

Irish fish, Irish people: roles and responsibilities for an emptying ocean

Dana D. Miller · Stefano Mariani

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Abstract Human decisions shape patterns of seafood resource use. Consequently, it is also these decisions made by actors within seafood industries which ultimately determine the environmental impact of fisheries resource extraction from marine environments. In this study, we investigated the roles and influences of various actors within the Irish seafood industry. Our objectives were to learn more about the working dynamics of the industry and identify possibilities for improvements towards industry sustainability. We employed qualitative research methods including semi-structured interviews, focus groups and participant observation to access information from Irish consumers, retailers, wholesalers, scientists and key industry informants. The diversity of seafood products available within the Irish market is generally low. However, consumers who experiment with trying new varieties of seafood are influenced by dining experiences at restaurants or while travelling abroad as well as through cooking shows or cookbooks. Potential for influence on factors including consumer choice, stocking and sourcing decisions, business management and fisheries policy was found within all levels of the seafood industry, though a sense of responsibility in the context of seafood sustainability was less common. In addition, the absence of shortages within the Irish market due to imports, aquaculture and mislabelling appears to be preventing widespread acceptance about claims of overfishing. It is clear that ultimately, responsible policy decisions and effective enforcement will be needed to improve the overall sustainability of the industry. However, pressure for positive change can come from all actors that prioritise sustainability as the most important objective for future industry operation.

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D. D. Miller (✉) · S. Mariani
School of Biology and Environmental Science, University College Dublin, Dublin 4, Ireland
e-mail: danadmiller@gmail.com

D. D. Miller
Fisheries Centre, University of British Columbia, 2202 Main Mall, Vancouver, BC V6T 1Z4, Canada

S. Mariani
School of Environment and Life Sciences, University of Salford, Salford M5 4WT, UK

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1 Introduction

Despite the rapid recent growth in the global aquaculture industry, seafood still remains an important wild food resource (FAO 2010). Exploiting raw materials from an environment uninhabitable by humankind, fishermen have managed to retain their essential roles as hunters and gatherers, roles which have been long lost to any large extent from human terrestrial existence (Jacquet 2009). This important, increasingly delicate connection that we hold with the marine environment has been threatened in recent decades as irresponsible and unsustainable fishing pressure has pushed the limits of what our oceans can provide (Watson and Pauly 2001; Pauly et al. 2002, 2005; Myers and Worm 2003; FAO 2010).

Starting from the late 1980s, the total quantity of wild fish landed by fisheries globally has generally declined (Watson and Pauly 2001; FAO 2010). Simultaneously, international fishing effort has steadily increased, resulting in declining rates of catch per unit effort and substantial economic losses recently estimated at 50 billion US dollars annually (World Bank 2009; Anticamara et al. 2011). The health of marine habitats has been compromised by coastal pollution (Islam and Tanaka 2004) and the widespread use of damaging fishing practices (Jennings and Kaiser 1998; Watling and Norse 1998; Pikitch et al. 2004), resulting in a reduced capacity for the provision of essential marine ecosystem services, of which we are only just beginning to realise the importance (Worm et al. 2006; Chan and Ruckelshaus 2010).

In Europe, the situation is particularly serious. In 2008, it was estimated that over 88 % of commercial fish stocks were being fished at levels beyond maximum sustainable yield and of these, approximately 30 % were considered outside safe biological limits (EC 2009). Despite the proximity to large areas of what once were rich and fertile fishing grounds, in some European countries, the most popular seafood items are foreign, imported species or varieties produced primarily through aquaculture (EC 2010). As a result of this growing dependence on imported fish, the EU is now the world's largest importer of wild seafood products (FAO 2010).

The Irish seafood industry provides a typical example of mismatch in relation to local resource availability and domestic market demand. Despite the closure of the Irish commercial fishery for wild salmon (*Salmo salar*, Salmonidae) in 2007 (Collins et al. 2006; DCMNR 2007) and a 90 % decrease in the Irish landings of Atlantic cod (*Gadus morhua*, Gadidae) from peak production levels during the 1980s (ICES 2010), salmon and cod remain the most commonly consumed fish varieties in Ireland, representing the majority of the fresh fish sold within the Irish market (BIM 2011). The Irish demand for salmon and cod has been met through increasing contributions of imported fish and substantial growth in farmed salmon production (Miller et al. 2012). In addition, recent studies have suggested that high levels of product mislabelling may be contributing to the artificial maintenance of an abundant supply of 'cod' to the Irish marketplace (Miller and Mariani 2010). The majority of fish caught by Irish fishing fleets are pelagic species or shellfish (SFPA 2011), for which there is a low domestic market demand relative to salmon and whitefish (BIM 2011). As a result, a large amount of locally produced seafood is exported to external markets for human consumption or processed into fishmeal, primarily for use as feed for aquaculture (Tacon 2005; CSO 2007). Consequently, a non-transparent market environment currently exists for Irish consumers where product availability does not reflect the reality of local resource depletion.

