QUAY ISSUES

EXPLORING THE STORIES BEHIND THE DATA: A LOOK AT THE SEAFISH FLEET SURVEY 2016

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Contents

2015: The Year in Numbers 3

Routes to Market 5

Exploring Different Routes 7

The Cost of Lost Gear 9

Reusing Lost Gear 12

The Fishing Gear of the Future 13

Picturing things to come 15

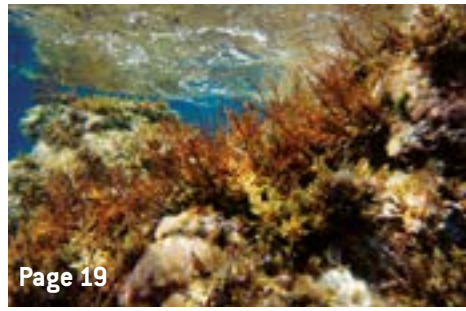
New Designs to Address New Challenges 17

Access to Marine Resources 19

Providing Evidence for Industry 20

Quay Figures: Scallops 22

Collaborating to Develop a Management Strategy 26



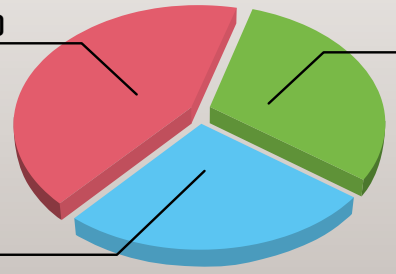
2015: The Year in Numbers

Since 2005, Seafish Economics has carried out an annual nationwide survey of the UK Fishing Fleet. Every year, our field researchers listen to the views of hundreds of fishermen across the country. Fishermen tell us about the major factors affecting their financial performance and their ambitions for the future of their business. As well as the interviews, vessel owners contribute financial data to our sample of fishing business costs and earnings. This is combined with data from the Marine Management Organisation (MMO) to create estimates of economic performance for every active vessel in the UK fishing fleet. This dataset shows how fishing fleet economic performance has changed over the years, and we can use it to analyse how the UK fleet could be affected by future changes in fisheries management measures and rules. In Quay Issues, we want to tell the stories behind these numbers and show how some vessel operators have overcome business challenges. First, let's see what the numbers say about how the UK fishing industry did in 2015.

MAKE UP OF FLEET

43%
ACTIVE (FISHING INCOME >£10K)
2,826 REGISTERED VESSELS

31%
INACTIVE (Fishing Income £0)
2,017 REGISTERED VESSELS

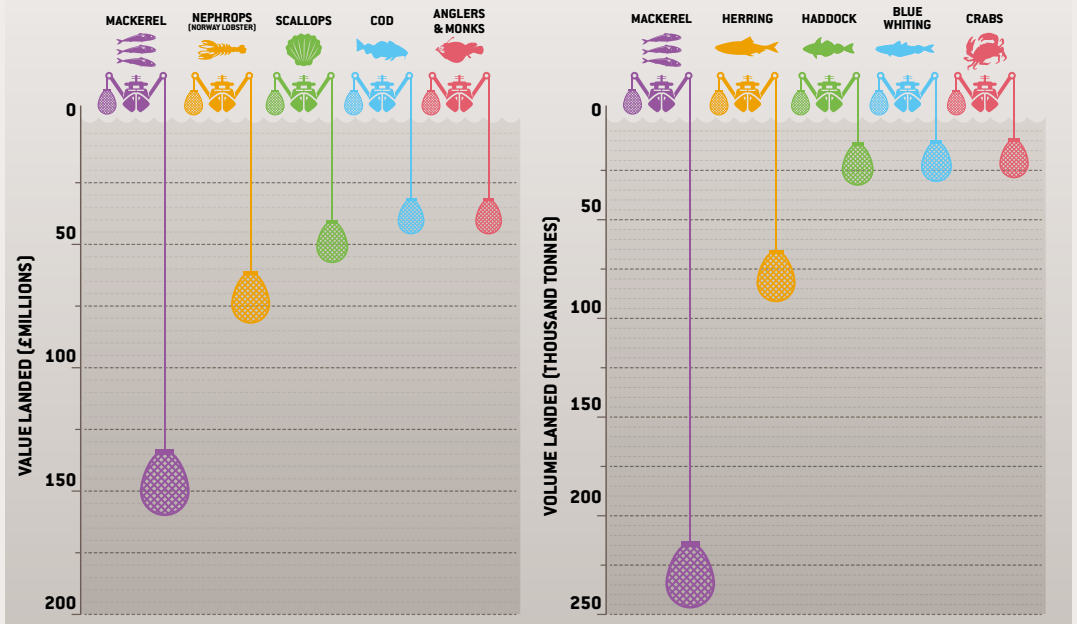


26%
LOW ACTIVITY VESSELS (Fishing Income <£10k)
1,710 REGISTERED VESSELS

6,553
TOTAL UK REGISTERED VESSELS

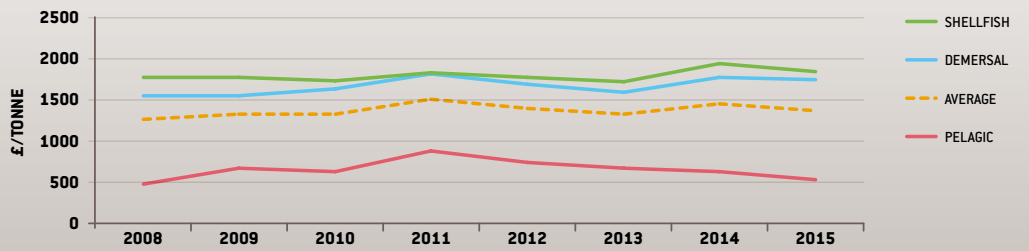
4,536 UK registered vessels were active in the calendar year 2015. An active fishing vessel is one that recorded landings of any volume of seafood in that year. Of these vessels, 1,710 were classed as low activity vessels because they landed less than £10,000 worth of seafood in the calendar year. The combined fishing income of low activity vessels was just 1% of the UK total. The remaining 2,826 active vessels, those with a fishing income greater than £10,000 in the year, generated 99% of the total UK fishing income. In 2015, there were 2,017 inactive vessels i.e. vessels that did not engage in any commercial fishing activity.

TOP SPECIES LANDED BY UK VESSELS



£772million worth of seafood was landed by UK registered commercial fishing vessels in 2015. The catch of the UK fleet is extremely diverse, yet just over half of total landings by value is made up of five species. Mackerel is an extremely important species, making up 35% of the total landings by volume and 21% by value in 2015.

AVERAGE FIRST SALE PRICE BY SPECIES GROUP



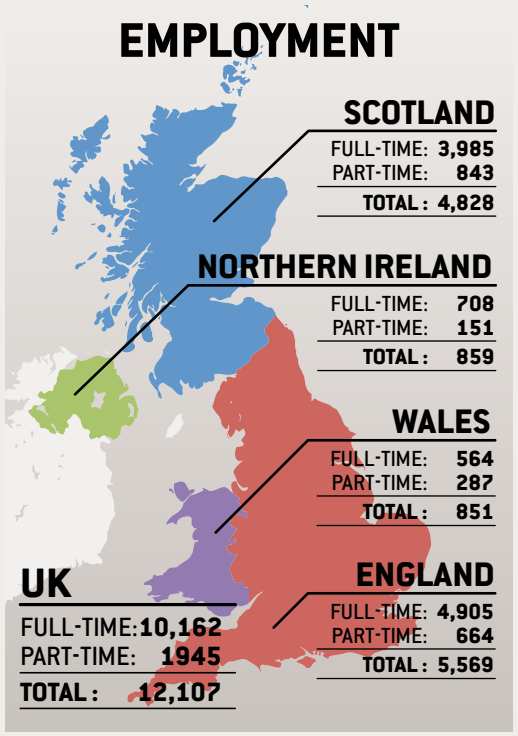
FIGURES ADJUSTED FOR INFLATION

£1,371 was the average first sale price per tonne of UK landed seafood in 2015. Shellfish is the highest value species group at £1,844 per tonne, while pelagic species are the lowest value at £529 per tonne. Price varies between years, but overall has increased since 2008 (accounting for inflation). Average first sale price of demersal and shellfish species fell 2% and 5%, respectively between 2014 and 2015, while the price of pelagic species fell 15%.

FUEL COSTS

35p per litre was the average cost of fuel (duty free) in 2015. This fell from 50p per litre in 2014 making it one third cheaper than the previous year. Total spending on fuel was £96.4 million. In 2015, average spending on fuel as a proportion of total income was 12%, the lowest it has been since before 2008.

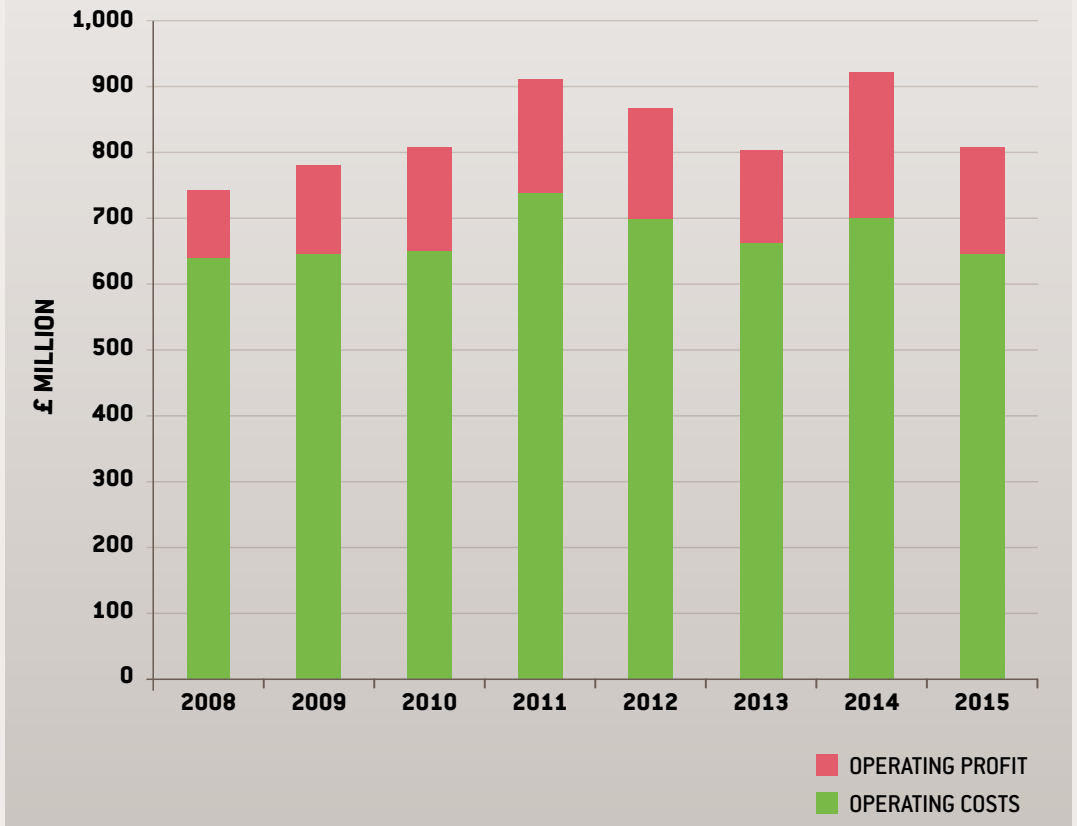
EMPLOYMENT



10,162 full time fishermen worked on UK registered fishing boats in 2015. There are an estimated 1,945 part time fishermen as well. Total UK fishing fleet spending on crew share was just under £200million, a quarter of the total income.

SOURCE: FLEET ECONOMIC PERFORMANCE DATASET 2005-2015, SEAFISH, 2016. & UK SEA FISHERIES ANNUAL STATISTICS, MMO, 2016

TOTAL UK FISHING FLEET OPERATING COST AND PROFIT



SOURCE: FLEET ECONOMIC PERFORMANCE DATASET 2005-2015, SEAFISH, 2016. FIGURES ADJUSTED FOR INFLATION

£163million was the total operating profit for the UK fishing fleet in 2015. Operating profit varies year to year, largely because of changes in fishing cost, quota and sale prices. Accounting for inflation, total fleet operating profit as a percentage of total income has increased gradually since 2008 from 14% to 20%. The spike in this trend was in 2014 when an increase in landings by pelagic vessels led to increased overall fleet profitability.

The UK fishing fleet is in a strong position. Spending on operating costs in 2015 had almost returned to 2008 levels and overall operating profit as a proportion of turnover is increasing. However we know that these are averages and that there is a lot of variation between years and between different businesses. This year we spoke to over 600 individual fishermen through our fleet survey and heard countless stories of the challenges and opportunities ahead. Read on to find out about some of the stories behind the numbers and to find inspiring examples of fishermen facing challenges head on.

