less efficient fishers will eventually be forced out of the industry. These social costs are justified in the face of the overall increase in productivity and efficiency that the economic theory promises (Kulmala *et al.* 2007). Despite the loss of smaller fishing businesses being entirely defensible from within economic dogma, a number of case studies of market-based management have made clear the social upheaval this causes (McCay, 1995; St. Martin, 2007). In the face of these criticisms, in the latest round of Common Fishery Policy reform the European Union suggested that a differentiated small-scale fleet be created Europe-wide, where social considerations (community cohesion and local jobs) could be prioritised over the rules of economic efficiency that

were to govern the large scale fleet, protecting the ‘inefficient’ small scale fleet from proper market competition. The UK case study below discusses just such a case of the introduction of market-based management, with a differentiated small-scale fleet ‘protected’ from market forces, and highlights some of the issues with this approach.

3. How it all began: the Common Fisheries Policy and the origins of the UK quota system

When UK politicians were negotiating entrance to the European Economic Community (which became the European Union in 1993, and is henceforth referred to as the Community) in the period from 1970 to 1972, fisheries were an important national interest. During the negotiations on the form of the fledgling European Common Fisheries Policy (CFP), UK representatives were primarily concerned with calculating what the benefits would be of allowing common access for all European fishing boats to UK inshore waters (O’Neill 2000).

European common access “up to the beaches” (meaning all Community boats could fish in all member nations’ waters) would disadvantage the majority fleet of smaller boats by increasing competition in the UK’s fertile coastal zone, but would also allow domestic large-scale, distant-water fleets corresponding access to other Community members’ shores. As a series of islands, the UK has some of the most productive fishing grounds in Europe, meaning common access up to home beaches would be a significant concession to other European states. However, the advantages of corresponding access to the rich Norwegian waters, and the fisheries controlled by Denmark in Greenland and the Faroe Islands, would greatly benefit the domestic distant-water sector.

At the time of negotiation, the UK had one of Europe's most significant distant-water fleets. As national sovereignties were claimed over the sea through Exclusive Economic Zones through the late 1970s and early 1980s, the potential fishing opportunities for these large, mobile distant-water boats had diminished dramatically (Symes 1992). The UK government predicted that under current circumstances, the benefits of Community membership extending distant water opportunities in Norway, Greenland and the Faroe Islands would result in greater economic returns than those that would be conferred by limiting foreign access to domestic waters (O'Neill 2000). Notwithstanding, it soon became clear that the domestic political mood was very much against common Community access to UK inshore waters. Inshore fishers were far more numerous than distant-water fishers, and local politicians and a number of voters vocally demanded that full national fishing rights up to twelve nautical miles from the coast should be retained, and ideally extended to fifty.³

In 1972, the existing members of the European Community agreed on a suggestion by UK politicians that national fishing limits would temporarily be granted for the area up to six nautical miles from national coastlines, moving out to twelve nautical miles for areas of specific local concern, although the historic fishing rights of some foreign boats would be recognised in this six to twelve nautical mile zone. Common access to fisheries however remained the mandate of the CFP, and these temporary national limits were to be reviewed ten years after the inception of the policy (Churchill & Owen 2009; O'Neill 2000)⁴. With this suggestion, UK delegates were attempting to appease both the inshore, small-boat fishers' desire for coastal waters to be protected from foreign ingress, whilst

³ HC Deb, 09 December 1981, vol. 14 cc877-921. The 12nm limit had been in place since the 1964 European Fisheries Convention.

⁴ See Council Regulation (EEC) No 170/83, Article 6, also Regulation (EEC) No 2141/70.

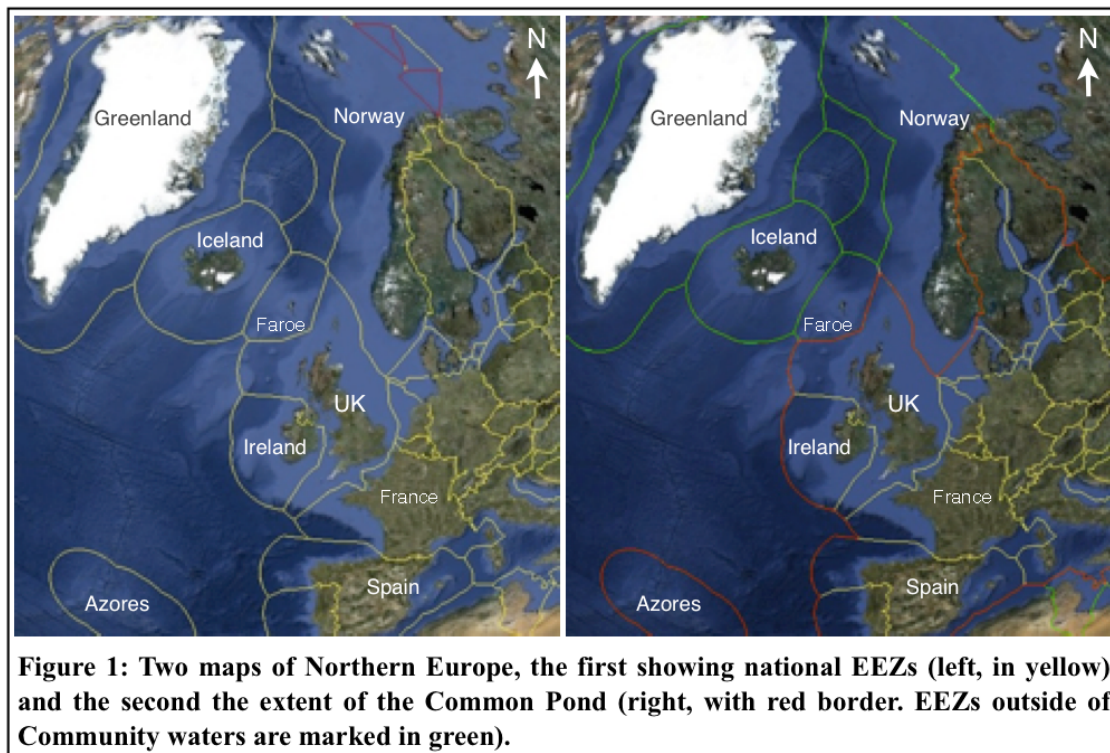
still supporting the interests of the distant-water fleet who were especially keen to regain previously lost access to Norwegian waters.

The fishery-dependent Norwegians, however, saw the common-access basis of the proposal as a betrayal by the UK delegation, whom they had thus far considered to be Community allies in fighting for national control over coastal fisheries. Norwegian delegates demanded a permanent twelve nautical mile exclusion zone, as per the conditions of UNCLOS⁵, and when this was refused, eventually withdrew from the Community negotiations taking their fertile waters with them (Churchill & Owen, 2009). To this day, Norway remains outside of the European Union. UK distant-water fleets thus achieved no access to Norwegian waters from the CFP. On top of this, the Danish waters around the Faroe Islands and Greenland were also unforthcoming: Denmark declined to extend the CFP to the Faroe Islands, leaving their waters outside of the community pond. Greenland was granted full restrictions on Community fishing until 1982, at which point its citizens voted to leave the European Community, before foreign fleets could harvest their waters (Leigh 1983).

By 1973, without Norway, Greenland and the Faroe Islands, the European common pond presented disappointing fishing opportunities to the UK fleet (see Figure 1), with existing Community waters considered to be mostly over-fished (O'Neill 2000). The negotiations over the common pond had thus not solved the problems of the UK's large-scale, distant-water fleet, which had been locked out of vast areas it used to harvest. These had now become foreign fishing grounds with the introduction of national

⁵ Third United Nations Convention on the Law of the Sea, Part II, Articles. 2-33. See also the European Fisheries Convention (1964), Articles 2-5.

Exclusive Economic Zones, and the Common Pond had not provided the access to these that the UK delegation had hoped.



In the Community negotiations to set up a total allowable catch (TAC) system under the CFP, UK delegates argued that the recent misfortunes of the distant water fleet should be taken into account in the division of Europe's fishing opportunities between member states, and that these should be calculated not just from a historic fishing record (based on a reference period of recorded catches), but also with reference to the losses to national fleets under legislative changes to access, and furthermore the special needs of certain fisheries-dependent regions, such as the remote Shetland Islands. The Community agreed to these propositions, suggesting a preferential quota allocation for the UK. British fishers however have questioned the validity of the track records used to establish the UK's historic rights, because of the paucity of reporting requirements and a

culture of underreported catches.⁶ UK Government records during early CFP quota negotiations in 1980-1982 show some controversy about how beneficial European quota allocations were for UK fishers, and this controversy has continued into the 21st century.⁷

4. The introduction of logbooks under the CFP

Conversely, the Community's legislation that fishing boats must keep logbooks to record the time, place and quantity of catches⁸ of quota stocks was entirely uncontroversial. Both fishers and politicians were unanimous in their favour of logbooks, principally because of fears that the impending accession of the huge fishing fleets of Spain and Portugal into the Common Pond would increase overfishing. This is because Spanish and Portuguese seas, with a shallow continental shelf, offered little local fishing opportunity, with much of the huge Iberian fleet dependent on (now lost) distant water opportunities.

With Spanish and Portuguese accession, an only marginally increased TAC would be shared between a fleet almost doubled in size, and the resulting desire among existing CFP members was to tighten the regulation of the expanded Community as much as possible before Spain and Portugal were granted voting rights. By this point, many British fishers felt that without the waters of Norway, the Faroe Islands and Greenland, the CFP essentially consisted of all of Europe fishing in British and Irish waters (O'Neill 2000) and were thus keen for stringent rules and as much Community policing as possible.

⁶ UK fisherman (anonymous), personal communication, 2011; UK fisheries enforcement officers, personal communications, 2012.

⁷ See HC Deb, 26 November 1980, c526; HL Deb, 22 October 1980, vol. 413 cc1937-97; HC Deb, 09 December 1981, vol. 14 cc877-921.

⁸ Commission Regulation (EEC) 2807/83

The Community brought in the first logbook requirement in 1983, pushed through before the accession of Spain and Portugal. At this time, the principal aim of the legislation was to police the large fishing vessels operating in the economically important North Sea and Western Waters (an area of the North Atlantic off the west coast of Scotland). The regulation was not intended to apply to the Mediterranean Sea, which operated in a different environmental and economic climate with a large number of artisanal, small-scale boats making relatively small catches.

The European Commission thus decided that in order to avoid onerous reporting requirements for Mediterranean administrations⁹, there should be exemptions to the logbook requirement for small vessels and those engaged in inshore fishing. Taking into consideration the sizes of vessels operating in the Mediterranean and those they were keen to police in the North Sea and Western Waters, the Commission set a lower limit of ten metres for the logbook requirement¹⁰.

This logbook requirement was transposed to UK law in 1985. It marked a significant change in catch recording in the UK, which up to this point had been somewhat cursory. Before logbooks, fish landings at major ports were recorded for annual national statistics by monitoring markets. For smaller ports, casual workers were employed by the Ministry of Agriculture, Fisheries and Food¹¹ to collect landings data on an *ad hoc* and irregular basis.

⁹ European Commission staff, personal communication, 2010.

¹⁰ See Commission Regulation (EEC) 2807/83, Annex IV, 2.1.1.1

¹¹ The Ministry of Agriculture, Fisheries and Food (MAFF) became The Department for Environment, Food and Rural Affairs (DEFRA) in 2001.

5. The role of producer organisations in UK quota allocation

As fishing vessels over ten metres long across Europe became more heavily regulated under the Community logbook requirements, the fishing industry in the UK searched for ways to improve the management of the quota system. The UK had a history of quota management for some stocks under the North East Atlantic Fisheries Commission (NEAFC), but the introduction of the CFP in 1983 dramatically increased the number of stocks subject to quotas (Hatcher *et al.* 2002). Monthly landing limits were gradually applied to all fishing for quota stocks by every boat that kept a logbook – all those that were over ten metres long.

In the early days of the CFP, many larger vessels had joined Producer Associations (POs). These voluntary associations of fishers and vessel owners were first set up under EC legislation in the early 1970s as marketing organisations¹², and to undertake any other activities that would ensure fishing be carried out “along rational lines” (Council Regulation EEC No. 3796/81), but they did not take a direct role in fisheries regulation.

In the early 1980s, in response to the monthly landing limits set for quota species, the Shetland Producer Organisation asked the UK government if it could be allowed to manage its own quota. As a series of islands far from the mainland, Shetland had a very self-contained fishing industry, and centralised management from a distant Westminster felt unsatisfactory. In April 1984, the Shetland PO was given permission to manage its own quota of area IV and VI (North Sea and West of Scotland) haddock, which was around 6.5% of the UK haddock allocation. Other Producer Organisations and the government supported this move, keen to see how an experiment in devolution would

¹² See Council Regulation (EEC) 2142/70.

work. The allocation went smoothly, and devolution was deemed a success. Gradually other UK POs followed suit, and more and more fish stocks were devolved to local PO management.

Not all boats were members of POs, however. Membership of a PO was optional, and in the early days of POs as marketing bodies some fishers considered them simply perfunctionary, and saw PO leaders as receiving money from fishers' membership fees yet contributing little in return. As quota management devolved, these non-PO-member vessels were left under the supervision of the government. The gradual devolution of quota management therefore saw UK over-ten metre boats split between two different management regimes: the PO members became known as "the sector" and vessels still managed by the government "the non-sector".

Many (government managed) non-sector fishers were critical of the differentiations in regime that were forming between themselves and the (PO managed) sector. Boats in POs were frequently allocated more quota than the non-sector, mainly because of more sensitive management, though an editorial in *Fishing News* (the UK's commercial fishing magazine) also attributed this to an attempt by the UK government to step out of quota management altogether by encouraging boats to join POs (*Fishing News*, 8th June, 1984). Angered by the Government's unfavourable allocations, one non-sector skipper in Peterhead publicly declared in June 1984 that he would break his 30 tonne cod quota in protest of the fact that the other half of his pair trawl (where two boats pull one net), whose skipper was a member of a PO, had received an allocation 50% higher than his own. Despite personally contacting the Ministry for Agriculture, Fisheries and Food to register his intended offence, he was not prosecuted.

At this point in the development of the differentiated quota system, the size of boats was not a hot political issue. Under ten metre vessel fishers did not have to record landings or stick to monthly catch limits, and were largely considered to operate outside of the quota management system, and as absent from the quota debate. Differentiation was instead developing between the sector and non-sector vessels in the quota-based management of over-ten metre boats, all of which were subject to logbooks and quota limits.

A large number of government managed non-sector boats tried to join POs, to take advantage of the preferential quota management regime they offered. PO management was a far more flexible and economically viable option, as the Government managed the non-sector allocations with little flexibility, and criminal charges could be brought against any fisherman going over their quota allocations. Within a PO, any fisherman catching more than his allocation would only be punished by the PO, and not by civil sanctions (Goodlad 1998). These departing boats took their track record, and therefore associated quota allocation with them, and as catch statistics and quota allocations were imperfectly matched, the pool of quota remaining in the non-sector began to decrease far more rapidly than the reality of non-sector catches.

Alarmed by the diminishing amounts of quota left in the non-sector pool, the government “underpinned” non-sector quota in 1995 to prevent boats leaving with their quota and the non-sector pool falling to an unworkable amount. By 2010, in a total of 1,430 UK boats over ten metres long, there were roughly 490 in the over ten-metre non-sector. Many of these remaining non-sector boats are now unable to join POs, which are unwilling to accept new members unless they bring quota allocations with them. A number of these switched to fishing for non-quota species, such as crabs and lobster.

6. The growth of a market for quota

Through the 1990s, quotas were annually allocated to fishing vessel owners based on a rolling three-year track records, and these were managed, in the sector at least, by the POs. Fishers' desires for in-year flexibility meant that an unofficial market for quota grew throughout this period. A number of moves by the UK Government enabled this nascent market. In 1993, the Government granted POs the permission to trade quotas, and in 1994, to retain the track records of member vessels when their owners surrendered their licences. The POs at this point had a variety of ways of managing quota: it could be kept in a pool, be allocated per-man, or administered with a mixture of different management methods, but the allocation of individual tradable quotas was increasing in popularity (Valatin 2002).

Quota trading became more popular after 1996. In order to save money on expensive decommissioning payments, the government instead allowed individual owners of decommissioned vessels to retain their quota and lease to other vessels or transfer it to other boat owners (Hatcher *et al.* 2002). In 1998 and 1999, in a move contested in some corners as potentially illegal market interference, Shetland Council took advantage of this ruling by spending £5.8 million purchasing quota from the owners of decommissioned boats, so fishing rights could be managed by the Shetland PO and prevented from moving outside the Shetland Islands (Valatin 2002).

In light of the growing quota market, and in an attempt to simplify the quota management system, the UK government set fixed quota allocations (FQAs) in 1999. This move was intended to prevent fishers from over-declaring catches in order to inflate their track record and acquire more quota, which had now acquired a market price. It

also granted fishers long term stability in quota holdings. These fixed allocations were, for most quota species, based on a reference period of catches made from 1994-1996. FQA units were attached to fishing licences, and were not supposed to be transferred: there was no intention to create an individual transferable quota (ITQ) system. The fixed quota allocation simply established a permanent basis for the proportion of the UK's catch that would be henceforth shared between fishing vessels, and importantly, between POs (taking into account quota sales and potential entry or exit of vessel owners), the non-sector, and the under-ten metre fleet.

The introduction of FQAs is now seen as an important turning point in UK fisheries management. Informal trading of quota units was common, and the market that developed in the years since 1999 had many characteristics of an Individual Transferable Quota System. However, there were important differences. Fixed Quota Allocations were just that – fixed – and the Government stated that in 1999 there was no intention that FQA be treated as possessions by vessel owners or traded¹³: as such, FQAs were officially non-transferable. Legal agreements were however administered by POs and vessel owners to transfer quota, and importantly these were recognised by the Government in successive rounds of reconciliation, whereby FQA allocations were periodically adjusted to acknowledge these transfers. These reconciliations facilitated a market, and the growth in the treatment of quota as a commodity.

Despite statements about their official intention on introducing FQAs, the UK Government's response to quota trading was highly ambivalent. In 1999, at the introduction of FQAs, a House of Commons Select Committee inquiry noted that quota trading did occur, and at a large scale: the market was estimated to be worth about £1

¹³ Personal communication, Scottish government representative, 2014.

billion annually, but the report stressed that what was being exchanged in the legal agreements was not a property right.¹⁴ The Government both ratified these transactions and indicated that FQA allocations could be used as collateral assets. Meanwhile Elliot Morley, who was Fisheries Minister when FQAs were introduced, stated that title ultimately remained with the state. After consultation with the fishing industry, it was decided in 2002 that FQAs could be transferred separately from vessel licences in limited conditions only (such as if a vessel sank or was decommissioned), and could not be removed from an active licence.

Despite these stringent limitations, the Government also gave the nod to the idea that FQAs were assets, and also implicitly approved unofficial quota trading. Since the 2003 Shetland Council state aid decision (in which Shetland Council purchased quota from decommissioned boats, in a move that was considered to be illegal state aid by the Commission) Capital Gains Tax had been payable on quota holdings as chargeable assets.¹⁵ Aware trading was continuing in the form of legal agreements (in which FQA owners agreed to an ongoing and indefinite ‘swap’ of their annual quota entitlements with buyers) the government also conducted three reconciliation exercises to allow for the transfer of FQA entitlements: in 2002, 2005 and 2011. This first round of government sanction for quota trading piqued the interest of private investment firms, two of which entered lengthy negotiations with a fishing industry quota management company in 2002¹⁶. The uncertainty around quota entitlements however discouraged external investors, and eternal financial speculation has not so far been a feature of the UK quota market.

¹⁴House of Commons Select Committee on Agriculture 8th Report, Sea Fishing, HC 141, published on 5 August 1999.

¹⁵ See 2003/612/EC. also the Taxation of Chargeable Gains Act 1992, s. 21(1)(c) and s. 155

¹⁶ Quota trading company manager, personal communication, 2014.

The banking and finance sector did however have a part to play in the commodification of quota allowances. Despite periodic Government reiterations that quota allocations did not amount to private property, the stability introduced with FQAs was recognised by banks, which allowed many fishermen to use their quota allocations as collateral. There were two large decommissioning rounds, in 2001 and 2003, in which (similarly to 1996) vessel owners were allowed to keep their FQA allocations in lieu of a decommissioning payment for the destruction of their fishing boat. A number of these vessel owners, particularly in the larger scale Scottish fleet, had bank debts to service; these were paid off in FQA units, leaving some banks (markedly the Scottish giants Bank of Scotland, RBS and Clydesdale) in ownership of significant FQA units, which were in the main sold to other fishing and vessel management companies.¹⁷

The potential financial gains offered by the newly commoditised FQAs, combined with the pressures of ever lower annual TACs being set by Europe, led to a significant number of large scale boat owners either cashing in their quota allocations or tying up their boats and choosing to rent out quota to non FQA holders in the early years of the 21st century. Between 1996 and 2006, the number of vessels in the UK over ten metre sector dropped by 40% (Marine and Fisheries Agency, 2007), a statistic that does not take into account those boats still registered but no longer fishing. A new class of “slipper skippers” was created: retired fishers who no longer fished but made a good income from leasing or selling the quota entitlements granted to them as FQA in 1999.

¹⁷ Quota trading company manager, personal communication, 2014.

7. The Rise of the Under-Ten Fleet

During the period that over-ten metre vessels were greatly reducing in number, under-ten vessels were flourishing. In the first decades of the CFP, monitoring of under-ten vessel catches was still somewhat *ad hoc*. Many small boats did not need a licence until 1993; they had to submit neither logbooks nor landings data, and were only formally represented in quota calculations by the inclusion in national statistics of a nominal figure estimating under-ten catches of TAC species, which were considered to be minimal (Hatcher *et al.* 2002). The small-boat inshore fleet was all but unregulated by the CFP, and was largely absent from the quota debate (Symes 2002; Hatcher & Cunningham 1994).

This exclusion of smaller boats from the regulations of the CFP was entrenched in 1993 by the European Commission's Council Regulation 2847/93, which confirmed that boats under ten metres would not require logbooks. Indeed, the quota system was considered of such little import in the day-to-day management of under-ten boats in the UK that a comprehensive study of inshore management, published by English Nature in 2002, barely mentioned the quota regime at all (Symes 2002). All boats fishing inshore (which covered the vast majority of under-tens) were instead subject to a series of bylaws and controls exercised by local Sea Fisheries Committees (SFCs, which became Inshore Fisheries and Conservation Authorities, IFCAs, in 2009), localised bodies with the legal capacity to manage inshore waters around the United Kingdom. These SFCs chiefly regulated stocks through area closures and gear restrictions, and mainly focused on shellfish species.