The Irish fishing industry also appears to have a substantial problem in relation to fleet overcapacity. In a recent report produced by the European Commission, Ireland was the

second worst Member State in reporting efforts to reduce fleet capacity in line with available fishing resources (EC 2011a). Fleet overcapacity and the subsidies that maintain or encourage overcapacity have been recognised as highly important factors that have contributed to overfishing both within EU waters and globally (Munro and Sumaila 2002; Pauly et al. 2002; Jacquet et al. 2009).

Human decisions have shaped the historical patterns of our marine resource use. Both globally and regionally, individuals and groups defined by a range of different roles within the seafood industry have chosen which species are appropriate, most attainable and most preferable for consumption. It has been these decisions, potentially made by consumers, fishermen, and where present, retailers, suppliers, fisheries managers, scientists and policy makers that have determined both the variety and quantity of seafood extracted from our oceans and consequently the impacts that these removals have had on marine ecosystems. Learning more about these decisions, such as which decisions are influential and what or who influences these decisions within a seafood industry, can possibly help inform strategies for introducing positive change in systems where resource depletion has occurred.

In this study, qualitative social science research approaches were utilised in an attempt at understanding the possible roles and influences associated with representative actors within the Irish seafood industry. The objectives of this study were to learn more about the drivers and working dynamics of the industry and to explore ideas for improving the sustainability of current industry operations. To achieve this, we sought to answer six research questions outlined in Table 1, which have been further broken down into six guiding themes used as coding categories in the analysis of all qualitative data gathered.

2 Materials and methods

The research methods used in this study were of a qualitative nature. Although quantitative surveys are often used in studies associated with seafood consumption and preference (e.g. Honkanen et al. 2005; Clonan et al. 2011), a qualitative research approach was chosen as

Table 1 Research objectives, questions and coding categories used in the analysis of all qualitative data

Research objectives	Research questions	Coding categories
To learn more about the drivers and working dynamics of the Irish seafood industry	What factors influence both the diversity and quantity of fish consumption in Ireland?	Consumer preference Market availability Patterns of change within the industry
	What factors influence seafood purchasing decisions by Irish wholesalers and retailers?	Decision-making processes
To explore ideas for improving the sustainability of the current industry operations	What are the emergent concerns within the Irish seafood industry?	Industry criticism
	Where are opportunities for positive change towards industry sustainability present?	Ideas for positive change
	What are both the apparent and potential roles of various groups of industry actors?	
	With whom does the perceived responsibility of ensuring sustainability lie?	

this study sought to obtain detailed descriptions and opinions about the seafood industry from those involved in its operation. In addition, an important objective of this study was to uncover ideas for improving the sustainability of the industry, and it was thought that a quantitative research design may have limited our ability to obtain the depth of information desired. Aspects of the internal working dynamics of the seafood industry in Ireland including the influences within decision-making processes were investigated through semi-structured interviews, focus groups and participant observation (see further details below). These three qualitative approaches were used as we felt that the groups of actors we wished to obtain information from differed in characteristics relating to accessibility that justified the use of varied research approaches.

Where permitted, audio recordings of the interviews and focus groups were made and transcribed verbatim in hard copy, reducing the potential subjective influence that note taking in isolation would introduce into transcripts (May 2001). In the minority of instances where interviews were not recorded, detailed notes were taken and a recollection of the interview was audio recorded immediately after and subsequently transcribed in hard copy. These few instances occurred in situations where a retailer was being interviewed in a consumer-facing environment and did not feel comfortable engaging in such a formal and perhaps suspiciously perceived interaction in view of customers. Participant observation notes were recorded continuously throughout the research periods, through detailed 'journal entries' which were later expanded upon and annotated further (Silverman 2005).

Transcript records of all qualitative research exercises were integratively analysed (Barbour 2008) through thematic analysis (Ezzy 2002) and coded using a 'scissor-and-sort' approach (Wells 1974). All transcript data were categorised both according to emergent issues and within previously determined guiding themes, outlined within Table 1. This method involved allocating sections of transcripts and notes into these multiple categories, then applying a cyclical process that constantly referred back to the transcripts and notes in order to define the categorisation and synthesis of data. Although the purely qualitative analytical technique applied in this study inherently presented opportunities for potential bias and subjectivity (Stewart and Shamdasani 1990), efforts were made to reduce this risk. Throughout the coding process, the opinions of one individual or group were consciously not given priority over any others and comments from all participants were regarded as equally valid. In addition, the lead author was the sole interviewer engaged in qualitative data collection and also the sole individual responsible for the transcription, coding and analysis of all data.