Routes to Market

The seafood supply chain is diverse. In some areas, vessel owners have many options regarding how and who they can sell their catch to. In other areas options are much more limited and depend on the links to the wider supply chain and local port infrastructure. The method of selling affects the price that vessel operators achieve for their catch.

Exploring different options could reveal opportunities for vessel owners to get better prices. During this year's survey of the UK fishing fleet, many fishermen across the country, using different fishing methods, described the price they achieved for their catch as a major issue affecting their financial performance. Limits to the volume they are able to land, whether because of quota restrictions, limited capacity or natural limits to supply, mean that vessel owners must either reduce fishing costs or get a higher price for their catch to increase profit margins.

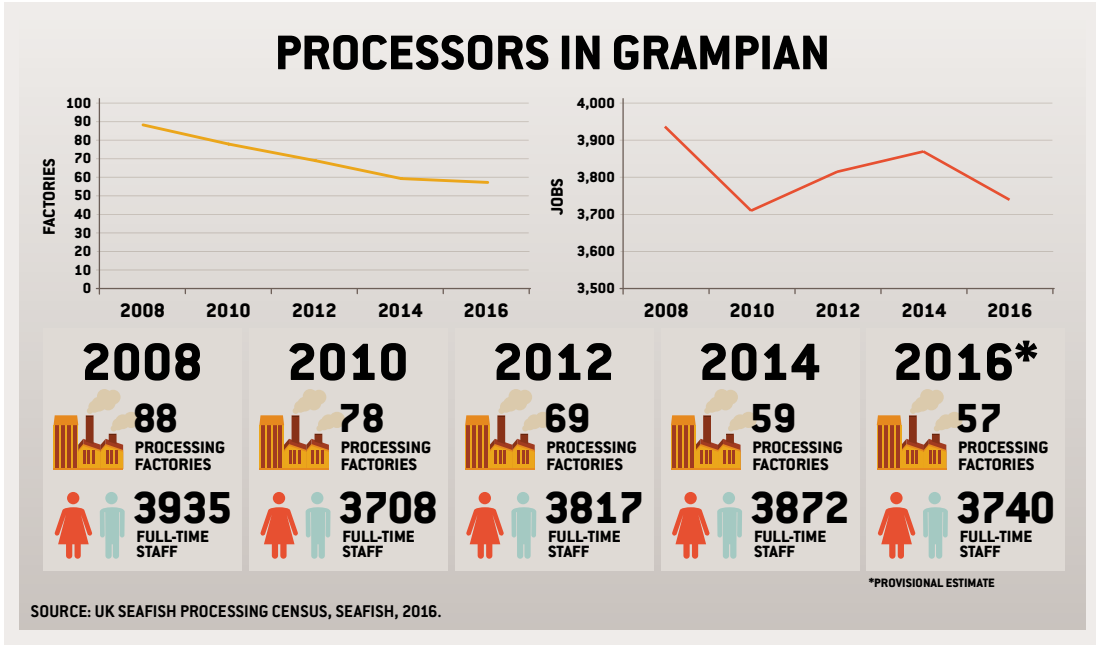
What does "route to market" mean?

Route to market describes all of the businesses that own and handle the fish and shellfish between the vessel and the consumer. Everyone that handles the fish will have costs and will be looking for profit. Shorter 'routes to market' with fewer 'middle men' can be more profitable for producers but can involve more work and are more risky too.

Hazel Curtis, *Seafish Chief Economist.*

Fuel, gear and crew share are among the major costs facing vessel owners, and there are opportunities to reduce these to some extent. Many fishermen have made significant efforts to reduce their fishing costs by increasing the efficiency of the vessel and gear. However, these costs are influenced largely by oil price and with no indication that future oil prices will dramatically reduce, there is a limit to the savings that can be made this way. Newly available technologies that could reduce fishing costs are often very costly, requiring significant capital investment and preventing some vessel operators from using these solutions. There are, however, opportunities to add value to products. Some fishermen have concentrated on improving catch handling procedures to ensure that their catch is of the highest possible quality. Others have sought accreditation for their products, proving that their activities conform to high standards and allowing them enhanced market access. Some have also explored alternative routes to the end consumer, including direct sales or owning their own processing facilities, allowing them more control over the product from catch to final sale.

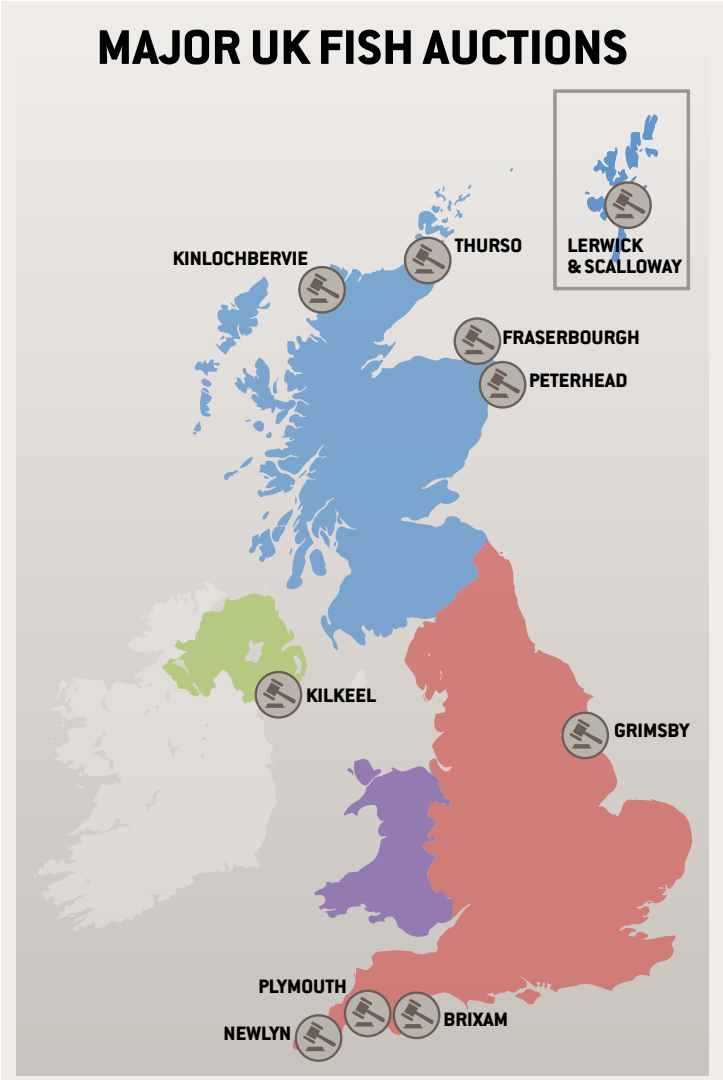
The amount of fish sold through fish auctions has increased in recent years in some parts of the country. For example, in Peterhead, Europe's largest fish auction, both landings and prices are on the rise. We spoke to Sally Skakle, Quality Advisor at Peterhead Port Authority, about the trends they've been seeing lately and the opportunities for vessel owners to access the market. "About 40-50 boats land here regularly and more on an ad-hoc basis", says Sally, "the market attracts buyers from all over the country, many of whom act as agents for overseas companies".



Fish processing is an important part of the economy in the Grampian region. Seafish Economists estimate there are 57 fish processing factories in the Grampian area and many more that handle smaller amounts of fish. The total number of factories has declined since 2008, but the number of people employed in fish processing has remained relatively stable. This indicates that there are now fewer, larger processing factories in the area. "Seafood is a major industry here in the north-east" says Sally, "many of our buyers represent local processors. But there are also growing numbers of buyers representing overseas clients and those supplying supermarkets. With so many buyers at the market it means there's a lot of competition between them and the products are in high demand. This diversity of buyers also means that there is more demand for a great variety of species, for example, in the past supermarkets were only interested in quite a limited range of species but this has really expanded in recent years, meaning good prices can be achieved for species that historically were less favourable".

> "Products from vessels that have a good reputation for quality are often in particular demand and can achieve really good prices"

Quality is a top priority at Peterhead market. The modern facility is temperature controlled and strict hygiene regulations are in place to ensure that environmental health standards are upheld. The strict standards in place ensure that the efforts of vessel operators to maintain fish quality are not compromised at market, and the fishing businesses get good returns for their efforts. "Quality is everything", says Sally, "and maintaining consistent quality allows vessel owners to build up a reputation amongst the buyers. Products from vessels that have a good reputation for quality are often in particular demand and can achieve really good prices".



Fish auctions, by nature, are dynamic, and prices are influenced by more than quality. Prices vary depending on the buyers present on the day of sale and the quantity of fish available in the market. Sally tells us of some other, more obscure factors that can influence price, "Fishermen should be aware of international public holidays, there are certain holidays for example in Spain where everything closes including the processors. There is always a dip in price around those times because production is put on hold in the countries where much of the product ends up. However, this can work both ways, for example when there are public holidays in Iceland, there is a dip in their supply to the UK meaning that demand for domestic products increases".

There are also opportunities for boats that land elsewhere to sell via Peterhead market. "We accept consignments from all over", says Sally "I know of individuals and groups of fishermen that send their products by refrigerated road transport to the market on a regular basis. Fishermen don't have to supply large volumes; recently we've had over 1,000 boxes in a consignment and in the same week we had another vessel land just two boxes". There are, of course, costs involved for fishermen that wish to send their product via consignment to auctions, although there are many examples of fishermen that work together to share these costs. The costs and benefits will be different for all fishermen but investigating these could reveal opportunities.

Fishermen will have different preferences and views about the best way to sell their product, but there are some valuable lessons to be learnt by looking at the dynamics of fish auctions. The large numbers of buyers present at auctions, coupled with their competitive nature, means that high prices can be achieved. Price is, however, dynamic and will fluctuate depending on supply and demand. These same forces that influence price at auctions play out on a national scale as well. Most fish auctions report price data on a regular basis via their websites, giving vessel operators an opportunity to research the current value of their product. "I would encourage fishermen to be informed about their product and also to think about the onward journey", says Sally, "think about their product and the about needs of the buyers, this will help them to achieve the best price".

Exploring Different Routes

Saul Astrinsky, from Hayle in Cornwall, was a fisherman for 35 years, specialising in line-caught fin fish from his vessel MFV Proper Job. Several years ago, Saul began exploring ways of achieving a better price for his catch, increasing catch quality and joining the South West Handline Fishermen's Association and RFS.

Saul went to great lengths to ensure his product was of the highest quality, but he felt this did not always yield returns. Despite consistent quality Saul felt the price his product achieved could be highly unpredictable and began to feel that the local fish auction was not the best route to market for his product. To reduce this uncertainty, he decided to take control of the sale of his product to gain a steadier and more predictable income.

In 2011, Saul, alongside his wife Abi, started selling directly to local restaurants and fishmongers. Since then they have developed a successful business together. "I didn't become a fisherman because I wanted to be a multimillionaire", says Saul, "but I began to feel that the extra time and cost I was committing to ensure top quality product wasn't always paying off". Saul and Abi developed a set of stringent quality and freshness standards, and took selling into their own hands, reaching out to local restaurants and fishmongers. By selling directly, Saul and Abi were able to agree to a fixed price with buyers.

Selling direct removed the risk of potentially having to accept a low price at auction but also meant giving up the possibility of achieving high a price when the conditions in the auction were good. After initial success, Saul and Abi began to buy directly from other local boats, working closely with the fishermen to help them achieve the quality and freshness required; in return they are able to set an above market price for their efforts. So began The Wild Harbour Fish Company.

Choosing to sell this way involved a significant amount of extra work. There was much to be done on shore in terms of promoting their products, seeking out customers and arranging packing and distribution. "We started off on a very small scale", says Saul. "Working together we would be in constant contact with each other and our customers to ensure we could fulfil orders, it was a big time commitment and fishing is a hard job in the first place". The hard work soon started to pay off. Wild Harbour Fishing Company began to build up a good relationship with buyers and establish a reputation for supplying high quality, fresh, traceable fish. Demand began to exceed what they were able to supply. As both the supplier and customer bases expanded, Wild Harbour Fish Company were able to recruit a small team. "We have a dedicated team of staff who now work alongside us and we wouldn't be able to do what we do without them", says Saul.

Relying on a small supplier base does not appeal to all customers. Some restaurants that consider buying directly may feel there is a risk that the products they want may not always be available. If factors like the weather prevent fishermen from going to sea, supply cannot be guaranteed. Wholesalers, with a larger supply base, have the ability to pool resources from a greater distance and are often more likely to be able to guarantee the products that their customers want. However, the compromise for this is often freshness because of the increased transit time. Other factors such as seasonality can also put some customers off buying direct. Restaurant menus do not always account for seasonal variability in supply, particularly as they have access to frozen products on demand. Variability in supply because of seasonality requires a lot of skill on the chef's part to adapt their menu on short notice. Saul's business model therefore appeals to a very specific, but fast-growing, niche market.