As the quota system developed for boats over ten metres, the catching power of the laxly regulated under-ten fleet gradually expanded. With one eye on regulatory changes in the large-scale fleet, fishers had rushed to claim licences for under-ten metre boats while they were given out freely, fearful of losing the chance thereafter. As the rules and regulations for larger boats increased, some boat owners sold their over ten metre vessels (and associated quota rights) to buy under-ten boats that would allow them virtually unregulated fishing access. This course of action was particularly attractive to the non-sector, over-ten metre boat owners who were subject to stringent monthly catch limits and a less favourable quota regime than their colleagues in POs. The unregulated under-ten fleet, however, was potentially attractive enough to tempt members of POs to sell their quota allocations and buy an under-ten vessel that had no quota restrictions beyond temporary area closures (Oliver 1998).

As this period of minimal regulation for small boats developed, a number of newly designed under-ten boats came to be referred to as “super under-tens”, or “rule beaters”. Rule beaters were vessels engineered to have the greatest possible catching capacity – “as wide as they are long”, as one fisheries enforcement officer described it - without breaking the ten metre mark, so still coming within the more relaxed management regime of the inshore fleet (see figure 2). By 2012, vessels between 9.5 and 10 metres long were catching significantly more fish by volume than the rest of the under-ten fleet combined.¹⁸

¹⁸ See [2013] EWHC 1959, Case No: CO/4796/2012



Figure 2: A Norfolk rule beater: a trawler under 10 metres long with the catching capacity of a much larger vessel.

8. The fall of the under-ten fleet

Concomitantly with the introduction of FQAs for large scale vessels, between 1998 and 2002 fears for stocks led to huge cuts in European TACs. Quotas were reduced severely for the over ten fleet, and aware of the vast discrepancies in regulation between the sectors, MAFF (which became DEFRA in 2001) began to tighten their controls on the hitherto largely unregulated small scale fleet. At the end of 1999, the first monthly catch limits were set for under-ten boats, on North Sea nethrops (also known as langoustine or scampi). Over the next few years these catch limits were gradually extended to all quota stocks (Hatcher *et al.* 2002).

The enforcement of these monthly limits was highly problematic for the under-ten sector. Firstly, the original quota allocation to under-tens had not been based on historical catch or track records, but on the nominal estimations made by the

government in the absence of landings data: the reason, they considered, for the “gentlemen’s agreement” regarding the non-enforcement of quota limits. Furthermore, unlike in the over-ten metre fleet, there had been no state-sponsored decommissioning for the under-ten sector. Capacity, especially among the high catching rule beaters, had actually increased, as had catching power.

The management regime adopted by the newly stringent MAFF/DEFRA was, in comparison to POs, very unfavourable (as discussed in section 5). Monthly catch limits were inflexible, remotely set on the basis of computer modelling carried out by government statisticians, with little transparency for fishers. There was little sensitivity to regional variations in seasonal catches. The complicated process of allocation meant that fishers could sometimes be left not knowing the annual monthly limits until as late as April, May or even June, fishing on guesswork in the interim (Oliver 1998). In the absence of logbook records, the limits were policed through random sampling of catches (DEFRA 2009), although the 2005 introduction of the European Registration of Buyers and Sellers legislation, which recorded fish landings at first sale, greatly increased the catch data for under-tens. Under-ten fishers would be subject to criminal prosecution if they exceeded their quota limits. As under-ten boats could not remove a quota allocation from the government under-ten pool, they had no exit strategy, as they could not take a track record into a PO (Hatcher *et al.* 2002).

Monthly catch limits for under-ten vessels catching Channel cod were introduced in 2002. Inshore fishers in the South-West of England disputed the punitive cod quotas enforced on under-tens; arguing they only caught cod for a limited number of months every year, that the set monthly limits were not a justifiable way to allocate the annual quota, and that the fish were so plentiful they could not avoid bringing them up when

fishing for other species, meaning the quota limits enforced discarding (*Fishing News*, 13th December 2002).

In 2002 in Mevagissey, Cornwall, a group of fishers' children wrote to 'Father Christmas' via DEFRA, begging not to be made destitute at Christmas (*Fishing News*, 13th December 2002). The Mevagissey fishers protested the lack of quota for small boats on environmental grounds, pointing out that they were netting with large mesh sizes and only taking mature fish, whilst, in the words of one small-scale skipper: "French trawlers take basket after basket of small cod and dump them back dead to save their quota allocation for the larger fish they catch. Is that conservation?" (*Fishing News*, 20th December, 2002: 14).

In 2002, in an attempt to ease the situation of the under-ten fleet, DEFRA introduced legislation allowing under-ten boats to lease or buy quota from quota owners in the over-ten metre sector to supplement their meagre allowances. Unfortunately, both purchasing and leasing quota is expensive¹⁹, and many fishers took umbrage at having to pay a private company or individual for a common good that they considered themselves to have a historic right to, yet it had been gifted to those other 'owners' for free. Leasing can leave little margin for profit for fishers (Gray *et al.* 2010). The ability to lease quota, combined with the 1996/1997 DEFRA rule change allowing the individual owners of decommissioned vessels to retain quota, has led to a number of "slipper skippers" (quota

¹⁹ A number of cases of fishers discarding hauls due to the high price of quota leasing have been reported. A set of Scottish pair trawlers working from Peterhead, for example, discarded over 1,000 boxes of cod in February 2011 when they caught their entire yearly cod quota in just one haul. The market price for cod at Peterhead at that time was £2 per kg, and the lease price for quota up to £1.60 per kg (John Kinsman, *World Fishing Today*, 6th February 2011). Available from Internet: <http://www.worldfishingtoday.com/news/default.asp?nyId=6886> [date of access 12-5-12].

owners who do not fish themselves, but make an income from leasing the right to fish to active boats) to rent quota to the under-tens. These were exclusively ex-over-ten metre vessel owners, as under-ten metre vessel owners cannot keep fishing rights if their boats are decommissioned (Gray *et al.* 2010).

In 2003, two under-ten fishers from Hastings in Sussex were caught and prosecuted for landing cod over their monthly quota of 150kg. The prosecuted fishermen challenged the conviction, arguing that DEFRA's limits were "unworkable and disproportionate", that they discriminated against under-ten vessels and were incompatible with EU legislation that did not impose monthly limits or catch recording requirements on under-tens.²⁰ They further argued that they had not broken their annual quota allocation, only the monthly, which they considered arbitrary. The Crown Court ruled against the fishermen in 2006, fining them £14,070 for exceeding their quota allocation. Since that time, numerous other under-ten boats have faced severe fines and criminal convictions for fishing over quota.

9. The problem of solutions

The Registration of Buyers and Sellers legislation, which enforced point-of-sale recording of fish, was rolled out in the years approaching 2005, and the resulting data collected on the first sale of all fish put the massive underestimations of under-ten catches in stark relief. It became clear that the under-ten pool was nowhere near large enough to account for properly recorded under-ten catches. As quota in the large scale sector was now a valuable market commodity, potential solutions to this problem were unforthcoming.

²⁰ R v Joy and Bossom [2006] EWCA Crim 1489 [2006] EuLR 1131.

British politicians widely recognised the excessive quota constraints and punitive punishments placed on under-ten metre boats, and in the years since the introduction of the Registration of Buyers and Sellers in 2005 the subject has made a frequent topic of parliamentary debate. In 2007, Castlepoint MP Bob Spink tabled an early day motion (EDM) on the plight of the under-ten fleet, which was shortly followed by another EDM from Leominster MP Bill Wiggin. Another came in 2009, from Tim Farron of Westmorland and Lonsdale. In October 2010, Peter Aldous of Waveney held an adjournment debate on the future of the inshore fleet. MP Sheryll Murray of South East Cornwall stated in the House of Commons that the under-ten quota allocation had been “grossly underestimated” (HC Deb, 14 October 2010, c599), and two years later Fisheries Minister Richard Benyon admitted that the quota allocation to under-ten boats was both unfair and unrepresentative of their historic rights (HC Deb, 22 February 2012, c326WH). In the same debate, David Amess, MP for Southend West, declared the Marine Management Organisation (the UK government body that polices fisheries) “vindictive... inconsistent and draconian” in its treatment of under-ten fishers and Ian Paisley, MP for North Antrim, agreed, accusing the Marine Management Organisation (MMO) of “using a sledgehammer to crack a nut” when it came to under-ten quota prosecutions (*ibid.*).

10. Quota management and devolution

In 1998, a number of powers were devolved from the UK government to the new Government administrations of Scotland, Wales and Northern Ireland. Quota management was not one of these devolved powers, and remained a UK government authority, managed by the national Marine Management Organisation (MMO), although with some input from POs. This centralisation of power was most significant for

Scotland, where the majority of the UK's fishing interests reside. In 2007, a Scottish National Party (SNP) government was elected to the Scottish Parliament. Fishing is more economically important in Scotland than the UK as a whole, and particularly in the remote northeast, which is both the location of the UK's largest fishing ports²¹ and an important base of SNP support.²²

The small-scale fleet in Scotland, which mostly fished for shellfish and nethrops, were broadly unaffected by under-ten quota issues, but the SNP were still concerned by the concentration of the fishing fleet and social impacts of the quota management system, and were keen to break away from Westminster rule. The industry had serious complaints about FQA trading, the commodification of fishing quota and the social and economic woes it created – loss of jobs, “slipper skippers” holding active fishers to ransom, the decimation of coastal communities – and in 2008 the recently elected SNP government launched a consultation on the future of Scottish quota management. The Scottish Government felt that the more free-market oriented UK administration was making changes that impacted severely on Scotland. The left-leaning SNP wanted to prevent what seemed like a gradual move toward ITQ, and implement a more social and community minded management regime.²³

The UK government responded to the Scottish consultation coldly. The authority to allocate quota officially rested with Westminster, and the Scottish Government had no legal powers to change the way fishing rights were allocated. DEFRA threatened legal

²¹ 43% of all fish landed in the UK in 2012 was landed at three Scottish ports: Peterhead, Lerwick and Fraserburgh (MMO, 2013).

²² Former first Minister Alex Salmond is MSP for fishing constituency Banff and Buchan, and the Minister responsible for fisheries, Cabinet Secretary for Rural Affairs and the Environment Richard Lochhead, is MSP for neighbouring Moray.

²³ Scottish Government official, personal communication, 2014.

action against the Scottish Government, and following this, the consultation was withdrawn.²⁴ As a consequence of this upset, behind closed doors the four administrations began negotiations on the future of quota allocation. In May 2012 a Concordat was signed that gave each administration the power to allocate an agreed share of the UK's overall TAC to their national fleets, rather than allocation powers resting solely with Westminster. Since the Concordat, the Scottish Government has been researching ways that Scotland can alleviate the legacy of UK quota management and implement a more socially conscious and less neoliberal regime. At the time of writing, this plan for reform is ongoing.

11. An English reallocation

Although the English administration has not taken the same systemic steps to reform the quota system as Scotland, significant attempts were taken to address the original diminutive allocations to the small-scale fleet. The first of these was an attempt to reduce the size of the under-ten fleet to align catches with the (arbitrary) original quota allocations. In 2008, DEFRA attempted to ease the problems of the under-ten fleet by reducing the number of boats to better match the allocated quota. The provision of £5 million to decommission under-ten metre boats was announced. This decommissioning targeted the “super under-tens”, those high catching capacity vessels just under the ten-metre mark. The basis of the decommissioning was however considered highly discriminatory by fishers as over-ten metre vessel owners were allowed to keep and profit from their quota allocation on decommissioning, and under-ten owners were not (Gray *et al.* 2010). Many under-ten fishers have stated that their quota allocations are so

²⁴ Scottish Government official, personal communication, 2014.

low that it is currently impossible for them to make a living from fishing. Without reallocation they argue that they will be forced out of the industry.

In 2009, after the failure of the decommissioning round, DEFRA initiated a project (SAIF - Sustainable Access to Inshore Fisheries) to try and address the significant issues in the inshore fleet. This was widely criticised by under-ten fishers as skirting around the issue that only widespread quota reallocation could help the small-scale fleet at this conjuncture. An independent advisory group was constituted to look at the issues of the small-scale fleet. This identified in 2010 that both quota allocation and quota management were serious problems for the under-tens (SAIF Advisory Group, 2010). In response to this, and further issues raised by a newly constituted industry working group, The UK government published an important consultation document in April 2011.

The April 2011 consultation document discussed the serious problem of lack of quota in the small-scale fleet, and emphasised the importance of these vessels for the social and economic wellbeing of coastal communities. It then went on to state that some quota that was ostensibly “owned” by the large-scale fleet (and non-fishing “slipper skippers”) was not fished, and that although the amount of underutilised quota was small in proportion to the overall UK FQA holdings, it was significant when compared to the slim percentages granted to the under-tens. The consultation then proposed among other measures that additional quota be secured for the English under-ten fleet by redistributing FQAs from the English PO sector to under-ten fishers, of any species that had been consistently underused (so neither caught, leased or swapped for a number of years in a row; with 2007 to 2010 as the reference period), if those species were also consistently highly-used by small-scale boats (considered to be the case if over 90% of

the under-ten pool allocation had been caught). This redistribution would amount to approximately 3% of English FQA units.²⁵

In September 2011, shortly after this consultation, the Commons Environment, Food and Rural Affairs Select Committee published a damning report on DEFRA's quota management (EFRA, 2011). This report emphasised the economic and social importance of small vessels, and their position as the majority in the UK fisheries industry. It emphasised that as well as providing employment both onshore and offshore, small vessels were often more selective, used passive gear, and had less impact on ecosystems than larger boats, so were more sustainable environmentally. EFRA criticised DEFRA's initial basis for allocation to the small-scale fleet, and the ongoing management pressures on smaller boats, and recommended that quota be realigned permanently in favour of the under-ten fleet.

In November 2011 the responses to the April consultation were published. Although some respondents stressed that a 3% allocation was not enough, the PO sector said firmly that any reallocation would be unfair considering the investment made in quota by many FQA holders, and the use of quota as both loan collateral and taxable asset (DEFRA, 2011). The UK association of Fish Producer Organisations (UKAFPO) responded to the consultation by commissioning an economic consultancy to provide a cost-benefit analysis of the reallocation, focusing specifically on the costs to sector quota-holders. This estimated the cost of the reallocation to sector quota-holders at £1.9 million.

²⁵ See [2013] EWHC 1959, Case No: CO/4796/2012.

Following the response to the consultation, and mindful of the upcoming Concordat, DEFRA requested that English Producer Organisations provide information on any Irish, Scottish or Welsh vessels that were members of English POs and their quota holdings, so these could be taken into account in the potential quota reallocations. Although POs had began in the 1970s as regional organisations, their movement into quota management roles meant membership was no longer spatially arranged, with vessels usually choosing a PO not because of its location but the favourability of its quota allocation system. Before the 2012 Concordat, quota allocation rested with the UK government, but POs were managed by the regional government where they were registered – Scotland, Northern Ireland, England and Wales. At this point, there was no comprehensive register of either PO membership or individual FQA holdings, so DEFRA did not know for sure if quota managed by an English (or Scottish, Welsh or Northern Irish) PO was held by an English (or Scottish, Welsh or Northern Irish) interest. Such a register, detailing the ownership of fishing quota, was not developed until December 2013.

This murkiness around quota holdings, and the nationality of these within the UK, has since been improved. The 2012 Concordat shifted quota allocation to the devolved administrations by vessel, which meant that a Scottish vessel in an English PO would still fall within the Scottish administration system. This also means that DEFRA now have clear information on the amount of quota within a given PO that belongs to Scottish, English, Welsh or Northern Irish interests. Until the Concordat, this information was not freely available, making DEFRA's attempts to reallocate only within the English fleet difficult. This difficulty was compounded by the lack of a comprehensive quota ownership register. At the time of the reallocation consultation in 2011, there was no publically available register of quota holdings in the UK. This was a significant grievance

for the under-ten fleet, as the public had no idea who the holders of UK FQA were – and the informal development of the quota market meant DEFRA were no wiser than the public.²⁶

Richard Benyon, the standing UK Fisheries Minister, announced in February 2012 that the permanent reallocation of quota to the under-tens consulted on in 2011 would be implemented. Quota would only be reallocated from English vessels in English producer organisations to under-tens, and realignment would take place in 2013. Only consistently underused stocks that were in high demand by the under-ten fleet would be reallocated. 10,494 FQA units of different species were to be moved from the large to the small-scale sector. Following appeals from the POs, the 10,494 FQA units to be reallocated was reduced to 7901 – about 0.4% of the total 2,166,260 units held by English Producer Organisations.²⁷ R & J Maritime, a consulting company regularly used by banks to value quota holdings for sale and collateral, valued this reallocation at £1,065,000 and then, after reassessment, at £1,405,000.²⁸

12. Legal challenge and judicial review

In 2013, the UK Association of Fish Producers Organisations (UKAFPO) challenged the UK government's decision to reallocate FQAs in the High Court of Justice. Their case rested on three arguments. First, UKAFPO argued that the ruling went against quota holders' substantive legitimate expectation in regards to their holdings as defining fishing rights, particularly considering the purchase of quota, its use as collateral, and its status in regards to capital gains tax, which suggests quota holdings are both sufficiently

²⁶ HC Deb, 22 February 2012, c326WH.

²⁷ See Judgment [2013] EWHC 1959, Case No: CO/4796/2012, section 69.

²⁸ *Ibid*, section 73.

permanent and liquid to be tradable assets. The second argument was that the reallocation was discriminatory as it only took into account English boats in English POs, and not Welsh, Northern Irish and Scottish boats, or English boats in non-English POs. As the reallocation was decided before the Concordat, there was, at that point, no such thing as an “English” under-ten fleet, and the reallocation should have been a UK wide one. UKAFPO’s third and final argument was that the reallocation represented an unlawful deprivation of possessions, protected by Article 1 of Protocol 1 of the European Convention on Human Rights and article 17 of the European Union Charter of Fundamental Rights.²⁹

UKAFPO lost the case, and the judge ruled in favour of the Secretary of State. He declared that due to the UK government’s ambivalence around the quota ownership issue, quota holders had no legitimate expectation, as this issue had always been ambiguous, and ministerial discretion had always been emphasised by the Secretary of State for the Environment. The ruling pointed out that as the quota was consistently unused (i.e. neither fished, leased or swapped) its actual value in effect, regardless of the different valuations provided, was nil. Regarding the accusation of discrimination against English boats in English POs, the judge ruled that through successive rounds of consultation, the UK government had attempted in the face of limited information to make reallocation non-discriminatory, that policy making was not an exact science, and that the Concordat meant these issues had now been ironed out for the future.³⁰ This led to a victory for the defendants in the case in hand, as the ruling decreed that the reallocation in question, of consistently underused quota allocations, was legal.

²⁹ *Ibid*, sections 77, 108 and 120-121.

³⁰ *Ibid*, section 99, 125-129.

13. Quota ownership: an important legal caveat

Although the government defendants won the case, the ruling also contained a significant judgement on the nature of FQAs. Despite broadly falling on the side of the Government in the case in question, the judge's ruling as to UKAFPO's claims that FQAs could be considered as possessions (as recognised by the European Convention on Human Rights and European Union Charter) is particularly important for the future of quota management in the UK. This is because the negative ruling on legitimate expectation and deprivation rested on the status of FQAs as consistently underused, and thus only applied to a small proportion of UK FQAs, as the vast majority are used annually. The position of FQAs as possessions, then, would dictate the freedom of the four UK administrations to take full control over quota allocations in the future. The possessions argument was therefore important both to the case claimants, UKAFPO, the defendants, the Secretary of State for the Environment, and the under-ten fleet representative body NUTFA (the New Under Tens Fishermen's Association), along with Greenpeace, who were Interveners in the case to represent the interests of the small-scale fleet and broader NGO environmental concerns.

The Interveners in the case, Greenpeace and NUTFA, argued that fishing rights were, and had been since the Magna Carta, a public right, and that thus FQAs were a public right, and could not legally be considered private possessions. The Secretary of State was less forceful on this charge, and accepted that though quota, once annually allocated, could be considered possessions, FQA units could not, as they were simply an abstract unit of measurement that did not correspond to a precise amount of quota. Importantly, the Secretary of State argued that the trade in quota occurred outside of government policy, that the periodic reconciliations should be looked on as an amnesty and not

government recognition of the legality of quota trading, and that this applied regardless of the position of banks or tax authorities in choosing to recognise FQAs as an asset.³¹

Interestingly, the judge chose to side with the claimants on the issue of FQA as possessions. He pointed out that the unofficial trade in quota had been officially recognised numerous times, specifically through reconciliation, and that the allowance that quota could be transferred separately to a licence (albeit in limited circumstances) supported the claims it could be recognised as a possession. He stated that the use of FQAs as assets was significant, as was their position in regards to capital gains tax. FQAs had both monetary value and could be marketed, so should be considered possessions under the European Convention on Human Rights and European Union Charter.

14. Property, quota and the future

The detail in the ruling on the status of FQAs as possessions left many quota holders and POs with the feeling that although the Secretary of State's victory in the courts meant they had lost the battle, the legal recognition of FQAs as possessions under European human rights law would win them the war.³² If FQAs were possessions, that would mean that any attempted allocation of FQAs that were not consistently unused – the majority – would fail.

The status of FQAs as legal possessions is particularly significant for Scotland. As discussed in section 9, the Scottish government are currently (as of summer 2014) considering options for the future management of Scottish quota, with an attempt to move away from the market-oriented allocation methods that developed under UK

³¹ *Ibid*, section 111.

³² PO Manager, personal communication, 2014.

management to a more community-friendly allocation. The Scottish under-ten fleet, due to the species targeted, did not suffer to the extent that the English under-tens fleet did under the UK allocation scheme. However, when the UK TAC was shared between the 4 administrations in 2012, the Scottish government decided to reallocate some quota from the Scottish sector to the under-ten fleet. 50 tonnes of cod was reallocated for 2014, with a Government promise to the sector FQA holders that should it be underutilised by the under-ten fleet, the equivalent FQAs would be returned the following year. The small amount in question meant that no legal challenge was mounted.

However, another Scottish reallocation is imminent that may prove important. When the UK TAC was shared between the administrations after the Concordat, Scottish under-ten metre vessels were only allocated a small amount of mackerel quota, a species with growing interest to the inshore fleet. As the Scottish Government are now managing their own under-tens (previously managed by UK Government body DEFRA, through the Marine Management Organisation), and the SNP have expressed explicit support for low impact fishing and coastal employment, the Scottish Government are keen to reallocate mackerel quota to the small boat fleet.

