European Commission, DG MARE

Studies for carrying out the Common Fisheries Policy:
Lot 3 Socio-economic dimensions in EU fisheries

Shetland: Cullivoe case study report

Lerwick harbour, image supplied by Lerwick Port Authority

October 2013
4.1 Fisheries as an economic activity ................................................................. 20
4.1.1 Diversification .............................................................................................. 20
4.2 Adaptation ......................................................................................................... 21
4.2.1 Analysis of adaptive response ....................................................................... 21
5 Summary and conclusions ................................................................................. 23
List of tables

Table 1  Fleet segments in Yell fleet ................................................................. 7
Table 2  Summary of fishing fleets in Yell .......................................................... 17
List of figures

Figure 1  Location of Cullivoe in Shetland.................................................................3
Figure 2  Changes in population in the Yell population over time (2001-11).........................4
Figure 3  Immigration and emigration in Shetland over time (2002-11).............................4
Figure 4  Age, gender and place of origin for crew types in Cullivoe .................................8
Figure 5  Whitefish (demersal) landings into Cullivoe from 2008-11..............................9
Figure 6  Whitefish (demersal) landings into Cullivoe from 2008-11................................10
Figure 7  Whitefish (demersal) landed price into Shetland from 2003-11 .........................10
Figure 8  Shellfish landed volume Shetland from 2008-11...........................................13
Figure 9  Shellfish landed value Shetland from 2008-11...............................................14
Figure 10 Shellfish landed price Shetland from 2003-2011 ...........................................15
Figure 11 Number of shellfish vessels in Cullivoe from 2003-11.......................................15
Figure 12 Proportion of the population employed in fish catching and the entire fisheries sector in Shetland from 1997-2011 .................................................................21
Abbreviations and acronyms

DCF: data collection framework
FTE: full-time equivalent
GBP: British pound (EUR 1 is equal to GBP 0.84 in April 2013)
MSC: Marine Stewardship Council
MSY: maximum sustainable yield
NAFC: North Atlantic Fisheries College
SAC: special area of conservation
SFA: Shetland Fishermen’s Association
SFF: Scottish Fishermen’s Federation
SFCT: Sea Fisheries Training Centre Trust
SIC: Shetland Islands Council
SFPO: Shetland Fish Producers’ Organisation
SPFA: Scottish Pelagic Fishermen’s Association
SSMO: Shetland Shellfish Management Organisation
SSQC: Shetland Seafood Quality Control
1. Methods

1.1 Secondary data sources
A number of data sources have been used to prepare this report, including:

- data on fish landings from Marine Scotland Science Fisheries statistics;
- population statistics, taken from Scottish government neighbourhood statistics and Shetland Health Board;
- employment statistics, provided by the Shetland Islands Council (SIC) Economic Development Unit.

Some data are only disaggregated as far as Shetland as they are collected only at the county (Shetland) level.

1.2 Interviews with focus groups
Stakeholder group A comprised community council representatives and the Yell councillor.

Two stakeholder sessions were held for fishers. All fishers in the community were invited, by letter/email, posters and radio advertisement. Due to the high level of shareholder ownership within the fleet, it was not possible to distinguish owners and non-owner crew prior to the session. Two fishers attended: the skipper from the whitefish vessel and a shellfish skipper. As there is only one whitefish fisher in Yell (all crew live on the Shetland mainland), this represented 100% of all whitefish fishers. There are five active shellfish fishers in Yell; so for this fleet, 20% of fishers were surveyed.

1.3 Questionnaires
All vessels are shareholder-owned by a number of crew (varying from 50% to 100% of the crew), so it was difficult to distinguish between stakeholder groups B and C. There is a low level of crew mobility within the fleet, so non-shareholding crew also have a sense of ownership of the vessels. All stakeholder representatives completed crew questionnaires. Skippers also completed the owner questionnaire.

2. Settings

2.1 Description of the Cullivoe case study site
Cullivoe is on the island of Yell, one of the 100+ islands that make up the Shetland Islands archipelago. It is one of only 16 that are inhabited. Approximately 1 km to the northeast of the Shetland mainland (Toft), Yell measures 31 km by 12 km and has a land area of 212 km². Yell is connected to the Shetland mainland by a Ro-Ro (vehicle-carrying) ferry. The journey takes 20 minutes and the ferry runs 30 times a day. The ferry terminal is 25 km from Lerwick, the main town of Shetland.
The main communities in Yell are mid-Yell, Burravoe and Cullivoe. The main harbour facilities are in Cullivoe and are operated by the SIC Ports and Harbours Authority. Cullivoe harbour accommodates small vessels (recreation and small shellfish boats) and has berthing for larger commercial vessels.

Shellfish and whitefish are landed to Cullivoe. Yell fishers also land shellfish to Burravoe, mid-Yell and directly to Toft (mainland Shetland). There are no pelagic fleet landings to Cullivoe.

The island of Yell is in the North Sea with the divide between the North Atlantic and North Sea, crossing through Shetland north-south. The eastern side of Shetland includes an extensive offshore area characterised by flat sandy seabed with occasional pockmarks (seabed craters), and small inshore firths, often with sandbanks, mud flats and sandy beaches. In contrast, the western side of Shetland has a rockier coastline exposed to the full force of the Atlantic.

Fishing has traditionally been the main source of employment in Shetland. While it remains one of Shetland’s largest industries, reduction in fleet size and increases in fleet efficiency have resulted in a decrease in the number of people directly employed in the industry. Decommissioning of the whitefish fleet has reduced capacity, with cessation schemes removing vessels from the Scottish fleet in 1994-97, 2001-2 and 2003-4. Within Yell, a number of whitefish boats have been decommissioned, reducing the number of fishers. Other traditional activities such as crofting are not significant employers on Yell due to the low fertility of the land.

Yell is now home to only one whitefish vessel, or 4% of the Shetland whitefish fleet. However, it is used by a number of Shetland and non-Shetland vessels to make mid-week landings to save time and money steaming to Lerwick and to ensure product freshness. The Shetland fleet landed 10,222 tonnes of fish across Shetland, valued at GBP 18.7 million (EUR 22.25 million), 10% of the total Scottish catch.