2.1 Semi-structured interviews

A total of 28 interviews were successfully arranged with retail, wholesale and trading representatives in addition to a small number of key industry informants including senior members of fishing organisations (Table 2). Retail representatives including managers or owners of small 'fish and chips' shops, fishmongers and supermarkets within ten postal code areas in Dublin, Ireland, were randomly contacted until a demographically representative coverage of small businesses within Dublin was achieved, keeping within a target range of between 20 and 30 interviews. In addition, the head offices of all major supermarkets operating within Ireland were contacted and interviews were successfully arranged with representatives from each business. If revealed, the wholesalers, suppliers and traders working in association with the retailers interviewed were contacted and, where possible, interviews with representatives from these companies were also arranged. In this sense, a type of snowball sampling protocol (Goodman 1961) was adopted for the companies

Table 2 Description of businesses and individuals interviewed

	Business description	Interviewee title
1	N/A	Key industry informant
2	N/A	Key industry informant
3	Trader	Manager, seafood division
4	Wholesaler	Managing director
5	Wholesaler	Managing director
6	Wholesaler/processor/trader	Business development manager
7	Wholesaler/fishmonger/ restaurant	Director
8	Wholesaler/fishmonger	Director
9	Wholesaler/fishmonger	Wholesale manager
10	Fishmonger/wholesaler	Owner/manager
11	Fishmonger/wholesaler	Seafood manager
12	Fishmonger/wholesaler	Production supervisor
13	Butcher's shop	Store manager
14	Supermarket chain	Head of purchasing
15	Supermarket chain	Food buyer for provisions and seafood
16	Supermarket chain	Store manager
17	Supermarket chain	Store manager
18	Supermarket chain	Store manager
19	Supermarket chain	Protein manager
20	Supermarket chain	Sales advisor
21	Supermarket	Butcher/fishmonger
22	Supermarket	Seafood manager
23	Fish and chips shop	Owner/manager
24	Fish and chips shop	Owner/manager
25	Fish and chips shop	Owner/manager
26	Fish and chips shop	Owner/manager
27	Fish and chips shop	Store manager
28	Fish and chips shop	Store manager

working at higher levels within the industry, some of which often filled multiple roles as retailers, wholesalers and traders.

Each interview lasted between 20 and 45 min and followed a loose structure of pre-determined questions (Barbour 2008) (Online Resource 1A). The semi-structured interview plan was modified slightly for each interview depending on the role of each interviewee but generally, each interview included discussions around the six themes listed in Table 1.

Individual interviews were selected over other qualitative approaches in obtaining information from industry representatives as it was felt that this was the most appropriate method for accessing the targeted respondents and for adequately fulfilling research objectives (Moran 1988). A semi-structured interview plan was chosen over the use of either a more rigid structured (e.g. Dunn et al. 2008) or flexible unstructured format (e.g. Arai 1994) to allow for the expansion of discussions beyond pre-defined interview questions while maintaining a reasonable level of comparability between interview transcripts (May 2001; Barbour 2008).

2.2 Consumer focus groups

Three focus groups were arranged, each comprising six to eight male and female adult Irish consumers residing within Dublin, Ireland. This size range was chosen to facilitate a high level of group interaction while maintaining manageability (Moran 1988; Stewart and Shamdasani 1990). All participants were over 18 years of age, did not live with their parents and shared or took the full responsibility for food shopping in their household (Verbeke et al. 2007). These screening criteria were necessary as information was sought on patterns of seafood purchase and consumption.

The participants within each group were all directly affiliated with each other: as old college friends that had taken the same course together, as work colleagues within a university department, and as friends that have volunteered for many years with the same church charity organisation. The first author of this manuscript, acting as moderator in all three sessions, had no direct affiliation with the group members, and the groups had been arranged through second party affiliated organisation or through the response of participants to poster and newsletter advertisements within their common work environment. As it is inherently not possible to make conclusive generalisations about a population through the use of focus groups due to limitations in participant numbers (Moran 1988; Stewart and Shamdasani 1990), the groups used in this study were chosen through 'convenience sampling' (Stewart and Shamdasani 1990). However, focus groups are still intended to produce some conclusions and potentially valid information about populations. As such, care was taken to select groups that were thought would provide meaningful information and to an approximate degree would be representative of the larger population of interest: Irish consumers. In addition, groups were chosen that comprised of individuals that were homogeneous in respect to socioeconomic background as it has been suggested that this encourages maximum participation (Moran 1988; Stewart and Shamdasani 1990).

We decided to bring together groups that previously knew each other to facilitate a casual flow of group discussion, under the advice of a skilled sociologist with knowledgeable experience on the social dynamics of specifically Irish society (Tovey, H., Trinity College Dublin, personal communication, June, 2010). The use of close friends within focus groups has been cautioned against (Moran 1988) as it has been argued that acquaintances can inhibit responses and upset group dynamics (Smith 1972; Templeton 1987). However, highly compatible groups have been found to perform tasks more effectively than less compatible groups (Haythorn et al. 1956; Schutz 1958; Sapolsky 1960), and it has been suggested that in most focus groups, the influence of acquaintanceship has been considered modest at best (Stewart and Shamdasani 1990).

Each focus group was provided with printed stimulus material, intended to prompt discussions towards the beginning of each session (Barbour 2008). Focus groups were given a brief front-page news article about seafood mislabelling in Dublin (Online Resource 2A), and later two graphs from highly publicised scientific articles which show trends of declining fish stocks both internationally and in local Northeast Atlantic waters (Online Resource 2B and 2C). The material was briefly explained by the moderator, and then, the participants were encouraged to discuss their awareness, reactions, concerns and general thoughts surrounding these issues (Online Resource 1B). Following the discussions on the material provided, the participants were verbally prompted to discuss any of the themes mentioned in Table 1 that had not yet been covered within group discussions.