Mackerel is notable both because of the high monetary value of its FQA units and because they are consistently fished, with no underutilisation, by the large-scale fleet. Mackerel, and other oily fish such as herring and blue whiting, are fished using different methods and in different areas to demersal fish such as cod and haddock. The pelagic (mackerel, herring and other oily fish) fleet has been managed on a quota system for the longest period of any fishery, and since the introduction of FQAs the pelagic fishery has consolidated considerably: there are now only 31 boats with FQA holdings for pelagic

species in the UK. The high concentration of valuable quota holdings in the pelagic fishery means demersal and shellfish fishers now refer to the pelagic fishery as “the millionaires club”.

There are approximately 700 under-ten boats with an interest in fishing for mackerel in Scotland. The quota split after the Concordat, however, only granted the Scottish under-ten fishery 300 tonnes of mackerel quota annually. Of the 31 boats that hold UK mackerel FQAs however, 24 are registered in Scotland. This means that for 2014, the Scottish government will be responsible for FQA units representing approximately 210,000 tonnes of mackerel, shared between the 24 sector vessels with mackerel entitlements.³³

In 2013, a decision was made by the Scottish Government to reallocate FQA holdings representing 1,000 tonnes of mackerel from the sector to the under-ten fleet for 2014. The Scottish Government consider the ethical case for mackerel reallocation as clear. The reallocation would affect only a small proportion of vast holdings held by a small number of people, and would offer social and economic benefit to those fishing with low impact technologies. Quota holders are however worried about the precedent this may set, and a legal challenge is expected. The rulings of the 2013 English judgement regarding FQAs as possessions have given quota holders some confidence that when it comes to consistently used mackerel quota, they are likely to succeed in the courts. The Scottish Government, in comparison, feel that should legal action occur, they too have a strong case based on the ruling of the 2013 English judgement.³⁴

³³ See MMO quota use statistics, <https://www.gov.uk/government/statistical-data-sets/quota-use-statistics>. Last accessed August 2014.

³⁴ Scottish Government official, personal communication, 2014.

15. What the UK quota case teaches us about environmental management

These ongoing issues around the allocation of fishing rights in the UK identify a number of important issues with using a market-based system to allocate fishing rights. The first of these is the vital need for full information at the point of first allocation of rights. The lack of information and poor historical record keeping during the initial allocation of fishing rights was the primary factor in the subsequent deprivation in the small-scale fleet, and the political issues and legal challenges this led to. The UK experience suggests that any such allocation problem cannot easily be solved after a market for rights has been established.

Economic theory suggests that any initial allocation of property rights should be essentially irrelevant, and that the market will correct itself to ensure that the most efficient outcome is achieved (Coase, 1960). However, the UK case shows that in practice political, social and particularly legal structures – as well as the moral attitudes of participants – could mean that this is not the case, and that the market will not naturally settle rights into their optimum place. When political and legal context is taken into account, initial allocations actually matter enormously: they can lead to community fractures or national controversies, and unfair allocation can come up against expectations of justice or entitlement. This is particularly so in the light of human rights law, which sets many edicts on the legitimate claim of an individual or community to a resource.

Coase's theorem (1960) about distribution may take theoretical efficiency into account, but it ignores individual feelings of legitimate entitlement, and the support of this through human rights legislation. This is true not just of the UK case, in which human

rights law was used to challenge the allocation of fishing rights, but in the case of another early adopter of market-based fisheries management, Iceland. Fishing rights and human rights have also done battle in the Icelandic courts. This time, the government allocation of rights was challenged not by the quota “owners” but by the small-scale fishers who felt themselves dispossessed. The result was a United Nations Human Rights Committee ruling that the Icelandic Government had no right to establish a market for fishing rights, which were a common good, that small fishers’ dispossession was unlawful, and that the country must reform their ITQ system (see Einarrson, 2012). The successes of these different claims mean that even where allocation has been undertaken in a clear, data-rich manner, when a commodity has been newly created property rights may be fundamentally poorly defined in the face of human rights legislation, tax or constitutional law or legitimate expectation. The matter of allocation is particularly important if we consider that globally, around 91% of fisheries using rights-based management allocate at least partially based on track records or historic rights – the method used in the UK (Lynham, 2014).

Individual transferable quota (ITQ) and associated market oriented rights-based systems (such as the one discussed in this chapter) have been widely praised in the academic and policy press as the answer to ensuring the long-term sustainability of global fisheries (e.g. Costello *et al.* 2008, Arnarson, 2005). However, it is notable that as a relatively new policy, market-based fisheries management remains widely untested, and early adopters are essentially acting as guinea pigs for what has up to now been a purely theoretical policy solution, based on purely theoretical presumptions: such as the presumption that initial allocation does not matter in the distribution of rights, and the market will always lead to the best possible allocation.

As fisheries management was one of the first major environmental policy areas to take up market based trading as an environmental management measure – preceding carbon markets and ecosystem payments by a number of years – the lessons it offers are important not just for the management of fisheries, but the global environment as a whole, and the myriad environmental, social and economic issues that have been addressed with economic theory in recent decades.

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Chapter 2

Transferable quotas, efficiency and crew ownership in Whalsay, Shetland

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This paper was co-authored with Robert Gear of the University of the Highlands and Islands (UHI). Robert was a History PhD student at UHI from 2008 to 2012, and wrote his thesis on the history of herring fishing in Shetland. I met Robert during fieldwork, and asked if he would be interested in co-authoring a paper on the modern development of the Whalsay fleet, which is now an important part of the Shetland herring fishing industry. I was the first author and did the majority of the work.

The first paper in this thesis questioned one of the economic assumptions implicit in the theory of market-based fisheries management: the allocative efficiency of the market as given in the Coase theorem. This second paper questions another economic assumption at the basis of market-based environmental management, which usually remains unstated in the literature: the theory of the firm.

Theory of the firm

Adam Smith's depiction of the unintended cooperation between self-interested individuals – making up the external force of a competitive 'market' – is often recognised as the birth of economics (Hirschman, 1977). The symbiosis of this collective self-interest is given as the defining principle of organic social organisation, and in mainstream economic theory (both historically and in the modern day) this organised selfishness represents a rule-of-nature that is larger than human agency, unplanned and unchangeable (Hayek, 1948).

Early economists were faced with a significant oxymoron when applying the principle of competitive individuality to the study of production. Much economic activity in the real world is not organised along the principles of the market by self-interested individuals, but by groups of individuals working co-operatively within a business or firm. This widespread co-operation was at odds with the economic ideal of the perfect, organic organisation of the competitive market and the inherently self-interested individual.

Early classical economics swept this problem under the carpet by treating firms and individuals as interchangeable. Much macroeconomics was thus (and often still is) based on the assumption of the 'firm' as a black box. A firm was conceptualised in

economics as a representative self-interested individual, rather than an organised collective of individuals – a principle that is echoed in the legal recognition of corporate personhood.

These implicit assumptions as to the structure of the firm in economic theory were finally addressed in 1937. The issue was - as with the attribution of rights discussed in paper one - raised by Ronald Coase (Coase, 1937). Coase's analysis is often painted both as critical of early firm theory and at odds with Hayek's contemporaneous ultra-individual stance. In reality, however, Coase's 'nature of the firm' serves rather to justify how the cooperative behaviour of the firm can be explained in a world where the notion of humans as commensurable, self-interested individuals rings true. Ignoring the role of coercion in the labour-relation as argued by Marx (2002 [1844]), Coase presents the cooperative structure of the firm as a contractual organisation between employees and employers that is intended to maximise efficiency by reducing transaction costs.

Thus the nature of the firm in economic assumption can be squared with the central importance of the self-interested individual, through the key role of the entrepreneur. A firm represents an individual (the entrepreneur) and the other individuals involved are contracted to subsume their self-interest in return for pay and become a factor of production (Putterman & Kroszner, 1986). The 'firm' is a relationship of production between entrepreneur and labour-factor, whereby the contract transforms the labourer into a form of capital available to the entrepreneur (Hayek 1933). In the words of Coase: "*A firm, therefore, consists of the system of relationships which comes into existence when the direction of resources is dependent on an entrepreneur*" (Coase, 1937:393).

The firm is an entrepreneurial individual made more powerful by the purchase of contractual obligations from a series of other individuals. The entrepreneur, who is the contractual nexus of the firm, hires in capital (in terms of labour-as-time – ‘man hours’ – and physical resources) and produces goods. The labourer is then also his own entrepreneurial ‘firm’, albeit a less successful one. He is an entrepreneur that sells his man-hours under contract to another entrepreneur and produces utility such as rent, food and recreation. It is this economic formalisation of self-interest that Foucault refers to when he claims that *homo-œconomicus* is an “*entrepreneur of himself*” (Foucault, 2010:226).

Although work on the firm in recent years has questioned the simplification of the firm-as-individual (Carroll & Teece, 1999), this approach to company organisation, although often unstated, still underpins much mainstream economic theory, including the formalised models of fisheries bioeconomics. Even though branches of economics do exist that discuss the organisation and boundaries of the firm, much as other branches discuss the boundaries of rationality and the ‘economic man’ (Offer, 2012), these assumptions still remain unquestioned across a wide body of economic work. This key notion of the firm as substitutable with the individual, and operating on the basis of labour and capital as factors of production, is central to the arguments of bioeconomics.

The firm in fishing

In practice, however, these economic assumptions as to the nature of the firm don’t always hold. This is particularly the case in the fishing industry, where a huge variety of firm organisation has been noted in fisheries around the world, with fisheries well

recorded as economically diverse (St Martin, 2005). Many fishers, for example, are paid not by pre-agreed wages, but using a share or 'lay' system; vessel owners and labourers, similarly, are not always separate entities (St. Martin, 2007; McConnell & Price, 2006).

This difference between theory and practice is important because the logical form of the argument for efficiency gains from market-based management rests on the applicability of its underpinning assumptions. The efficiency hypothesis, the central justification of market-based environmental management, is based on the argument that when rights can be bought and sold, a more efficient firm is more likely to buy rights and a less efficient firm sell. This is because the more efficient a firm is, the more profitable it will be, and therefore the more capital it will have available for investment.

Labour is a factor of production, and thus a cost, so the lower labour costs are, the more efficient and profitable a firm will be – this is why many economists consider the significant job losses recorded in the fishing industry under market-based management systems both necessary and desirable (e.g. Hentrich & Salomon, 2006). In an 'efficient' system, we simply see successful entrepreneurs increasing their efficiency, while less successful entrepreneurs (including the labouring entrepreneur of the self) are punished by the neutral, value-free market for their economic failings. This sleight of hand – the logical leap from access to money to the justifiable right to have money (shorthanded as efficiency, considered as the power to multiply production for the social good), is difficult to disprove after the fact, and so the efficiency arguments of market-based management often go unchallenged.

This paper addresses this lacuna by looking at the efficiency claims of market-based fishery management in detail, with particular reference to the diverse economic organisation prevalent in fishing firms, and what this means for the theory of the firm. It does this through a case study of the sector with the UK's oldest and most developed market-based management regime, the pelagic fishing fleet.

Pelagic vessels fish only for shoaling, oily fish such as mackerel, blue whiting and herring, rather than bottom dwelling demersal or shellfish. These were the first fish species to be subjected to quota and market based management in the UK. The application of market-based management to the pelagic fishery has had a significant and fascinating impact on both fishing methods and industry structure in the UK.

Concentrated and highly lucrative, both industry and state actors have named the pelagic fishery as the Government's ideal model for future fleet management across the fishing industry. Paper two looks at this 'ideal' market-based fishery and asks to what extent the efficiency claims of bioeconomics are played out, with a particular focus on long-term (dynamic) efficiency, a factor that is often ignored in the static theorems and models of bioeconomics.

Paper 2: Contributions to the literature and original arguments

- *The development of the UK pelagic fleet under ITQ has never been written about.*
- *Production of new, never before published data on the development of the UK pelagic fleet under ITQ.*
- *Original critique of unstated assumptions in economic-based natural resource management.*
- *Original, critical analysis of the central efficiency claims of market-based fisheries management.*
- *Original critique of as-yet unconsidered dynamic efficiency losses under market-based management.*
- *Original analysis of the importance of firm structure in market-based management systems, when diverse company structures are well documented in fisheries worldwide.*

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Transferable Quotas, Efficiency and Crew Ownership in Whalsay, Shetland

Abstract

Resource economic theory tells us that individual transferable quotas (ITQs) improve efficiency in the fishing industry by removing the least efficient actors from a fishery and allowing ownership to concentrate in the hands of the most efficient operators. Assertions about the nature of this allocative efficiency are, however, often based on purely theoretical assumptions. This paper presents a case study of the efficient operators remaining in the UK pelagic fishing fleet. After over thirty years of rights-based management (RBM) and twelve years of ITQs, the UK pelagic fleet numbers only thirty-one large-scale boats. Seven of these operate from the island of Whalsay in Shetland, which, with a population of approximately one thousand people (0.000016% of the population of the UK), is entitled to land around 22% of the UK pelagic catch. A key characteristic of the economically efficient Whalsay fleet is a crew ownership structure. This is now under threat from the long-term dynamics of the UK's ITQ system, as the high price of quota prevents the renewal of the fishery through new entrants. In the majority of global fisheries, where vessel ownership structures do not follow an assumed economic norm, fully marketised transferable rights may not be the most efficient method of management.

Keywords: Fisheries management; Rights-based management; Individual transferable quotas; Efficiency; Shetland

1. Introduction

Resource economic theory tells us that individual transferable quotas (ITQs) improve economic efficiency in a fishery by incentivising the least efficient actors to exit the market, leaving only the most efficient fishers in operation. In this theoretical transaction, access to funds to buy quota is regarded as a proxy for a vessel's level of profit, which in turn acts as proxy for its efficiency of operation. Although a number of studies have recorded the tendency towards fewer, larger vessels under ITQ systems [1] [2] [3], little detailed research has been conducted into the ownership characteristics of successful vessels. Considering the plethora of ownership structures across global fisheries [4], the identification and analysis of successful ownership models is an important area of research for sustainable fisheries management.

This paper presents a case study of the UK pelagic fleet, which after thirty years of rights based management (RBM) and twelve years of ITQs, now centres around 31 large-scale midwater trawlers. The majority of these are owner-operated, and a considerable proportion are owned and operated by a collective group of on-board fishermen. The fishers operating this collective ownership model are based in the small Shetland island of Whalsay, Shetland, which has a population of approximately one thousand people (about 0.000016% of the population of the UK). Despite the island's small size, Whalsay fishers have the right to catch around 22% of the entire UK pelagic catch.

The development of the UK pelagic fleet under RBM and ITQ suggests that fishers operating their own vessels are an important contributor to fleet efficiency. However, the high cost of entry into the ITQ system threatens the long-term renewal of crew

ownership and owner-operation, favouring the resurgence of an onshore company ownership model that has historically proven to be less efficient in the UK. When these generational dynamics are taken into account, an ITQ system may reduce the efficiency of capital distribution in a fishery.

The vast majority of ITQ systems worldwide have been implemented since 1980 and were initiated by freely allocating quota based on historic catches, and thus still contain a large number of the first-generation fishers who were gifted quota for free. The results of this research suggest that a significant generational shift in ownership models is likely to occur as these actors retire and leave the fishery, resulting in a less efficient ownership structure. Based on preliminary performance, the efficiency gains of ITQ management have been widely celebrated [5] [6]. These plaudits however do not take into account the long-term mechanics of an ITQ system, and dynamic efficiency gains should not be claimed prematurely.

2. The economic theory of transferable property rights and efficiency

Economists have encouraged the development of market based environmental policy, a central tenet of which is the potential to achieve greater efficiency [7]. According to the theory of rights-based fisheries management, when property rights are granted, less efficient actors have an incentive to sell their allocation and leave the fishery, and more efficient operators will buy those rights and increase their market share [8] [9]. This is because fishers with cost-intensive operations will make more money if they capitalise on the price of catch-shares and sell quota, and those with lower costs will maximise their profits by buying quota and increasing their catch [10]. As fishing rights are transferred from these high- to low-marginal cost producers, the fishery contracts into the hands of the most efficient owners [11]. The profitability of the industry increases and a more efficient capital structure is created [12]. There is some evidence that in Europe's ITQ systems to date, owners of more profitable vessels are more likely to buy quota, and those of less profitable vessels are more likely to sell [13]. This supports the assertion that fleet contraction results in more efficient fishers remaining in the market.

2.1 Fleet contraction under ITQ: academic and ethical debates

The contraction of fishing fleets under ITQ systems has been widely documented, with ITQ managed fisheries tending towards a smaller fleet made up of larger, higher catching vessels [1] [2] [3]. The academic debate about this change in fleet structure is often centred on ethical considerations, as an important aspect of the shift to fewer, larger vessels is the reduction of employment in the fishery. Social scientists question the distributive justice of this contraction, the widening of inequality and the dispossession that concentrated ownership necessarily entails [14] [15]. In return, proponents of ITQs argue that labour costs are the most significant area for efficiency gains [16] [17] and if restructuring is necessary for the fishery to operate cost-effectively and sustainably, these social costs are justified [10]. The arguments about ITQs and efficiency are thus usually presented as economic benefits versus social consequences [18].

Some scholars have questioned the inherent efficiency of a shift from numerous small-scale fishing operations to concentrated large-scale fishing fleets. If fish

populations are dispersed, or if the quality of fish landed is taken into account, numerous small-scale vessels are potentially more efficient than larger ones [19], and if ecological externalities are taken into consideration, small boats using less intensive gear are more efficient as they are less environmentally damaging [20]. However, when studying the trend towards fewer, larger-scale vessels under ITQ, it is important to remember that as a fishing fleet develops over time, reinvestment and new vessel building occurs. Therefore, changes in fleet structure do not simply represent the fact that smaller vessels are leaving the fishery, but also that fishers with the means to make use of greater capacity commission the building of newer, larger boats and expand their operations. It is important, therefore, not to attribute efficiency purely to the characteristics of vessels, but also to take into account the nature of vessel owners, who are a more permanent feature of successful fishing operations than the vessels themselves [21].

3. Methods

This paper looks at the ownership characteristics of the fishing operations that remain in the UK pelagic fishery after over thirty years of RBM and twelve years of ITQ. According to economic theory, the small body of boats that now make up the pelagic fishery should represent the most efficient members of the previously overcapitalised fleet.

The characteristics and development of the UK pelagic fleet were analysed using a variety of quantitative and qualitative research methods. An overview of the fleet was created using a list of the vessels licensed to fish for pelagic species in July 2012, provided by the UK Marine Management Organisation (MMO). This list was cross-checked and corrected using information provided by the Scottish Pelagic Fishermen's Association, and the Producer Organisations and companies responsible for managing UK pelagic fishing quota: the Scottish Fishermen's Organisation, the Shetland Fish Producers' Organisation, Interfish, Lunar Group, the North Atlantic Fish Producers Organisation, Klondyke, the Northern Irish Fish Producers Organisation and the Anglo-North Irish FPO. This data was then supplemented with quota management and capacity information published by the MMO [22].

The development of the pelagic fleet since the introduction of RBM was measured using published and unpublished data provided by the MMO and Marine Scotland. This was supplemented with information on the fishing fleet of Whalsay from Harry Jamieson's *Harry's Shetland Fishing Almanac*, published annually by the Shetland Times [23]. Figures for the UK pelagic fleet in 1995 came from the 1995 edition of the MMO's *UK Sea Fisheries Statistics* [24]. The size of the Scottish pelagic fleet is published annually in the Scottish Government's *Scottish Sea Fisheries Statistics* [25].

For the qualitative aspect of this research, eighty interviews were conducted between October 2008 and October 2012 with pelagic, demersal and shellfish fishermen, quota managers, industry representatives, fish processors, enforcement officers and policymakers across the United Kingdom. After each interview, the interviewee was free to request any information be removed from the recording, or to withhold the content of the whole interview from public access. Interview quotes are made anonymous in the paper, as are the names of individual companies.

4. The management of the UK pelagic fishing fleet

The most important UK pelagic stocks are mackerel and herring, which make up approximately 94% of UK pelagic catches by value [26]. Historically, the herring fishery was predominant in the UK, but herring stocks were seriously depleted in the 1960s and 1970s after a period of rapid development in catching technology and increasing exploitation by the European industrial fleet. Total Allowable Catches (TACs) had been introduced for European pelagic stocks by the mid-1970s, first by the North East Atlantic Fisheries Commission in 1974, then under the European Union Common Fisheries Policy from 1983 (see [27] and [28] for an overview). After a collapse in herring stocks, fishing for North Sea herring was banned in 1977, and not fully opened again until 1983. During this period of closure, according to local conditions, UK herring-fishers shifted their efforts to demersal fish species, shellfish, or to fishing for (previously economically insignificant) mackerel. Mackerel soon became the most important species in the UK's pelagic fishery, a situation that remains to this day.

A rights-based management regime was introduced to the UK pelagic fleet in 1980, with restrictive vessel licensing for all pelagic stocks, and no new entrants allowed into the fishery¹. Aggregation of existing vessel licences was permitted so that by combining multiple licences fishers could increase the catching capacity or quota entitlement of individual pelagic vessels. This period saw a shift towards the greater development of midwater trawlers for pelagic fishing, as owners could aggregate demersal and pelagic trawl licenses, but could not use demersal trawl licences for purse-seine vessels [28].

Initially, the UK government allocated pelagic fishing rights to individual vessels on a monthly (or sometimes weekly) basis. In 1985, the first pelagic stocks were given over to sectoral management, whereby decentralised industry member groups, Producer Organisations (or in the case of owners with a number of boats, companies), were allocated member vessels' annual quota based on individual track records to manage as they saw fit [29] [30]. Initially quota could not be traded but only swapped between POs. From 1993 onwards, quota could be bought and sold; in 1995, track records were attached to licences instead of vessels, increasing the transferability of quota; after 1996-1997, individual owners of decommissioned vessels were allowed to retain their quota and transfer it to other boat owners or lease it [31]. By 1999, the system of rolling track records had been replaced by fixed quota allocations (FQAs), leaving the UK with a *de-facto* ITQ system.

5. The current state of the UK fleet

As of October 2012, there are only 34 boats over 10 metres long with pelagic licences registered in the UK². Three of these are under 15m and have a negligible quota

¹ Three extra vessels were licensed in the mid 1980s. Two of these licences were allocated to large English trawling companies, one of which subsequently lapsed [28].

² In the UK boats under 10m are considered to be small-scale and operate under a separate management system without individual quota allocations. As the small scale fleet has an insignificant quota allocation they are not considered here.