Shellfish landings are spread across Shetland. Shellfish landings in 2010 were valued at GBP 5.8 million (EUR 6.9 million), slightly less than 1% of all Scottish vessel landings. Landings into Cullivoe represented less than 0.1% by weight and value of all Shetland landings.
2.2 Demographics
The population estimate for Yell is 1,030 people, 5% of the Shetland population. The Yell population has been stable in recent years, apart from an unexplained peak in 2010, see Figure 2.

Figure 1 Location of Cullivoe in Shetland
A breakdown of age structure for the Yell population is not available but is likely to be similar to that of the whole of Shetland (see national level report). Shetland has a very small proportion of residents originating outside the UK. This is also true of Yell, where the proportion of residents originating outside the EU is estimated at less than 1% of the total population. Across Shetland 98.1% of the community originated in the UK. This is higher than the Scottish average of 91%. A breakdown of residents whose origins are non-UK is not available at a Shetland level.

The number of individuals entering and leaving Yell is not available but is likely to be similar to that of the whole of Shetland, see Figure 3. The number of people entering Shetland has been relatively stable from 2002-11, varying between 700 and 800 individuals a year or approximately 3% of the population. In contrast, the number of people leaving Shetland has shown a slow decline, resulting in net immigration, contributing to population growth. There has also been a similar trend in immigration/emigration nationally.
2.3 Employment opportunities/Sector overview

In 2007 estimates indicated there were 235 full-time equivalent (FTE) jobs in Yell. Employment opportunities in Yell include fish processing, aquaculture, tourism, fishing, and public sector jobs within education, social care and recreation.

Lerwick and Sullom Voe are within commuting distance of Yell. Sullom Voe is within 10 minutes of the mainland (Toft) ferry terminal, Lerwick is within 40 minutes of the Toft ferry terminal. However, given the length of Yell length and the ferry crossing time; travel to Lerwick or Sullom Voe takes over an hour. The cost of travel to and from Yell can be a barrier to people working outside Yell.

The fishing industry provides direct employment within Yell but also to related sectors such as marine engineering, processing and transport. It also helps to support the local shop. While fishing is still an important industry to Yell (and Shetland), decommissioning has reduced the number of whitefish vessels and consequently the number of people employed within fishing. This has also affected dependent businesses. The Shetland economy has become increasingly dependent upon public sector employment, however, the SIC is currently making a number of expenditure cuts and this is expected to result in a reduction in the number of public authority jobs available.

In 2009 the average yearly wage in Yell was lower than the Shetland average at GBP 27,950 (EUR 32,422) compared to the Shetland average of GBP 30,180 (EUR 35,008).

Unemployment statistics are not available beyond the Shetland level. Unemployment in Shetland is below the Scottish and national averages (7.6 % and 7.8 % respectively), varying between 1.7 % and 2.2 % since 2005.

Across Shetland, the number of FTE employees in fish catching and fish processing has decreased from 1997-2011, falling by 25 % and 27 % respectively, however, since 2003 the decline in these sectors has been less rapid, falling by 10 % and 3 % respectively. This trend is likely to be similar in Yell. Decommissioning reduced the number of whitefish boats by six between 2002 and 2004, representing the loss of about 30 jobs. With 235 FTE jobs in Yell, it is estimated that fish catching would have represented 15% of all FTE employment prior to decommissioning, higher than the current Shetland and Scottish averages. It is estimated that fish catching now represents approximately 2 % of all Yell employment, similar to the Shetland average but higher than the Scottish average of 0.2 %. Fisheries (fish catching, aquaculture and fish processing) directly employ 8.6 % of the workforce across Shetland. For Yell it is estimated that fisheries provide more than 10 % of all FTE employment, with aquaculture and fish-processing being important employers.

Aquaculture is an important employer in Cullivoe and the surrounding area, providing permanent year-round employment. There are nine finfish sites on Yell operated by two companies, one an independent company and one international company, both producing farmed salmon. There are ten mussel farms
on Yell. There is a salmon processing factory and a mussel factory in mid-Yell. Aquaculture processing and wild fish processing does not take place in the same factories.

Engineering and transportation will service both the wild fisheries and aquaculture companies.

Tourism is not a large employer within Yell, but there are a number of bed and breakfast businesses in Yell and some self-catering accommodation. In addition, recreational sea-fishing has become popular around Yell and Unst, with one Shetland mainland company using Cullivoe as a basis for recreational fishing trips. Across Shetland, accommodation and catering has shown large growth from 1997-2011 and full-time employment in this sector has increased by 72%.

Within Yell, fish farming employs staff in the mussel-farming and fish-farming sectors. There is also a farmed salmon fish-processing factory in Yell. Yell retains one of only three locally owned fish-farm companies in Shetland. Across Shetland, the aquaculture industry has grown from 1997-2011 and full-time employment in this sector has increased by 59%.

2.4 Fisheries
Fishing remains a well-regarded industry within Yell. The Yell fishing fleet has remained in Shetland ownership and there are no non-UK crew.

While there are positive trends in terms of the value of landings, the fishing sector faces significant challenges. Yell community representatives and fisheries owners expressed concern that rising fuel prices, quota costs, quota restrictions and reduction in days at sea have reduced the profitability of the sector, particularly the whitefish fleet. This makes it more difficult to attract investment to upgrade vessels and makes the industry less attractive to young people. Decommissioning has significantly reduced the size of fleet and the cost and difficulty of obtaining licences make it difficult for new boats to enter the fleet.

Infrastructure
Cullivoe harbour is managed by the SIC Ports and Harbours Authority. The harbour offers facilities such as fuel, water and berthing. There is a transport and engineering firm based in Yell, which transports fish, provides ice and fuel and can undertake marine engineering work. Supplies can also be purchased from the nearby shop. The harbour was upgraded in 2001 to increase berthing capacity.