"Our customers are seeking really fresh fish that has been handled exceptionally well to maintain top quality."

Some customers are willing to pay a premium for top quality products. With local, seasonal and traceable fast becoming essential criteria for many top-end restaurants, Saul and Abi have tapped in to this market by offering exceptional quality products that meet the customers' needs. The close relationship with their customers gives Saul and Abi a unique opportunity to explain the limits of supply to their customers, cultivating a strong understanding and a willingness to make compromises on availability in return for high quality, fresh products. "Our main customers are fine-dining restaurants" say Saul, "many of which are in London. They include places like Outlaw's at the Capital, Heston Blumethal's Dinner and Fera at Claridge's, as well as some high end fishmongers. Our customers are seeking really fresh fish that has been handled exceptionally well to maintain top quality. Some of our customers also demand good environmental credentials so we have a strong environmental policy, and we are in various accreditation schemes". Wild Harbour Fish Company are members of the Responsible Fishing Scheme, an approved supplier by the Sustainable Restaurant Association and recently the hake and sardines they source have achieved Marine Stewardship Council (MSC) certification.


Abi Astrinsky

Wild Harbour Fish Company started out with a fairly limited customer base, but this has grown significantly. "Our reputation has taken several years and a lot of hard work to build up", says Saul, "but it has recently started to snowball. At first we depended a lot on making cold calls to attract new customers but as our reputation has grown and spread by word of mouth we now find that many new customers contact us directly. Instagram and Twitter have also been useful for marketing our products because a lot of people use social media. It allows us to keep our customers updated and we find that new customers use it to seek us out".

"This price is discussed and agreed upon with suppliers, ensuring that they receive a fixed price for their fish."

As the business has grown, so have the demands on Saul's time for marketing and selling products. In 2015, Saul chose to sell his vessel so that he could commit himself full time to the onshore side of the business. "It was a real struggle for the first few years to run the onshore side of the business as well as going out to sea. As the business grew I started to find that I just didn't have the time to do both". By focussing his efforts on the onshore side of the business, Saul is able to ensure the continued growth and development of Wild Harbour Fish Company and that the twenty six local fishermen supplying him continue to get a fair price and access to the market that he has tapped in to. Having spent much of his life as a fisherman himself, Saul understands the difficulties and uncertainties they face and is committed to giving them the best possible price. "The fishing community here is very close", says Saul, "I've known and worked alongside many of these guys for a very long time. We strive to make sure we always treat the fishermen fairly and pay them weekly by BACS".

Saul and Abi have devised a unique way of determining the price they pay their suppliers. At the beginning of each year Saul and Abi examine market summary data for different species at the local fish auction and calculate an average price for each species. They discuss these prices with suppliers and add a premium to reward the fishermen's efforts to supply quality. Prices are agreed ensuring the fishermen receive a fixed price for their catch. "This removes the uncertainty for them", says Saul, "providing they are able to go to sea and meet the quality and freshness standards they will always get a guaranteed price and many of the fishermen prefer this".

Wild Harbour Fish Company continues to be a huge success. Saul and Abi have found a unique route into the fine-dining restaurant and fishmonger trade. By developing close supply chain relationships with their buyers and the fishermen selling to them, they can guarantee top quality products at fair prices for all. Some buyers will always be willing to pay more for quality, and Saul and Abi have found a way to access that niche market.

The Cost of Lost Gear

Fishing gear is a major expense for most UK fishing businesses. Gear can be lost at sea to bad weather, poor ground, or even another boat. Owners are required by law to make an attempt to retrieve lost gear, but it is not always safe to do so.

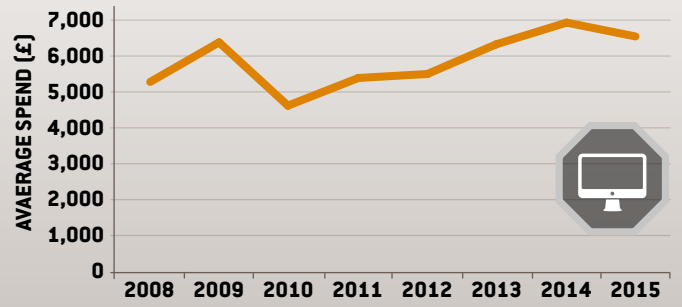
Image Credit: Tracey Williams

In some cases, the gear may be transported great distances in strong currents and rough conditions from the place where it was lost. If gear cannot be retrieved by the owner, they must inform the relevant UK fisheries authority within 24 hours. Replacing lost gear is necessary to continue fishing and is very costly, but the costs to the fishing industry do not end there.

Fishing gear can be lost at sea for many reasons, and common causes vary depending on the gear type. Trawl gear can be lost after becoming entangled with obstructions on the seabed, which can be natural or man-made and can even include other derelict fishing gear. Obstructions are more commonly reported in areas with high levels of offshore engineering activities (for more information on seabed structures visit the Kingfisher Information Services , Seafish webpages). Static gear such as pots or gillnets is more often lost due to extreme weather, although damage from another boat's gear is also common, and misplacing gear and vandalism have also been reported.

Seafish Economists estimate that, in 2015, the UK fishing fleet spent a total of nearly £30million on fishing gear. There is huge variation in spending between individual businesses and between years. In 2015, the average spending on gear per active vessel was roughly £6,500 and has increased nearly 20% since 2008 (adjusted for inflation). Much of this cost comes when gear is upgraded, but some also comes from replacing lost gear. In 2014, the MMO distributed nearly £400,000 in grants to the fishing industry through the EFF Storm Damage Replacement Scheme. These grants, while greatly appreciated by those that have lost gear, are reserved for gear lost to bad weather and

SPENDING ON GEAR



SOURCE: FLEET ECONOMIC PERFORMANCE DATASET 2005-2015, SEAFISH, 2016.

FIGURES ADJUSTED FOR INFLATION

do not cover other instances of gear loss, such as entanglement with seabed obstructions.

Gear that is lost and cannot be retrieved, known as derelict gear, can remain in the ocean for many years and can affect fishing business economic performance. It is not possible to estimate the full extent of this effect because we do not know how much derelict gear is in our waters. Several organisations are now working to improve our understanding of derelict gear and are working on solutions to reduce its effect on fishing business profitability.

"Marine litter can accumulate in towed gear leading to less effective tows."

When a fishing boat or gear becomes entangled in derelict gear, it can cost both time and money to repair damage. Marine litter can also accumulate in towed gear leading to less effective tows and can increase the amount of time the crew must spend sorting debris from the target catch. Marine litter can also damage the target catch reducing the value of marketable catch. In a 2010 survey by KIMO International (Kommunenes Internasjonale Miljøorganisasjon), 86% of fishermen said that marine litter has been caught in their nets during hauls. One skipper commented that debris in the net reduced the catching potential of his net by causing it to silt up more quickly and alter the net geometry. An estimated eight million tonnes of plastic marine litter enters the ocean every year, mostly from shipping and land based sources. It is very difficult to estimate the volume of derelict gear in the ocean but crude estimates have suggested it could account for up to 10% of the litter entering the ocean i.e. up to 800,000 tonnes per year globally.

Another major way in which derelict gear can affect the fishing industry is through ghost fishing. This is when gear that was lost at sea continues to catch fish until it degrades to the extent that fish and shellfish can avoid becoming trapped. Many of the species caught in derelict gear are of commercial value. If they cannot free themselves, they die and become bait attracting others, reducing the amount that could be caught by active gear. The extent of this loss varies significantly depending on the type of gear and species in question. One cost benefit analysis of commercial crab catches in Washington, USA, found that ghost gear cost the local industry nearly $750,000 in lost harvest, while one Norwegian study reported losses of up to 30% of commercial catches of Greenland halibut. Competition for space on the seabed is already intense in some areas. The added pressure of derelict

Image Credit: World Animal Protection

gear catching commercial species only makes this worse because it is equivalent to that area of the seabed being used by active gear. The highly durable materials used to make fishing gear can last for a long time in the ocean. This means that the problem of derelict gear will only get worse with time, unless it is found and removed.

Derelict gear is a global issue. Gear can be transported great distances in strong ocean currents, and gear that has been washed up on the beaches of Shetland has been traced to as far away as Newfoundland. Due to the difficulties in identifying owners, or even the country of origin, it is very difficult to decide who should be responsible for its removal. The task therefore often falls to local authorities or the voluntary sector, either to remove it from beaches or to retrieve it at sea. Several organisations are now working globally to unite groups and individuals with an interest in the sea to tackle this issue for the benefit of all.

Global Ghost Gear Initiative (GGGI) was launched in 2015 by World Animal Protection, an international animal welfare charity. This cross sector, global partnership aims to unite marine stakeholders, including fishing industry groups, academics and NGOs, to find solutions to the issue of derelict gear. "After consultation with various marine stakeholders it became apparent that ghost gear places a significant financial cost on a number of ocean users and the fishing industry is the worst

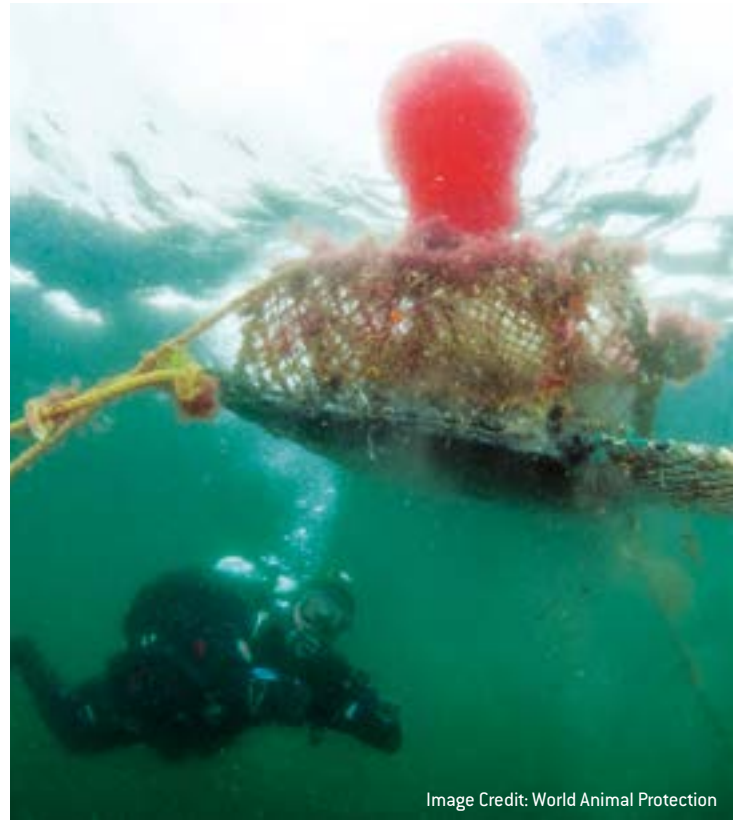


Image Credit: World Animal Protection

"Ghost gear places a significant financial cost on a number of ocean users and the fishing industry is the worst affected"

affected because of the impact to income", says Christina Dixon, Campaign Manager at World Animal Protection. "We support several efforts in the UK and abroad to prevent and remove ghost fishing gear", says Christina. "Fishermen's participation in these projects is really valuable. Often they are able to collaborate with project partners, such as voluntary dive groups, by providing information on the location of ghost gear and allowing targeted retrieval". Christina goes on to explain that retrieval is only part of the solution.

"This isn't a long-term solution, it's important to address the causes of gear loss. We are looking at ways to reduce the ability of gear to ghost fish. We're currently working closely with fishermen in Wales, trialling soak times on weak link mechanisms that allow escape hatches to spring open after the gear has been submerged for prolonged periods". For more information visit: *www.ghostgear.org*

Fishermen have proved their commitment to addressing the issue of marine litter

by their involvement in the Fishing for Litter (FFL) programme. Although not specifically aimed at tackling derelict gear, the programme provides opportunities for fishermen to remove marine litter that they find at sea, at no cost to the vessel owner. In the 11 years this programme has been running, over 1,150 tonnes of marine litter has been collected by approximately 370 fishermen at 27 participating harbours in Scotland and south-west England. "The logic is simple", says Graham Humphries, National Coordinator of KIMO UK. "Fishermen are provided with heavy duty, durable bags in which they can collect marine litter that they encounter at sea. These bags are deposited in participating harbours and transported to landfill at no cost to the fisherman. What's key to this project is that it is really simple for both fishermen and ports to take part in and it removes the cost barrier for fishermen and harbours in disposing of marine litter". In addition, KIMO also support a number of affiliated schemes across the country. "We are not restricted to Scotland and the south-west. For success, it's important that there is local demand and support for the scheme. Fishermen and harbours should get in touch if they are interested in championing the scheme in their area", says Graham.