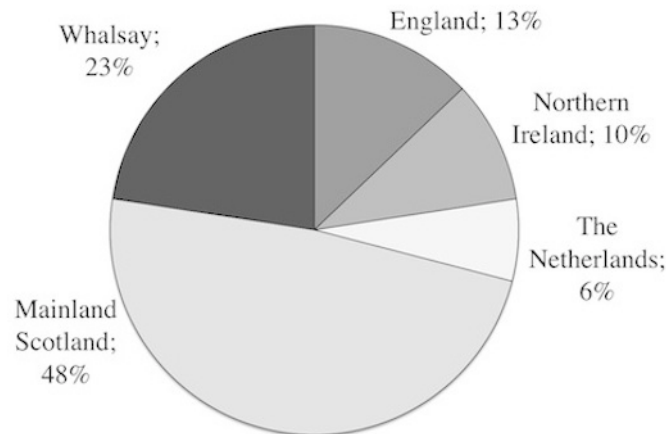


Figure 1: Regional Administration of UK Pelagic Fleet

allocation (around 0.0001%). Another 0.001% of pelagic quota is reserved for small-scale inshore vessels handling for mackerel. The remaining 31 vessels are large-scale midwater trawlers. The majority of these (22 of 31) are administered in Scotland (see Figure 1). Ownership of Scottish vessels is based in three places: Peterhead (five vessels, three of which are owned by one company), Fraserburgh (ten vessels, three of which are owned by one company) and the Shetland island of Whalsay, which has seven pelagic vessels. Four of the nine non-Scottish vessels are majority-owned by a Plymouth-based company and administered in England – although one of these has its home port in Shetland (see section 6). Three vessels (two of which operate as a pair-trawl) are based in Northern Ireland. The final two UK pelagic vessels are Dutch-owned and based in the Netherlands, but fish using UK quota.

5.1 Fleet dynamics over time

The UK rights-based management system evolved slowly towards an ITQ system between 1980 and 1999. UK-wide data on the number of pelagic vessels in 1980 (at the onset of restricted licensing and RBM) and in 1999 (when FQAs were set) were not available, but an extensive contraction of vessel numbers across the fleet is recognised, with UK pelagic vessel numbers estimated to be a good number over 100 in 1980 [28]. The MMO published vessel numbers by sector in their annual statistics of 1995. By then, after fifteen years of rights-based management, there were 67 pelagic vessels in the UK. In 2012, the number of vessels in the UK pelagic fleet has almost halved from the 1995 level, to 34 (see section 5). Alongside the contraction of vessel numbers, the share of the catch going to larger vessels increased dramatically. In 1982, vessels under 24m long took about 34% of the UK pelagic catch, and vessels over 34m long about 27%. By 1995, it was 4% and 84% respectively [28].

5.2 The Scottish and Shetland fleet

The majority of the UK pelagic fishing fleet (over two thirds of all vessels) and UK pelagic quota (at around 65% of mackerel and herring FQAs) are based in Scotland. Scottish records are more comprehensive than those covering the whole UK, and allow a more detailed analysis of regional fleet contraction. From 1980 to 2012, the number of Scottish pelagic vessels fell from 90 to 22, a reduction of 76%. 24% of this reduction (16 vessels) occurred after FQAs were introduced in 1999.

In 1980, about 11% of the Scottish pelagic fleet (ten vessels) were based in the Shetland Islands. Seven vessels (around 8% of the Scottish fleet) were in the small Shetland island of Whalsay. By 1995, Shetland had increased its pelagic fleet to nine vessels. Eight of these were based in Whalsay, so the island had a 16% share of the Scottish fleet and a 13% share of the UK fleet overall. In 1999, Whalsay's seven pelagic vessels made up 18% of the Scottish fleet. In 2012, the Whalsay fleet remains at seven, comprising 29% of Scottish pelagic boats. Between 1980 and 1999, the number of Whalsay pelagic boats remained relatively stable, while reductions across the rest of the fleet meant that the proportion of Scottish pelagic vessels based in Whalsay increased from 7% to 18%. This trend continued after the onset of FQA in 1999. From 1999 to the time of this study in 2012, Whalsay lost no fishing boats, and the island's share of the Scottish fleet grew from 18% to 29%.

The rapid redevelopment of the pelagic fleet in the years between 1980 and 2012 means that vessel numbers do not tell the whole story, as the capacity of individual vessels can vary greatly. The Whalsay fleet was completely overhauled between 1996 and 2008, with an entirely new fleet of larger, more technologically advanced vessels, all between 60 and 70m long. Whalsay pelagic vessels are now among the largest fishing boats in the UK. Measured by vessel capacity units (which take into account the size and power of fishing vessels) 24% of the 2012 UK pelagic fishing capacity is based in Whalsay (see Figure 2).

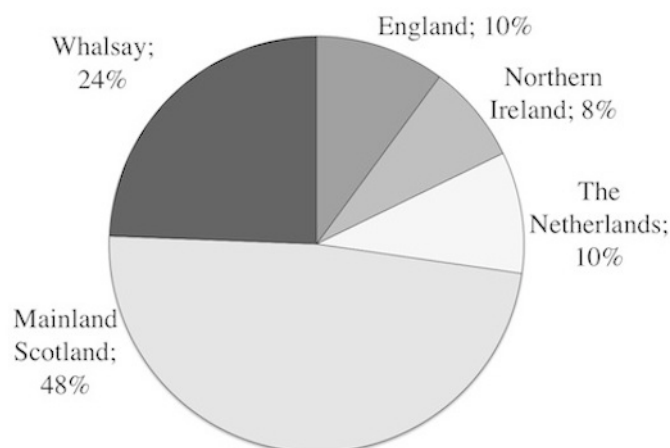


Figure 2: The UK's Pelagic Fishing Capacity by Region

Whalsay fishers have the right to land about 22% of the UK's annual pelagic catch, and around 28% of valuable mackerel and herring FQAs [32]. Statistics on long-term trends in quota-ownership in the UK are not available due to data protection, but interviewees confirm that Whalsay fishermen have bought up pelagic quota as other boats have exited the industry. The large-scale, high catching capacity Whalsay fishery has developed a significant share of the UK's pelagic fishing capacity, belying the island's tiny size and scant population.

6. Whalsay crew ownership

A key feature of the Whalsay pelagic industry is the model of vessel ownership based on equality and the absence of onshore investors, which is often tied through kinship.

These ownership structures are termed ‘boat fellowships’ by Holm [33]. In a boat fellowship, a large proportion of the onboard crewmembers own a share in the vessel. These shareholders remain at sea and continue to fish from the boat. Other crewmembers are paid a share of vessel profits. When share-paid fishers decide to become owners, they have the option to either buy a share of the boat on which they fish when another crewmember retires, or to buy shares in a new crew-owned vessel with others. The boat fellowship model of crew ownership has been recorded in Shetland as far back as the 1820s, but became the predominant form of ownership after the Second World War, when government grant and loan schemes allowed islanders to invest in fishing capital [34]. During this period, onshore vessel ownership in Shetland declined due to the companies’ inflexible, bureaucratic management and high marginal costs [35].

The Shetland crew ownership system is a more pronounced version of the owner-operator ownership model commonly found in Peterhead and Fraserburgh, where the owners of the rest of the Scottish pelagic fleet are based. An owner-operator skipper would own a boat, often in partnership with or using loans from an onshore management company, and employ crew on a share (or “lay”) system. This owner-operated share payment system is prevalent across global fisheries and has received a good deal of scholarly attention [36] [37]. Owner-operation is also common in the UK demersal and shellfish fishing fleets. Owner-operators’ share of the UK fishery has increased significantly since the mid-20th century, during which time a number of large fishing companies have left the industry [38]. The majority of the Fraserburgh and Peterhead based pelagic fleet are single vessel operations with an onboard owner. Two Scottish companies own multiple pelagic vessels: one based in Fraserburgh; one with operations in both Fraserburgh and Peterhead. Both of these multi-vessel companies are the result of expansion by owner-operators.

Whilst shared ownership models are not exclusive to Shetland, the Shetland example is markedly unique, with Whalsay a particularly interesting case. Three factors make the Whalsay fleet different from both the mainland Scottish and wider pelagic industry. First, there is a lack of horizontal or vertical expansion (with the minor exception of the purchase of one Whalsay vessel by another group of Whalsay owners in 1994). Now, no Whalsay company owns more than one vessel, nor have any of the fishing companies expanded into ancillary industries such as netmaking, shipbuilding or fish processing. Second, the Whalsay ownership system means the retention of older fishers at sea. In mainland Scotland, and throughout the North Atlantic, it is more usual for older fishers to come ashore and manage the business aspect of fishing. Linked to this, the third factor is the strength of familial and community ties within crews and shareholding partnerships in Whalsay, informed by the close interconnectedness of the island’s population. In the 1980s, three quarters of the Whalsay population could be interlinked through their grandparent’s generation, and the entire island-born population could be linked by going back four generations [39]. Other less unique efficiency factors in the Whalsay fleet include an extremely low turnover of crew; an increased sense of stewardship and care of a vessel by owner-operators; the willingness of crew owners to stick with the vessel through lean times and a larger number of owners meaning that the decision to exit from the industry must be agreed by more agents.

6.1 Onshore support and the importance of the fishery agent

An important aspect of the Whalsay crew-owners' success is the cooperative onshore support given to fishermen in Shetland. The local fishery agent plays a particularly important role in the crew ownership system. As the value of boats and quota rises and the complexity of management increases, many boat owners choose to remain onshore to deal with the 'business' side of the industry. In Shetland, the same company has been the agent for all pelagic fishing vessels since the late 1960s. The agent's wide range of services includes negotiating fish sales both at home and abroad, organising tax, wages and insurance, and even arranging contracts for vessel construction. As the director of the Shetland fishery agent describes:

"We look after all the accounts, we sell the fish, we pay all the invoices: the oil, the insurance, the nets and the food and the landing dues, we pay all that, we prepare the accounts, make up the wages – the crew wages, share them up... do all the sort of book-keeping for them, plus we do all the relationship with the banks, relationships with the tax and insurance companies, that sort of thing. Anything to do with the running of the boat that's no' fishing. They do the fishing, we do all the other bits."

The services of the fishery agent have allowed the integrity of the shareholder-fishermen crews to be maintained. The agents are highly experienced in the business aspects of vessel management, and the knowledge and experience of older fishers is actively retained onboard Shetland's fishing boats.

The arguments for the efficiency of crew ownership mirror the economic arguments used by the proponents of ITQs. Ownership drives care and conservation of a resource [40], and having an ownership stake in the vessel gives fishers a vested interest in its long-term management, incentivising upkeep and ongoing investment. The hostile conditions within which all fishing vessels are employed, and the considerable stresses placed on a fishing vessel during its productive life, makes this upkeep and investment especially important. This factor has been cited as the reason for the continued predominance of owner-operated vessels in global fisheries, and the common occurrence of difficulties for non-fisher owned fleets [4].

7. Threats to crew ownership under ITQ

Since the introduction of ITQs, however, the increased cost of entry into pelagic fishing has curtailed the renewal of Whalsay's boat fellowships. Quota costs make up a significant share of the capital necessary to enter the fishery, and only fishers with substantial personal wealth, or direct kinship to an existing owner who is willing to offer a reduced price or gift them a share for free, can now buy into a vessel. This means many share-paid fishermen cannot afford to buy into a share of a vessel. In 2006, when members of a Shetland pelagic boat fellowship decided to sell their shares, the vessel, licence and quota were worth around £14 million. To buy an eighth share, a local fisher would need to raise £1.75 million. Instead, a large fishing company based in the south of England bought the shares of the departing fishermen, and now holds a majority stake in the vessel.

Presently, the first generation of vessel owners that were gifted quota at the onset of the management regime still populate the pelagic fishery, meaning the distortive impacts of restricted entry have not yet been fully realised. As these vessel owners

approach retirement, however, the only actors who can take their vessel shares are the companies that can raise the significant capital necessary to buy the quota and licence share, or any direct kin-relations that the present owners are happy to gift shares to. Although kin relations are very important in the Whalsay fleet, the existence of strong kin ties is not enough to guarantee a continuation of the crew ownership system. One Whalsay skipper described the sale of a successful pelagic boat in 1995 as something that he would regret “till his dying day” and would “never forgive” himself for:

“There were seven owners who all owned the boat... and worked on it too. One of the owners died... two were very keen to sell off. The boat then was 14 years old... we either had to sell the boat or build a new one. I was 58 then. I thought it was better to sell, because it was too big a commitment to take on with my years. One or two wanted to keep it, but it seemed to be the best way out. Looking back, it’s one of the worst decisions I ever took. We made money, and I’ve got no financial problems now, no worries about that. But the thing is that I have grandsons who are fishing now. And I sold something, and they can never get it. That’s what bothers me now. If I could have held onto it, and get them going now... when I sit and brood sometimes that comes to my mind.”

The same issues have been noted in the UK demersal fishery, which is also managed using a *de-facto* ITQ system. In demersal fleets this has led to significant changes in crew organisation, and the use of foreign wage-labour is common, something that has not occurred in the Shetland pelagic fishery. As one older skipper noted:

“We could go and get a boat and get our own business together. Young people just can’t do that nowadays. That’s what’s going to kill it, I think. It’s creeping in here. There’s more foreign labour. Filipinos. To me it’s morally completely wrong³. They have to take in that men because there’s no young people coming into the industry, because they know they can’t progress the way they should do. Filipinos are cheaper. That’s the thing that worries me. In this industry the men are getting older.”

Even where boat ownership can be passed to kin, there is no guarantee of the continuation of the crew ownership system. For those offspring of fishermen brought into the industry by inheritance, the predominant economic incentive is to sell their share and exit the fishery. As one Scottish quota manager, speaking of a company that owns a number of pelagic boats, observed:

“[The company] is worth far more to be sold than it’s worth producing what it’s producing now. But it’s because the guys there, the board, the management and the fishermen, do not want to sell to foreigners... The problem there is a change of generation. They all retire or die, and the young fellas that come through probably think ‘what am I doing this for? I’ve got an offer for this that’s three times what I’m earning. I may as well just sell up and go and live in the Bahamas’ and quite a lot of the pelagic guys have done that.”

8. Efficiency and company ownership

³ Filipino crew are employed through an agency and are paid a wage, rather than a share. Their remuneration is much lower than the share-paid fishermen that work alongside them.

Before the impact of barriers to new entry, the crew ownership and owner-operator systems have proven to be highly efficient. However, when it becomes necessary for new entrants to the fishery to renew these systems, the mechanics of ITQ actively prevent recruitment, and the high entry costs catalyse a shift to onshore company-based ownership. In Whalsay, the importance of kin in fishing crews may to some extent soften these negative impacts, but it cannot override them completely.

In interviews, fisheries stakeholders repeatedly questioned the historical efficiency of onshore ownership. Onshore ownership was historically common in the UK, with companies running large fishing fleets in areas such as Grimsby (where a short-lived fleet of pelagic freezer-trawlers was based in the 1980s), Lowestoft, Hull and Fleetwood. The growth in the proportion of owner-operated vessels in the UK, and reduction of company ownership, has been partly attributed to the greater efficiency of owner-operators compared to onshore-owned boats [38]. Interviewees widely considered shore-based company ownership to be less efficient. As a manager from a (now defunct) large English vessel-owning company stated:

“Why did [our] fishing industry collapse? I believe it collapsed, as with most of the fishing industry, because of the company ownership system. What we should have done years ago, years and years ago, is give the skippers a share in the ownership of the boats, a share of the profit. [Our skippers had] no personal interest in the boat at all... The boats were neglected, they were dirty, they were rusty. Because the fishermen didn’t care. All they cared about was the catch. The quality of the catch could have been better, because the storage facilities weren’t looked after. It’s like a hire-car, if you like, you don’t look after it. A stark illustration of this is in Scotland, where Aberdeen was the premier fishing port, again owned by companies, in opposition with the unions demanding wages. Now there’s a huge fleet of skipper owned boats in Peterhead, and hardly any left in Aberdeen.”

Interestingly, even interviewed owners of multi-vessel pelagic companies, the most significant ‘winners’ under RBM, expressed a negative attitude to the impacts of the ITQ management system. As a vessel owner from a fishing company with multiple boats and substantial pelagic quota stated:

“It’s not right, the way things are now. We were lucky, that’s all, just lucky. Families just can’t get into it now, and it’s a real shame. It’s killing the fishing. I’d change it all back if I could.”

This “luck” factor in quota ownership is clearest when generational effects are taken into account. Fishers granted quota at the onset of the system benefit from windfall gains at the expense of later entrants [41]. As this first generation of fishers are gifted the heretofore unpriced economic rent of a fishery, profits increase. However, for later generations that have to buy quota, profits decrease, creating a trap of transitional gains [42] [43]. As retired fishers, or their families, have the option of retaining their quota and leasing it, resource ownership and economic rent can be permanently transferred away from the active members of a fishery [44]. European data suggests that quota ownership for leasing by non-fishery members is common [13]. This external rent-capture is a substantial cost for fishers, reducing industry profits [45]

and arguably having a greater negative impact than the labour costs that were cut by ITQ, which at least provide positive operational impact.

9. Economic theory and different ownership models

The economic theory behind ITQ does not account for these long-term efficiency impacts because it does not take into account the existence of different ownership structures. The problematic narrowness of economic theory when applied to fisheries has been critiqued before [46] [47] [37] [7]. The arguments for the allocative efficiency of ITQ are largely based on untried assumptions about a linear relationship between efficiency, profit and the means of investment, which do not necessarily hold under conditions of owner-operation and shared crew ownership. The claimed efficiency benefits of ITQ are often based entirely on the logic of simplified theory, and ‘proven’ using purely theoretical modelling scenarios (see [18] [48] [49]). The assumption is often made that if fishing capacity is reduced in relation to landings, efficiency is necessarily being achieved [50]. The increased values of the fishing fleet and its associated catch rights are often used as a proxy for its efficiency, or the increased cost of buying into the industry under ITQs considered proof that the system is more efficient (for example, in [16]).

The notion of economic efficiency employed in relation to ITQs is that the lower the costs of an operating vessel, the more efficient it will be, with labour costs frequently cited as the area with the largest potential for increased efficiency [6]. Efficiency calculations rests on the assumption that a shift in distribution away from those employed in a fishery, and towards those who have invested in the capital base, will improve efficiency, because income accruing to capital investors is profit and will be reinvested, whereas payments to labour are costs that are lost (see for example [51] [11]). The greater the profitability of the company - measured by returns to investment - the higher is its value, and the more investment it is likely to attract. However, under the different ownership models common in fisheries, these suppositions do not hold.

Where a boat is share-owned, the relationship between “labour costs” and “profit” is changed, as the majority of labourers are also investors. If these onboard investors are lost from the fishery, labour costs are likely to increase as those to be paid, either by wages or share, replace them. As discussed above, this will also have other negative efficiency effects, because for a complex technology like a fishing vessel, operating in dangerous, hostile environments, onboard ownership incentivises care, while an intimate knowledge of the boat increases the chance of judicious investment. When a market for quota is established, fishing rights can often concentrate in the hands of onshore investors to be leased back to working fishers, becoming a net cost to the industry [45]. This cost is offset by reductions in the share paid to onboard crew. Quota leasing can therefore be viewed as a shift in distribution from onboard crew to shore-based quota holders who add no value to the fishery [52] [45].

10. Conclusion

The findings of this research suggest that the mechanics of the ITQ system may reduce the efficiency of capture fisheries. In the UK, the temporal dynamics of ITQ management threaten an ownership structure that has developed an increasing market

share over the last 30 years, and proven to be economically efficient under both a rights-based management and transferable quota regime. The threats posed to the future development of both owner-operator fishing vessels and the heretofore successful Whalsay pelagic fleet's boat fellowships suggest that a fully marketised system, without some sort of intervention to allow access to new entrants, will create a less efficient capital structure industry-wide.

Attention to these problems is vital, because the ownership model assumed in the economic theory of ITQs is relatively rare in fisheries, and different ownership structures are very common worldwide. Research has already found that investment under ITQs may not be efficient under a share payment system [17] and that economic models that fail to account for the unique characteristics of the share system are poor [36]. In fisheries where different vessel ownership structures are common, the assumptions of economic theory do not hold. The disregard of economic difference by some contemporary approaches to fisheries management is a vitally important aspect of management with massive and long-lasting impact for the health and productivity of the fishing industry.

The full marketisation of fishing rights, without crucial controls, could reduce the long-term efficiency of the fishing industry. This impact, however, will only become clear upon the generational change when fishers initially gifted quota exit the market. As most of the world's developed ITQ systems are still relatively young, we are likely to see much of this generational change in coming years. Celebrations of efficiency gains under ITQs before this generational shift has taken effect are premature, and in the long term, dynamic efficiency conditions may not be met by the ITQ system.

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Chapter 3

Power and performativity in the creation of the UK fishing rights market

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The case study of the Whalsay pelagic fleet outlined in Chapter 2 showed us that traditionally organised firms, with a clear distinction between entrepreneur, investor and labourer, are not necessarily the most efficient organisation for fishing companies. The economic theory of the firm, however, sees all firm structures as alike and does not take into account economic diversity. This means that the straight-line logical assumptions made about efficiency in market-based management – that a

market guarantees the most efficient industrial organisation – do not necessarily play out in practice.

Chapter 2 showed that in fact, by retarding new entry to boat-fellowships, market-based management is in the long run likely to make the fishing industry less efficient. Considering the wide range of different economic structures found in fisheries worldwide, and that the efficiency claims of market-based management are so far based only on static, not dynamic efficiency gains, this finding is pertinent for environmental theorists and managers around the globe.

A fascinating aspect of the case study given in Chapter 2 was the way that even though a traditional firm structure did not lead to greater efficiency, the application of market-based management still led to fishing firm organisation changing to match the assumptions of the economic literature. Under market-based management, cooperative ownership of fishing vessels is threatened. This is not because cooperative ownership is not efficient – far from it, as cooperative management has proven (before the dynamic necessity for new entrants takes effect) to be extremely effective. Cooperative ownership cannot continue because the economic theories applied to fisheries management with the creation of the market changed the structure of the fishing industry in such a way as to preclude it. The assumption of firm ownership intrinsic to the logics of market-based management means that under the rules of the market, this is the only ownership that can now exist.

Economic theories seem, at first glance, to describe natural organisations of production; to paint a picture of the world “out there”. What we see here however is

not a case of academic description (or what philosopher John Austin would term a “constative” speech act) but an active reshaping of the world (a “performative” speech act) (Austin, 1962).