The whitefish and shellfish fleets land at Cullivoe, but all pelagic fleet landings are made at Lerwick. A local firm transports all landed whitefish at Lerwick for sale through Shetland Seafood Auctions or for direct sale to the mainland. Shellfish are transported to Lerwick or to the crab factory in mid-Yell. Specialist marine engineering and dry dock facilities are only available on the Shetland mainland.

Seasonality
Employment in Shetland is dominated by full-time work, with only the tourism sector showing any seasonality. Business tourism comprises a significant proportion of the tourism industry, and does not have a seasonal pattern.
Whitefish fishing is non-seasonal and occurs throughout the year. Due to the reduction in days at sea, some boats may choose to make fishing trips based on weather and market prices. Shellfish fishing takes place all year round, but creel fishing levels can be higher in the summer when the weather is better, reducing the risk of losing gear.

**Fleet**

In Cullivoe the fleet comprises two main fisheries: inshore shellfish (creel and scallop dredge) and whitefish (demersal) fishing. There is no pelagic fishing in Yell. The Yell fleet comprises shellfish (92 %), comprising creel (69 %) and scallop dredge (23 %), and whitefish trawl (8 %). Nationally, the Scottish fleet comprises shellfish (88 %), whitefish (11 %) and pelagic (1 %).

The Yell shellfish fleet represents 8 % of the Shetland shellfish fleet, and 0.8 % of the Scottish fleet. In Yell the shellfish fleet comprises vessels under 10 m. Restrictions on the number of scallop dredges mean that it is not economical to operate large shellfish trawling boats. This has meant that the Shetland shellfish fleet is dominated by smaller boats. The Yell whitefish boat represents 4 % of the Shetland whitefish fleet and 7 % of the 15-24 m fleet segment.

<table>
<thead>
<tr>
<th>Segment (length class)</th>
<th>Number of vessels in Yell</th>
<th>Number of vessels in Shetland</th>
<th>Main gears used</th>
<th>Number of crew (average)</th>
<th>Main species fished (list at least 3 and up to 5 for all fleet types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>9</td>
<td>109 (8%)</td>
<td>Creel</td>
<td>1</td>
<td>Lobster, brown crab, green crab, velvet crab</td>
</tr>
<tr>
<td>0-10</td>
<td>3</td>
<td>20 (3%)</td>
<td>Scallop dredge</td>
<td>1</td>
<td>King and queen scallop</td>
</tr>
<tr>
<td>15-24</td>
<td>1</td>
<td>15 (7%)</td>
<td>Trawl - TR1</td>
<td>4</td>
<td>Cod, whiting, haddock, anglerfish</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>172 (7.6%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Scottish government.

### 2.4.1 Whitefish fleet (demersal)

**Fleet segment as a whole**

Historically, the Yell whitefish fleet has been locally owned by a number of shareholders who also work on the one whitefish boat left in Yell. Working patterns have changed due to the reduction in days at sea, which now means that boats can only fish 120 days per year. Working patterns will differ throughout the year but are normally one week on and one week off.

Wind direction and strength influence choice of fishing areas. In response to strong winds fishers traditionally fished closer inshore and on the leeward side of Shetland. However, reductions in the number of permitted days at sea and cod-closed areas have restricted the choice of fishing areas. This has reduced the fleet's ability to exploit available grounds fully and has meant vessels are increasingly
having to exploit the same areas. The increasing cost of fuel and the reduction in days at sea mean that fishers are targeting grounds further inshore, looking for shoaling fish such as cod, haddock and saithe, rather than high-value but more dispersed species such as monkfish.

The Yell whitefish boat has a crew of four: skipper, engineer and deckhands. The skipper lives in Yell and the other crew members live elsewhere within Shetland. Two of the crew are shareholders and there are no managerial or administrative roles associated with the vessels. Crew demographics are shown in Error! Reference source not found.4.

![Crew Demographics](image)

**Figure 4** Age, gender and place of origin for crew types in Cullivoe

There is no evidence of spouse/partner or other family involvement in the whitefish industry, either formally or informally. There might have been previous involvement of spouses or partners in ancillary industries such as fish processing, but they were not directly employed by the vessels.

**Economics**

The Cullivoe-based whitefish boat lands in Cullivoe, Lerwick and Scalloway. Both Shetland and non-Shetland boats land in Cullivoe. The Scottish and Shetland whitefish fleets have shown record landed values. Operating costs, including quota costs and fuel, have become more significant. Fuel prices have risen sharply and now represent up to 50% of the boat costs. The whitefish fleet is particularly vulnerable to the cost of fuel because of the power required to tow gear over the seabed. Modern boats are more fuel efficient due to improved hull, engine and gearbox design. Investment in new boats or improvements to existing boats is a problem as it is difficult to source loans and funding. There is concern that this will lead to an aging fleet.

**Landings**

In 2011 total whitefish landings into Cullivoe were 1,511 tonnes, 11% of total Shetland landings. Cullivoe is the 12th-largest landings port in the UK. Cullivoe demersal landings represent 1.2% of all whitefish landed in the UK by UK vessels and 1.7% of landings made by Scottish vessels in the UK.
In Cullivoe landed volumes peaked in 2009 at 1,811 tonnes. While landings declined in 2010, there was an increase in 2011. The landed volume of cod, haddock and saithe has declined since 2009, although landings of these species were higher in 2011 than in 2010. The landed volume of anglerfish has declined since 2008, however, landings in 2011 increased relative to 2010. Landed volumes are shown in Error! Reference source not found.5.

Figure 5  Whitefish (demersal) landings into Cullivoe from 2008-11

Demersal landed value in Cullivoe in 2011 was GBP 2.86 million (EUR 3.32 million). Total landed value increased in 2011, only slightly lower than the peak in total landed value in 2009. Anglerfish has the highest landed value, peaking in 2011. Cod, saithe and ling have shown increasing landed values. Landed values are shown in Error! Reference source not found.6.
Figure 6  Whitefish (demersal) landings into Cullivoe from 2008-11

Price at first sale has shown a steady increase from 2002-11 for all major species, see Error! Reference source not found.7. Megrims and haddock have shown the greatest increase in landed price.