In 2015, FFL Scotland launched a pilot project to provide collection points where fishermen can deposit end-of-life nets free of charge to be recycled into plastics. Working with Plastix Global, a Danish company, FFL Scotland has provided collection points at harbours where fishermen can deposit both derelict gear that they encounter at sea and their own end-of-life nets. "Old nets are sent to Denmark, shredded, cleaned and transformed into plastic pellets for the manufacturing industry", says Graham. "The net recycling scheme removes the cost of disposing of end-of-life nets as well as those that are collected at sea. Disposing of nets can be very costly, normally upwards of £150 per tonne". The net recycling scheme is still in its infancy. So far, all of the participating ports are located in Scotland and include Peterhead, Ullapool and Scrabster. For more information visit: *www.fishingforlitter.org.uk*

Image Credit: World Animal Protection

"The net recycling scheme removes the cost of disposing of end-of-life nets as well as those that are collected at sea"

There are other opportunities for reprocessing and reusing these valuable materials. We spoke to Dr Neil James of the Environmental Research Institute at the University of Highlands and Islands in Thurso which is a lead partner of Circular Ocean, a Regio Star Award 2016 finalist in the Sustainable Growth category. This transnational programme in the Northern Periphery and Arctic area helps promote partnerships, innovation and green business opportunities for groups and individuals who creatively reuse and reprocess derelict and end-of-life fishing gear. "The aim is to inspire communities to think creatively about reusing and reprocessing end-of-life fishing gear and to find local solutions that divert these valuable materials from landfill", says Dr James. A particularly successful example of this type of eco-innovation has been the development of Bureo, a Chilean organisation that makes skateboards and sunglasses from reprocessed fishing gear. "Projects currently underway in the Northern Periphery and Arctic region include investigating the use of fishing nets to reinforce concrete for use in construction and the use of old fishing nets as materials for 3D printers. Other projects have included collaborations with local artists, and many other applications". Next year, Circular Ocean will launch an eco-innovation competition seeking creative ideas about potential uses for end-of-life fishing gear. For more information visit: *www.circularocean.eu*

Losing fishing gear is costly to fishing businesses in a number of ways, but there are opportunities for owners of fishing businesses to ensure that lost gear does not continue to cost the industry. Key to this is establishing links between the fishing industry and volunteers that are involved in the prevention, removal and reuse of derelict gear. Owners of fishing businesses can provide valuable information to the voluntary sector, ensuring the targeted removal of derelict and end-of-life fishing gear and can also get involved in the removal and recycling of derelict gear to reduce the costs to their own business, ensuring a cleaner, healthier and more productive ocean for current and future generations of fishers.

Image Credit: Tracey Williams

Image Credit: Tracey Williams

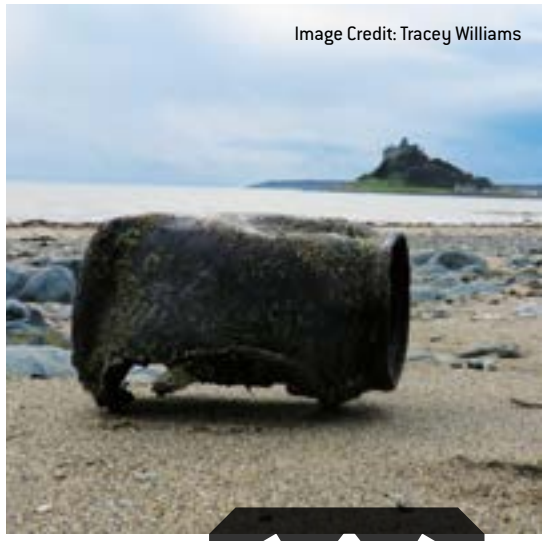


Image Credit: Tracey Williams

Reusing Lost Gear

There are many voluntary organisations working around the country to recover and remove fishing gear that is lost at sea and washed up on beaches. There are opportunities for fishermen to work with volunteers undertaking these activities, and there are direct benefits for those who do. We spoke to Ben Lowe, owner of MFV Atlantic Voyager, about the work he has been doing with a local beachcombing group and how this has helped him boost his new fishing business.

Beach litter that is removed by councils and the voluntary sector is usually destined for landfill, but among this litter, there are valuable materials, parts and, in some cases, whole pieces of fishing gear.

Ben Lowe launched his Newquay-based fishing business last year. Targeting mainly lobsters and crabs using pots and fin fish including pollack, mackerel and cod using rod and line from his 8m vessel, Atlantic Voyager, Ben has built up his business from scratch.

Gear is a major investment for a start-up business. "Starting a business from scratch was difficult", says Ben. "To begin with I felt like I was losing money because any profit was invested in the boat and the gear, this was the biggest obstacle when starting up my business. When I first came into the industry I had 20 lobster pots, which I bought second-hand. They weren't very good, but I gradually reinvested my profits and I now have 160 pots. Although gear costs a lot, each pot is an investment for the future".

The waters around North Cornwall, which are popular with surfers, are known to be very rough at times. Large swells can damage static fishing gear and, in some cases, dislodge gear from the seabed causing it to be lost at sea. Ben has lost around 5% of his gear to these large swells, although in most cases he has been able to recover it. "I do a lot of small repairs to my gear as well", says Ben. "I do repairs almost every day and larger repairs are done in my workshop".

In early 2016, Ben was approached by Tracey Williams of Newquay Beachcombing, a volunteer beachcomber based in North Cornwall. "Tracey contacted me looking for information about some fishing gear that had washed up on the beach", says Ben. "This began a conversation about the possibilities of recycling fishing gear that gets washed ashore because a lot of smaller components of pots often end up on beaches and Tracey thought there might be opportunity to be reused". Beach litter that is removed by councils and the voluntary sector is usually destined for landfill, but among this litter, there are valuable materials, parts and, in some cases, whole pieces of fishing gear.

As well as running Newquay Beachcombing, Tracey is a co-founder of the Facebook group Lost At Sea. This global network is made up of over 3,000 beachcombers and fishermen who share images online of items found on beaches. "The purpose is to share information about things that we find washed up", says Tracey "some items have travelled very large distances and it's really interesting finding out where they have come from and map their journey". For more information visit: *www.facebook.com/groups/LostAtSeaGroup*. Beachcombers find all sorts of items from pens to crates, but most of these items are made of plastic. "The main issue with plastic marine litter is that it breaks down into smaller particles becoming even more difficult to remove". Tracey often finds fishing gear and equipment sometimes from very far away. "I come across a lot of lobster tags from the US and Canada, also buoys, floats and fenders. Recently there has been an increase in octopus pots, I think from North Africa and Spain as well as fish boxes sometimes from Holland, France and Portugal".

"If I find fishing gear and equipment in good condition I normally photograph it and stack it somewhere where people can easily collect it"

When Tracey finds fishing gear washed up on Cornish beaches, she does her best to trace the owner. "I once found a buoy with a name on it and posted an image on a Canadian lobster fishing page. The owner was


Image Credit: Tracey Williams

directed to the site and when he saw the photo thought it was a hoax. He couldn't believe his buoy had travelled from Nova Scotia to England". Although it's not feasible for Tracey to return lost gear to owners from as far away as Canada, local fishermen may find their lost gear through the network. "If I find fishing gear and equipment in good condition I normally photograph it and stack it somewhere where people can easily collect it", says Tracey. "As far as I'm aware there is no official facility to deposit found gear, but if fishermen regularly check the social media page they can follow the instructions and come to collect items". Ben has helped Tracey to identify local owners of some items and has also helped out with beach cleaning. When items are unclaimed or the owners are abroad, Tracey has offered them to Ben. "Tracey has passed on all types of equipment including buoys, pot hooks, rubber necks, spinners, rubber bases and strips", says Ben. "All of these have been useful and have helped to reduce the cost of repairing and replacing gear".

By working with Tracey, Ben has been able to reduce his spending on gear and divert valuable materials from landfill. "Using less plastic and rubber is more eco-friendly", says Ben. "It's great to use products that would otherwise be thrown away or washed back into the sea to become marine litter which can harm wildlife and catch in boat propellers, causing damage to vessels. There are long-term benefits too. Netting and equipment can break down into micro-plastics and get into the food chain, removing it from beaches and the sea prevents this from happening and helps to maintain healthy fish stocks for the future".

Several voluntary organisations are working to remove derelict gear from the sea and beaches. By working with Tracey, Ben has demonstrated that fishermen and the voluntary sector can provide value to one another. Establishing and fostering links between these two sectors could help provide opportunities for others in the fishing industry to get involved. "It's devastating for a fisherman to lose a whole tier of pots, but if beach combers or even walkers happen to find it, there's not much opportunity right now for them to contact fishermen and help return it. Social media can help people recording sightings and allow fishermen and volunteers to do swaps so the gear can be reused and recycled but collection points in harbours would also be useful", concludes Ben.

Networks of beachcombers exist all over the country, and there are many other voluntary organisations that undertake regular beach cleaning. At present, the links between these organisations and the fishing industry are poor, meaning that materials that could be reused often end up in landfills, and vessel owners miss opportunities to recover some of the material and therefore the costs incurred from losing the gear. Newquay Beachcombing demonstrates that social media is a simple but effective tool that can be used to establish and maintain these links. Could you start a new partnership in your area?

The Fishing Gear of the Future

The earliest evidence of fishing methods and technology dates back 23,000 years to a cave on a Japanese island where fishhooks made from shells were recently discovered. We have come a long way since those early technological innovations, but fishing methods are still evolving. Now the landing obligation presents a new challenge, shaping future designs of fishing gear. As full implementation of the new regulation draws closer, innovation in gear selectivity is rapidly growing once again.

Necessity is the mother of invention and is leading some people to explore ways to adapt their fishing methods so they can comply with the new regulation when it is fully implemented. While the decision makers have been finalising the detailed rules and area management plans, fishermen have been working out practical solutions to meet the significant operational challenges of reducing discards. These pioneers, working together with scientists and gear technologists, are leading fishing gear innovation to create a set of tools that can be approved before the landing obligation is fully implemented.

The phasing in of the landing obligation for the demersal sector began on 1st January 2016. By 1st January 2019, the new regulation will apply across the board, and the catches of all TAC species will have to be counted against each vessel's quota or monthly catch allowance. This is a concern for all fishing businesses, but perhaps particularly for those operating in highly mixed fisheries where separating fish as they enter the net is very difficult. Fishing businesses that cannot separate fish before they are brought on board may choke on particular species for which they have no quota, potentially preventing them from going to sea for the rest of the year.

Many fishermen will have to change the way they fish in order to follow the rules of the landing obligation, and these changes will likely have economic implications. Seafish analysed the likely economic impacts of the landing obligation, highlighting the ways the fishing fleet might be affected by choke stocks. The assessment concluded that, even with the built-in flexibilities of the landing obligation, the UK fishing fleet is likely to be negatively affected. To prevent choke situations, fishing boats will have to overcome significant operational issues.

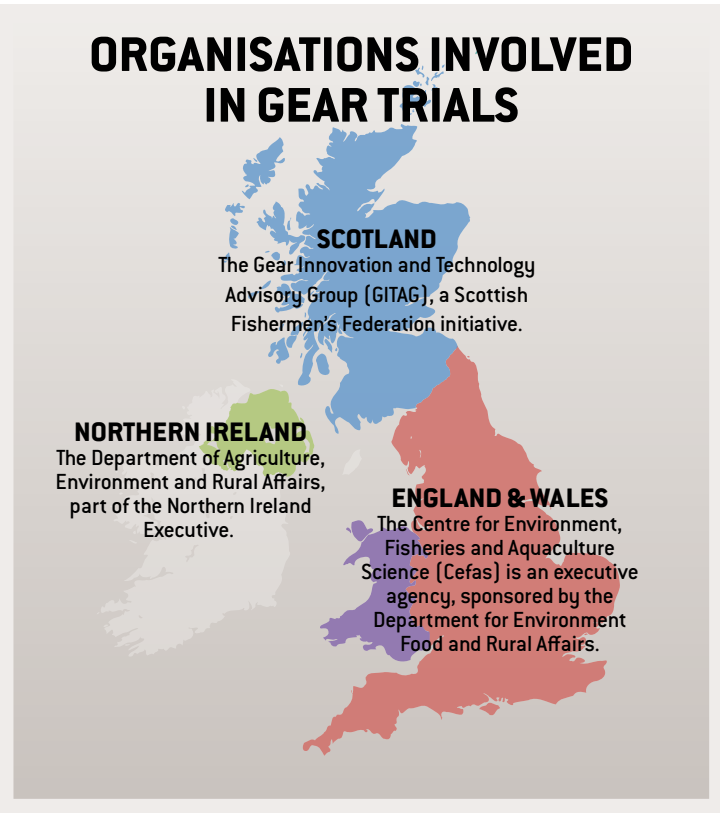
A key part of the reforms to the Common Fisheries Policy (CFP) is the recognition of fishermen's expert knowledge of fishing methods and gear. Fishermen have a unique opportunity to get involved in developing and trialling new gear that, if proven to be successful at reducing unwanted catch, could help to overcome the choke problem. Gear and devices have been developed in countries that already have discard bans, and these will be included in the fishermen's toolbox. However, some skippers feel that existing devices are not suited to all fisheries and that there needs to be a range of options available to address the very different problems in different parts of the country.