In seeking information from consumers, focus groups were advantageous over other qualitative research methods as this technique enabled the accumulation of large amounts of data in a short period of time and at a low cost (Moran 1988; Stewart and Shamdasani

1990). In addition, focus groups are excellent in obtaining exploratory information and are well suited for the investigation of attitudes, opinions, perspectives and experiences relating to an issue within a population (Moran 1988). Lastly, a group setting may facilitate a synergistic effect amongst participants, encouraging the production of ideas that may not have emerged through individual interviews (Stewart and Shamdasani 1990).

2.3 Participant observation

Permission was granted by the Irish Marine Institute to join the scientific crew on board a government vessel during two legs of the annual Irish groundfish survey (25 September—6 October, 2009; 28 October—12 November, 2009). This survey is conducted each year in three back-to-back legs, each lasting approximately 2 weeks, with the purpose of gathering scientific data to aid stock assessment and the creation of scientific advice for fisheries management purposes.

The first author of this manuscript joined the scientific crew as a participant observer, engaging in all the same activities as the government scientists. In addition, this author joined other crew members during meal time and social activities or discussions that took place between work duties. This social immersion was undertaken with the intention of facilitating an understanding of the actions of government marine scientists within the context of their work environment. It has been argued that this technique reduces the likelihood of researchers imposing their own perceptions on the social world that they are attempting to gain a greater understanding of (May 2001). Thus, the influence of researcher bias on gathered data was therefore reduced, and this was a benefit of choosing this method over other qualitative approaches (May 2001). Throughout the duration of each survey trip, detailed journal notes were recorded of the activities and discussions encountered and observed throughout the research experience (Silverman 2005), with particular attention paid to any information learned of relevance to the six themes outlined in Table 1.

3 Results and discussion

3.1 Seafood consumption in Ireland

The frequency of seafood consumption amongst the consumers participating in this study was variable, with some claiming to never or barely ever purchase or consume seafood and others claiming to eat fish or shellfish upwards of two times a week. Most consumers agreed that their knowledge of the diversity of seafood products available was low, sometimes to the point of embarrassment. Within one focus group session, all participants agreed with a statement made by one individual, admitting that he occasionally felt intimidated in the presence of fishmongers when faced with a diverse selection of seafood that was not clearly labelled.

In all three focus group sessions, consumers claimed that when they purchase seafood from a supermarket or fishmonger, they often choose fish that they are familiar with or that they have tried before. This behaviour is in line with recent research conducted in both Belgium and Norway which found that past behaviour and habits of consumers rather than short-term reasoning and attitudes tended to explain differences in the intention to consume seafood (Honkanen et al. 2005; Verbeke and Vackier 2005). In contrast, during all three focus group sessions, Irish consumers also stated that when eating out at restaurants, they were much more open to trying new varieties. If they liked what they had ordered, they

might in the future be more open to purchasing the fish at a shop and attempting to cook it at home. This tendency appears to extend to Irish consumers travelling on holidays abroad as well. With exception to the 'fish and chips' shops, the majority of retailers interviewed (12 businesses) felt that in recent years, consumers seem to be requesting and purchasing a slightly larger diversity of fish including 'exotic' species not native to Irish waters. Seven retailers suggested that this change in preference has been influenced by Irish consumers travelling abroad, eating out at foreign restaurants, then coming home to Ireland and wanting to have that same culinary experience again. This theory was reinforced by comments made by participants within two of the three focus group sessions. An influx of foreign immigrants, influencing the establishment of a larger number of ethnic restaurants in Ireland as well as the popularity of cookery books and cooking shows was also mentioned as suspected influences to the increasing diversity of seafood sought by Irish consumers in recent years.

The physical qualities of some varieties of fish such as having a strong smell or many bones in addition to a perceived difficulty in buying, preparing and cooking fish have been recognised as barriers that influence the purchase of seafood by consumers in the UK (Leek et al. 2000). When it comes to marketing, retailers in Ireland appear to be aware of these barriers and the hesitant nature of consumers in purchasing seafood they have not tried before. When discussing the use of tactics in introducing new products in their stores, eight retailers claimed that they would provide cooked samples to consumers, giving them an opportunity to try the fish before making a purchasing decision.