Figure 7  Whitefish (demersal) landed price into Shetland from 2003-11
**Fleet**
Decommissioning has significantly reduced the Yell fishing fleet and only one whitefish boat remains. Prior to decommissioning there were an additional six boats based in Yell. There has been no recent change in fleet power or tonnage as there have been no upgrades of vessels.

**Ownership and remuneration**
Shetland whitefish boats are owned by a number of shareholding crew. The skipper is normally one of the shareholders, but the proportion of non-shareholding to shareholder varies from boat to boat. The Cullivoe-based fishing boat is owned by two shareholding crew. Grants and interest free loans have previously been available to help younger crew members become shareholders. These loans are no longer available, making it more difficult for younger crew members to become shareholders. All crew members on the Cullivoe whitefish boat are paid on a share basis which means that income is dependent on the success of the fishing trip and is therefore variable. This means that any change in profitability of the sector directly affects the income of the crew. Increased costs (such as fuel, quota) and reduction in earning potential (through reduction in days at sea) all reduce the potential income of the fleet. Fishers reported that these challenges were reducing the profitability of the sector. While no foreign crew have been taken on in Cullivoe, in other areas the fleet has tried to adapt to these challenges by employing cheaper non-EU labour.

All reported remuneration included any additional income from being a shareholder in the boat. Note within the whitefish fleet the phrase shareholder does not always infer the boat is a limited company, rather the fishermen jointly own the boat.

**Market**
The price for Shetland demersal species has been increasing in recent years. It is estimated that 90% of fish landed into Shetland is sold through Shetland Seafood Auctions, which was established in 2003. By establishing a local auction, which is independently inspected by Shetland Seafood Quality Control (SSQC) Ltd, Shetland has been able to develop a reputation for high-quality seafood. This has increased the price that can be gained and the fishing vessels have increased landing frequency (normally twice per trip) to ensure landed fish is as fresh as possible. Cullivoe has become increasingly important for boats wishing to make mid-week landings as vessels fishing north of Shetland can quickly land their catch without having to steam to Lerwick. This is also an important consideration due to the reduction in the number of permitted days at sea.

While Shetland Seafood Auctions and product quality has helped increase prices, the maximum price is also dependent upon supply. With the fleet now fishing closer inshore due to changes in quota and days at sea, vessels are targeting similar fish. This has the potential to reduce the diversity of fish landed and cause an oversupply of some species. In addition, fish price is vulnerable to landings elsewhere in Europe and high landings in other areas such as Ireland can reduce the price obtained in Shetland.

**Employees within segment**
All crew members have accident and sickness insurance, regardless of their role within the vessel which does not extend to their spouses or partners. As there is only one whitefish boat in Yell, revealing
wage details would be a breach of confidentiality. However, reported wages were similar to those elsewhere in Shetland: GBP 30,000-50,000 (EUR 36,600-61,000). This is higher than the average wage on Yell and in Shetland.

Crew entering the fishery have to undertake basic training, including sea survival and fire fighting. This is available at the North Atlantic Fisheries College (NAFC) Marine Centre. Further training is required to gain engineering and skipper positions. Crew are normally employed on reputation and/or recommendation and all crew are permanent. The skills and qualifications gained in the fishing fleet are transferable to the aquaculture industry, the merchant navy and the local ferry service. However, all respondents indicated that they did not wish to change profession.

**Representation**
Fishers reported that they felt the socio-economic importance of fishing was recognised locally. However, they felt that at both a Scottish level and EU level, there is little understanding of, or consideration given to, the impact of changing regulations on fishing-dependent communities. They were also concerned that the number of SIC councillors who have a fishing background has declined, which might reduce understanding of the fishing industry locally. The Yell councillor does have a fishing background and it was believed that this was an important addition to the SIC. Fishers outside Yell also highlighted the value of his fishing experience.

Concern was also raised that celebrity-led publicity campaigns have the potential to give misleading information about the fishing industry, and that these campaigns were being given greater weight than the views of the fishers.

**Spouse involvement**
The fishing vessels are crewed by men and there is no spouse involvement with the vessels.

**Summary**
The whitefish fleet in Yell has been significantly reduced by decommissioning, reducing the number of fishers employed in Yell. The whitefish fleet has adapted to external pressures by trying to improve quality of the fish they have landed to increase the price obtained for the fish. Landing at Cullivoe has become an important part of this strategy for a number of boats. The fleet has also made changes to fishing patterns which include increasing the frequency of landings, fishing closer to shore and increasingly targeting shoaling fish.

Fishers reported that they believe fish abundance is currently at the highest level in living memory, however, they felt that fisheries science was not recognising these changes in stock levels. The fleet faces challenges in financing the modernisation of the fleet, to ensure that vessels are economical and efficient to run and the economic uncertainty generated by quota and reductions in days at sea may discourage young people from joining the fleet.
2.4.2 Shellfish fleet

*Fleet segment as a whole*

Due to the small size of vessels in the shellfish fleet (less than 24 m), they are normally operated single-handedly by the vessel owners. Fishers require a local Shetland Shellfish Management Organisation (SSMO) licence to operate a shellfish boat.

There are nine licensed creel boats and three licensed scallop boats in Cullivoe. However, local fishers and community representatives advised that only four shellfish boats are currently actively fishing. There are a number of other boats fishing around Yell but these are not based in Yell. Shellfish fishing is more weather dependent due to the small boat size and the risk of losing static gear, however, fishing takes place throughout the year.

*Economics*

The boats surveyed operated with no crew, so the owner received all income generated through the boat surplus. One tonne of shellfish was landed into Cullivoe, representing 0.06% of the total Shetland landings. This low landed value is probably because many boats fish around Yell but land directly at Toft on the Shetland mainland to avoid paying the extra transportation fees of landing on Yell. The shellfish landed volume in Shetland in 2011 was 1,565 tonnes, accounting for 1% of landings by UK vessels into the UK and 3% of all Scottish landings into the UK.