Fishermen have a unique opportunity to get involved in developing and trialling new gear.

One of the key challenges in developing new methods and gear is a lack of funding. Skippers take a risk when they undertake trials because there is no guarantee that experimental gear will perform as effectively as existing gear. Skippers risk profit, quota and their limited days at sea allowance when they use experimental gear. To remove this cost barrier, funding has been made available for gear selectivity trials from several sources.

Support for research and development has also come from other sectors of the seafood supply chain. In 2015, Young's Seafood Ltd. supported the first sea trials of SafetyNets lights fitted to nephrops trawls to guide escaping fish out of the net. Following the encouraging results of initial trials, Young's Ltd. aims to assemble a stakeholder group consisting of supply chain companies, retailers, NGOs, and governmental groups to fund further research and development of radical, high-tech gear innovations.

Existing fishing methods will have to adapt considerably to meet the new requirements of the landing obligation. Technical solutions are an important part of the arsenal of measures to ensure that fishing businesses are prepared for the landing obligation. Over the next couple of years, there is a chance for skippers and vessel owners to get involved in developing these solutions and to collaborate with gear technologists, scientists and the government. This collaboration will help to ensure that fishermen have the tools that enable them to address the problems they will face when the landing obligation is fully implemented. Many collaborative projects are already underway across the country, and there are opportunities for others to get involved.



Picturing things to come

David and Alec Stevens from St. Ives, Cornwall, run their family fishing business, Crystal Sea Fishing. The brothers co-skipper MFV Crystal Sea, a 20-metre twin-rig trawler. The Stevens family operate within a mixed demersal fishery of around 25 species and target mainly haddock, lemon sole and monkfish in the South Channel and Celtic Sea. David and Alec consider themselves proactive and pioneering fishermen, always seeking new ways to improve efficiency. They have recently taken part in the catch quota trials, a fisheries science partnership project with the MMO (Marine Management Organisation) and Cefas. We spoke to David about his experiences in the project and about some of the measures they have trialled on board Crystal Sea.

Four years ago, the Stevens family were invited to participate in a catch quota trial (also known as the camera trials). This long-term monitoring project simulated the conditions of the demersal landing obligation allowing industry and researchers to gain evidence of how fishing businesses would be affected under the new regulation.
The catch quota trial included installing CCTV on board participating fishing vessels to monitor and count catches rather than landings against quota. Initially, David was reluctant to take part in the trial, but after some further research on the incentives available, he chose to get involved. Vessels involved in the trial were awarded a small increase in quota to compensate for the potential loss of catch during the project. This extra quota came from a 5% uplift of the UK's TAC approved by the European Commission for scientific reasons. The UK government chose to use this uplift for the catch quota trial to ensure the fleet would be better prepared for the landing obligation when it is fully implemented.
"The incentives were there, and we felt that by being fully documented and monitored by the MMO, we'd further embrace what was required", says David. "The cameras have far more to offer rather just an enforcement tool and have really worked for us. Instead of being a hindrance, the data they've captured has helped to build a highly accurate picture of our experiment's impacts. This has got to be advantageous for the industry as a whole and an approach that other fishermen should look to embrace. I, like most people, am not an advocate of 'big brother' at sea, but to shift our approach to fisheries management from precautionary to incentive-led and proactive there needs to be some level of transparency".

Early trials indicated that, under the landing obligation, large numbers of haddock would be a major issue for demersal vessels fishing in the South Channel and Celtic Sea. David tells us that in recent years they have experienced an increase in haddock, particularly juveniles, in his usual fishing grounds, but he feels that current TAC does not reflect these recent increases. Even with the extra quota that Crystal Sea Fishing received for the trial, their haddock quota was exhausted part way through the year.
"Once the quota for one species has been caught then it becomes a choke against catching others", says David. "Our experiments have demonstrated that even with built-in flexibilities, year-round fishing may be very difficult to achieve. We could potentially choke on haddock half way through the year. These are valuable lessons we're learning".

> "This work has given us a valuable insight into the potential scenario we will face in 2019, once full implementation has been achieved"

Under the catch quota trial, Crystal Sea Fishing tested various selectivity measures to reduce the level of unwanted by-catch with some very promising results. Measures included reducing headline cover by 10 feet, using 120mm square mesh panels, 100mm square mesh panels in the cod end and agitators below to entice the fish through the

been a cost to us for undertaking some of this work. By avoiding certain grounds, our total catch of squid is down by 50%. We've also forgone 25% of our hauls by not towing at night. This has been necessary as the volumes of haddock have just been too large for our available quota, but in doing so we've missed out on our regular landings of species such as whiting, gurnard, soles and monks", says David. This loss could be compensated for by better prices due to increased catch quality, but with no certainty over future prices, it is not possible to estimate how much fishing income could change as a result.

cod end panels. "Although all the different gear types produced positive results, they also each have different drawbacks and subtleties that need to be managed according to conditions. This is where the skipper's knowledge and experience is key", says David. "It's important to stress though that the modifications and adjustments we've made should not be definitive and will not suit all. Skippers need to retain the ability to employ different methods and practices at their discretion. Once something has been written into law, flexibility and reactivity is lost. Rigid systems, to our mind, will not suit the landing obligation and this work has given us a valuable insight into the potential scenario we will face in 2019, once full implementation has been achieved".

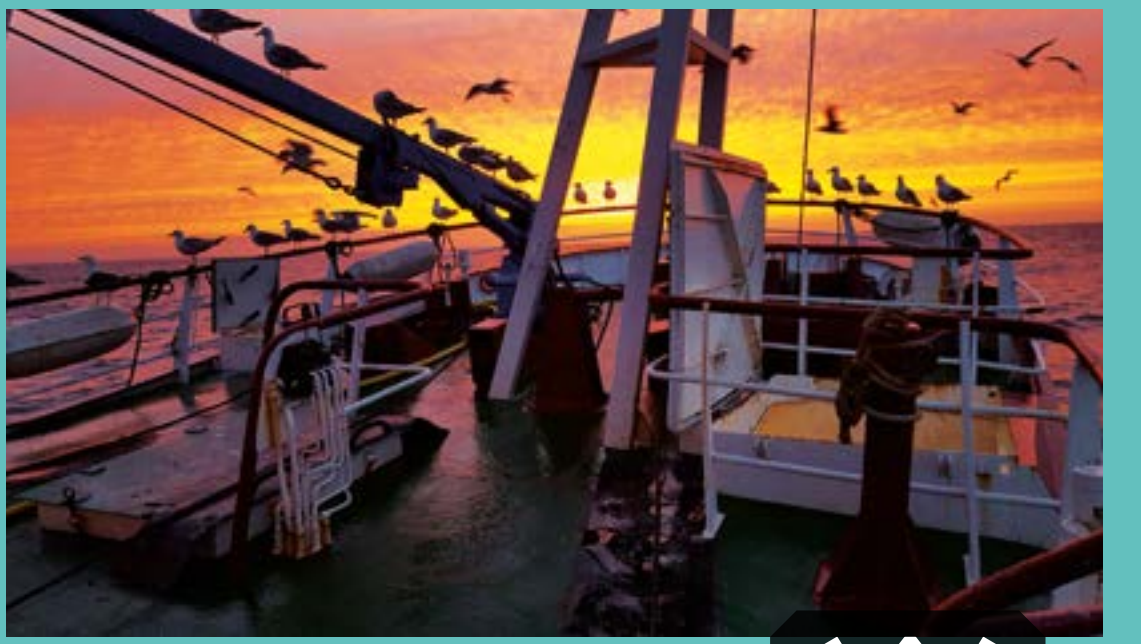
Changes in fishing tactics such as choice of location or time of day are another potential solution that skippers could employ to avoid non-target catch. As part of the catch quota trial, Crystal Sea Fishing changed their fishing patterns in combination with selective gear, and through several trials they have demonstrated the effectiveness of these measures. Much of their work involved simply avoiding fishing in areas they know to have high populations of species for which they have a limited quota and not towing at night to avoid certain species. Crystal Sea Fishing managed to reduce their by-catch rate to just 2% of the total catch by adopting a combination of selectivity measures and changes in fishing tactics. These trials have proved successful in some ways, but there have also been some drawbacks. "There has

> **"We are all (fisherman, policy makers and scientists) desperately in need of more real-time data"**

David hopes that, under the landing obligation, fishermen will play an important role in providing real-time data to help inform reactive management of fishing effort. "In my view, current policy is the major hold-up to better fisheries management. My hope is that as an outcome of Brexit, the UK will rethink our approach to fisheries management. In my opinion, the landing obligation will not work under the current rigid, top-down approach to fisheries management. We are all (fishermen, policy makers and scientists) desperately in need of more real-time data, especially when dealing with erratic recruitment species like haddock and cod. Provision of this data could eliminate the time lag we experience between changing species

abundance and TAC levels. From what I have seen now, in our fourth year of working within the catch quota trial, cameras can offer that real time data. I hope for an approach to management that incorporates in-year policy adjustments, in response to real-time changes within the fishery". The participation of Crystal Sea in the catch quota trials has helped to strengthen the links between fishermen, policy makers and scientists which could lead the way for future fisheries management. "Skippers are a valuable resource and can provide the necessary data and tools with which to equip the policy makers. We are the ones on the ground able to see and to react to the changing population dynamics of different species. Through the catch quota trial, we have been able to demonstrate that fishermen themselves are able to deliver a responsive and responsible fishery if given the means. Wheel houses are now the platforms for the science to evolve, the necessary data is lying with us and we now have the ability to reverse the burden of proof and influence policy", concludes David.

In February 2016, Crystal Sea Fishing was awarded the Seafood Champion Award for Innovation for initiative and leadership at the SeaWeb Summit in Malta. The award was given in recognition for their pioneering approach to finding technical solutions to the issue of discards. Working in partnership with the MMO and Cefas, Crystal Sea Fishing has been able to demonstrate the strengths and weaknesses of some of the measures available to fishing businesses facing the landing obligation. They have also demonstrated some of the upcoming challenges and remain very concerned about the issue of choke species. "I pose the question", says David, "is policy up to the challenge? Fishermen have proved beyond doubt that they are. We have taken huge steps to addressing operational issues we are likely to encounter under the landing obligation and we are waiting for policy to catch up".



New Designs to Address New Challenges

Peterhead-based Jimmy Buchan fishes in the mixed North Sea fishery. Jimmy targets mainly nephrops from his 21-metre twin-rig trawler MFV Amity II. Jimmy is a pioneering fisherman and has been involved in several trials of selective devices. A year after Quay Issues accompanied a group of Scottish nephrops fishermen to the SINTEF flume tank in Hirtshals, Denmark, we caught up with Jimmy to discuss his experiences of developing and trialling a revolutionary style of twin-rig trawl.

Although mainly targeting nephrops, a large part of Jimmy's fishing income is generated from white fish for which he has quota. When the landing obligation was announced, Jimmy was keen to start developing fishing gear that would allow him to comply with the regulation and get the most out of every tow. "I had been involved in trials of grids in the past, which proved to be highly selective, in my case too selective", says Jimmy, "as well as cutting out all of my by-catch I was losing most of the high grade fish that I also target, which makes up a significant part of my income". Grids have proved to be very effective at reducing white fish by-catch in nephrops fisheries and are a legal requirement in both Sweden and Denmark for fishing vessels targeting nephrops.

> "We're embracing change, we've taken the lessons learnt in previous years and applied them to a new concept"

Last year Jimmy was involved in trials of different variations of twin-rig nets, including coverless trawls, reduced headline height, escape panels and large mesh sizes. All of these were effective to some extent, but Jimmy did not feel they were in balance, retaining either too many of one species or none at all. "My aim was to develop a piece of gear that

eliminates undersized fish, maximises nephrops and retains a small amount of high grade fish", says Jimmy. Last year Jimmy embarked on a journey to finely tune these modifications, crafting ideas together to produce fishing gear that is extremely selective in separating non-target catch and enhancing the quality of retained fish and nephrops to increase their value. "We're embracing change", explains Jimmy. "We've taken the lessons learnt in previous years and applied them to a new concept, which we're now trialling under an SFF (Scottish Fishermen's Federation) derogation with some very encouraging results".

The first stage of the journey for Jimmy and his skipper Philip Reid was attending the Seafish Trawl Gear Technology Training course at the SINTEF flume tank in Hirtshals, Denmark. Seafish secured funding for skippers to attend through the European Fisheries Fund (EFF). This was a chance to learn about optimum net geometry and selective devices, ideas that they could apply to trials at sea and to make adjustments. This was also an opportunity for Jimmy to test a scale model of a trawl net designed in conjunction with Seafish Gear Technologist Mike Montgomerie and Jackson Trawls of Peterhead. Mike and Jimmy later incorporated elements from a Danish nephrops trawl that Jimmy had seen used in Hanstholm to the new design. The full-scale prototype was built by Jackson Trawls and has since been trialled on board Amity II. Through an extensive process of trials and tweaks, the crew of the Amity II have become experts at adjusting the gear to adapt to the conditions at sea and the mix of species present on each tow.