Scholars of science and technology studies (STS) have in recent years adopted Austin’s notion of linguistic performativity to explore just this way that economic theories and models work to create the world they ostensibly portray (see Callon, 1998; MacKenzie *et al.* 2007). This has included studies of the role of theory in shaping markets, including those for finance (MacKenzie, 2008), oil (Mitchell, 2010), carbon (Blok, 2011), and, in two cases, fishing rights: in Norway (Holm & Nielson, 2007) and Alaska (Hébert, 2014).

In the most explicitly theoretical paper of this thesis, Chapter 3 explores the performativity of economics literature and what it can tell us about the restructuring of the UK fishing industry under market-based management. Going beyond this, I also query what this UK case study can tell us about the theory of economic performativity. Existing economic performativity literature tends to focus on the technical, practical and material ways in which economic theories are performed, rather than what this performance means for the actors involved and the circulations of power and influence that run through it. This has led to a number of criticisms of the economic performativity literature for being apolitical (for example, Mirowski, 2012; Blok, 2011; Cochoy *et al.* 2010; Mirowski & Ni-Khah, 2007).

In the case of UK fisheries management, I found that the performativity of economic theories was an overtly political process, involving a high degree of divergence,

conflict and dispossession. In order to understand these political processes fully, which are not fully integrated in the wider literature on economic performativity, I drew upon the work of Michel Foucault, who has written extensively about the processes of power and discipline in regime and market creation (Foucault 2007; 2010). Foucault's work has not previously been referenced in the performativity of economics literature. It does, however, play an essential role in another important theory of performativity drawing on the language work of Austin: the gender and queer studies analyses of Judith Butler (1988; 1993; 1999).

Chapter 3 of this thesis uses the case study of UK fisheries management to suggest ways that processes of power and politics can be better integrated into existing theories of the performativity of economics, in an approach informed by the work of Butler and Foucault. This not only presents an original theoretical framing of UK fisheries market creation, but also extends and develops the theory of economic performativity in a new academic direction, answering one of the key criticisms of the wider literature.

Paper 3: Contributions to the literature and original arguments

- *An original theoretical approach to UK fisheries management.*
- *An original integration of the work of Foucault into the performativity of economics thesis.*
- *A response to an often-made criticism of the performativity of economics literature as apolitical*

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Power and performativity in the creation of the UK fishing rights market

Judith Butler's work on performativity takes an explicitly Foucauldian approach to politics. Economic performativity literature, in comparison, has been criticised for failing to foregrounding power. This paper uses a case study of market creation in UK marine fisheries to suggest, after Butler, ways in which a Foucauldian analysis of the exercise of power can inform our understanding of economic performativity.

Key words:

performativity; economics; Foucault; Butler; neoliberalism; fisheries.

1. Introduction

Understanding the global spread of social organisation based on the principles of neoclassical economics (often termed as late capitalism, financialisation or neoliberalism) has been termed as one of the primary imperatives of the social sciences (Muellerleile, 2013). One of the principal epistemological tools currently in use to allow us to think productively about this economisation of cosmopolitical society (in the sense used by Stengers, 2005) is the concept of economic performativity, as outlined by Callon (1998). These performativity theories make clear the contingent and constructed aspects of the economy, emphasizing how the apparently explanatory tenets of economics are, in actuality, illocutionary acts (as described by Austin, 1962), and how expert statements about the economy do not simply describe the world, but create it.

Since Austin coined the idea of linguistic performativity, it has been applied in many contexts and across many fields. In contemporary social enquiry, the concept of performativity can largely be categorised into two broad fields. First, the performativity theories identified by authors such as Callon and Mackenzie, which are informed by science and technology studies (STS) and actor network theory (ANT), and which look specifically at the role of the sciences and other knowledge practices in performing the world. Second, the critical gender studies and queer theory informed cultural performativity based on the work of Butler (1999) that emphasises the role of personal performance (and political discipline) in identity construction.

Despite the fact that these broad strands of performativity scholarship both focus on the vital role of performance and semiotics in social construction, there has, so far, been surprisingly little cross-pollination between the two strands, each disciplinary approach advancing largely independent of the other. A special issue of the *Journal of Cultural Economy* (3:2), published in 2010, drew attention to this gap and explored a range of ways that the politics inherent in Butler's work could be more explicitly brought into economic performativity thinking. Despite the strength and range of these analyses, there are still many potential associations between these approaches that have not yet been fully explored.

This paper takes up this call by using aspects of Butlerian performativity theory – in particular, Butler's Foucauldian focus on the constitutive role of power and discipline – to address the criticism of Callonian economic performativity as apolitical (Mirowski and Nik Khah, 2007; Mirowski, 2012). This argument is illustrated with a case study

of the introduction of a market-based regime for the management of fisheries in the UK.

Ocean fisheries are a fascinating case study of the incursion of market logic into different areas of life. These include their early origin as one of the first forms of market-based environmental management: theories of market-based fisheries management precursed (and influenced) Hardin's famous 'Tragedy of the Commons' (Hardin, 1968) by a number of years (Hubbard, 2014); and also their astronomical growth in recent decades – since the 1970s, market principles are estimated to have been applied in approximately 158 large-scale fisheries worldwide (Lynham, 2014).

This paper is structured in eight sections. After this introduction, section two briefly outlines the Callonian and Butlerian approaches to performativity. Section three then argues for a critical, power-based analytical approach to economic performativity drawing, after Butler, on the work of Foucault. Foucauldian analysis is an important aspect of Butler's work on performativity, but remains largely absent from STS and ANT informed performativity debates. Section four gives an example of economic performativity in the UK fishing industry. In section five, the role of power, discipline and technologies of governance in this performativity are explored. Section six extends this analysis with a case study of the performativity of statistics, and section seven argues that a Foucauldian approach to economic performativity has much to contribute to our understanding of the encroaching neoliberalisation of the energetic vicissitudes of life.

2: Performativity: between Callon and Butler

The idea of performativity has its conceptual roots in the language philosophy of Austin, who pointed out that words – even ostensibly descriptive ones – always to some extent perform an action, rather than simply describing a pre-existing state-of-affairs (Austin, 1962). As such, language can be considered as an active, productive process, rather than a dispassionate representation of a world-out-there. Derrida (1977) expanded on Austin's work by breaking performance away from intention, arguing that a performative utterance has the agency to free itself of its original context and perform to other ends and in other contexts far beyond the control of the original speaker. As an example of this, he compares the written to the spoken utterance, with its extended capacity to travel across time and space, meaning that context (and thus meaning) can never be pre-determined (Derrida, 1977).

Drawing on Derrida's phenomenological approach, the feminist theory of Butler (1999; 1988) states how gender is not a stable, predetermined locus of agency, but an identity constituted in time through a stylized repetition of acts. Butler's approach to performativity is thus as much about shifting the foci of attention from static substance to active becoming as it is about linguistic agency. It also extends performativity beyond language to material, bodily forms of communication. In this, and in emphasising the role of performativity in identity-constitution, Butler's approach corresponds not only to Austinian linguistics but also to the theatrical and psychoanalytical analyses of performance by writers including Goffman (1959) and Riviere (1991).

The Callonian performativity of economics thesis differs from Butler in drawing predominantly on the linguistic theory of performativity, and not the psychoanalytic and theatrical traditions that take the discursive creation of the human-subject as their analytic nexus. Instead, the performativity of economics literature explores the way that the purportedly descriptive utterances of economists form the economy (Callon, 2007). Drawing on Polanyi (1944), who first outlined the role of economic theories in establishing the market, Callon (1998) looks at how the supposedly constative discipline of economics shapes the world, and how the economy is not an object to be described by economics, but a performance of economics in itself.

Although rooted in semiotics, Callon's performativity of economics also foregrounds the constitutive nature of the material as well as the linguistic in performativity. Indeed, for Callon, the performance of an economic utterance is one-tenth theory, and nine-tenths engineering (Callon, 2007). This particularly material analysis of the engineering of illocutionary performativity stems from the position of economic performativity within the wider discipline of STS (science and technology studies). An important aspect of this approach is the methodology of laboratory ethnography, whereby the cultural and material practice of science is emphasised, de-naturalising our ideas of scientific enquiry as a process of objective description rather than active construction (Law, 2008).

Resulting from many of the same authors, STS has close family resemblances to actor-network theory (ANT). ANT is an epistemological position that emphasises the importance of relations, with nothing being foundational, and all being contingent on, and constitutive of, its (borderless) milieu (Law, 2008); and in response to an over-

reification of the ‘social’ as an independent structure (Latour, 2007), the constitutive agency of material things. Thus in economic performativity, non-human actors (or ‘actants’) such as economic models, lab coats or university buildings are as important as scientists or their utterances in shaping the world (Callon, 1986). This recognition of agency beyond sentience is one of the most famous aspects of ANT, and mirrors the utterance-beyond-intentionality argument of Derrida (1977).

Both Butlerian gender and Callonian economic performativity are thus explicitly material, with economic performativity drawing on the material networks of wider STS and ANT, and gender performativity on ‘materialization’ – the way that regulatory and disciplinary practices work to produce material bodies (Butler, 1993; Foucault, 1977). Both Butler’s materialization and Callon’s material-semiotic actor-networks require that phenomena rather than static atomic entities should be considered as a primary epistemological unit, in a way that echoes the process philosophy of Whitehead (1978).

Drawing on Bohr and feminist studies of science, Barad (2003) suggests that Butler’s work should be extended into a posthumanist formulation of performativity, whereby discourses, rather than being distinctly human in nature, are considered as more-than-human practices. Barad argues that this approach requires thinking not just of the constitution of human identity as being an active process, but about reality more generally as discursively and temporally co-produced. From this process-oriented, more-than-human perspective, Barad states that performativity theory represents a break with representationalism – the ontological split between words (linguistic or

internal signs) and things (the external being signified) – that characterised modern Enlightenment philosophy.

3: Foucault and the performativity of expert knowledges

The omission of overt political analysis from economic performativity literature has led to Callonian performativity being criticised as a ‘flat ontology’ that obscures the social manoeuvres inherent to market creation (Mirowski & Nik-Khah, 2007:200). Emphasising the performativity of anything that has been presented as a fact – and thus is contingency – is however an inherently political act, as it shows that things presented as facts are not immutable (Butler, 2010). There yet remains scope to develop the political aspects of economic performativity with a scholarly approach that, following Butler, explicitly discusses performativity as politics (Cochoy et al. 2010), and queries what this means for shared existence.

Callonian economic performativity, though it implicitly emphasises the potential of other ways of organising relations of production and exchange, focuses primarily on the pragmatic, conceptual-material-technological processes of economic performance. Butler’s gender work, by comparison, is explicit about the political aspects of the social constitution of gender. Drawing on Foucault, she emphasises the role of power, discipline and social sanction in forcing certain performances (Foucault, 1977).

This Foucauldian critique of the performance of gender encompasses not just social norms, but the productive circulations of power and the explicit discipline of law, which is prohibitive of certain acts and correspondingly productive of performative identities. As Butler states:

‘Foucault points out that juridical systems of power produce the subjects they subsequently come to represent. Juridical notions of power appear to regulate political life in purely negative terms – that is, through the limitation, prohibition, regulation, control and even “protection” of individuals related to the political structure... But the subjects regulated by such structures are, by virtue of being subjected to them, formed, defined, and reproduced in accordance with the requirements of those structures.’ (Butler, 1999 p.4).

This role of discipline in gender performance is equally applicable to the performance of the economy. In some contexts, such as the adoption of the Black-Scholes mechanism described by MacKenzie (2008), this discipline rests on the acceptance of new socio-material norms that, when collectively adopted, render other approaches to worldly interaction in a given context less successful or out-of-place. In other contexts, however, this discipline is backed up by the full force of the law and by politics, in the aggressive Foucauldian sense of the continuation of war by other means (Foucault, 2002).

One of the first steps in establishing a market is the constitution of the rules and sanctions that discipline its constituent actors into a certain mode of economic performance: legal rights pertaining to property are granted to some and removed from others; certain reporting measures are made compulsory; non-sanctioned forms of exchange become illegal. This legal-illegal binary is, in all cases, backed up by discipline. The application of law is productive in creating the performative actor who is correctly constitutive of his or her part in the wider play of the economy.

4: Performativity, fisheries and market-creation

4.1 Performativity and the UK fishing rights market

To illustrate this argument and present an example of the role of discipline and power in the performance of the economy, I will present a case study of performativity in the creation of a market to manage UK oceanic fisheries. This case study is one output of a four-year research project, undertaken between 2010 and 2014. The research consisted of multi-site study of market-based fisheries management practices in England and Scotland. 84 interviews were undertaken around England and Scotland, as well as participant observation on fishing trips and textual study of academic and policy literature.

The UK gradually introduced an informal market-based system to manage fisheries between 1984 and 2001. Under this system, a commodity (the right to catch a certain weight of a given species of fish, divided into commensurable, saleable units) was created through a system of centralised, complex statistical modelling. This new commodity ('paper fish' Høst, 2012) ostensibly corresponded to the living fish any given harvester was permitted to catch. The correspondence between paper- and living-fish, which was vital for the meaning and power of the paper fish commodity and market system as a whole, had to be enforced through processes of discipline, such as fishery officer checks, helicopter surveillance, court orders and fines.

The practice of creating new markets to allocate fishing rights is a significant example of the proliferation of economic principles to order life. Since Christy introduced the idea of creating a fishing-right currency and using ownership of this currency to decide who can harvest fish (Christy, 1973), over 158 major fisheries worldwide have

been reformatted in this manner (Lynham, 2014). The most important literature on fisheries market creation from a performativity perspective is that of Holm (2001; Holm and Nielson, 2007) which uses ANT and performativity of economics theories to illustrate the process of market for fishing rights in Norway. Hébert (2014) has also adopted a performative perspective on fisheries market creation in Alaska.

These studies focus on the technical-material processes necessary for the application of economic theory to fishing-rights market creation. For this reason, I will not dwell on these aspects of economic performativity in the UK. Instead, I will focus on the political processes of power and discipline necessary for the creation of the UK fishing-rights market. In order to do this I will present two scenarios in which discipline and the productive force of power – particularly judicial and pecuniary power - played a significant role in enforcing the performativity of inscriptive utterances.

4.2. Performing the theory of the firm

The logical justifications for market-based fisheries management will be familiar with anyone who is even passingly conversant with economic principles: that the market works with the inherent economic behaviours of fishers to produce incentives that will promote optimum behaviour; that it automatically identifies the ‘true’ value of the fishing-right resource; that it naturally allocates rights to the most efficient individuals in the fishery, increasing the productivity (as measured by the ratio of inputs to outputs) of the industry as a whole, and therefore producing the maximum social benefit. These well-known claims are based not on the empirical study of

markets in action, but on the internal logics of economic theory and its models in and of themselves (see for example Péreau, et al. 2012).

The degree to which this logic plays out ‘on the ground’ has been studied in a number of market-managed fisheries (e.g. Højrup, 2012; Weninger, 1998), some of which support the ostensibly constative claims as ‘true’ and others which do not. For scholars of performativity, of course, the interest lies not in the truth or falsity of economic claims, but the extent to which we can trace their influence in the circulation of life. As such, however, a ‘false’ economic claim – one that purports to represent yet differs significantly from existing practices – presents a promising opportunity to trace the process of performativity, as it is in difference, and the potential for conflict, that the performative becomes most visible (Callon, 2007).

Processes of performativity are not always easy to find. If a market does what economists claimed it would, this is usually used as a post-hoc rationalisation that the economic theories were simply correct in their descriptions of reality. The improved efficiency of a market-managed fishery, for example, is usually ‘proven’ by the fact that when the market was introduced, significant numbers of companies closed and numerous people lost their jobs without a corresponding fall in overall profit. This means that the ratio of inputs to outputs, as measured by the internal logics of economics, has been improved, and so therefore has efficiency (Weninger, 1998). These logics have been queried (Cardwell and Gear, 2013; Højrup, 2012) but economics is a closed system governed by its own rules.

As such, it is interesting to analyse exactly what the rules of the closed system of economics are, as the conditionality of the if-then assumptions that make up this system often go unstated. The archetypal example of these is the ‘if’ of *homo-oeconomicus* (Foucault, 2010) that is necessary for the ‘then’ of commensurable, price-bound preferences that can be best met by the market. The relationship between the if-and-then of market allocation and *homo-oeconomicus* runs both ways, meaning that the implementation of market logics in the organisation of life is not purely structural, but requires the productive constitution of the identity of all those who transact on the market: creating a market means creating *homo-oeconomicus* (Williams, 1999).

This web of performativity – that an utterance not just performs itself, but the whole assemblage in which it is set – has been termed by Law (2011) collateral realities. Returning to the efficiency assumption that is so important in bioeconomics, it is necessary to trace the surrounding if-then logics on which the improved efficiency claim is based. Efficiency is justified on the basis that a more efficient firm will be more profitable, and thus able to invest in more fishing rights. A direct relationship is assumed between profit (as a proxy for efficiency) and the potential for investment. This unstated assumption is the crux of one of the most important justifications for market-based management. When a rights-owner sells, the most efficient potential customer will automatically buy, as they will both have the greatest scope for investment (in past profit) and the most to gain from purchase (in potential future profit).

This configuration of logic rests on the idea of the market as a mass of *homo-oeconomici*: commensurable, interchangeable competitive individuals. The idea of the individual is here important. It is patently clear that in many given markets, it is the firm – as a cooperative assemblage - rather than the individual, that makes up the basic unit of action. This simple fact caused great pains for economists until Coase (1937) applied a logical sleight of hand that justified how the firm could be considered an extension of the economic individual, removing any requirement to reassess the foundational logics of the discipline (for an overview of the theory of the firm, see Foss, 2000).

In Coase's formulation, the firm as a whole becomes a simple proxy for the dominant individual (the entrepreneur) with all other actors reduced to the status of purchased inputs (employees). In this way, Coase allowed economists to define a company as commensurate with *homo-oeconomicus*. This theory is foundational to the internal logics of economics, but is rarely mentioned outside of niche disciplinary debates. Its logical formulation is however intrinsically connected to the efficiency arguments for the market-based allocation of fishing rights.

4.3 Performativity and fishing firms

A number of ethnographic and sociological studies of fisheries worldwide have noted the varied and often unique organisation of fishing firms (McConnell and Price, 2006; Cardwell and Gear, 2013). These rarely operate on a traditional entrepreneur-employee relationship. Instead, fishers are often paid by a share system whereby profits (and risk) are split equally between boat owner and crew. Shared ownership of vessels is common. These unorthodox economic relations are sometimes dismissed as

pre-capitalist relics, but are yet found in highly developed fisheries around the world (St. Martin, 2005). This is true of the UK, where share-organised ‘boat-fellowships’ (Holm, 1992) are not only common, but disproportionately represent the largest and most profitable vessels (Cardwell and Gear, 2013).

Since the introduction of a market for fishing rights, UK boat-fellowships are gradually being replaced by a more economically orthodox company organisation aligning with the accepted theory of the firm. The mechanisms of this shift can be illustrated with an empirical example. In a boat-fellowship, a group of crewmembers co-operatively own a boat. Often, this boat would have one or two extra crewmembers paid by share of the vessels profits. Before the introduction of market-based management, when one fellowship owner decided to retire, a share-paid crewmember would purchase his share in the vessel and become a part owner, continuing the fellowship system.

In the early years of market-based management, boat fellowships could continue to operate in their customary manner. They become threatened, however, when any member of the fellowship desires to retire and find a younger fisher to fill their place. In 2005, a successful boat fellowship of seven men found itself in the position where four of its owner-crewmembers wanted to retire. At this point, the boat in question was the third largest fishing vessel in the UK, and had the right to a significant proportion of the relatively newly created fishing-right commodity. The boat with associated rights was worth between £14 and £17 million pounds: an astronomical figure that is symptomatic of economists’ claims that market-based management improves the economic value of fisheries. Such high prices meant any individual

interested in following the traditional route of buying into this boat-fellowship would need an initial investment outlay of over £2 million pounds.

Perhaps unsurprisingly, young fishers keen to start a career and holding the requisite funds to do so were thin on the ground. Instead, a multi-million pound fish processing company secured investment from a national bank to buy a 57% stake in the vessel. In the years since 2005, a similar pattern has occurred across a number of valuable boat fellowships, with each retiring owner leading to a proportion of the boat's ownership being transferred to more economically orthodox onshore companies, backed up by investment from the financial industry.

As the example above shows, the market is not a level playing field inhabited by commensurate competitive actors, and where access-to-investment has a simple, linear relationship with efficiency. Instead, success depends on occupying a certain position within the circulation of the capitalist system as it stands, and the discretionary power of financial institutions to grant or deny the means of investment. Thus the disciplinary power of the market and political and financial system in its officially sanctioned form works to reproduce itself through the application of the basic principles of economics – both stated and unstated – that are intrinsic to it.

It has been three decades since the initial (freely gifted) allocations of fishing rights, and many fishers are now reaching old age. With every retirement, the UK fishing industry moves one step closer to economically orthodox ownership that is in line with the theory of the firm. Furthermore, the closure of traditional advancement routes by the now impossible cost of purchasing into a vessel has discouraged a

younger generation from entering into fishing. This dearth of young people willing to enter the industry has led to a common practice of employing overseas workers (usually from the Philippines) through international staffing agencies. These agency workers are paid not by share, but by a wage. This is often significantly lower than the UK minimum, leading to the term ‘*boat slaves*’ (Murray, 2014).

After the implementation of market-based management, the cost of fishing rights – and the necessity of external investment to purchase these – meant financial institutions gained a new power to control the structure of the fishing industry. Fishers could use existing fishing rights as collateral for loans to purchase more fishing rights, giving banks considerable power to decide which firms would succeed in the industry.

In the words of one Scottish fisherman:

‘We decided to invest in nearly £500,000 in quota [fishing rights] to help keep us legal... The bank took a very active role, not just with me, but with most boats. They saw a quick way of clearing debt: decommission boats and they would still have control over the vessel’s quota, which they then sold on to large companies.’

The above is termed by Graeber (2009) as indebtedness as a political instrument. On a newly created market, the power of financial institutions to control access to money is a considerable factor in steering the future directions of economic organisation. Access to money is a disciplinary and productive power that plays a vital role in producing the relative identities of all operating within a capitalist system. The restructuring of the UK fishing industry broke down established organisational forms, and ‘*the pieces [were] picked up by those with good bank connections and access to capital*’ (ex-fisherman, Scotland). It is for this reason that Højrup (2012) states that market-based fisheries management could be seen as a tool to allow large-scale,

capitalist interests to destroy the superior, non-capitalist forms prevalent throughout the industry.