Changing tendencies in religious practices were mentioned during two consumer focus groups and two retailer interviews as an additional factor that has likely influenced the frequency and occasions of eating fish in Ireland, as well as the changing role that seafood has held in Irish households. Seafood has traditionally been a common alternative to meat as the main protein which could be eaten on Fridays, the Catholic day of abstinence (Bell 1968). The ancient importance of this religious observance is reflected in the Irish language, where the Irish Gaelic word for 'Friday', *An Aoine*, means 'the fast' (Williams 1999). The immigration of non-Catholic foreign nationals into Ireland combined with a growing tendency in younger generations to not strictly adhere to Catholic practices, or to simply not follow any religion, has likely changed the role that fish has held in Ireland as a second-rate alternative to meat (Hickman 2007; Inglis 2007). This view is reflected in the following excerpt from an interview with a wholesaler:

Friday was traditionally the day you ate fish, you weren't allowed to eat each meat... if you were Catholic,... obviously Ireland is a Catholic country... [and] it used to be much more so.... Before, they [the Irish people] nearly felt they could only eat it... [as if it was a form of] penance.

Despite these changes, the diversity of products available for purchase by Irish consumers in supermarkets remains low and retailers claim that sales of seafood in Ireland are enormously dominated by imported prawns, farmed salmon (*Salmo salar*, Salmonidae) and cod (*Gadus morhua*, Gadidae) (Miller et al. 2012; BIM 2011).

3.2 Seafood availability in Ireland

When asked about the factors that influence seafood purchasing and hence stocking decisions, the general response by Irish retailers and wholesalers was that it is a combination of both product availability and consumer demand that determine which products and, in what quantities, will be purchased from suppliers and made available to their

customers. For five smaller businesses, fishmongers, and fresh fish wholesalers, weather was mentioned as a limiting factor which prevents Irish fishing vessels (e.g. Fig. 1) from travelling far out to sea and catching the desired diversity of fish in adequate quantities. In addition, limited quota for Irish vessels was listed as a contributing factor by nine retailers.

For most 'fish and chips' shops, larger businesses, supermarkets, or fishmongers that sold a wide range of imported and pre-frozen fish, consumer demand was mentioned as the most important influencing factor for purchasing decisions and limited supply in many cases was not an issue at all. There was an exception to this with 'fish and chips' shops in selling ray (*Raja* sp.), which does not freeze well, and so, retailers must depend more on supply from local fisheries. The supply of ray can be variable throughout the year causing prices to fluctuate, which has influenced a number of shops to simply not sell it despite an existing demand.

The managers of fresh fish counters at supermarkets often claimed that anything was attainable and could usually be brought in for a customer on request with only a few days notice. The large wholesalers and traders that were interviewed claimed that although supply from Irish fishing vessels was often limited, overall sourcing was not an issue as much of the fish that they sell are imported in large quantities from countries outside of the EU. Ideally, they would prefer to sell only Irish products but dealing in large quantities, this is often not possible.

Paradoxically, Ireland is concurrently exporting unprocessed fish in large quantities, often of the same variety that is imported, to other European countries where whole, unprocessed fish is more desirable than in Ireland (CSO 2011). Two key industry informants claimed that issues with the organisation and development of Ireland's processing



Fig. 1 Fishing vessels at the pier in Howth, Co. Dublin. Photo credit: S. Mariani

sector are responsible for these mismatched supply paths. In addition, the bulk in quantity of what is currently being landed in Ireland is small, pelagic varieties of fish (SFPA 2011). Without a strong demand for these species by Irish consumers, the majority of these fish are also being shipped off to foreign markets. This increasingly important part of the Irish industry has been described within the following excerpt from an interview with a major seafood trader, operating from Ireland:

The sort of cheaper end,... the herring [*Clupea harengus*, Clupeidae], mackerel [*Scomber scombrus*, Scombridae], horse mackerel [*Trachurus trachurus*, Carangidae], blue whiting [*Micromesistius poutassou*, Gadidae], all of which used to be what they call rubbish fish, which would end up as fishmeal, is now seen as a very important form of protein,... [Y]ou're seeing more and more of this being exported to African countries as a very cheap form of protein. It would be consumed to a certain extent in Europe, but the increase [in the exporting of these species] has been [because] there's been less and less fish landed into West Africa. [T]heir own fleets... [in West Africa] have gone downhill, so they've been importing a lot of frozen fish.

It appeared as though assumptions of what Irish consumers prefer may often contribute towards purchasing and stocking decisions by retailers. All 'fish and chips' shop owners claimed that their menus were based on the menus of other similar businesses and/or on an assumption of what their customers like to eat. Assumptions also appear to be made in supermarkets in a similar way. Four of the major supermarkets interviewed claimed that purchasing decisions of what to buy from suppliers are based on what has sold well in their stores and that what has sold well in their stores is usually what has been heavily promoted. However, what are chosen to be put on promotion are generally those varieties that have sold well in the past so there is a cyclical process at play that often involves the assumed traditional favourites, both salmon and cod.

3.3 Salmon and cod

Wild stocks of both salmon (*Salmo salar*, Salmonidae) and cod (*Gadus morhua*, Gadidae) within Irish waters are considered largely depleted by the scientific community at both national and European levels (Collins et al. 2006; Marine Institute 2010; STECF 2010; ICES 2011), yet they remain the most popular varieties of fish sold within the Irish marketplace (BIM 2011) and a reliance on imports and aquaculture is necessary to meet this demand (Miller et al. 2012). According to a recent study funded by the European Commission, the European Union is currently dependent on imported fish for 90 % of the whitefish and 83 % of the salmon consumed within Member States (EC 2009a).