In Cullivoe landed volumes peaked in 2009, but decreased to 2011. Scallops underwent the greatest decline, falling from 13.6 tonnes in 2009 to 0 tonnes in 2011.

![Figure 8 Shellfish landed volume Shetland from 2008-11](image-url)
The value of shellfish landed in Cullivoe in 2011 was GBP 1,263 (EUR 1,465) and in Shetland as a whole GBP 3.4 million (EUR 3.99 million). Shellfish landings into Cullivoe accounted for less than 0.1% of all Shetland landings. In Cullivoe landed values have decreased since 2009 in contrast to the trend in Shetland, where landings have increased since 2009. The largest change in landings has been in scallops, with no reported landings in 2011. This is likely to reflect the landings at nearby piers and ports, rather than there being no scallop fishing around Yell in 2011.

**Figure 9  Shellfish landed value Shetland from 2008-11**

Landed price is only available at a Shetland level. The price at first sale of velvet crabs and lobsters increased in 2011. The price at first sale of edible crabs has remained relatively constant. The price at first sale of scallops has been decreasing since 2006.
Figure 10 Shellfish landed price Shetland from 2003-2011

The number of licensed shellfish vessels has fallen since 2003. The cause is unclear, but the decrease may be due, in part, to the initial granting of licences by the SSMO to all part-time and full-time fishers, regardless of their fishing track record. As a small fee is levied to obtain an SSMO licence, inactive fishers may now have left the fleet.

Figure 11 Number of shellfish vessels in Cullivoe from 2003-11
As for all fleet segments, increasing fuel costs have reduced the profitability of the fleet. Fishers reported that the cost of entering the fleet (boat cost) and the difficulty of obtaining a local licence has restricted new entrants into the fleet.

The fleet has recently gained Marine Stewardship Council (MSC) certification for king and queen scallops, and brown and velvet crabs. The dredge fishery gained accreditation after the fleet agreed voluntary closed areas, developed in consultation with the fishers.

**Employees within segment**

None of the fishers interviewed in Cullivoe had accident or life insurance associated with their vessel, insurance cover was through other boats. A number of the fishers interviewed also worked in other fleet segments, and for them fishing for shellfish was a secondary employment activity. Nevertheless, it should be noted that there are full-time fishers within this fleet segment but they did not participate in this study.

All fishers interviewed had more qualifications than required to skipper their vessels and all were qualified to skipper or crew larger vessels.

The fleet is represented through the Shetlands Fishermen’s Association (SFA). As the fleet is not quota led, representation at an EU level is less relevant to the fleet. The fishers and community representative reported that they felt they had been poorly represented in recent UK media reports.

**Summary**

The fishing fleet comprises small vessels, which are predominantly part time. Shellfish fishing is managed by the SSMO. The recent MSC certification may increase the prices the fleet can command.

**2.5 Summary of settings**

While direct employment within the fishing fleet has declined in recent years, land-based ancillary industries remain important employers within Cullivoe and Yell. Entry into all fish segments has become more difficult with the cost of entry high and difficulties of obtaining licences and quota due to increased legislation. It has become increasingly difficult for young people to join the fishing sector.

Fishers report a high level of job satisfaction but report that legislation has made it difficult for the fisheries to operate effectively.
Table 2  Summary of fishing fleets in Yell

<table>
<thead>
<tr>
<th>Demersal fleet (whitefish)</th>
<th>Shellfish fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target species status</td>
<td>85% maximum sustainable yield (MSY)</td>
</tr>
<tr>
<td>Business type</td>
<td>Shareholding crew</td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
</tr>
<tr>
<td>Average annual income</td>
<td>GBP 30,000-50,000</td>
</tr>
<tr>
<td>Main education level</td>
<td>School education until 16. Fishing qualifications up to class 2</td>
</tr>
<tr>
<td>Highlights</td>
<td>85% of Scottish stocks considered to be at MSY. Many stocks increasing. Fishers reporting large numbers of fish</td>
</tr>
<tr>
<td></td>
<td>Shetland catch considered to be of a high quality. Shetland Seafood Auctions has helped to increase landed price</td>
</tr>
<tr>
<td>Key points</td>
<td>Management measures (days at sea / quota) creating difficulties for the fleet</td>
</tr>
<tr>
<td></td>
<td>Fuel costs and quota costs reducing profitability</td>
</tr>
<tr>
<td></td>
<td>Fleet has been significantly reduced by decommissioning</td>
</tr>
</tbody>
</table>

3. Linkages

3.1 Inter-sectoral linkages

Institutions
The Shetland Fishermen’s Association (SFA) represents all fleet segments within Shetland. The SFA organises meetings for each fleet segment to ensure they are all represented. The SFA, as a member of the Scottish Fishermen’s Federation (SFF), represents the interests of fishers nationally and internationally. Fishers reported that the SFA was representing their fleets.

Within Shetland the SSMO manages the inshore shellfish fishery. The SSMO has representatives from the SFA, SIC, Association of Community Councils and the fish-processing industry.

Fishers reported that they were not reliant upon state or voluntary aid and this was not rated as important to them. As fishers work all year round, they think there is no need for organisations to provide financial aid for difficult times or hardship. The SFA and Scottish Pelagic Fishermen’s Association (SPFA) do not provide assistance in times of hardship and the fishers reported that none was required. The Fishermen’s Mission is a charity that can provide support to fishers and their families in emergency, including loss of life and boat.
**Geographical**

Within Yell the fishing fleets have the potential to overlap spatially with other industries. For example, cables, pipelines, aquaculture installations and proposed renewable devices can have impacts on the inshore fishing fleet. For the whitefish fleet, renewables, cables and pipelines, and oil-related infrastructure (oil rigs, etc.) have the potential to compete for space.

Natural heritage designations might reduce fishing opportunity in the future, through management measures such as restrictions imposed on gear types. Fishers and community representatives expressed concern that a proposed special area of conservation (SAC) to the east of Yell will reduce fishing opportunity.