5: the particular performativity of economics

What does the above example tell us about the role of power in economic performativity? Echoing Austin, Law and Urry (2004) state that all knowledge practices are performative, and of course this is true. However, the tenets of economics are particularly so. It is argued here that this is because economics plays a vital role in an established circulation of power that has the disciplinary tools necessary to overcome competing aims and interests. Performativity is a group effort, and it takes disciplinary power to enable acquiescence (Butler, 1999). Economics is significantly performative because it has disciplinary power behind it.

In order to understand the disciplinary potential of economic performativity, we can situate it within a wider circulation of power using, following Butler, the work of Foucault. Foucault's *governmentality*, covered in his *Collège de France* lecture series between 1977 and 1979 (Foucault, 2007; 2010) states that we can fruitfully think of governing (an exercise of power that both includes the state and goes beyond the state) as an activity concerned with the propagation of meaning and action; that is, regimes of practices based on certain ways of seeing the world, using certain technologies and techniques, and enabled by the ability to steer the behaviour of humans (and although not explicitly stated by Foucault, the more-than human) to fit into the subjectivities created by these (Dean, 1999).

If power is the management of possibility (Foucault, 2002), governmentality is the exercise of this; the techniques that both state and non-state actors use to form an image of the world as it exists beyond the limits of their perception, and the techniques they then use to act upon this. Particular technologies are needed to enact will from afar, or govern at a distance (Law, 1986). Of course, at this scale, power does not represent the will of a single individual, but is a process running through assemblages of human and non-human entities. These assemblages can in this context be thought of as being made up of technologies of governance (Barry, 2001).

If we think of an economic theory or equation as a technology of government, part of a particular assemblage of power and meaning, it helps explain a performative ability to create a world in which utterances can propagate (Mitchell, 2007). Economics is thus particularly performative because as a governmental technology, it is part of a powerfully productive assemblage, an established regime of influence backed up by disciplinary mechanisms.

It is more difficult to allow purchase for the performativity of an idea that goes against established disciplinary norms, and the existing techno-assemblages of survival, production and bureaucratic organisation. Power is held not just in intention, but also in the solidity and entrenchment of existing assemblages (Barry, 2002). Thus the performative success of neoclassical economics can, in a Foucauldian sense, be attributed to its constitutive role in the powerful assemblage of the nation state, corporation and military as they now stand, and the disciplinary powers that these possess (Mirowski, 2012).

6: Foucault and the performativity statistics

If economics is granted particular performative potential because of its political role as a technology of governance, this suggests that other technologies of governance are similarly performative. Foucault cites statistics as the archetypal technology of modern governance from a distance (Foucault, 2010). Statistics play a key role in governmentality by creating a population that can then be controlled, a population that is a separate entity from the mass of bodies statistics are claimed to represent. Although not explicitly framed within the lexicon of performativity, the constitutive potential of statistics and their role in the exercise of power has been explored elsewhere (Desrosières, 2002; MacKenzie, 1984).

Returning to the case study of UK fisheries market creation, I will support the above case for a Foucauldian approach to economic performativity with the example of an explicitly political process of statistical performativity. As the fishing-right commodity is essentially a statistical conceit (the permission to catch an allocated portion of a mathematically determined total allowable catch) the ongoing production of the market is extremely data intensive. This means that statistics are a vital technology of governance in the creation and sustenance of the UK fishing-rights market.

In order to create a fishing-rights market, the UK government needs statistical representations of the amount of fish being caught by UK vessels every year. This is produced through the legal requirement, introduced in 1983, that all fishing vessels record their catches in a logbook. This logbook data is then fed into the mathematical models that set the parameters of the fishing-right commodity. It is notable that the

logbook requirement was introduced before the establishment of the market for fishing-rights. At the time of introduction, in fact, it was only the catches of the large-scale industrial fleet that were considered of interest to the governance system. Small-scale boats (under ten metres) were not required to submit records of their catches.

In lieu of catch records for the small-scale fleet, at the creation of the market the UK government inserted a 'placeholder' figure in the calculative models used to allocate fishing rights. Boats under ten metres long were not allocated individual transferable fishing rights, and were not included in the market-based system. Their catches however had to be reported to Europe as part of the national total allowable catch (TAC), and this was done with an estimated figure. This estimated figure represented catches that were outside of the fishing-rights market, and could not be divided into the commensurable units of fishing-right commodity and traded between members of the large-scale fleet.

Through the 1980s and 1990s, as the fishing-right commodity developed, small boats existed outside of the circulation of the fishing-right market. The attraction of being free from statistical and financial obligations led a number of fishers to move from the market-regulated large-scale fleet into the largely unregulated small-scale. A new kind of boat was developed: highly powerful, high catching vessels specifically built just under ten metres long, so falling beneath the imposed fishing-rights market. These tiny-yet-powerful boats (known as 'rule beaters') could catch as much as a large-scale equivalent without having to purchase the right to fish.

As the small-scale fleet grew, the arbitrary figure used by the government to represent small-scale catches remained the same. Already considered a substantial underestimation, it soon became clear that the official statistics for small-scale boats were wildly incompatible with the actual volumes of fish entering the market. In the words of one English small-scale fisherman:

'That number was just plucked out of the air, and it was obvious that it did not represent what under-tens were catching. We said this ourselves to Government. But they said it didn't matter, as they would leave us alone and the small-scale fleet catches were not really a part of the calculations.'

In 1998, however, the mathematical models used in Europe to decide the TAC of fishing nations began to produce very low numbers. Many members of the UK large-scale fleet had by this point invested substantial amounts of (often borrowed) money to purchase a fishing-right commodity representing a stable percentage of this TAC. As the overall TAC fell, the amount of fish that the fishing-right commodity entitled rights-holders to catch fell too, while costs (and loan repayments) remained the same. This produced an alarming incentive for illegal fishing, and 'blackfish' – fish caught without purchasing the corresponding legal right – became big news.

In response to this, the UK government attempted to institute further disciplinary mechanisms to protect the workings of the fishing rights market. A key feature of this was the introduction of the Registration of Buyers and Sellers (RBS) legislation in 2005. RBS stipulated the reporting of all fish at the point of first sale, and made the buyers of fish legally liable if their purchases did not tally with official fishing-rights. Vitally, these new statistics were a blanket requirement. Recorded by buyers, not sellers, RBS applied to all fish landed in the United Kingdom. This meant that not only did the landings of large-scale boats have to comply with the available fishing-

rights commodities, but landings of small-scale boats suddenly had to comply with the arbitrary place-holder figure that had been inserted into the wider calculative assemblage used to create the commodity of fishing-rights.

What followed on from this was an intense political battle for the performance of this arbitrary figure. In order to stabilize the market for fishing rights in the face of new data that showed the non-market fleet were catching - without paying for - a significant amount of the UK's total allowable catch, and thus destabilizing the fishing right commodity and market for fishing rights, the government attempted to reduce the small-scale catches to match the figures used in their statistical modeling.

Fisheries enforcement officers began to impose the extremely low estimates of small-scale catches. Anyone catching over this nominal amount was subject to prosecution and large fines. The materialities of discipline – helicopters, port inspectors, written affidavits – were employed to perform the numbers. In the words of another small-scale English fisherman:

'I'm allowed to catch 1.4 kilo a day of cod: that's half a cod. Now I've got four crew and a worker on the shore, and I can dump up to a ton a day. [...] We're playing a cat and mouse act with DEFRA [the government department responsible for fisheries], and it's really serious. They use the proceeds of crime act. I went to court, there was a drug dealer in front of me, another drug dealer after me that had beat somebody up, who was being charged for GBH, possession of heroin, crack cocaine. They got away with a couple of hundred pounds, I got a £7,500 fine.'

This discipline was necessary because the arbitrary statistic representing the catches of small-scale fishers had, since the introduction of the fishing-rights market, taken on an important role within the wider circulation of the financial system. The Government could not increase the overall official catch, as this was set externally by

Europe. Therefore, if they wanted to increase the proportion of catch rights allocated to the small-scale boats to match the much larger RBS figures of fish being sold, they could only do this by reducing the proportion of total rights allocated to large-scale vessels.

The large-scale vessels' catch rights, however, had been turned into commodities that were now circulating on a market. These financial exchanges linked up the fishing-rights statistics into an established pecuniary system with its own customs, rules, and legal protections. The attachment of a market price to a statistical allocation changed the numbers' nature both substantively and legally. Allowing the commodification of large-scale rights attributed to the figures the characteristics of possessions, which could not legally be taken without due recompense. Granting a larger proportion of total fishing rights to the small-scale fleet by removing rights from large-scale boats would mean transforming that reallocated portion from a commodity back into a representative inscription –making the financial value attached to it disappear. This would undermine the entire organization of the economy, something that the established legal system would not allow.

Therefore the only option for the government was to enforce the statistical figure. The political struggle of this performance was heated. Intense debates took place in Parliament. The Marine Management Organisation (the UK government body that polices fisheries) was called 'vindictive... inconsistent and draconian' in their treatment of small-scale fishers, and fisheries enforcement officers were accused of 'using a sledgehammer to crack a nut' when it came to prosecution (HC Deb, 22 February 2012, c326WH). By 2012, widespread public protest about the unfair

treatment of small-scale fishers led to politicians deciding that a small amount of fishing-rights had to be taken from the large and given to the small-scale fleet. In an attempt to circumnavigate the financial and legal implications of this, it was decided that only consistently unused (which meant no corresponding fish were recorded as being caught) fishing rights would be reallocated.

This reallocation (of approximately 0.4% of UK fishing-rights) was immediately met with legal challenge. In May 2013 The United Kingdom Association of Fish Producers Organisations (UKAFPO), a body representing large-scale English vessel owners, initiated a case in the High Court of Justice, claiming that the reallocation represented an unlawful appropriation of possessions. The ruling, given in July 2013, declared the Government's reallocation legal. This however was not because there was no legal ownership of the commodity of fishing rights, but because according to Government records, the rights to be reallocated were consistently unused.

This meant that although the fishing rights that had been taken away were possessed assets, the claimants would only have grounds for grievance if there had been 'material economic consequences'. As the owners of the rights had clearly made the 'business decision' to neither catch, lease, sell or swap their entitlement, and the amount to be reallocated had year-on-year sat dormant, it must have had no market value (see [2013] EWHC 1959). The judge's ruling, and the enforceable legality or illegality of the allocation of rights, was specifically based upon the potential threat of the action to the market and the logics of wider economic principles. Currently, both fishers and governors are expecting future legal action.

7. Economic performativity, politics and anti-politics

I have presented above two examples of the role of legal and financial discipline in the performativity of economics. Drawing on the work of Butler and Foucault, the case studies show how the process of performativity is vitally political. In fact, in the scenarios described above, economic performativity can be seen as not a political action, but one that is profoundly anti-political. If politics, as understood by Barry (2002), is an unstable entity with a multitude of future potentials, an anti-political entity is, in comparison, one that attempts to remove any space for contestation.

Making the allocation of fishing rights a market matter has worked to make it anti-political, by moving the will to power out of the political sphere (where disorder and competing aims are recognized) and into the ‘natural’ (and thus incontestable) sphere of the ‘invisible hand’ of market forces (Pálsson & Helgason, 1996; Cochoy *et al.* 2010). The case brought by the English large-scale fishing fleet to the UK High Court was based on exactly this anti-political argument: that politicians could no longer intervene in the allocation of fishing rights, as they had become part of the untouchable assemblage of the market.

Of course, the irony of this is that the movements of the ‘invisible hand’ are only so powerful because law and discipline make them so: in the words of Lionel Robbins (1965), the invisible hand is government. The reification of market laws places limits on the potential for change, and is an anti-political action. The tying in of policy decisions into a market assemblage limits the potential for change and other alternatives in the living process (in the Whiteheadian sense) that makes up our perpetual becoming.

8. Conclusion

The UK fishing rights market is a case of economic performativity-in-action: an ever-unfolding circulation of power that benefits some as it dispossesses others. The particular performativity of economic and statistical inscriptions was influenced by their position in a powerful assemblage of governance, and took part in a heated political battle. It is argued here that the enmeshment in a wider flow of power is an important factor in the performative potential of numerical inscriptions, and that a combination of Callon's approach with Michel Foucault's writings, already incorporated by Butler into understandings of gender performativity, present a useful way of thinking about performativity in the economic (and scientific) realm. With governmentality and biopower, Foucault explicitly deals with the powers of supposedly descriptive technologies and the material and semiotic regimes necessary for their use. The market assemblage of economics, which touches so many aspects of life, is a particularly potent example of this.

These assemblages of statistics, computers, helicopters and legal rulings that make up the technologies of governance have enough power to perform their own mistakes, and to naturalise arbitrariness in order to bolster the logic of their own statistical models and techno-regulatory regimes. Awareness of these processes is vital, because it is important for democracy, morality and the wellbeing of all that the needs of the governing 'machine' do not become more pressing in regime-creation than the needs of those it should serve. Understanding that economics is performative, and querying the role of power and discipline in this performativity, is an important aspect of this explicitly political action.

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Chapter 4

Geographical imaginations: a call for more geography in marine management

Submitted to *Geoforum*.

This paper was co-authored with Dr. Thomas Thornton, my DPhil supervisor.

Chapter 3 discussed the constitutive role of the academic discipline of economics in creating the UK fisheries market that has been the topic of study for this thesis. Rather than inertly describing a reality out-there, we have seen economic theory playing a fundamental part in changing the structure of the fishing industry, the life-course of fishers, and the relationship between humans and the sea.

Chapter 4, the final paper of this thesis, follows on from this study of the role of economics in fisheries management by asking if economists make markets, what role can geographers play in fisheries management? As a discipline explicitly concerned with the relationship between humans and the environment, geography should have a lot to say about the way we organise our relationship with fish and the sea. After all, the salt-water environments that are the setting for this thesis make up around 70% of the earth's surface.

Despite this, geography has historically had surprisingly little to say about the sea and the human activities in and on it, leading to calls for far greater geographical attention to be paid to the sea (Bear, 2013; Peters, 2010). Geography has played an even smaller role in making substantive suggestions for successful marine management. In Chapter 4, I ask why this is, and present an argument for more geographical engagement with the sea, calling for geographers to play an active role in marine and fisheries policy. A number of aspects of geographical thought suggest positive potential for geographical contributions to marine management, as do the few existing examples of geographers who have taken it upon themselves to study the sea (such as Bear & Eden, 2008; St Martin & Hall-Arber, 2008; St. Martin, 2005; Mansfield, 2004).

This argument is backed up by my empirical research on the way that fishers conceive of and engage with the ocean: something that I argue has much in common with current directions in geographical thought.

As well as discussing the role of economics in marine policy, I present two other academic disciplines that have played an important role in setting the terms of debate and formatting fisheries and marine management systems worldwide: conservation biology and anthropology. I argue that these disciplines have been successful in shaping the way we see the sea, and the organisation of human relations with it. However, the uniquely interdisciplinary nature of geography means it has much potential to work alongside these approaches, as well as integrating important future directions for marine and fisheries policy: ecosystem management and marine spatial planning.

Paper 4: Contributions to the literature and original arguments

- *Speaks to emerging interest in the sea in geography, which has classically been overlooked.*
- *An original call for Geography to play a stronger role in marine and fisheries management.*

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Geographical imaginations: a call for more geography in marine management.

Abstract

The management of the sea has increased exponentially in the last half-century, and different academic disciplines have been vital in shaping this management. Geography, however, despite its explicit focus on the human-environment nexus, has so far had little impact on human relations with the sea. We argue that this should change: that geography is uniquely placed to offer effective solutions to marine resource management problems, and that geographers have the potential to offer key insights into how human populations can best interact with the living seas. Three of the most important current scholarly imaginations of the sea and the policies they inform (economics and market-based management, conservation biology and area based protection, and anthropology and community management) are outlined, and a potential 'geographical imagination' of the sea, drawing on key themes in contemporary geography is then presented. It is argued that geography can offer much to marine management and that human-ocean relations should be a key feature of future geographical research agendas.

Keywords

Oceans; Fisheries; Geography; Marine Policy; Natural Resource Management; TURFs.

1. Introduction

The management of the sea is a hot topic in current environmental policy, attracting much attention from both international and national governance bodies, non-governmental organisations, the global media and the wider public. Despite this political spotlight, geography – the archetypal academic discipline for dealing with human-environment relations – is surprisingly quiet on the human relationship to the sea and exploitation of the life within it.

This paper attempts to address this shortage by suggesting how geography might play a stronger action role in marine policy, particularly that relating to the exploitation of wild oceanic creatures. The marine management landscape is widely recognised as having been distinctly shaped by various academic approaches, and the influence of different disciplines can clearly be seen in the main approaches currently used to manage the ocean: market-based fisheries management (based on bioeconomics), area-based conservation (based on conservation biology) and community management (based on anthropology).

The disparate and piecemeal application of these disciplinary approaches to marine management has however been criticised, and a more integrated policy approach called for (Degnbol *et al*, 2006). The development of such an integrated management system, which should bring together economic, social and environmental considerations as well as taking into account political commitments to ecosystemic and mixed-use marine spatial planning concerns, is currently a priority for many governments worldwide. Geography, as an inherently interdisciplinary social science with a focus on the human-environment nexus, is particularly well placed to inform this approach, but as yet, geographers have had too little to say to marine policy.

This paper attempts a call-to-arms for geographers to engage more readily with the management of the saltwater environments that make up so much of our living earth. We begin by outlining three major trends in the contemporary marine management landscape (market-based management, area-based conservation and community management) and the role of three academic disciplines (economics, conservation biology and anthropology) in informing these (section two). Section three then presents the particular potential of geography for future directions in marine management, outlining existing geographical work on the sea. This argument is supported by a presentation of original empirical research (section four) that draws out the particularly geographical nature of the relationship between fishers and the sea. The potential for a solutions-based, applied geographical approach to marine management is then suggested in section five.

2. Academic disciplines and the contemporary marine management landscape

Three central trends can be identified in contemporary global fisheries management: market-based management, area-based protection (marine protected areas) and community management. These key marine policy approaches can be linked to the research and advocacy of distinct academic disciplines.

2.1 The economic solution: market-based management

Rights-based management refers to any type of management where human relationships with marine creatures are controlled by the allocation of a set of rights – usually harvesting rights – to a group or individual. This means that the term “rights-based” covers a wide range of fisheries management arrangements, from licensing to establishing national waters. In practice, however, the term “rights-based

management” is often used as shorthand for a particular sub-section of this policy approach: rights that are allocated using the market. These market-based approaches typically apportion a set of harvest rights (broadly corresponding to property rights) to companies or individuals, then put systems in place that allow these rights to be traded.

An example of the conflation of the broader term “rights-based”, which covers a wide gamut of management, with specifically market-based management structures is the 2008 paper by Costello, Gaines and Lynham, “Can Catch Shares Prevent Fisheries Collapse?” (Costello *et al.* 2008). Although the abstract of the paper claims to be a study of rights-based management, the research actually studies a much narrower range of purely market-based policy tools. When rights-based approaches have been explicitly adopted in practice, this market subsector is also in the majority (see CSDCD, 2014).

In a market-based system, a governing body sets an upper limit for the harvesting of any given species. The right to catch up to this limit is then split into commensurable units (usually based on weight) that can be bought or sold. These saleable units are usually referred to as “catch shares”, “quota”, or “individual transferable (or tradable) quota” with the common acronym “ITQ”.

The first market-based management schemes were introduced in Iceland, the Netherlands and Canada in the 1970s (Chu, 2009). The seemingly immediate successes of these in fishery control led to a wave of fanfare, and over the next 30 years market-based schemes proliferated, and have now been introduced in 158 large-scale fisheries worldwide (Lynham, 2014). A number of celebratory articles proselytising on the panacea of market-based management have been published (e.g.

Costello et al. 2008; Pascoe, 2006), and market-based approaches are formally recommended by organisations worldwide.

Although the discipline of economics had had a profound effect on fisheries biology since its foundation in the 19th century (Hubbard, 2014), the idea of using the market to manage fisheries was first proposed in the 1950s in the new discipline of bioeconomics, formally established by economists working on theorising the optimum exploitation of fish (Gordon, 1954; Scott, 1955).

These bioeconomists argued that equilibrium could be achieved where the ‘perfect’ or optimal amount of fish – in terms of long-term production yields – could be caught. Under an open-access regime, however, an erroneous equilibrium would be reached, whereby the resource (and, more importantly, its rent) would be dissipated. It was only a small logical leap from this supposition that the only way to avoid this unfortunate outcome was through attributing property rights and sole ownership (Scott, 1955). In this way, the tragedy of the commons (Hardin, 1968) - in which a theoretically unlimited number of fishers would be chasing a limited number of fish with no incentive to limit individual harvest - could be avoided.

Mirroring wider trends in approaches to nature through the 1960s and 1970s economists continued to develop this mathematical, theoretical modelling of fisheries, with the stress increasingly laid on the solution of private property (Munro, 1992). In 1973, Francis Christy introduced the idea of ITQ: a tradable currency of fishing rights. These economic ideas were presented just as nations worldwide were looking for ways to manage their newly enclosed fish-stocks after the introduction of national exclusive economics zones under the United Nations Convention on the Law of the Sea (UNCLOS, 1982).

Throughout its history, bioeconomics has been a specifically applied field, with economists not only presenting theories as to the optimal management of fisheries, but also vocally advocating for these theories to be applied by government (Wilén, 2000). The explosion of market-based management in oceans around the world over the last forty years can be traced directly to the advocacy work of economists, and the development of natural resource economics according to neoclassical and neoliberal theory (Harvey, 2005). The US state department also exerted significant foreign policy pressure in favour of the adoption of bioeconomic principles (see Finley, 2011).

Advocates of market-based fisheries management argue that it is uniquely effective in conservation terms, increasing fish stocks and reversing the tendency toward fishery collapse, that the market is an efficient, responsive allocation tool, and that the ownership rights over potential fish catches foster stewardship behaviour among fishers (Pearse, 1992). Critics however point to the consolidation of fishing rights ownership in a small number of hands, which often means devastation for traditional coastal communities. These social effects have led to intense criticism of market-based management approaches from anthropologists, sociologists and human geographers (Carothers and Chambers, 2012). The legality of creating property rights – and thus effectively privatising – the wildlife harvested from the sea has also been questioned, both by academics and in the courts (Einarsson, 2012; Cardwell, 2012).

Furthermore, many of the tenets of market-based fisheries management rest on economic assumptions that are purely theoretical and either remain untested or are not played out in a fisheries context. One significant assumption is that having a property right over a resource increases stewardship and protection of that resource. Empirical

studies of fisheries, however, have cast doubt on the applicability of this argument to ITQs in practice (Gilmour et al. 2012; van Putten et al. 2014).