The scarcity of these resources is not evident within the Irish marketplace. In addition to the dominant physical presence of these products, salmon and cod were frequently referred to by Irish retailers as any of the following; part of the 'traditional Irish line' or 'bread and butter line', 'main line fish', 'core line fish', 'standard, every-day fish', 'old reliables', 'reliable seafood' or 'standard whitefish'. In contrast, while on board the scientific research vessel 'the Celtic Explorer', during the annual Irish groundfish survey, cod was spoken about and treated with a certain level of reverence in respect of its commercial importance and recognised scarcity. Cod caught in survey tows were always filleted and retained for freezing or eating on board by the crew if they were of edible size. Pelagic species or less valuable demersal species such as white pollock [*Pollachius pollachius*, Gadidae] or saithe [*Pollachius virens*, Gadidae] were not treated with the same regard and were more

commonly thrown back overboard after the survey unless they were particularly sizeable. Despite these views shared by members of the scientific crew, the Irish mismatch of consumption preferences and local resource availability penetrated the lifestyles maintained on board the survey vessel by this same crew. By the eighth day of the first survey leg observed, only 16 specimens of Atlantic cod had been caught, most of them of an inedible size. Also on day eight, the entire vessel crew of 30 plus people were served cod for dinner by the ship's cook, evidently purchased on shore prior to departure from port.

In addition to the presence of imported cod within the Irish marketplace, recent studies have shown that a significant percentage of fish labelled as cod in Ireland are actually entirely different and generally less valuable species (Miller and Mariani 2010; FSAI 2011). When asked about their knowledge of this issue, industry representatives had varying levels of awareness. This ranged from denial of knowing anything about the problem, in the case of most 'fish and chips' shop owners, to familiarity with the issue in the case of most fishmongers, wholesalers, traders and the industry informants. The responses from those who knew about the issue ranged from acknowledgement of the seriousness of the problem, as described by a wholesaler in the first of the following two interview excerpts, to a near trivialisation and economic view of the issue, as evident in comments made by a fishmonger in the second of the following two excerpts:

[W]e find ourselves selling fish like.... pangasius [*Pangasius spp.*, Pangasiidae].... [R]estaurants are looking for a white fish [and] they don't particularly want to pay for fresh cod or whatever, so they're prepared to put these other ones on [their menus]. Now I will often say to restaurants or I'll tell our reps to say to them, tell them not to call it cod on their menu, because it's not cod. And I don't want it to come back and impact on us. But I know I have seen it in restaurants described as cod.... But we're starting to see... that sort of fish [pangasius] has come through, largely over the last, I'd suppose 5 or 6 years. And that's to fill a demand because cod has become scarcer and more expensive. Oh, I am aware of it.... From the time I was a boy in this fish business, we sold smoked coley [saithe] as smoked cod. And everybody knew that right? [W]e weren't kidding people or anything like that.... [I]t's a black pollock [saithe] that they smoke, that they sell as smoked cod but there is genuine smoked cod.... But [now] they [have] brought the law in about traceability and what fish you put out on the counter, that it has to be the genuine article.... we label it smoked coley now.... I can't buy smoked cod, it's far too expensive.

When speaking to a key industry informant about this issue, it was apparent that Irish fishermen are aware of the problem and see it as a threat to their livelihood and also an opportunity for cheap foreign imports to infiltrate the Irish marketplace.

Lastly, a number of interviewed individuals commented on where they think the mislabelling could be occurring within the industry. Although it is clear that this could and is likely happening on a number of different levels depending on which type of business is involved (Miller et al. 2011), one major wholesaler provided his own personal opinion through a descriptive response, articulated in the following interview excerpt.

[T]here's quite an amount of mislabelling within the seafood [industry].... I wouldn't say it's occurring at supermarket level because supermarkets would have their own checks in place.... on the foodservice end of it, it's happening at the wholesaler or [at] the processor [level], and if it is happening on retail,... if it's a fish shop, they obviously are the processor as well, so it's happening there. If it's a butcher, [mislabelling is happening] at the wholesaler or processor [level].

3.4 Ideas for positive industry change

3.4.1 Policy

It has been widely acknowledged that the policy which is currently in place to govern fisheries in Europe, known as the Common Fisheries Policy (CFP), is ineffective (EC 2009b, 2011b; Khalilian et al. 2010). This overarching system of management was introduced in 1983 and employs a combination of single-stock quota limits, or Total Allowable Catches (TACs) and a complex mixture of technical measures. Under this system, over 75 % of the commercial fish stocks in European waters are currently being overfished (Damanaki 2011). Elevated rates of discarding, high-grading, subsidies driving fleet overcapacity and the disregard of scientific advice are amongst the many problems associated with this regime (EC 2009b, 2011b; Khalilian et al. 2010). The CFP was revised in 2002 (Gray and Hatchard 2003; Daw and Gray 2005), and now, a decade later is once again in the process of reform (EC 2011b). Ultimately, the effectiveness of this reform and the regional implementation of the new policies created will rest in the hands of politicians, who may potentially be vulnerable to the influence of short-term gains and the priorities of industry lobbyists (Froese 2011).