**Labour**

There are now no fishing crew on Yell, only skippers, so competition for labour between marine sectors is not applicable within Yell. The whitefish boat based on Yell will compete with other areas of Shetland for crew, although labour mobility is low between boats.

Fishers and community representatives reported that young people are now less likely to join the fishing industry. Starting income in the fishing industry is relatively low until qualified. In addition, trainees have to pay their own training costs and support themselves while in college. Within Shetland financial support is available to young fishers through the Hunter and Morrison Trust and the Shetland Fisheries Training Centre Trust (SFCT).

**Economic**

The Shetland fishing fleet uses more than 300 local and national suppliers. Within Yell there is a company that supports the fishing and aquaculture industries through the provision of fuel, ice, transport and engineering. There is a crab-processing factory in mid-Yell. The fishing fleet also supports the local shop. It is estimated that fishing supports 30 onshore jobs or 12 % of all full-time equivalent (FTE) employment in Yell. The crab-processing factory is solely dependent on fishing, with fishers across Shetland providing crabs to the factory.

The Yell fishing boats also directly support onshore jobs across Shetland in transportation, processing, sales, engineering and supply. Landings by non-Yell based boats also help support onshore jobs within Yell and the inter-island ferry. A survey of companies conducted as part of this study indicated that at least 225 onshore jobs in sectors such fish processing, transport and engineering are directly dependent on fishing across Shetland. Some of these business are solely dependent on fishing (such as fish-processing companies), while for others it represents a proportion of their income. Many of these businesses have already had to adapt to the reduction in the number of fishing vessels in Shetland and have increased reliance on other marine industries such as aquaculture and oil. While many of these companies would be able to continue to trade if the fishing industry were to close, it would be likely that staff whose jobs are directly dependent on fishing would be made redundant. In addition, the income to the fishers and onshore workers will indirectly help to support jobs across Shetland.
Fish (supplied by both aquaculture and wild-capture) are Shetland’s largest export product and these industries help to support Shetland’s ferry link to the mainland and also the inter-island ferry services.

The Hunter and Morrison Trust and SFTC offer financial assistance to fishers to help them gain the required qualifications. The Fishermen’s Mission is a national charity that can assist fishers and their families in times of hardship and bereavement.

### 3.2 Intra-sectoral linkages

#### 3.2.1 Between fleet segments

**Geographical**

Fishers reported that there was no major conflict for space within the Shetland fishing sectors, however, the demersal fleet reported that conflicts with non-Scottish vessels are increasing, especially with Spanish gillnetters (targeting monkfish). Gillnets are left in place for a number of days at a time and this presents a hazard to trawlers. They reported that gillnets were being used in increasingly shallow depths. Fishers felt that foreign vessels were not as tightly controlled and regulated as the Scottish vessels.

**Labour**

Labour mobility appears to be low among the Shetland fishing fleets, with fishers working on the same vessels for a number of years. In addition, as many fishers are shareholders in the boats they work on, and all boats use a share system to pay crew, there is less incentive to move boat.

**Economic**

The shellfish segment is not managed by a quota system and Shellfish fishers organise the transportation of their catch independently.

Whitefish boats are able to obtain quota from a number of sources: they can purchase or rent quota from other fishing boats, SIC, L.H.D. Limited (fish agents) and the Shetland Fish Producers’ Organisation (SFPO). The SIC rents quota at market prices and makes GBP 800,000-1 million (EUR 970,600-1.22 million) a year from rental. LHD and SFPO are able to purchase and rent quota to benefit the local fleet, and unlike the SIC they are not affected by State Aid legislation so do not have to offer the quota to vessels outside of their memberships, nor do they have to ensure that the rental rates are at full market value.

#### 3.2.2 Between subsectors

**Geographical**

There is limited spatial overlap between fisheries subsectors. While shellfish dredging grounds and whitefish trawling grounds may overlap, fishers reported that this did not cause any conflicts between the fleets. Fishers suggested that this was because the fishing grounds are quite large and fishing intensity relatively low.
Labour
None of the fishers reported that their spouses or partners were involved in the fishing industry. Ancillary onshore jobs across Yell (of which there are more than 30) are held by different households. Across the whole of Shetland nearly all of the 225 jobs supported by the fishing industry are also held by separate households. There is little evidence of more than one household member working in a fishing-dependent industry.

Economic
Unprocessed seafood from Shetland is primarily sold to Scottish mainland distributors. Whitefish is sold via Shetland Seafood Auctions with buyers bidding on the fish and shellfish is predominantly sold directly to mainland buyers, although brown crab is processed and canned in Yell.

The price fishers receive is dependent on the national availability of fish, with over-supply lowering prices and under-supply raising prices. The different fleet segments do not compete in the same markets, so the landed volume of one sector does not affect the landed price in other sectors. In Shetland the aquaculture industry produces significant volumes of salmon and mussels, but these are not fish that are caught by the wild fishery in Shetland, so there is little market competition. Within Yell aquaculture is a large local industry.

3.3 Summary of linkages
The Yell and Shetland fishing fleets support onshore jobs across Yell and Shetland in marine engineering, transport, processing and boat supply. There is no evidence that these jobs are held by people from the same households as the fishers. As Shetland’s largest exporter, the fishing fleet also helps to support key infrastructure, including the ferry service. No negative interactions were reported between the Shetland fleet segments due to differences in markets and fishing grounds.

4. Role of fishing
4.1 Fisheries as an economic activity
4.1.1 Diversification
Full-time fishers have reported that fishing represents a high proportion of household income (normally more than 50%). Some shellfish fishers are part time, and shellfish fishing represents a small proportion of their household income, generally less than 30%.

Within Yell the main alternative industry is aquaculture or SIC. While these sectors have provided employment within Yell, it is likely that any reduction in fisheries employment would have an impact on dependent businesses and would result in people having to commute out of Yell to work. While commuting to Lerwick and Sullom Voe is feasible, it is expensive and time consuming and so there is limited potential for diversification of the Yell economy.