2.2 The conservation biologist's solution: area-based conservation

Area-based conservation is another marine management method that has proliferated in recent years, with an increasing number of marine protected areas being introduced worldwide. Marine area-based conservation is similar to area-based conservation on land in that a given area of sea is delineated as a protected area and certain activities (usually, but not limited to, the harvesting of wild species) are prohibited in order to conserve wildlife and habitats. These protections can go as far as banning all human activities, but more commonly the potential impacts of activities on the area in question (or a feature, range of features or habitat within that area) is estimated, and activities are then prevented accordingly.

The International Union for the Conservation of Nature (IUCN) has played an important role in the movement towards marine protected areas (MPAs). This began with the IUCN World Congress on National Parks in 1962, and more particularly with a 1982 follow-up meeting that called for the incorporation of marine areas into the global network of protected areas on land (Gubbay, 1995). By 2006, a number of international agreements had been signed by countries worldwide agreeing to protect 10-30% of marine habitats by 2012 (Wood *et al.* 2008). Although these targets have not yet been met, there has been an exponential rise in marine protected areas in recent years, and approximately 3% of global ocean is now classed as a marine protected area (IUCN and UNEP, 2013).

Most marine protected areas are designated using a “features-based” approach. Specific habitats or natural features are identified in an area, and these are then offered protection from harm by prohibiting human activities that could negatively impact on them. The features that should be protected can be set internationally (e.g. through the OSPAR or RAMSAR Conventions), nationally or locally, with the representivity, rarity and vulnerability of features or habitats most often taken into account.

Conflicts often occur in marine area-based protection between a precautionary approach, which suggests limiting as much activity as possible in the form of no-take or non-disturbance throughout an MPA, and the political contingency of achieving buy-in among human sea-users in hard-to-police ocean environments. As such, although much of the literature on MPAs recommends precaution and the adoption of no-take zones, in many MPAs a limited number of human activities are prohibited.

Area-based protection has been presented as an ecological approach (Degnbol *et al.* 2006), but in practice it has far stronger theoretical ties to conservation biology. Conservation biology is itself rooted in the biological sciences, but has an explicit focus on conservation that takes it closer – in having an important normative element – to social sciences and natural resource management, although that normative element is unique in being explicitly focused on the intrinsic value of wild nature.

Conservation biology emerged as a distinct discipline with the First International Conference on Conservation Biology in 1978 and subsequent publication of an edited volume laying out the precepts of the discipline by Michael Soulé and Bruce Wilcox in 1980 (Van Dyke, 2003; Soulé and Wilcox, 1980). Conservation biology is, like bioeconomics, an applied science with an explicitly normative element, and as such

political advocacy has been an important aspect of the discipline (Hunter *et al.* 2006). As a discipline it has a distinct focus: to promote nature conservation and provide tools to preserve biodiversity for biodiversity's sake, rather than economic maximisation (Soulé, 1985). As such, despite being a relatively young discipline, its values, principles and ideas are based on established conservation thinking (Van Dyke, 2003).

The conservation movement as we know it emerged in the late 19th century. Since that time, applied conservation has followed two main strands: either species based conservation, such as the distinct and especial protection of whales or birds, or area-based conservation, such as national parks and reserves. Although the idea of area-based protection was only recently introduced to oceanic ecosystems, protected areas were the dominant conservation ideology on land throughout the 20th century, and continue to be to this day (Adams, 2004; Brockington *et al.* 2008).

The application of area-based conservation, particularly the National Parks introduced in the United States of America, were foundational in setting the norms and values of conservation biology (Van Dyke, 2003), and subsequently the form of marine area-based protection. The idea of protected areas was that some places be left free of human interference, to preserve wild settings and the natural features and species within them. This normative history is evident in the modern application of marine area-based protection: the designation approach used for marine protected areas (of identifying a discrete area that has valuable natural features to protect, and in which human activities should be prevented) mirrors that applied to conservation on land. The literature on marine area-based protection has a tendency to present no-take or

no-disturbance MPAs – those with the most complete exclusion of humans - as being the only legitimate form of protected area (Agardy *et al.* 2003).

In the face of multiple criticisms of a prevalent single-species approach to fisheries management that ignores ecosystemic interactions, many governments worldwide are now committing to adopting an ecosystem approach to marine management (Ruckelshaus *et al.* 2008). Area-based conservation in the form of MPAs is often seen as the policy tool that can fulfil those commitments. As such, ecosystem-based management and marine protected areas are sometimes used interchangeably in the literature (Halpern *et al.* 2010).

This is however inaccurate, and usually the result of a conflation of two distinct area-based approaches that are in reality not often implemented together. Although there has been some integration of ecosystem management with marine protected areas (such as for the Great Barrier Reef), ecosystem approaches are in actuality rare, and MPAs are more frequently stand-alone protected areas that are not integrated into wider ecosystem management (Cicin-Sain and Belfiore, 2005). Instead, wider area-based management in fisheries is often not based on ecosystem principles, but is rather merely a single-species policy applied over a grossly drawn area - a resource patch - recognised for the productivity of a particular fish commodity and sometimes supplemented by areas set-aside for conservation.

Although the proliferation of area-based protection in recent years is arguably a good thing for marine conservation, there are issues with the approach as it now stands. Area-based protection is by no means an ecosystem-based approach to fisheries management in its totality, with protected areas often tending towards being discrete, isolated and small, limiting their conservation potential (Ruckelshaus *et al.* 2008).

The common conflation of area-based conservation and ecosystem-based management, particularly in policy and grey literature, can mean that implementing an MPA allows governments to tick ecosystem management off their to-do list, leaving vast areas of ocean vulnerable, with only limited protected areas designated as a ‘good enough’ conservation policy.

The commonly adopted designation process of identifying ‘special’ habitats or features to be protected by MPAs is a somewhat problematic carry-over from conservation approaches on land. In land-based conservation biology the existence of features or habitats to be protected is usually a foregone conclusion, and a necessary prerequisite of conservation. The same, unfortunately, does not logically follow for the sea.

In the landscape, a features-based approach to conservation is a pragmatic one, as habitats and features can be easily identified by sight: the Grand Canyon, for example, is easily recognised as a unique natural feature. Under the sea, however, ecosystems and natural features are usually invisible to the human eye, and the features based approach can cause definite problems. Proving the presence of a habitat or feature in a given area of ocean is often expensive, and understanding the prevalence of these habitats or features – and where the best examples of them can be found – can be one of the most difficult parts of marine protected area designation (Lieberknecht *et al.* 2013).

The unthinking application of the features-based approach that originated on land to a marine environment causes problems. If, for example, an area of ocean supports a productive scallop fishery, but is thought also likely to contain a network of fragile maerl beds (such as the waters around the isle of Arran in Scotland), a features-based

approach leaves the onus of proof on scientists to confirm that the maerl feature exists, and where it exists, rather than on fishers to prove that their fishing methods will not damage life on the seabed.

As such, using an area-based approach with MPAs as the main conservation tool means that protection is necessarily partial, and rests heavily on proving the existence of spatially-distinct areas of given features, which often exist in unrecorded abundance in places that are not given protection. The MPA approach does not take into full account the inherent uncertainty and invisibility of the undersea environment. The focus on discrete, self-contained protected areas means that displacement of activities can have a negative effect on unprotected areas of habitat (Agardy *et al.* 2011), that feature and habitat dependence on wider ecological health are ignored, and that the spatially and temporally dynamic nature of species abundance can be disregarded.

2.3 The anthropologist's solution: community management

Community fisheries management as a policy approach focuses more on the procedural aspect, and is thus less top-down than market-based management. Community management ostensibly empowers local management of marine resources, with decisions made by local user groups, often alongside a broader governing body (because of the important role of different agencies working together, this collaborative form of community management is usually termed co-management. The nature of state power however means that most community management is in effect co-management, so the two terms can here be thought of as interchangeable).

The proceduralist nature of community management means that it has a long history, as most traditional methods of local resource control can retrospectively be considered community management institutions, although they may not be legible or valorised by governing bodies. In its modern form, however, community management developed in response to the failings of the top-down, technocratic fisheries management systems implemented in the late 20th century (Jentoft, 2003), informed by the anthropologically-inflicted fields of development studies and rural sociology.

As community management tends to be less prescriptive and more reflexive than market-based approaches, and often relies on local knowledge, customary rules, and social capital, it is a particularly popular policy solution in remote or underdeveloped areas where the infrastructure for market-based approaches is lacking. Community management paradigms run the gamut from simple consultations, wherein local perspectives are sought but final authority for management decisions remains firmly centralised, to fully devolved local decision-making and enforcement of fisheries regulations in coordination with broader management policies and bodies.

The advocacy of community-based management developed from a number of anthropological studies showing that the absence of private property rights did not necessarily mean overexploitation, as described in the Tragedy of the Commons (Hardin, 1968). Instead, complex local institutions often governed common property regimes in fisheries, and ensured the long-term sustainability of the resource (e.g. Berkes, 1985; McCay, 1980; Ostrom, 1990).

Anthropological studies emphasised the efficacy of local and traditional knowledge and community management of fisheries resources for some marine environments, where conditions such as clear social and ecological boundaries, compelling social

norms, benefits and feedbacks, and predictable, resilient resources and habitats exist (Berkes, 1999; Guitierrez *et al.* 2011; Ruddle and Johannes, 1985; Thornton and Scheer, 2012). However, successful linkage of local and traditional knowledge with modern scientific forms of knowledge within a community management organisation often requires attention to the conditions of knowledge generation and transmission, including social benefit flows and opportunities for bridging and social learning across generations and cultures (Berkes, 2009).

At the same time, community-based management is not panacea and can fail under instances where key design principles for management of common-pool resources do not adhere (Ostrom, 1990). In addition, it is important to recognise that in today's highly mobile and integrated global economy, communities may be quite heterogeneous, not only in terms of ethnicity and social economic status, but also in how they relate to local resources. Some stakeholders may be invested mainly in commercial interests, including exports, while others hold more traditional and diversified subsistence and cultural seascape ties. Thus the community should not be reified as a homogenous or stable entity when it comes to management of natural resources.

Nevertheless, where clear social norms, cohesion, and rewards for cooperative management exist, the benefits of retaining fisheries quotas and management "in place" can be multiple. Not only are economic interests served but also the ecological and sociocultural. The disjuncture between market-based ITQs and place-based subsistence can be seen clearly in places such as Alaska, where takes of subsistence marine resources are limited to rural communities in federal law. Studies show that harvesting of such resources tends to engender high rates of participation and sharing

within communities, leading to equitable flows of resources and the build-up of social capital among social networks both within and without of the geographic community (Wheeler and Thornton, 2005). These benefits are much less equitably and locally distributed in commercial fisheries where non-local fishing interests control ITQs.

The origin of community management studies in anthropology and development has meant that, despite a number of strong arguments for the effectiveness of community management in highly-modernised or industrial fisheries (such as Jentoft and McCay, 1995; Jentoft, 1989; Marciniak and Jentoft, 1997), in political practice it is often seen as being only relevant for “traditional” fisheries in global south or indigenous community contexts, with its potential in “first world” capitalist fisheries ignored (St. Martin, 2005).

2.4 Disciplinary imaginations of sea

Each of the approaches to marine management outlined above entails a particular way of thinking about the sea: distinct disciplinary imaginations of the ocean, and human interactions with it. Market-based fisheries management is inextricable from an economic imagination of the sea. The sea as imagined by economics is flat, placeless, and mathematical, spatially equivalent across its extent, and populated by discrete, quantifiable units of resources that can be measured, predicted and controlled. Under ITQ, fishers are economic agents that harvest interchangeable, controllable units of resource within a spatially indistinct and bounded area.

The sea as imagined by conservation biologists and managed by area-based conservation approaches mirrors the conservationist’s environment on land: it is a variegated space of degradation and naturalness, with specific areas of special

conservation interest, 'wild' homes to vulnerable species, wherein humans do not belong. These should then be protected as the proper homes to nature, outside of human use and disturbance: an approach that has led to criticisms of MPAs as neoliberal and technocratic fortress conservation (Segi, 2014).

The anthropological imagination of the sea that informs community management is more complex. It is often an animated landscape inhabited by a community of beings, human and non-human, whose interactions and relations collectively shape the seascape. In this conceptualisation humans are not the only actors with agency. Non-human persons, including even features of the seascape itself, may respond to human actions by advancing or withdrawing their presence. The history of anthropology as the study of the 'other' however means that this imagination of the sea is often wrongly consigned to an essentialised global south, indigenous or traditional community context that is outside of modern industrial organisation.

2.5 The future of fisheries: emergent marine approaches

Although the three systems outlined above can be considered the core elements of modern fisheries and oceanic management, two emergent approaches are important for future direction. The ecosystem approach has received much policy and academic interest as a potential alternative and successor to single-species management. However, while laudable in principle, it is difficult to realise in practice due to the complex and dynamic nature of marine environments that often feature highly mobile species and fluctuating ecosystem conditions. Understanding and managing the key drivers and components of such systems can be expensive and challenging. Even determining the basic boundaries of the marine system can prove elusive in comparison to reductionist single species biomass forecasting which requires

considerably less data or spatial prescriptions. There is also the question of what to manage for - stability or feedbacks - in a complex and dynamic system. These problems mean that despite recognised potential and considerable policy interest, ecosystem management has not presently been widely adopted.

A second approach gaining increasing interest in oceans management is marine spatial planning (MSP). MSP is a project specifically concerned with defining spatial boundaries to protect marine ecosystems in balance with human activities and needs, and is an explicitly place-based approach. However, as in land-use planning, priorities for zoned activities may take existing uses or boundaries for granted, rather than fundamentally reassessing community interests or ecosystem values according to science-based evidence. Similarly new priorities may be subject to a political ecology of interests, the more powerful of which may dominate the allocation of space or resources over other stakeholders in the planning process. Thus the integration of economic, social and environmental concerns presents a significant challenge (Jentoft and Knol, 2014).

3. What role for geography in marine management?

3.1 What does a geographical imagination of the sea look like?

As discussed above, each of the approaches to marine management presented above rests on a distinct academic imagination of the sea. The sea as imagined by bioeconomists is a flat resource-base, best managed by market-based methods, the sea as imagined by conservation biologists is a range of vulnerable habitats to be protected from human incursion, and the sea as imagined by anthropologists is a site of rich, locally variegated and collaborative human institutions, often operating

outside of modern capitalism. Each of these imaginaries has their associated strengths and weaknesses, especially when applied in unison.

But what is the geographer's imagination of the sea? Surprisingly, geography as a discipline has classically ignored the seas, and despite some strong work in the last decade from a small number of authors, this broadly continues to be the case (MacDonald, 2006; Bear, 2013). Although reference to the sea has now become more common in historical (Steinberg, 1999; Lambert *et al.* 2006) and political geography (Blacksell, 2004), geography as a whole contains a surprising paucity of the element that makes up 70% of the earth's surface. A number of geographers have recently questioned the discipline's "terracentrism" (Hasty & Peters, 2012; see also Peters, 2010) and called for the sea and the creatures in it to be more widely integrated into the geographical canon.

A small body of strong geographical work on the sea does exist. A recent edited volume by Anderson and Peters (2014) asks what geography can tell us about the material, more-than-human spaces of the ocean. Bear and Eden (2008) question the issue of space in the demarcation of oceanic regulation, and bring attention to the necessity of new ways of thinking about fluid space and place when it comes to marine governance, and what such a revised theoretical approach might mean for successful management. Although this work focuses explicitly on fishery certification, their arguments are also pertinent to the spatial issues of market-based management and area-based conservation presented above. Lewis (1999) also queries territory by emphasising the historical contingency of conceptions of sea space and oceanic boundaries.

Bear (2013) discusses the co-constitutive and co-productive nature of fisheries as an embedded assemblage of humans, non-humans and technologies. He emphasises the interconnected materiality of the sea: the co-constitution of human-and-nonhuman actors, oceanic governance and the “politics of space” (Bear, 2013:23), and suggests, based on Thrift, management practices that take into account the particularly fluid and emergent nature of saltwater environments.

Mansfield (2003) also draws attention to the hybrid, socio-material and human-animal nature of a fishery, the global industrial networks that fish are now a part of, and the importance of economic and political developments on land, often thousands of miles away, for fish. Cook and Tolia-Kelly (2010) present the material interconnections of matter across land and sea, and Lehman (2013) emphasises the agency of the sea in shaping the humans that spend their lives with it: the hybrid nature of human and environmental co-constitution.

Mansfield (2004) and St. Martin (2005; 2007) criticise, from a geographical perspective, the ahistorical nature of market-based management, which ignores the important roles of politics and technological change in fisheries overexploitation, and question the mono-cultural solutions this leads to. Older work by cultural geographer Nietschmann (1998; 1973) looks at the role of wider economic, political and social systems in impacting indigenous and local practices at sea, which emphasises the importance of situating local community management approaches within global economic contexts. From a historical perspective, Hasty and Peters (2012) and Lambert *et al.* (2006) also focus on technology, drawing on the importance of boats in mediating and forming human-oceanic relations, as does Gregson (2011) in geographically situating the material life-courses of oceanic vessels.

3.2 Geography's potential for fisheries and marine management

For those geographers that have focused attention on the sea, the geographical imagination, although still yet sketchy, offers much promise. Recent oceanic geography focuses on the living materiality of the sea, and the networks and relations between the forms of life and inorganic matters that live with it. It is posthuman and draws in a range of different actors. The relationship between humans and the non-human is foregrounded, as is the interconnected and emergent nature of social, environmental and political assemblages. Spatiality, territorialisation and deterritorialisation are discussed, as are the important role of boats and fishing technologies in mediating human-ocean relations.

However, perhaps because of the relative youth of oceanic geography, the literature currently offers very little in the way of applied or practical directions and solutions for marine policy. Mansfield (2004) is critical of both community management and market-based approaches, yet offers no alternative solutions. St. Martin and Hall-Arber (2008a) are similarly critical of market-based management, but use the geographical approach of mapping to emphasise the promise of community management.

Bear (2013) and Bear and Eden (2008) discuss the management implications of marine geography, particularly for mapping fisheries and marine conservation areas, but do not go into policy solutions in depth. St. Martin and Hall-Arber (2008b) go a step further in proposing particularly geographical solutions to marine spatial issues by emphasising the integration of biophysical and social data in mapping for fisheries management and marine planning. St Martin et al. (2007) call for an interdisciplinary approach to fisheries management that integrates an ecosystem approach with an

anthropologically influenced focus on communities, their interrelations and their local ecological knowledges.

The tentative steps taken above suggest that the intrinsically interdisciplinary approach of geography offers huge potential for marine management. Geographers' more-than-human and material approaches offer great potential for ordering our relations with the seas, in which technologies and other living species – with all their accordant mysteries and uncertainties - are crucial. Further to this, geographers' spatial imagination of the sea, as a variegated, multi-layered, hybrid and fluid space of emergent territorialisation and deterritorialisation could be an important addition to our understanding of ocean-going activity, and in particular fisheries.

4. Primary research – how fishermen see the sea

4.1 Methodological approach

As part of a wider project looking at the effectiveness of management of UK fisheries, in order to explore these issues an extensive empirical investigation of how fishermen relate to the sea was carried out. Based on qualitative research, this investigation was designed to assess the practical impacts of the theoretical approaches outlined in section two, and the parallels and differences between academic approaches to the marine and the embedded understandings, life-courses and practices of working fishers.

This empirical work was conducted between 2010 and 2014 in England and Scotland. Over this period, 84 interviews were conducted with fishermen, policy makers at the national and local level, marine managers and fisheries scientists in 35 locations around England and Scotland. Interviews were conducted ad hoc harbour-side and at

regional fish markets and snowballed from entry points at local and national fishing organisations, government bodies and non-governmental organisations.

The aim of the sampling process was to include a diverse range of respondents across a range of field sites, with a particular focus on diversity of fishing methods and geographical spread among those respondents from the fishing industry (69 of 84 interviews). Geographical heterogeneity was an important focus of the study because qualitative research on the UK fishing industry has traditionally taken the form of ethnographic case studies, looking at a single area or fishing community, rather than a broad spread of the varied fisheries covered by blanket national policy. This means that certain areas with distinct fishing cultures (such as the Scottish Highlands or Hull) are often assumed to be a proxy for the fishing industry more widely. The geographical areas covered and fishing methods used by interviewees were crosschecked against UK Sea Fisheries Statistics to ensure all major areas, fishing types and industry sectors had been covered.

4.2 Empirical results

There is a wide range of fishing practices currently in use in the UK. This extends from small, one-man boats placing pots in the same small area for a few crabs and lobsters, to high-tech ‘super-trawlers’ returning from every trip with millions of pounds worth of pelagic fish (oily fish such as mackerel and herring) that have never touched a human hand.

Perhaps unsurprisingly, there are many differences between the lifestyles, attitudes and income of the fishermen employed across these sectors. There are also geographical differences: general geographical trends can be found around the British

coast, with certain fishing methods and target species concentrated in certain areas. Pelagic super-trawlers, for example, are concentrated mainly in the north east of Scotland and Shetland. The fleet in Cornwall and Devon, in comparison, is mostly made up of smaller day boats targeting mixed demersal and shellfish species (with one large pelagic trawler owner in Plymouth). Most boats in north Norfolk concentrate primarily on crab, and those in the Hebrides and to the west coast of Scotland on nephrops (langoustine). As such, the nature of fishing, and fishers, in the UK is inherently geographically diverse.

During interviews, fishers were asked about their opinions as to conservation, and their moral attitudes towards exploiting the sea. Despite the wide differences between the lifestyles and fishing methods and technologies employed across the sector, fishermen were consistent in conceiving of conservation, and their personal, ethical and affective relationships to the sea, in a very particular way. Despite the apparent flatness of the oceanic surface, the fishers interviewed saw the sea as featureful and spatially heterogeneous, based on personal experience and local narrative.

Perhaps unsurprisingly, these place-relationships were stronger for fishers operating from smaller vessels, who could not travel as far and tended to work the same area continually for a number of years. But they were also present for fishermen operating from larger, more technologically advanced boats with a wider range, particularly if these vessels worked the same grounds repeatedly. Interestingly, a number of fishers working on ‘super-trawlers’ kept a smaller boat for during their time off, and the relationship with the sea and the affective being-fisher that this type of fishing enabled was a key factor in their choosing such a busman’s holiday.