It is the opinion of many that large-scale sustainable fisheries management and the effective conservation of marine ecosystems can be achieved primarily through appropriate policy creation, implementation and enforcement (Pauly et al. 2002, 2005; Pikitch et al. 2004; Jackson 2008; Jacquet et al. 2009; Froese 2011). Many consumers, retailers and wholesalers felt that it was ultimately not their responsibility to protect our oceans against further degradation or to repair the damage already done. During four interviews, retailers acknowledged that their businesses are essentially directly dependent on healthy fish stocks but they did not feel that their role extended beyond the requirements of obtaining fish at an affordable price and making it available for purchase by their customers.

When speaking with wholesalers, they also had concerns about the health of fish stocks and supply of wild seafood. However, developing solutions to the problems that unsolved will inevitably directly affect their livelihoods; three wholesalers revealed that they felt it was the sole responsibility of the government to improve the situation through the creation and enforcement of policies for sustainable industry management.

A number of scientists participating in the groundfish survey gave the impression that they thought their role of influence within the industry was passive. One scientist described his job as 'documenting the decline and extinction of species', and a second admitted his frustration within the system, conceding that '...yes [this is frustrating], very, but we are not conservation scientists and we can only give the best advice we can given the available data that we have'.

3.4.2 Industry initiatives

As we have seen, retailers and suppliers hold very important roles within the seafood industry in making the decisions on which products to make available to consumers, in what quantities and how to market them. With fast and affordable shipping options available, retailers and wholesalers are not limited to sourcing fish only from local sources, nor are fishermen limited to selling their catch only to the domestic Irish market (Taylor et al. 2007; Swartz et al. 2010). The global nature of the seafood industry makes it difficult for small-scale regional changes in fish preference and consumption to have a direct impact on the fishing pressure placed on local or international stocks (Jacquet et al. 2009). This is

not a justifiable reason to abandon efforts for change, however, as it is reasonable to believe that localised efforts can have regionally positive effects if they are targeted and implemented appropriately (Jacquet and Pauly 2007; Jacquet et al. 2009).

Retailers are in a position where they can influence this, particularly fishmongers that consumers have to verbally interact with when purchasing fish. This interaction presents an opportunity for fishmongers to educate and influence consumers on which seafood varieties to purchase. Four fishmongers claimed they already use this opportunity for verbal interaction to recommend alternative options when the product a customer is looking to buy is not available. One fishmonger claimed that he tries to encourage responsible purchasing decisions and inform consumers on environmental issues relating to their choices whenever possible. Additionally, four interviews with supermarket representatives and wholesalers provided evidence that efforts were being made within some businesses to make sustainable purchasing decisions. Unfortunately, however, considering all interviews conducted, these examples are better described as exceptions rather than the norm.

At one popular 'fish and chips' shop in Dublin, the owners are already anticipating a damaging shortage in supply of their most popular selling fish, cod (*Gadus morhua*, Gadidae). To prepare for this, they have provided customers with samples of different varieties of cheaper, farmed whitefish, such as pangasius (*Pangasius* spp., Pangasiidae), to gauge customer response. Currently, the price of fish is still low enough to allow for customer demand to determine what is present on their menu. In the future however, the company is anticipating that what is present on their menu might instead be determined by price and availability if the cost of traditional favourites such as cod and haddock (*Melanogrammus aeglefinus*, Gadidae) rise too high and they are forced to switch to alternative cheaper products.

Industry initiatives for improving sustainability are also being made at production level. In collaboration with the Irish Sea Fisheries board (BIM), a group of fishermen have joined together in a project called the Seafood Environmental Management Systems (SEMS), where fishermen involved with the project agree to adhere to 14 different guidelines that reduce the impact that their fishing activity has on the environment. Cooperation within this project permits the fishermen to sell their catch with a certification that can be used in the Irish marketplace to distinguish these products as environmentally responsible and Irish (www.fishermanfrank.ie). Reports on the impact and/or successes of this project have not yet been released publically. In light of recently published studies revealing high levels of seafood mislabelling within the Irish marketplace however, it may be questionable as to how effective this project can be in achieving conservation objectives and ultimately improving the sustainability of the Irish seafood industry.

Unfortunately, the reality of the seafood industry in Ireland is that because many stocks are in a depleted state and quotas are constantly being reduced (Marine Institute 2009); price was frequently mentioned as a very important factor for businesses, particularly those operating at small-scale. The financial challenges facing Irish seafood companies are compounded by the presently occurring Irish economic recession, and as a result, many businesses may feel that they cannot afford to make sustainable choices.