The concept of the design is based on observations of the way fish behave when evading capture. In Jimmy's new net, trialled through the GITAG programme, prawns move downwards and into one cod-end, while fish are ushered

upwards by an inclined separator panel. The standard approach using only one mesh size leaves prawns, quality fish and non-target catch (such as juveniles and non-TAC species) in the same bag with no separation. Separating these species after the catch has been brought on board can be time-consuming for the crew to sort and grade. The new design separates species and size classes as they travel down the net towards the cod end, reducing the overall quantity of the non-target catch brought on board. The design features a square-box section with an inclined separator panel, ahead of the twin cod ends, effectively sorting white fish from the nephrops. The crew of the Amity have also experimented with different mesh sizes in the separator panel. The results achieved by the trial net are compared with the conventional "scraper trawl" that acts as the control net when towed alongside.

Skipper Philip Reid is enthusiastic about the progress made so far and explained how the revolutionary trawl works. "Initial separation of prawns and fish is achieved via the inclined separator panel of a 200mm mesh size", says Philip. "This allows prawns to drop through and move along the floor of the net into the lower bag. Fish on the other hand, swimming against the incline, move up the panel and into the upper bag where they are protected from the prawns ensuring maximum quality is retained. There is opportunity to achieve further selection of white fish, by inserting square mesh panels in the upper cod end, allowing undersized fish to escape upwards and clear of the net".

The level of separation achieved in Jimmy's new trawl design ensures that the potential for damage to the marketable catch is significantly reduced.

The landing obligation has the potential to alter the cost structure of many fishing businesses, something of which Jimmy is well aware. One of the major goals in developing the new trawl was to enhance catch quality, ensuring that any loss of revenue incurred through reduced catch volume could be partly compensated for by getting better prices for the marketable catch. "Too high a volume of often unwanted white fish, can really affect the look, and longevity of the nephrops", explains Jimmy. "Our trips last around 6-8 days and we need to know that at every stage, the quality of our product is not being compromised". The level of separation achieved in Jimmy's new trawl design ensures that the potential for damage to the marketable catch is significantly reduced.

Jimmy has now completed several successful trials using the prototype, with encouraging and very consistent results. Jimmy is already experiencing returns, both in the prices achieved for the catch and the enhanced on-board efficiencies. "The panels are easy to change over, especially when you compare it to tying on a whole new cod end", says Philip. This means less crew time and an added contribution to their on-board welfare, in terms of maintaining health and safety, a vital component of the Responsible Fishing Scheme (RFS).

Mike Montgomerie of Seafish is also delighted with the results so far. Mike has contributed significantly to the design of this innovative selective trawl, blending his extensive knowledge of technology with Jimmy's desire to work within the rules of the landing obligation while still achieving maximum catch value and minimising overheads. "What Jimmy has done so far is just the first stage in demonstrating that the device works commercially", says Mike "there's a lot of tweaking to be done yet to achieve that desired consistency. Once the primary objectives of separation have been mastered, then we can modify the cod ends using diamond or full square mesh to further select out the non-target catch, further minimising the potential to retain unwanted fish".

Jimmy has achieved a huge amount in a relatively short space of time. The results of the commercial trials on board Amity II demonstrate that, by pooling the experience of fishermen, gear technologists and gear manufacturers, solutions to even the most difficult problems can be found. Previous work in the field of gear innovation has provided a sound platform on which to build devices that can allow profitable and year-round fishing under the landing obligation. Pioneering fishermen like Jimmy and others around our shores are currently at the cutting edge of gear innovation, and there is support available for those that wish to get involved in finding solutions to the specific set of challenges the landing obligation will present to their business.

Access to Marine Resources

As competition for access to marine resources continues, the marine protected area (MPA) debate is of more relevance than ever before. While the fishing industry competes for space with other industries including offshore energy, mineral extraction and recreation, there is also intense competition between different fishing sectors. This competition extends to the proposed introductions of MPAs. The health and productivity of the sea is important to the fishing industry, both for those fishing now and for future generations, but more restrictions on fishing puts pressure on fishing businesses.

The cumulative effects of marine industries, coupled with long-term environmental change are threatening important sea habitats and the livelihoods of the people that depend on them. The UK waters are among the richest and most diverse in the world and are home over 8,000 different marine species of plants and animals, including some of global importance. These habitats have provided an important source of food and income for coastal communities for generations. The long-term sustainability of the fishing industry is closely linked to the health of these sea habitats, and there is mounting global pressure to take action.

A global network of MPAs is being established to protect marine habitats and benefit wild fish populations. Several conventions and regulations deal with marine conservation at international, national and regional levels, from the international 1992 Convention on Biological Diversity to the Wildlife and Countryside Act, to name a few. The UK is required, under these regulations, to establish a coherent network of MPAs in its waters that will help conserve the marine environment, while also ensuring sustainable use of marine resources in these areas for the benefit of present and future generations.

To ensure sustainability objectives are met, all human activities taking place within MPAs will be carefully managed. The need to manage activity has caused concern among the fishing industry that they could lose fishing income in the short term if control measures relating to fishing activities are introduced as part of an MPA management plan. Nonetheless, the MPA debate is intricate, and this opinion is not shared across the whole industry, a fact that became clear during the Seafish Economic Survey of the UK Fishing Fleet this year.

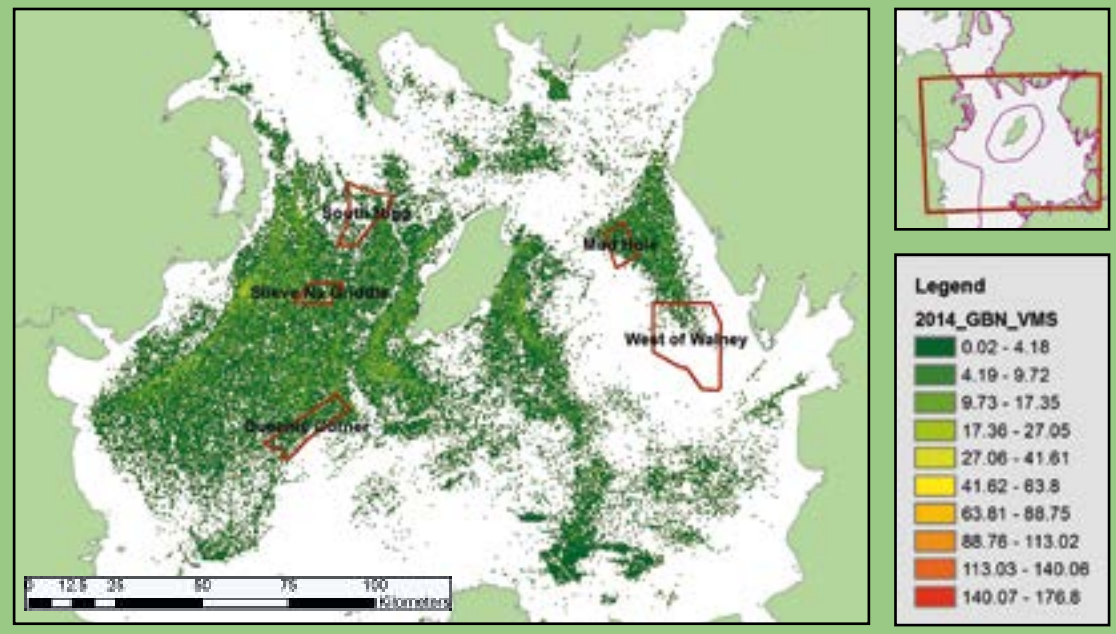
The need to manage activity has caused concern among the fishing industry that they could lose fishing income in the short term.

The MPAs will have different effects on different parts of the industry, depending on the rules and regulations put in place for each. There is no standard outcome to having an MPA because each one will have a unique management plan and a different set of control measures in place, depending on the habitats present and the conservation goals of the MPA. Control measures can include no-take zones, which are also controversial across industry. There are split views on no-take zones, as studies have shown that they can benefit fish populations beyond the boundaries of some MPAs. Some MPAs are used by fish as breeding and nursery grounds, and juveniles then migrate to other areas when they reach maturity. Other studies have demonstrated that fishing communities located near MPAs have benefited from increased catch levels. There is a deep divide across the industry in opinions towards MPAs because, depending on the types of restrictions in place, fishing businesses using different methods may be affected in different ways.

This summer, our researchers heard from fishermen, sometimes in the same ports, with vastly differing opinions on MPAs. Support for MPAs generally came from fishermen using pots and traps because they feel that proposed restrictions to towed gear in their area would allow them better access to the seabed without the risk of losing their gear to trawls. Hand divers also seemed to support MPA proposals because they felt this would allow them to dive safely without the risk of disturbance from towed gear. In some areas, where towed gear is already restricted, some say they have experienced increases in catch volume. Skippers of vessels using towed gear, on the other hand, were less in favour of MPAs because they felt that the proposed restrictions to towed gear in their area would lead to loss of important fishing grounds. This divided opinion has severely complicated the issue, as different sectors of the industry argue different viewpoints. Unfortunately, it is not always possible to find solutions that are favourable for all.

The process of selecting and agreeing on MPA sites is lengthy. Some have already been designated while the debate continues. Designating MPAs has generated discussion and compromise from various stakeholders, and the future management of these areas will require cooperation. There are still opportunities for fishermen to raise their concerns if they feel that MPA designations will cause significant financial effects. Speak to representatives of your PO, Department for Environment, Food and Rural Affairs (Defra) or Marine Scotland for advice or information.

Providing Evidence for Industry



The UK Government and devolved administrations are currently designating MPAs in UK waters. In 2011, the Irish Sea Conservation Zones project recommended 19 Marine Conservation Zones (MCZs) in the Irish Sea, outside of the 12 nautical mile limit. Some of the proposed sites overlapped with valuable historic fishing grounds for vessels targeting nephrops, a particularly important species for the Northern Irish fishing fleet. Many fishermen felt that these proposed MPAs and associated restrictions on fishing activity would pose a major threat to Northern Irish fishing businesses. Seafish worked closely with Northern Irish Industry groups, scientists and local Government to investigate the potential impacts of these MCZs and propose alternative sites.

Following the concerns voiced by Northern Irish industry groups on behalf of their members, Defra agreed to delay designating these contentious sites. Dick James, Chief Executive of the Northern Irish Fish Producers Association, told us about their involvement in the process. “We had attended various stakeholder group meetings in the run up to the proposal of the original sites and raised concerns about the potential impacts”, says Dick. “We felt that these economic concerns weren’t fully assessed and that if the designations went ahead the Northern Irish industry would be severely impacted. The official socio economic assessment was published after the sites were proposed rather than during consultation, prompting Northern Irish industry to seek an independent assessment of our own”.

The Seafish Northern Irish Advisory Committee commissioned and managed an economic evaluation of fishing in the contentious sites. Poseidon Aquatic Resources Management Ltd. used Seafish economic data on the performance of the UK fishing industry combined with data on fishing effort to assess the value of these fishing grounds. “The study found that these sites were indeed highly valuable to the Northern Irish industry and that a significant amount of revenue was generated from these areas”, says Dick. The study also showed there would be a knock on effect to the onshore industry resulting in an economic loss that extended beyond the fishing businesses to the wider industry. The report recommended that alternative sites should be identified. “With the evidence from this study to back up our concerns we got the go ahead from Defra to assess the suitability of alternatives sites and we wanted to make sure that the fishing industry was better represented in this process”, says Dick.

Following discussions with Northern Irish industry groups and government departments, Defra agreed that the Agri-Food Biosciences Institute (AFBI) should be tasked with identifying other sites. Dr Annika Clements, Senior Scientific Officer at AFBI, tells us about the approach she took. “We invited a group of stakeholders including representatives from the fishing industry, government and NGOs to a series of workshops. These were interactive sessions where we used maps of seabed habitats and fishing effort data from VMS (vessel monitoring system) to identify potential sites. Attendees were split into groups composed equally of stakeholders from different sectors allowing them to work together and ensure that the goals of the different sectors were represented. The resulting ‘areas of consideration’ were collectively reviewed and given a ‘traffic light’ rating of overall preference”.

“We used maps of seabed habitats and fishing effort data from VMS to identify potential sites”

In total, 11 alternative sites were identified in the first workshop, which AFBI then reviewed in more detail. “There are a number of criteria which qualify proposed MCZ sites for consideration”, says Annika. “We had to investigate the potential sites identified in the workshop to confirm the presence of relevant habitats and species. Other criteria for MCZ site selection include the size and political boundaries. Some of the definitions used in the guidance documents, particularly about habitats, are quite vague and obscure making it challenging for industry to interpret the actual goals of MCZ selection. Part way through the process, new criteria were announced meaning some of the 11 sites we initially identified were knocked off the list”.