Fishing has provided long-term well-paid employment for fishers. At the Shetland level, 3 % of the workforce depends directly on fish catching, however, this does not take into account the additional
jobs created in ancillary industries. In total, 9% of the workforce is employed in fish catching, fish processing and aquaculture.

![Graph showing proportions of population employed in fish catching and the entire fisheries sector in Shetland from 1997-2011](image)

Figure 12 Proportion of the population employed in fish catching and the entire fisheries sector in Shetland from 1997-2011

All fishers surveyed reported a high level of job satisfaction (although many fishers, particularly in the demersal fleet reported by EU regulation, reduced this). All fishers reported that they wished to stay working in the sector and did not intend to leave within the next 12 months. No fishers reported that they were, or had previously been, looking for alternative employment.

The Yell and Shetland fleets show low labour mobility and as such, employment levels have been stable in recent years, following a period of fleet reduction, particularly within the whitefish fleet. Vessels in the shellfish fleet are operated single-handedly, so do not need to recruit crew.

4.2 Adaptation

4.2.1 Analysis of adaptive response

**Whitefish fleet**

Fishers expressed concern that it was hard to adapt to future change as many of the challenges facing the fleet were beyond their control. Many fishers wished to make additional investments in the fleet, in terms of upgrading or replacing vessels but availability of loans and uncertainty created by governance measures reduced investment certainty. The cost of purchasing quota and the cost of purchasing new boats reduce the likelihood that the whitefish fleet in Yell will grow.
Fishers reported that fishing regulations (quota and days at sea) reduce fishers’ ability to adapt to future changes in fish abundance. As the whitefish fishery is quota controlled, it is difficult for fishers to take advantage of changes in stock abundance. Fishers can rent quota or trade their quotas, which can allow them to adapt to some changes in abundance or markets. Fishers reported that they were seeing high stock abundances but were not able to utilise increased stock abundance as the biological data collected did not reflect the changes in stock. Reductions in allowed days at sea have also reduced fishers’ ability to take advantage of changes in stock abundance and fishers report that this has reduced total landings.

Wider declines in the economy have made it more difficult to access loans from banks. There has also been a reduction in the level of financial support that can be offered at a national level. Historically, decommissioning has reduced the size of the whitefish fleet in Yell to just one boat.

The fishers surveyed did not wish to leave the whitefish fleet but reported that regulations were making it increasingly difficult to maintain an economically viable fishery. Fishers would be qualified to work in the aquaculture industry and in the offshore industries. The surveyed shellfish skipper had previously worked in the whitefish fleet but had to change fleets during decommissioning. Several Shetland boats have been working for the oil industry on ‘guard duty’ while new pipes are being laid. This has provided additional income to boats.

Fishers reported that the uncertainty created by fisheries regulation also made them unwilling to take on young fishers in case they could not afford to keep them employed. Community and fishing representatives expressed concern that if opportunities did not exist for employment within the fishing sector, it could lead to depopulation of Yell. The NAFC Marine Centre in Scalloway is now offering a modern apprenticeship for young fishers wishing to join the industry.

Economic challenges such as increased fuel prices affect all crew members as fishers are paid on a share basis. Reduction in profitability has the potential to affect new fishers more because skippers will be less willing to take on new crew members.

**Shellfish**

The shellfish industry is not controlled by quota, so can adapt more easily to increases in stock abundance. Regular local monitoring of stock abundance means there is greater confidence in stock assessment.

Fishers report that currently it is very difficult for the sector to grow as the SSMO is not issuing new licences to fishers making it harder for new entrants to join the fleet. As most vessels are operated by only one crew member, unless a family member already owns a shellfish boat it may be difficult for a young person to gain shellfish fishing experience.

Wider declines in the economy have made it more difficult to access loans from banks. There has also been a reduction in the level of financial support that can be offered at a national level.
Economic challenges such as increased fuel prices affect the profitability of the sector. Most fishers are not solely reliant upon an income from shellfish fishing. Reduction in profitability has the potential to affect new fishers more because skippers will be less willing to take on new crew members. MSC certification may help fishers achieve a higher price and help maintain profitability.

4.3 Future development of the community
Fishers reported that uncertainty created by external regulation makes it difficult for the fleet to prepare for the future and to invest and upgrade boats. While work for the industry through guard duty is currently providing supplementary income for many whitefish boats, this work is reliant upon the laying of new pipelines so has a finite time period.

Across Shetland there has been a general trend of decreased rural employment and an increase in centralisation. Community representatives and fishers are concerned that a reduction in local employment will result in an increasing need for people to commute out of Yell for work or the depopulation of Yell. Fishers and community representatives are concerned that proposed cuts to the Yell ferry service and increases in ferry fares will make commuting out of Yell for work or education more expensive and make it more difficult for the community to adapt.

While a number of local businesses have developed, particularly within the aquaculture industry, fishing remains an important industry within Yell. Fishers placed a high value on education for young people to enable them to adapt to future changes in the economy.

A new funding scheme has been made available since 2012 for coastal communities through the European Fisheries fund, Axis 4. There have been no grants awarded for the Cullivoe area.

5 Summary and conclusions
The island of Yell is one of 16 inhabited on the Shetland archipelago. With a population of just over 1,000 Yell is situated to the north-east of the Shetland mainland. It has three main communities: mid-Yell, Burravoe and Cullivoe, with the latter being the main fishing, recreational and commercial harbour. An employment estimate suggested that there were 235 FTE jobs in Yell. Employment opportunities in Yell include fish processing, aquaculture, tourism, fishing and public sector jobs within education, social care and recreation. Within Yell the SIC is large local employer, employing staff on the local ferry, and in education, recreation and social care. Lerwick and Sullom Voe are within commuting distance of Yell. Sullom Voe is within 10 minutes of the mainland (Toft) ferry terminal, Lerwick is within 40 minutes of the Toft ferry terminal. However, given Yell's length and the ferry crossing time, it can take more than an hour to travel to Lerwick or Sullom Voe. The cost of travel to and from Yell can be a barrier to people commuting to work outside Yell.