3.4.3 Consumer-mediated change

Consumers have power in numbers. They are the end-users of seafood resources, and they have the ability to choose what they will or will not purchase and consume, ultimately influencing the demand for a product and creating the incentive for this product to be caught (Grescoe 2008). By choosing to avoid certain species that are depleted, eat fish from

lower in the food web or increase the diversity of species consumed, large numbers of consumers can possibly have a cumulative positive effect on the sustainability of fisheries (Hall 2007; Grescoe 2008; Jacquet et al. 2009; Greenberg 2010). Before consumers can actively make responsible purchasing decisions however, they first need to be made aware of the issues, enough to develop genuine concern and a willingness to change. Consumers can be educated about environmentally relevant issues through a large range of information sources including various forms of news media. Consumers, retailers and wholesalers all mentioned the news as a source from which they had heard about issues relating to the sustainability of fisheries in Ireland. However, during two focus group sessions, a number of consumers claimed that they felt fisheries were often mentioned in the media in relation to issues effecting employment or fishermen's rights to fish rather than to sustainability. Consumers acknowledged occasionally hearing about environmental issues in the news, but in one focus group, a number of individuals explained that they were often sceptical about scientific claims, particularly if the news was dramatic. In the following focus group excerpt, a consumer claimed that scientific arguments are hard to believe when you cannot see evidence of it in real-life:

You don't see any evidence of it, that's the problem. You keep hearing that fish stocks are declining, but the price of fish is probably still going down and you can get fish whenever you want it, so there's no shortage of fish, in the shops or in the chippers [takeaways] or anything like that as far as you can tell, so it's hard for it to hit home.

In order to consumers to have a direct and profound influence on the seafood and fisheries industries of the world, a very large number of people would have to become concerned enough about these issues to change their seafood eating habits. This is potentially a massive challenge as attitudes towards seafood may differ greatly between cultures and this could in turn affect which factors could be influential in eliciting change in seafood consumption patterns (Tuu et al. 2008). There will always be people that will not change unless forced, either through policy or through the decisions made by suppliers and retailers on what to make available for consumers to purchase (Johnston and Roheim 2006). This is not necessarily because these consumers are not or would not be concerned about the issues, but instead, it may also be that other issues such as product affordability or nutritional benefit take priority when facing a purchasing choice (Johnston et al. 2001; Clonan et al. 2011). The reality of this presents a significant obstacle for change, which is reflected in the following comment made from a consumer during a focus group session:

Unfortunately it's difficult to see if it will be done. It's difficult to imagine that there is a way forward. I mean to simply say yes as consumers, we have to take responsibility is all very well, but that requires four billion people acting in a concerted way.

Large groups of consumers, small groups of consumers, or even individuals still do have the potential to influence positive change within seafood industries indirectly, through voicing their opinions and concerns to industry representatives and policy makers (Jacquet et al. 2009). Involvement with non-governmental organisations (NGOs) can be a very effective way to accomplish this. Currently, in Ireland, a number of small national NGOs are working together through the European coalition OCEAN2012 (www.ocean2012.org), campaigning on issues relating to the reform of the Common Fisheries Policy (CFP). In addition, the Irish Wildlife Trust (IWT) has published a 'Consumer Guide to Seafood' on their website (<http://iwt.ie/what-we-do/sustainable-seas/>) which is also promoted through a

number of Irish aquariums. Beyond this, efforts to promote sustainable seafood in Ireland are nonexistent or inconspicuous thus far. Recognition of the benefits of NGO campaigns to the sustainability of seafood industries was evident in one interview with a representative from a large seafood trading company. In the following interview excerpt, some of the positive influences that NGOs have had on the seafood industry in Europe have been described:

I was very sceptical about... NGOs who had... their own way of going about making public what was going on in the industry. However, they have done a fantastic job, especially in Europe in the last three to five years, in making sure that people and countries and fishermen stick to quotas that are supported by politicians and scientists in Brussels.... Stocks are recovering, maybe not quite as quickly as they would like, but they are recovering.

4 Conclusions

It is clear that both the seafood and fisheries industries in Ireland are facing major obstacles in the path towards achieving sustainability. Although ideas for improvement exist at all levels of industry operation, through a review of the issues covered by this study, it is perhaps evident that in order for positive change to occur, ultimately effective and responsible policies must be created, implemented and enforced. Influence from all levels of the industry can contribute towards ensuring that this happens, by creating an environment where industry sustainability is perceived as a priority issue.

As the visibility of the few existing efforts to improve industry sustainability is low, the Irish market is currently ripe for NGO-driven awareness campaigns or other strategic seafood sustainability initiatives. However, it is important to bear in mind that wild marine stock dynamics are complex and deserve careful monitoring and investigation. NGO actions should strive for an objective approach and be firmly grounded in the best scientific evidence, rather than veering towards advocacy driven primarily through emotions.

Fisheries sustainability is a global issue that stretches beyond food preference availability and employment. As seafood is the world's last major wild food resource, this issue is one concerning global food security (Pauly et al. 2005). If local fish stocks become depleted, more fish cannot be instantly created to meet demand—they must be sourced from fish stocks elsewhere in the world. Unless sustainability is accepted as the most prioritised factor when creating and enforcing fisheries policy, we risk further depletion in addition to economic, social and environmental loss on a global scale.

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