AFBI found two suitable sites for MCZs to propose as alternatives. One of these, West of Walney, was then under consideration for designation by Defra, pending resolution of its co-location with an offshore wind farm, and in 2015 it was successfully designated. The second, Queenie Corner, was put forward for further investigation, including comparing the economic value of this area with the originally proposed sites.

Healthy and productive marine environments are vital for the long-term sustainability of fishing businesses. Although industry is divided, many support MPAs, providing that they do not unduly restrict the ability to fish profitably. “We are not completely opposed to MCZs”, says Alan McCulla, Chief Executive of Sea-Source. “What we are suggesting is that in this case the [originally] proposed MCZ sites were in the wrong place. We are striving for sustainability and that means having a profitable fleet”.

“Evidence-based decision making is the way forward and it was the major advantage of this process”

By working together with scientists, the Northern Irish industry gathered evidence in support of their case and led the way in proposing alternatives. “It’s not enough just to say that it will have a negative impact, having the evidence is key”, says Alan. “We went to great lengths to get the evidence to support our claims. Much of the data came from VMS which many fishermen think of solely an enforcement tool, but in this instance we were able to turn it around and use it to the advantage of the industry”.

“Evidence-based decision making is the way forward and it was the major advantage of this process” continues Alan.

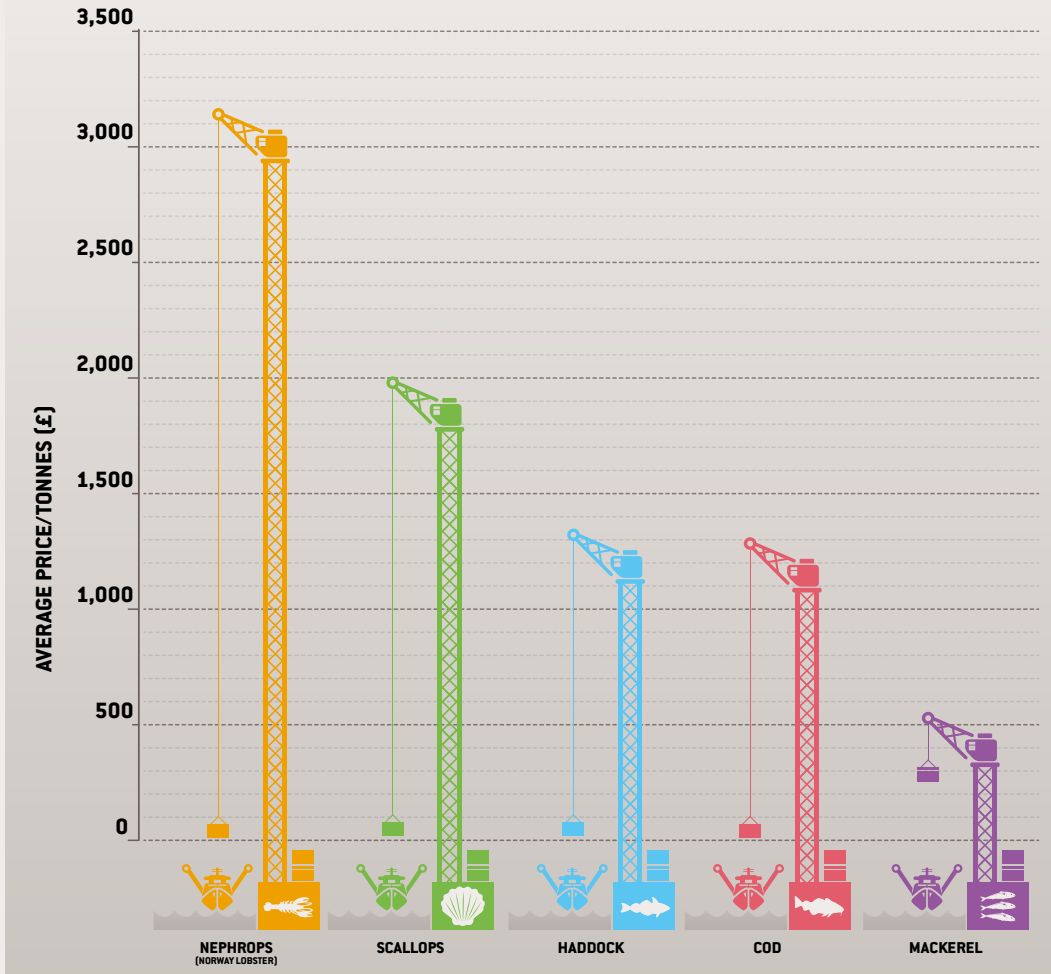
Working in partnership with scientists and other stakeholders we were able to take ownership of the situation and lead the way in developing the solutions. If other industry members are concerned about the selection of MCZ or MPA sites they should take their concerns to their PO and replicate what we have done here. The fishing industry has generated a substantive amount of evidence through VMS. The data are there, fishermen have collected it and nothing should stop them from deploying it the way we have here to achieve a pragmatic solution.

Evidence relating to the proposed new MCZ (Queenie Corner) has been submitted to JNCC (Joint Nature Conservation Committee) and Defra, and the final decision will be announced shortly. The Northern Irish industry has made a huge contribution to the decision-making process and demonstrated that the data fishermen have collected through VMS is valuable in defending the case of fishing. They have showed that, by working together with scientists, government and NGOs, it is possible to ensure that the interests of industry are fully represented and lead to decisions that are just and fair.

Quay Figures: Scallops

UK scallop landings grew from 2008 to 2012, when they peaked at nearly 50,000 tonnes before declining in the three years that followed. By 2015, scallop landings had fallen by nearly 50%, and vessels targeting scallops were less profitable. This situation prompted discussions between industry and government concerning the management of scallop fishing activity. In this article, we explore Seafish Economic data relating to the UK scallop sector.

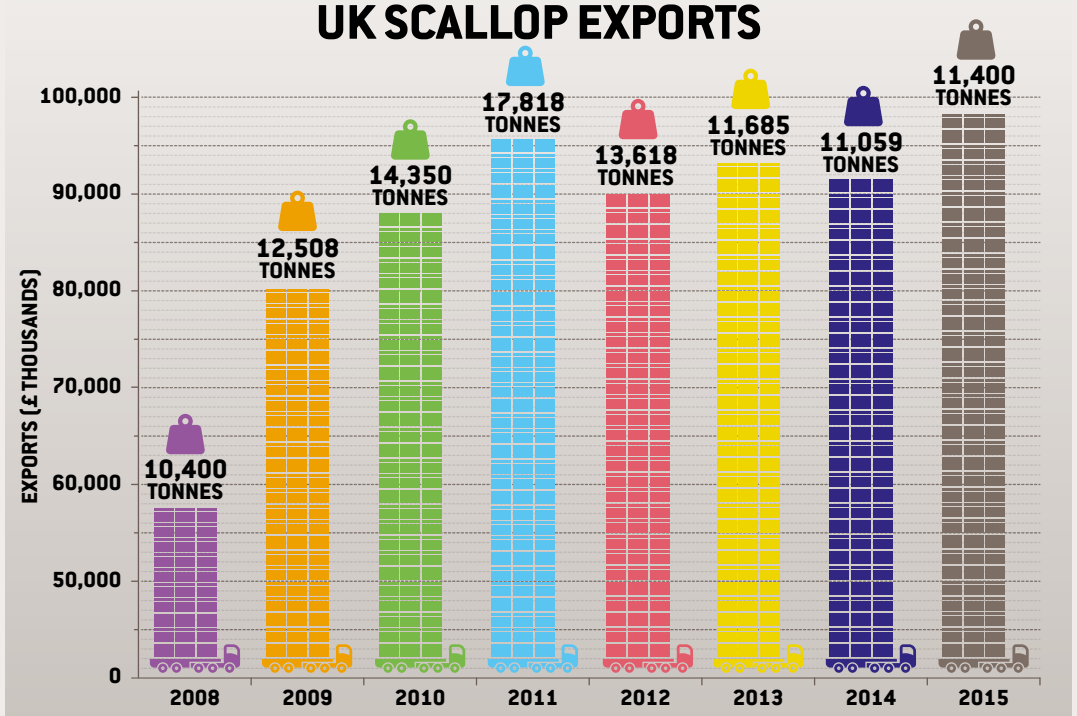
2015 AVERAGE PRICE OF TOP UK LANDED SPECIES



SOURCE: UK SEA FISHERIES ANNUAL STATISTICS, MMO, 2016.

The king scallop is an important species for the UK seafood industry. Scallop grounds are widespread in UK waters, with important areas in the Irish Sea, the English Channel and the North Sea. Since 2008, the king scallop has been amongst the five most valuable species for the UK fishing fleet, with over £57 million landed in 2015. King scallops have a high price compared to other species at an average of £1,700 per tonne between 2008 and 2013, which increased to nearly £2,000 per tonne in 2015. The UK has strong export markets for processed scallops, mainly in France, Italy and Spain, worth approximately £100 million in 2015. Scallops are also important for British seafood processing companies. Recent Seafish research (not yet published) shows that currently around 150 fish processing factories in the UK handle shellfish, and scallops make up a large proportion of that shellfish material.

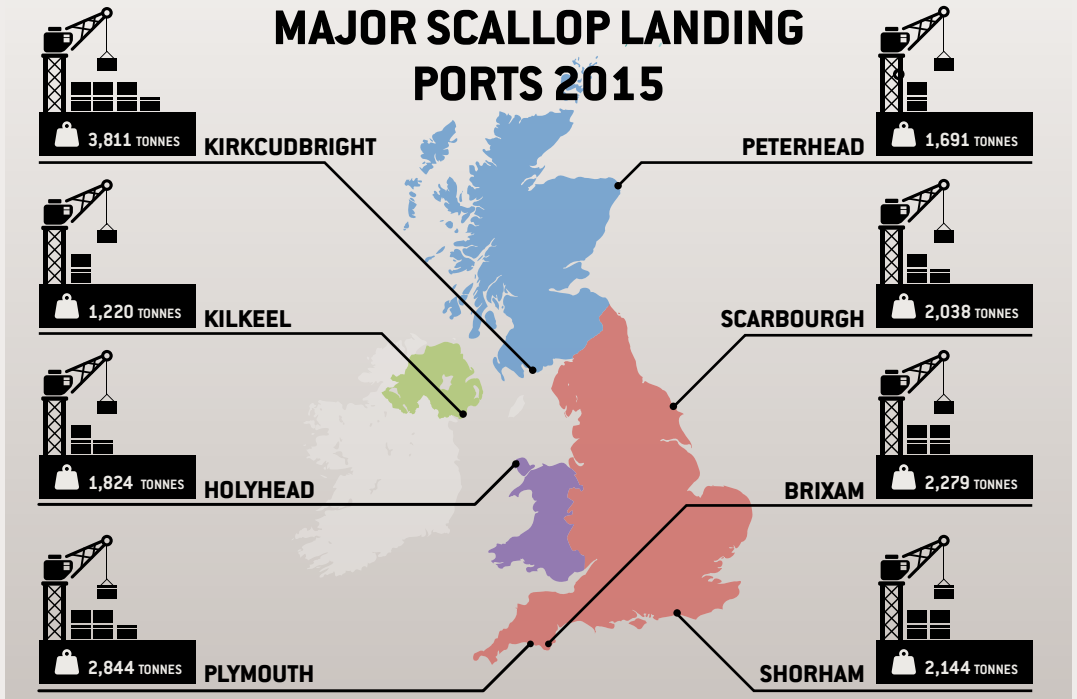
UK SCALLOP EXPORTS



SOURCE: HMRC, 2016.

FIGURES NOT ADJUSTED FOR INFLATION

MAJOR SCALLOP LANDING PORTS 2015



SOURCE: UK SEA FISHERIES ANNUAL STATISTICS, MMO, 2016.

UK SCALLOP SECTOR 2008 - 2015

NUMBER OF VESSELS

2008	63
2009	75
2010	83
2011	83
2012	90
2013	99
2014	100
2015	94

Total UK annual fishing effort on catching scallops has increased over the last ten years. The number of vessels falling into the Seafish over 15m UK scallop dredge segment increased from 63 in 2008 to 94 in 2015, and their combined annual fishing effort increased from just under 12,000 days at sea to over 16,000 in the same period. The under 15m UK scallop dredge segment has also seen substantial increases in total annual effort over this period.

LANDINGS (TONNES)

2008	2009	2010	2011
19,578	26,232	34,399	45,612

LANDINGS (TONNES)

2012	2013	2014	2015
49,073	36,496	27,789	28,373

Annual landings by UK over 15m scallop dredge vessels increased for several years followed by a decline. There was a sharp increase in annual landings (of all species) by over 15m UK scallop dredge vessels from 2008, more than doubling to nearly 50,000 tonnes in 2012, followed by a decline each year since to just over 28,000 tonnes in 2015.