This attachment to place was based on layers of piecemeal knowledge about the immediately invisible undersea world, built up through experience over time. Fishers discussed differences in the seabed in different places, the patterns of the currents, and the habitats favoured by target and non-target species alongside the impacts of the weather, seasons and human activity in a given area. This application of spatial heterogeneity to a featureless landscape can be thought of as a “fisherly imagination”: the population of an immediately invisible seascape through knowledge and experience. As such, the fisherly imagination was not of the sea as a whole, but of a spatially bounded territory of personal experience.

Both the fisherly imaginations of the seascape and their attitudes to conservation were widely holistic and ecosystemic in approach. The connections between target and non-target species and habitats were emphasised, and fisheries management that was considered not to take these interconnections into account was criticised. Importantly, fishers also tended to see themselves as key actors in this ecosystem assemblage, with the role of changing fishing patterns, gears, or harvesting trends in the wider ecosystem often discussed, usually in historical perspective.

The notion of stewardship, or looking after the area of ocean you fish in, was repeated consistently by fishers. Importantly, this stewardship was usually spatially distinct, and linked to the territorial fisherly imaginations that had developed through ongoing personal interactions with certain places. This notion of stewardship was place based, and more consistently mentioned by fishers operating in a small spatial area, using smaller-vessels that allow greater exposure to the sea (with times between hauls spent on an open deck, rather than in a TV room) or who had spent a long time repeatedly working the same grounds.

“They [Scarborough fishermen] fish out the back of the wind farms, we fish inside the wind farms [...] we’ve got excellent ground here. We’ve got a chalk edge, that’s been there hundreds of years, that’s the only one left in the country, ‘cos we’re managing it. If it was up in Yorkshire [...] there’d be trawl gear going up and down on it 24/7.”

Open deck crab Fisherman, Sheringham, Norfolk

This stewardship of place went hand-in-hand with what fishers considered to be their justifiable ‘rights’ when it came to the sea. The UK operates on a market-oriented rights-based system, so fishermen’s official ‘rights’ are to a percentage proportion of the annual catch of a given species according to their quota holdings, following the principles of bioeconomics and market-based fisheries management. Interestingly the majority of fishermen, including those operating from the large super-trawlers that have consolidated significant financial rewards under market-based management, considered the rights-based system to be morally wrong, and not conservation oriented. When asked what conservation policies should be, there was a broad consensus that these should be place-based, with areas locally managed to take into account ecological and social heterogeneity.

Interviewees often criticised the placelessness of market-based management. Fishers considered that historical stewardship of an area should be rewarded, and that ‘outsiders’ should be prevented from fishing in ‘their’ areas of sea. The term ‘outsiders’ was used both for foreign vessels and vessels from other areas within England and Scotland who were thought to do things differently from local fishers, as shown in the Sheringham fisher quote above, referring to boats from Scarborough.

In Cornwall, French boats with historical links to an area were not considered ‘outsiders’ but Scottish or other English boats, without personal relationships with local people, operating different gear and following different fishing methods, were.

“Years ago I remember one of them big Scottish netters came down here, fishing pilchards. No one would talk to him, when he tried to land it, they wouldn’t buy his fish. We wouldn’t talk to him in the pub. It’s not what we wanted, not the way we wanted to do it here.”

Small-scale pilchard fisherman, Mevagissey, Cornwall

“It’s them east coast boats, they don’t think of the future, they just exploit an area and move on. Some of them have been coming here for a while, we’re fine with those guys, that’s ok. But those that just came this year, it shouldn’t be allowed.”

Nephrops trawler fisherman, Stornoway, Outer Hebrides

Fishers considered their true ‘rights’ to be to fish in certain areas of sea close to their home, areas that they knew and cared for, and that their communities and families (where appropriate) had historically fished. Despite no legal recognition of this position (fisheries Producer Organisations are not regional bodies) ‘outsiders’ who didn’t know an area, and ‘came in’ and fished without the proper knowledge, ties, and care were considered to be acting immorally and without proper right. This was despite their being very much within their rights legally to fish in an area if they had purchased the requisite quota.

“I bet you could take it right down to bay level. There’s people here, who think every bass in a bay is their family’s. They will actually get really riled if when they are out there somebody is on their patch. Right down to port level, bay level. It’s about the custodianship of the sea.”

Producer Organisation manager, South West England

“When it comes down to it, it’s ‘this is my bit, and you’re not getting in’.”

Producer Organisation manager, East Scotland

When asked how they would redesign UK fisheries management to make it more effective, the vast majority of fishers suggested a more geographically organised approach to management:

“Ideally, what we want, is a regionalised quota [...] The biggest herring spawning area in the North Sea is between nine and twelve miles east of Scarborough, but the Scotchmen ended up with all the quota. Them herrings, now, is on our doorstep, and we can’t catch a herring all year round.”

Mixed fisherman, Scarborough, Yorkshire

“If you look at the geography, and the different ambitions that we’ve all got, I’m not sure that even with a Scottish regional policy and a one size fits all for Scotland we’d be any better off than we are at the moment [European common management]. It’s got to be localised.”

Shetland fisheries manager

5. What could a geographical solution look like?

5.1 Geography and marine policy

The empirical results of this research outlined above found a striking similarity between a potential geographical imagining of the sea, based on contemporary themes in geographical thought, and the ‘fisherly imaginations’ of the people whose activities are the primary subject of marine management. Both geographical and fisherly imaginings of the sea are relational, heterogeneous and place based, and draw on affective entanglements and the co-production of knowledge.

This place-based imagination is not limited to the UK. Similarly territorial tendencies in fishers can also be seen in a number of anthropological works looking at fishing communities in other areas around the world, including the North Pacific (Colombi and Brooks 2012; Thornton 2008), the North Atlantic (Acheson 1988; Pálsson 1998) and Oceania (Johannes 1978; 1981).

Alongside this territoriality, fisherly imaginations of the sea and how it should be managed focus not only on geographical stewardship, but the material and affective

relationships of fishers, fish and the environment, on technologies and the more-than-human, and on the dynamic and hybrid nature of social and ecological systems.

The strong similarity between a geographical and fisherly imagination of the sea sets a substantial basis for greater intervention in marine and fisheries policy by geographers. There is a strong justification for working with existing moral structures and the way fishers already understand conservation in implementing marine policies (Jagers et al. 2012). Market-based and area-based conservation policies do not do this, and thus fishers often fight against their implementation (Jentoft et al. 2012; Cardwell, 2012).

Area-based conservation is based on the way conservationists see the sea: as an environment to be protected from human influence. Contrary to this, fishers see humans as being an integral part of the ecosystem they operate in, focusing more on technologies, the concentration of fishing effort, the fishing methods employed and the temporal and spatial organisation of fishing, as well as the relationship between the fisher and the place in which they fish, in their understandings of conservation.

Market-based management is based on the way economists see the sea. The claim of economists, that market-based policies promote stewardship by offering stable property rights over a resource are based on theory alone and have not been shown out in an empirical context (Gilmour *et al.* 2012). Our research suggests, to the contrary, that stewardship is not based on the ability to purchase a right to a percentage of a total species stock spread over a large, non-ecological area. Instead, fishers see stewardship holistically, spatially, and in a particularly place-based and territorial manner.

Community management, based on the way anthropologists see the sea, has much potential to be expanded, and this could be done, following St. Martin (2005), in a spatially aware, critical geographical context that works with fisherly imaginations. Such a spatially aware, scalar take on community management could also work to prevent the assumption that because a community management scheme exists, communities are necessarily being empowered, when wider social and economic forces mean this is not necessarily the case (Nadasdy, 2005).

Interdisciplinary is vital for any successful marine management initiative, and this is a particular strength for geography. Geography is well situated to integrate the substantial offerings of anthropology (in community management) and ecology (in an ecosystem approach) in a wider marine spatial planning context. Marine spatial planning – the spatial mapping and delineating of human activities on the ocean - is currently a hot policy topic much in need of academic input, and the contribution of geographers to this, both theoretically and practically, is crucial.

5.2 A geographical solution?

In order to give something substantive to marine management, geographers need to not only to be critical of existing management structures but also offer potential policy solutions. What could these solutions be? As discussed above, a geographical solution could draw on the fisherly imagination of the sea, be interdisciplinary, focus on the nexus of the social and environmental, and take into account regional and place-based contexts whilst being globally embedded. The geographical imagination supports a socially integrated management method, such as community management, and an ecologically integrated system such as ecosystem management. It also requires that these be brought together in an adaptive and reflexive manner.

Considering the issues facing current approaches to marine management, and responding to both the empirical findings and explicitly geographical ways of understanding the world outlined above, one potential geographical solution could be territorial use rights for fisheries (TURFs). TURFs, like ITQ, are a form of rights-based management, in that certain rights are granted to fishers. However, in the case of TURFs these rights are place-based and territorial, rather than being purchasable market-based rights to harvest a certain amount of a given species. TURFs can thus be integrated into an ecosystem approach and can broadly be integrated with community management, in that territorial rights are granted not privately but to a community or collective (Panayotou, 1984).

As a rights-based management regime, many of the arguments made in favour of market-based mechanisms can also be applied to TURFs. The key difference, however, between market-based mechanisms and TURFs is in the origin of the notion of what fishers can and should have rights over. For ITQ systems, the rights granted are a statistical conceit: the 'right' to a given percentage of a modelled species population. This is a right born of the office-based, centralised, mathematical approaches to fisheries management (Hubbard, 2014). For TURFs, however, the right granted is an organic one over a geographical area, born of the co-produced and holistic beliefs, practices and lived experiences of fishers amidst their working environment. As such, from a historical context, TURFs can be considered widespread in traditional fisheries management (Christy, 1983).

Species-based rights systems such as ITQ assume a homogenous distribution of fish across space - a supposition does not play out in reality (Sanchirico and Wilen 2005). They ignore the many complex factors that play into fishers' spatial decisions as to

where to operate, the predator-prey interactions across different species of fish living in the same area, and the habitat and ecosystem impacts of fishing (Wilén *et al.* 2012). This ignorance of space and interconnection should of course be anathema to geographers. Territorial rights, in comparison, can be closely attentive to space, place, the material technologies and methods of fishing, and the relationship between these and the wider environment.

Although TURFs have not been adopted as enthusiastically as the policy solutions outlined above in modern fisheries management, their traditional popularity means some international examples do exist. Japan has had TURFs in coastal areas since the 16th century (Ruddle, 1987). These adopt an integrated ecosystem-management based approach across a given territory, with decisions made in inter-scalar devolved co-management institutions; the resulting fisheries are adaptive, productive and effective at preventing conflict (Wilén *et al.* 2012). Chile also has TURFs for inshore fisheries. Since their adoption in 1991, stock biomass and average landings sizes have increased dramatically, as has the abundance and diversity of non-target species (Gelcich *et al.* 2008). Other, less well-studied TURFs systems exist at a smaller scale across the global south (see, for example, the locally managed marine area network at Immanetwork.org), although their often traditional and customary nature means that despite their promise, the number of TURFs is decreasing, rather than increasing, over time (Charles, 2002).

The academic attention paid to TURFs systems, compared to market-based rights, area-based conservation and community management is currently scant (Charles, 2002). This means that there is considerable scope for geographers to query the

specificities, contexts and regional variations in the potential for territorial and geographical approaches to marine management and conservation.

Of course, TURFs are only one example of a potential geographical approach to the human relationship with the sea, and others may exist or yet be developed. The research outlined above suggests a number of other questions that geographers are uniquely placed to explore. To what extent can the territoriality of the fisherly imagination be used for conservation? What does it mean for the integration of wider ocean uses in marine spatial planning? How can scalar and multi-level considerations be integrated into an ecosystemic and community managed approach? What role do emotions, affect and relationship to place play in sustainable oceanic use? How do wider markets for fish products play into local level economic, social and ecological dynamics? How can animal geographies inform our understanding of marine life? What role might the regulation of technology and thus the cyborg identities (after Haraway, 1985) of fishers play in sustainable ocean management?

6. Conclusion: geographers should pay more attention to sea

This paper has presented a call for geographers to engage more closely both with theoretical and ontological studies of the sea, and the applied management of fisheries and marine environments. It is argued that the academic disciplines of economics, conservation biology and anthropology have played significant roles in recent advances in oceanic understandings and governance, and that geography is currently not meeting its considerable potential to do the same. The “disciplinary dogmatism” of academic approaches to marine management has been criticised before, and a more interdisciplinary role advocated (Degnbol *et. al.* 2006:534). The particular strengths

of geographical thought in this and other respects is clear, as are the close parallels between the geographical imagination of the sea and that of those individuals at the coal-face of management: fishers.

The time is ripe for geographers to contribute to the relationships between humans and the sea. Oceanic activities are increasing apace, and governments are increasingly concerned with understanding these geographically and implementing successful marine spatial planning (this is evident in, among others, the UK Marine and Coastal Access Act 2009, the 2014 European directive 2014/89/EU establishing a framework for marine spatial planning, and the USA's 2010 National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes). These spatial plans must incorporate a variety of (sometimes conflicting) human activities with an ecosystem stewardship approach to marine management. Despite being hailed as a paradigmatic change in marine management, these approaches are still yet rare in operation, and shrouded by uncertainty as to their interpretation and effective implementation in dynamic marine social-ecological systems (Österblom et al. 2010).

Nascent political commitments to as-yet-uncertain marine spatial planning and ecosystem management initiatives need strong theoretical and empirical input. Geographers have, so far, remained surprisingly silent in this distinctly geographical debate. The successes of economics in setting the table for contemporary marine management show us that academic disciplines can have a significant impact on the health and productivity of the human relationship with the oceans, and the distinctly geographical issues facing current oceanic policy are crying out for disciplinary intervention. Now is the time for geographers to play an action role in marine management.

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Conclusion

It's not fish you're buying, it's our rights

In the 20th and 21st centuries, economic theories have become central to the organisation of human life. Economics is often presented as a science, and in turn its theories are presented as objective truths, describing human nature and social organisation as it really is. This thesis has problematised these assumptions. It has argued that the application of economic principles to the flow of life – via the disciplinary mechanisms of government – is actually a highly political process with the capacity to irreversibly transform human experiences, social relations, and our relationship to the non-human world and the creatures in it.

This empirical study of the transformation of fishing (which, as a form of hunter-gathering, is one of the oldest ways in which humans organise to provide for

themselves) in the UK has queried who has won and who has lost, and how lives and livings have changed with the application of economic principles to the organisation of the industry. As the first chapter showed, small-scale fishers have so far perhaps been the biggest losers in the commoditisation of the right to fish. Dispossessed of their entitlement to land and sell their catch, we have seen UK fish production since the introduction of market based policy concentrate into ever-smaller numbers of large companies.

This finding is nothing new, and these patterns have been noted in market based management systems around the world. However, it is important to note the failure of bureaucratic attempts to protect small-scale boats from the vagaries of the quota market with the use of a differentiated management scheme. The UK experience shows that delineating between a large scale fishing fleet to meet economic objectives, and a small-scale fleet to meet social objectives, is not simple. It also shows us that primary allocation is vitally important, and entitlements cannot be granted scattershot and then be expected to coalesce organically into their 'rightful' place.

Questioning this assumption also leads us to question the naturalness of a social and economic organisation that leads to resources being concentrated into a small number of large companies, rather than a more equitable division of wealth between a larger number of industry participants. Economic theory tells us that greater efficiency (in the shape of greater pecuniary returns) is more important than equality, as a greater absolute income can potentially be redistributed to those disenfranchised by marketization. Such an assumption, however, assumes not just a modern welfare state,

but that the rents and returns of industry accrue to the government, rather than into private hands. In the fishing rights market, as in many other environmental markets, this is not the case. The results are not greater aggregate social good, but greater inequality, a loss of community cohesion, and a large number of jobless and disenfranchised people alongside a small number of millionaires.

It is important however to note that the story uncovered in this thesis is not simply one of industry Goliaths versus artisanal Davids. Although tempting to do so, we cannot lay the structural changes in the fishing industry at the door of unscrupulous actions by powerful fishing companies. As the second paper showed, even the current ‘winners’ under market-based management – such as the pelagic super-trawlers of Whalsay – are, in the long run, victims of marketization. Traditional shared ownership, a firm-level economic organisation that worked effectively both before the introduction of ITQs and for the first generation of fishers gifted fishing rights for free, cannot be sustained upon generational change. This means that under ITQ, shore-based ownership models see a resurgence, despite there being no proof to support (and some evidence to the contrary – see also Højrup, 2012; Thompson *et al.* 1983) the assertion that this is because shore based firms are more efficient.

An important factor in the privileging of large, shore-based firms is the relationship these have with banks and financial institutions. This is because making the entitlement to fish dependent on access to money gives great power to those institutions that provide access to credit. Just as money is a proxy for power and possibility in economics, it becomes the means of power and possibility in the restructured fishing industry, with access to money dictating who is entitled to fish.

This foregrounding of financial status in deciding rights mirrors the simplified and incomplete view of human organization espoused within economic theory.

This thesis has outlined how such economic logics can lead to unpredicted effects when human organization is restructured along market lines. Individual economic postulates (such as the statement that the ability to buy and sell a right to produce a good will lead to greater efficiency) are part of the web that is the wider internal logic of economics. Individual economic principles are tied to their supporting theories and underlying assumptions. There are therefore *collateral realities* when applying economic principles: the application of a theory of efficiency can perform other economic ideas, such as (as given in this example) an assumption of firm structure.

The ways in which such economic performances are imposed and directed were expanded in paper three. This discussed the role of the disciplinary powers of government in enforcing economic ideals; how the strictures and sanctions of the law, and material and active processes allow the state to enforce certain mandated ways of being. Paper three suggested that certain inscriptions – those of economics, and statistics – receive the backing of legitimate force and state discipline because they are necessary tools for the sustenance of that discipline. Statistics and economics are tools of state power, vital for creating a docile polity that can be measured and controlled.

This argument politicized both the theory of economic performativity, which has previously been criticized as apolitical, and the ostensibly descriptive arguments of bioeconomics that underpin market-based fisheries management. We see that power

plays a vital role in the creation of markets, and economics is a tool in the expression of that power. This power is an important topic of study. But whom does it serve? As paper three discusses, and was mentioned above, a clear beneficiary in the creation of the fishing rights market was the financial sector.

Unfortunately, understanding in depth the role of the financial sector in the creation and shaping of markets was beyond the scope of this research. This is primarily because of issues of access. Finance is bound up in protective layers of privacy and data confidentiality that make research very difficult. Due to this lack of empirical evidence, in this research I have not made any postulations on the role of agents within the financial sector in driving these processes of industry financialisation and marketisation. This is an important potential topic of future research, and one that could be perhaps investigated by economic or cultural geographers. As paper four discussed, geography has so far had little to say about marine policy, a situation that I would like to see changed, as further engagement would benefit both the managers of the sea and the scholars of geography departments.

Fisheries and their management have been a fascinating and enlightening topic of study for this geographer. The study of the UK's market-based system for this thesis allowed me to create a piece of original work on a national management system that has previously received little scholarly attention. This, combined with the dynamic politics at play in UK fisheries management during the period during which this project was being undertaken, made this both an exciting and a fascinating research process.

In the four years that this thesis took to develop, there were a number of important changes in UK fisheries management. During this period, I was lucky to witness first hand a number of events that were the making of UK fisheries history. These included a significant reform of the European Union Common Fisheries Policy; the 2012 devolution of fishing-rights management from the UK government to the administrations of Northern Ireland, Scotland and Wales; the development of new ties between UK small-scale fishers and environmental NGOs (particularly Greenpeace); the 2013 Court Case deciding the legal status of fishing-rights as possessions (which I had the good fortune to watch unfold in the Royal Courts of Justice) and, in late 2013, the publication of a register of fishing-rights owners (who had up to that point been entirely unknown).

The only downside of undertaking this thesis at such a dynamic and interesting time is that at the point of finishing, many important aspects of the future direction of UK fisheries currently remain to be seen. The devolved administrations are keen to use their new powers to make changes to the established UK system. What will these be? Industry members and governors are expecting future legal action in order to determine the nature of the fishing-rights that are currently traded on the UK market. How will these unfold, and what will be the outcome? Unfortunately, only time can answer these questions, so they must in the case of this thesis remain open-ended.

Despite this, the papers that made up this thesis have however had the benefit of a rich and variegated subject of study. I have explored the development of a market for fishing rights in the UK: its conceptual foundation, the technical means by which it was implemented and its impacts so far. As market-based approaches to fisheries

management have increased apace in recent decades, and now exist in a number of countries internationally, the original findings of this work have global significance for fisheries worldwide.

The conclusions drawn - particularly those that show the problems that stem from applying untested economic assumptions to real-world scenarios - are applicable far beyond the management of fisheries. Markets are increasingly being used to format our relationship with the environment and the use of natural resources (both sources and sinks) in a variety of contexts globally. This includes applying market organisation to some of the most pressing environmental issues in existence: not just the health and productivity of our oceans, but also water quality (Hoag & Hughes-Popp, 1997); the hole in the ozone layer (Hahn & McGartland, 1989); the destruction of biodiversity (Redford & Adams, 2009); and the changing of climatic conditions through carbon and greenhouse gas emissions (Callon, 2009; for many further uses of markets-based environmental management tools see Stavins, 2001).

Not only does the application of these market-based solutions have real and tangible effects on our environment, and therefore the quality, and even potential future existence, of human life on earth but it also influences the form and structure of our social relations – with both the human and non-human – and therefore the constitution of ways of life, experiences, and our very identity.

That we fully understand the impacts of these processes of market creation is even more pressing when we consider the irreversibility of many of the socio-material changes that the introduction of the market enforces: as Chapter 1 described, the

established legal and financial system is such that there is no room for error: reversing a market-making process, in the case that we find it fails to do what it was established to do, is a task akin in difficulty to changing the wheel on a bicycle without losing forward momentum or being able to dismount.

The dynamic efficiency issues discussed in Chapter 2 bring alarming attention to this difficulty: the relative youth of market-based environmental management means that it remains essentially unproven, and we have no secure knowledge of what its future impacts may be. Chapter 3 shows us how untested, and often unstated, assumptions can be performed in ways that we could never predict when a market is introduced, with far reaching consequences.

The power of the performance of ideas allows us, however, to end this warning about market creation on a relatively bright note. The incursion of markets is not the only trend in fisheries policy today, with conservation and community management also receiving increasing political attention. Such developments are not limited to fisheries, and attention to the ethical enmeshment of human communities in non-human environments, and the co-production of social and environmental justice, can be found in many academic and philosophical works (e.g. Sandler & Pezzullo, 2007; Lorraine, 2011; Stengers, 2005). As geographers, we are well placed to do what we can to attempt to ameliorate the human condition, and be a part of the change we want to see in the world.

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