In Cullivoe the fleet comprises two main fisheries: inshore shellfish (creel and scallop dredge) and whitefish (demersal) fishing. There is no pelagic fishing in Yell. The Yell fleet can be broken down into shellfish (92 %), comprising creel (69 %) and scallop dredge (23 %), and whitefish trawl (8 %). Shellfish and whitefish are landed to Cullivoe and shellfish are also landed to Burravoe, mid-Yell and directly to Toft (mainland Shetland). There are no pelagic landings to Cullivoe. Yell is now home to just one whitefish vessel, 4 % of the Shetland whitefish fleet, although a number of Shetland and non-Shetland
vessels make mid-week landings to Yell to save time and money steaming to Lerwick and to ensure product freshness. As a result, Cullivoe is the 12th-largest landings port in the UK, with Cullivoe demersal landings representing 1.2% of all whitefish landed in the UK by UK vessels and 1.7% of landings made by Scottish vessels in the UK.

Within Yell, people are employed in the mussel farming and other fish farming sectors including a farmed salmon fish-processing factory in Yell. Yell retains one of only three locally owned fish farm companies in Shetland. Across Shetland, the aquaculture industry has grown from 1997-2011, with FTE employment in this sector increasing by 59%.

With 235 FTE jobs in Yell, it is estimated that fish catching would have represented 15% of all FTE employment prior to decommissioning. This is higher than the current Shetland and Scottish average. It is estimated that fish catching now represents approximately 2% of all Yell employment, similar to the Shetland average but higher than the Scottish average of 0.2%. There are now no fishing crew on Yell, only skippers, so competition for labour between marine sectors is not applicable within Yell. The whitefish boat based on Yell will compete with other areas of Shetland for crew, although labour mobility is low between boats. Fisheries as a whole (fish catching, aquaculture and fish processing) now directly employs 8.6% of the workforce across Shetland. For Yell it is believed that fisheries provide 10% of all FTE jobs, with aquaculture and fish processing being important employers. It should be noted that while there are some supporting jobs within Yell, the fishing fleet supports a greater number of jobs outside Yell.

The single remaining Cullivoe-based whitefish boat is owned by two shareholding crew. Grants and interest-free loans have previously been available to help younger crew members become shareholders but these loans are no longer available, making it more difficult for younger crew members to become shareholders. All crew members on the Cullivoe whitefish boat are paid on a share basis. This means that income is dependent on the success of the fishing trip and will vary for each trip. As there is only one whitefish boat in Yell, revealing wage details would be a breach of confidentiality, but reported wages were similar to elsewhere in Shetland at between GBP 30,000 and GBP 50,000 (EUR 36,600-61,000). This is higher than the average wage on Yell and in Shetland. The whitefish fishers report that they are reluctant to recruit new young crew in case they cannot afford to keep the individual employed.

Shellfish boats are operated single-handedly, some part time, with the income obtained solely by the owner through the boat surplus. The number of licensed shellfish vessels has decreased since 2003, possibly reflecting the initial granting of licences by the SSMO to all part-time and full-time fishers, regardless of their fishing track record. As a small fee is levied to obtain an SSMO licence, inactive fishers may now have left the fleet. As for all fleet segments, increasing fuel costs have reduced the profitability of the fleet. Fishers reported that the cost of entering the fleet (boat cost) and the difficulty of obtaining a local licence restricted new entrants into the fleet.

Fishers on Yell reported that they felt the socio-economic importance of fishing was recognised locally but at a Scottish level and EU level little understanding or consideration was given to the impact of changing regulations on fishing-dependent communities. The Yell councillor has a fishing background
and it was believed that this was an important addition to the SIC. Fishers outside Yell also highlighted the value of his fishing experience.

In summary, while direct employment within the fishing fleet has declined in recent years, land-based ancillary industries remain important employers within Cullivoe and Yell. Entry into all fish segments has become more difficult: the cost of entry is high and it is difficult to obtain licences and quota due to increased legislation. It has also become increasingly difficult for young people to join the fishing sector. Fishers report a high level of job satisfaction but report that legislation has made it difficult for the fisheries to operate effectively. Full-time fishers have reported that fishing represents a high proportion of household income (normally more than 50 %). Some shellfish fishers are part time, and shellfish fishing represents a small proportion of their household income, generally less than 30 %.

A number of local businesses have developed, particularly within the aquaculture industry, however, fishing remains an important industry within Yell. Fishers reported that uncertainty created by external regulation makes it difficult for the fleet to prepare for the future and to invest and upgrade boats. Work for the industry through guard duty is currently providing supplementary income for many whitefish boats but this work is reliant upon the laying of new pipelines. Across Shetland there has been a general trend of decreasing rural employment and an increase in centralisation. Community representatives and fishers are concerned that a reduction in local employment will result in an increasing need for people to commute out of Yell for work or the depopulation of Yell.

Data collection for small island communities like Yell is challenging, mainly due to the small population (approximately 1,000) and resulting small sample size. In addition, most demographic and economic information collection is only conducted at Shetland level, as most of the population and economic units are mainly clustered around the population centres of Lerwick and Scalloway.

At present there are no data collection framework (DCF) variable types associated with social dimensions, apart from some information on employment (FTE employment and the number of engaged crew). It is apparent from Yell that there is a high dependency on fishing-derived employment and thus the community is highly vulnerable to external factors such as changes in quota allocation, fuel costs and market prices. Many of these are captured in the current DCF regime (for example, under expenditure) but the vulnerability element is not currently captured nor fully understood by many. Therefore, it is suggested that key indicators are identified and included where possible in a new socio-economic dimension of the DCF. These could include:

- entrance and departure rates of persons involved in fishing;
- ratios of fisheries dependence in the local economy, in terms of both employment and economic contribution;
- relative contribution of Member State/other EU and non-EU employment within the local fisheries sector.