FISHING INCOME (£ MILLION)

2008	2009	2010	2011	2012	2013	2014	2015
33.6	40	49.4	48.3	49.1	45.4	40.8	41.4

Annual fishing income for over 15m UK scallop dredge vessels has declined in recent years. Total segment fishing income (for all species) of these vessels fell from £47 million (not adjusted for inflation) in 2012 to £41 million in 2015. The fall in annual fish sales by the vessels was less severe than the fall in quantity of landings partly because of rising scallop prices. Average annual fishing income per vessel in this fleet segment peaked in 2010 at £596,000(adjusted for inflation), falling to £441,000 in 2015.

Annual average profits of the larger scallop vessels have fallen in recent years. Seafish economic performance estimates show that the average operating profit of over 15m UK scallop dredge vessels increased from £110,000 per vessel in 2008 to £159,000 per vessel in 2010 (values adjusted for inflation). However, operating profit then declined to an average of £93,000 per vessel in 2015.

AVERAGE OPERATING PROFIT (PER VESSEL)

2008	2009	2010	2011	2012	2013	2014	2015
£109,600	£100,300	£158,700	£140,000	£120,800	£83,100	£66,300	£92,600

SOURCE: FLEET ECONOMIC PERFORMANCE DATASET 2005-2015, SEAFISH, 2016. & UK SEA FISHERIES ANNUAL STATISTICS, MMO, 2016.

FIGURES ADJUSTED FOR INFLATION

UK over 15m scallop vessels have become less efficient on average over the last few years. The Seafish fleet economic data set shows that annual average landings per day at sea (all species) of the over 15m scallop dredge segment grew to a peak in 2012 at 3.18 tonnes per day, then declined to 1.64 tonnes per day in 2014 and 1.74 tonnes per day in 2015.

Seafish presented these figures from the Seafish fleet economic analysis to the industry and government members of the Scallop Industry Consultation Group (SICG), who then asked for more detail relating to scalloping activities of over 15m vessels in ICES Area 7 (Western Waters). In particular, people wondered if the effort limits imposed as part of the Western Waters Management Regime had caused a decline in profits from scalloping in Area 7.

Further investigation into Area 7 scalloping by over 15m vessels

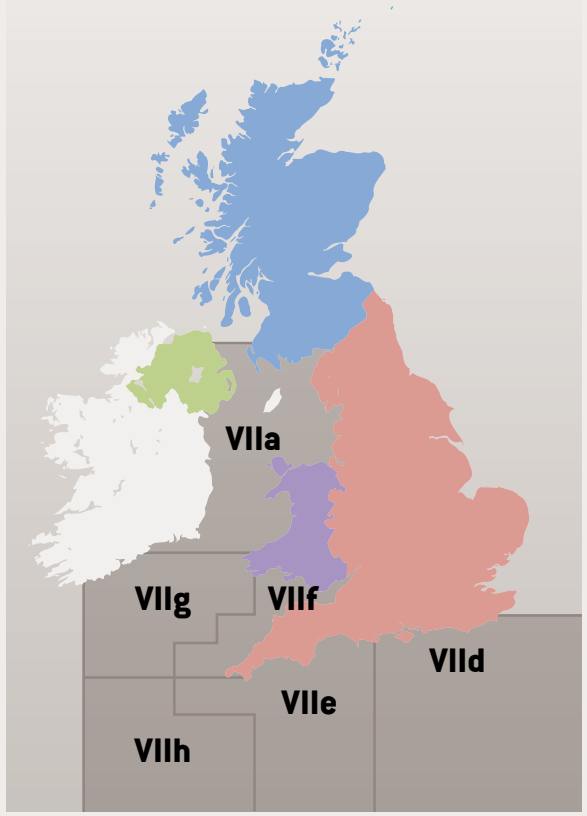
Total effort in Area 7 scalloping by over 15m vessels increased in recent years. In line with the trends experienced by the UK scallop sector described above, Seafish analysis found that increasing numbers of vessels were dredging for king scallops in Area 7 from 2008 to 2015, and most of these additional vessels were over 10m in length.

For over 15m vessels, Area 7 scallop landings and catching efficiency have declined since 2012. In line with UK trends, scallop landings peaked in 2012, with over 23,000 tonnes of Area 7 king scallops landed, then declined to approximately 15,000 tonnes in 2015. The reduction in landings over this period led to a decline in average fishing income per boat. Analysis of government data revealed that, for over 15m vessels in Area 7, average landings per day at sea, per vessel declined from over 2.0 tonnes of scallops per day at sea in 2012 to just over 1.3 tonnes of scallops per day at sea in 2015.

Profits also fell since 2012. Despite lower fuel prices, average operating profit per vessel fell from £57,000 in 2012 to £37,000 in 2014. In 2015, the higher prices of scallops and reduction in average fuel costs helped operating profits to recover partially, to an estimated average of £49,000 per vessel.

Analysis revealed that the decline in profits resulted from reduced catching efficiency during the days that were spent in Area 7, and not from effort limits imposed as part of the management regime.

SCALLOPING IN AREA 7



Better management of scallop fishing

Scallop fishing in the UK is attracting interest and efforts to improve management. Universities, regulators and industry groups are investigating scallop fishing in different areas of the UK and trying to ensure the long term sustainability and profitability of scallop fishing.

In recent years, there have been proposals and consultations on new management measures in Scotland, Wales, England and the Isle of Man. The specific details of these measures vary from one to another, but general points include restricting the number of vessels licensed to dredge for scallops in an area, introducing technical restrictions on the gear used, controlling effort, introducing quotas, seasonal and spatial closures and close monitoring of dredging activity in the areas concerned.

Stock assessments are also an important tool for good management. While scallop stock assessments would ideally be a fundamental part of management plans to ensure the fishery remains sustainable, only two are conducted on a regular basis in the UK and neither is used to inform management decisions. Therefore, industry, government and members of the SICG are working together to prepare a new project proposal to assess scallop stocks in English waters.

Collaborating to Develop a Management Strategy

Fishermen can provide a unique insight into the fisheries in which they operate. Working together with scientists to gather evidence, fishermen can help inform management plans that achieve a healthy and profitable industry for present and future generations. In 2009, the Welsh Scallop Industry and fisheries scientists began working with the Welsh Government and Natural Resources Wales (NRW). The aim was to develop a new, more effective approach to manage scallop fisheries in Cardigan Bay. The proposal was presented to the Welsh Government for consultation in Spring 2016.

King scallops are a valuable species for the Welsh fishing industry. The MMO estimate that 2015 landings of king scallops at Welsh ports were worth £1.8 million. Dr. Holly Whiteley, Seafish regional manager for Wales, explains that there is more to Welsh scallops than their economic value, "The seafood industry is very important for coastal communities in Wales. Most of our seafood businesses are small-scale, but they are important in terms of local employment in rural, coastal areas". Jim Evans, chair of the Welsh Fishermen's Association - Cymdeithas Pysgotwyr Cymru (WFA-CPC), agrees, "The fishing fleet is very important to Wales because it links into tourism, local trade and services. Fishing is a key component of Welsh maritime heritage. If there are no opportunities for youngsters to remain in the area, these coastal communities won't thrive. When you consider the social and economic contribution to the coastal economy the importance of fishing is often overlooked".

Jim Evans

Mike Kaiser

One of the most abundant Welsh scallop grounds is in Cardigan Bay, West Wales. This area was designated a Special Area of Conservation (SAC) in the early 2000s for conservation features, including rocky reefs, sandbanks and bottlenose dolphins. There was also small-scale scallop fishing in the Bay, but this changed in 2009. Professor Mike Kaiser of the School of Ocean Sciences at Bangor University explains what happened, "Around 2008 there was a large settlement of scallops which attracted a lot of fishing vessels to the area. This caused concerns among environmental groups that the increase in fishing activity could damage the features of the SAC, and they complained to the European Commission. Faced with a possible infraction procedure, the Welsh Government closed the majority of the SAC to scallop fishing". A small part of the SAC area known as the 'Kaiser box', has remained a seasonal scallop fishery to this day, open from the 1st of November to the 31st of April each year, subject to pre-season survey and assessment.

"We discussed the closures, recognising that there were issues that could be resolved through dialogue"

Mark Roberts

Members of the fishing community were deeply affected when scallop fishing was restricted in Cardigan Bay. Mark Roberts, owner of the MFV Harmoni, tells us that the consequences went further than losing their traditional scallop grounds, “We had to travel farther away from home, outside of the Welsh 12 nautical mile limit. Because our usual winter fishing grounds were no longer available, we had to fish queen scallops in the winter, when previously queen scallops were our summer fishery. Winter fishing meant the queenie grounds were not being properly rested and there was more pressure on them”.

After the closure of parts of Cardigan Bay, members of the WFA-CPC, together with scientists, Welsh Government and NRW, agreed to consider a new approach to managing the fishery. “We discussed the closures, recognising that there were issues that could be resolved through dialogue”, says Jim Evans. “Our board immediately offered to facilitate discussions between the scallop fishermen and fisheries managers. That was pretty much where the journey started”.

A ‘Scallop Strategy Group’ consisting of Welsh Government, NRW, scientists and industry representatives was formed to consider whether it would be viable to develop a new, evidence-based management plan for Cardigan Bay. When this process started, the fishermen in the group engaged in the collaboration knowing that any scientific evidence they helped to collect would inform fishing management decisions, and the evidence might show that fishing for scallops in Cardigan Bay would not be advisable.

Collecting evidence to support a new approach to management required extensive fieldwork, including stock assessments and seabed mapping, led by Bangor University and partly financed by the European Fisheries Fund. A big part of this fieldwork was a carefully designed fishing intensity experiment that helped to understand the impacts of scallop fishing and how long it took for seabed communities to recover. This study was the largest of its kind to be undertaken anywhere in the world. Professor Kaiser explains, “This research has enabled us to identify the threshold of scallop fishing disturbance at which environmental impacts become apparent. The findings told us that the seabed at this location in Cardigan Bay could withstand disturbance up to a fishing intensity of being fished three times per year”.

Four local fishing boats, along with one from England, took part in the fishing intensity experiment. The fishermen involved took a risk, since costs incurred by the vessels were only to be covered by the money earned from the sales of the scallops fished during the experiment. However, Mark Roberts believes it was worth the risk that the experiment could have resulted in losses for the vessels involved, “all the fishermen that were involved in it saw the end goal, a sustainable fishery”.

Another part of the work, also led by Bangor University, involved trialling new vessel monitoring technology to enable accurate monitoring of fishing effort. As Mark described, “we did a lot of work with VMS tracking and “gear in/gear out” technology, in which there are sensors that tell you if the fishing gear is on the seabed. This is important for effort control”. This technology is also useful for demonstrating fishermen’s compliance with restrictions on where fishing is allowed.

“To achieve a sustainable and profitable fishery, you need fishermen in the room with scientists and regulators”

Taking account of the findings of all the research that had been done, the Scallop Strategy Group proposed a new, evidence-based approach to manage the scallop fishery in Cardigan Bay. As part of this approach, several measures have been suggested: spatial zoning to avoid fishing on sensitive areas of the SAC; the use of high-resolution VMS with “gear in/gear out” technology to monitor fishing activity; an annual catch limit on scallops from the area; and importantly, a precautionary limit on the allowable amount of seabed disturbance permitted by fishing.

The participation of fishermen was crucial to the successful development of an approach that is based on the best available evidence and balances both environmental and industry goals. As Holly explains, “Having fishermen involved from the beginning is essential, because they understand the fishery and the environment in which they operate. To achieve a

sustainable and profitable fishery, you need fishermen in the room with scientists and regulators to know where the balance point is". This is a view shared by Jim, "Fishermen are a key part of developing any fisheries management measures. Fishermen need to support the measures meaning measures must be appropriate and proportion. I think it was hugely important for the WFA-CPC and our members to be involved in this piece of work". In addition, the development of this new approach to participatory management is becoming the way forward in fisheries management, rather than regulators making rules that do not necessarily work for everyone. Holly feels that the work in Wales could be replicated elsewhere, "The work of the Scallop Strategy Group is a good example to other fisheries. There is more and more consumer focus on environmental credentials and here in Wales we are setting an example of how we can achieve that evidence-based balance between environmental, social and economic sustainability".

In October 2016, the Welsh Government announced their approval of the proposed new approach in Cardigan Bay. "In terms of paving the way in novel science on fishing impacts and industry-science partnerships, I am not aware of anything done this scale in the UK", says Holly, "It is a great example of what can be achieved when you have scientists, industry and regulators working together". The proposed new approach is not the end of the story. The Scallop Group is looking ahead to other opportunities that could benefit the fishery and the communities that depend on it. The WFA-CPC recently commissioned an independent MSC pre-assessment of the scallop fishery in Cardigan Bay based on the proposed new measures. Jim concludes, "MSC accreditation of the fishery would, importantly, endorse sustainability; a by-product of which is the creation of opportunities that add value and employment for future generations in Wales".