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Jones EV, Caveen AJ, Gray TS. [Are fisheries-dependent communities in Scotland really maritime-dependent communities?](#)
Ocean & Coastal Management 2014, 95, 254-263.

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DOI: 10.1016/j.ocecoaman.2014.04.025

Further information on publisher website: <http://www.elsevier.com/>

Date deposited: 25th September 2014

Version of article: Accepted

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Are fisheries-dependent communities in Scotland really maritime ne-dependent communities?

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ABSTRACT

It is often said that fishing is not a job, but a way of life. The traditions, culture and structure of fishing in coastal communities have been built over the centuries, supporting their development and sustaining their existence (OECD 2007). Scotland has one of Europe's largest fishing fleets with 2,046 working vessels; around 4,800 fishers; 132 active fishing ports; and landings which totalled £466 million in 2012. However, during the last ten years, the number of vessels, people employed and active ports have all decreased and are now at the lowest levels ever recorded (though the value of landings in 2011 was at its highest since 2000 (£501 million) (Marine Scotland 2012)). This contraction (or 'consolidation') of fishing activity has been driven by fleet efficiency and policies targeting stock recovery – targets which are now showing some success, though, arguably this has been at the expenses of some 'fisheries dependent communities' (FDC). This paper looks at community well-being and the links with changes in fishing activity to ask the following questions: has a decrease in fishing opportunity had a negative effect on community well-being in Scottish coastal communities?; and if so, has that effect been greater or less in rural compared to urban areas? Community well-being has been measured using the Scottish Index of Multiple Deprivation (SIMD) to compare fishing communities' well-being in relation to other Scottish towns. Our main conclusions are that the decrease in fishing activity has had relatively little effect on so-called FDCs, especially those in rural areas, and that we should therefore expand the concept of fisheries-dependent communities into the concept of maritime ne-dependent communities (MDCs) to encapsulate the impacts that a the range of marine industries have on coastal communities.

Key words: deprivation; fisheries dependent communities; well-being; identity

1. INTRODUCTION

It is often said that fishing is not a job, but a way of life that is reflected in the traditions, culture and social structures found in fishing communities which have evolved over the centuries to support their development and sustain their existence (OECD 2007). Scotland is one of Europe's largest fishing nations (Marine Scotland 2013) but as with most other European nations it has seen a decline in the fishing industry over the last three decades, first and foremost due to severe over-fishing (Froese 2011) and further by intervening policy initiatives such as decommissioning, resulting in fleet consolidation, and regulations, which have limited fishing opportunities e.g. through quotas and days at sea (The Scottish Government 2010). The severity of the decline has been clearly mapped from the mid-1980s until the early 2000s (Fig. 1 left), when landings saw a notable recovery but then declined again from 2006. Although this latest decline was offset by price rises which have resulted in the value of landings (real value) recovering to levels observed in the early 90s (Fig. 1 left), the price rises have not been reflected in jobs, and employment has been declining steadily since the early 1990s along with vessel numbers which have been in continual decline for large vessels, and also for small vessels, though at a much lesser rate from 1996 onwards (Fig 1 right)¹.

Figure 1: Volume and value of landings into Scotland from 1985-2012 (left) and number of people employed as fishers, and number of active vessels in Scotland from 1985-2012 (right). All monetary values are to 2012 prices.

The impact of this decline is well documented in the literature, often discussed in terms of the negative effects on 'Fisheries Dependent Communities' (FDC) (Jamieson et al. 2009; Brookfield et al. 2005; Ross 2013). The generic term, FDC, has strong social and cultural dimensions (Ross 2013; Reed et al. 2013) often linked to the historical importance of the industry, but the focus in the policy arena is on the economic dimension (Jamieson et al. 2009) particularly referenced to income and employment.

As many of Scotland's coastal towns have been built on the back of fishing, the country is often said to have a high number of FDC (Agnew et al. 2010), and the observed decline has been a major concern for policy-makers and academics. This decline has been a result of a number of factors, including overfishing, technological developments, drive for efficiency and profits, and policy interventions (The Scottish Government 2010). The technological developments have been particularly noticeable, resulting in the majority of the industry which was once low technology, with high local employment on local vessels, evolving into sophisticated businesses, with diverse crews

¹ The recorded increase in the late 1980s in small vessels is accredited to incorrect data collection methods, rather than a true rise in the number of small vessels (per comm. Marine Scotland, 2013).

and often serving distant markets. The rhetoric surrounding FDC has, however, remained the same, in that **marine** fisheries are still regarded as vital for social wellbeing in otherwise resource poor areas;

"In many small and medium sized settlements, especially on the islands and the remoter parts of the mainland coast, fishing is often the major contributor to the productive economy... fishing in many cases is vital to their survival"

(The Scottish Government, 2010: 5)

"The fishing industry provides important social goods in many remote and deprived areas"
(Cabinet Office, 2004 in Urquhart et al, 2011: 241)

However, what is the evidence that the recent decline in Scottish fisheries has resulted in a reduction in the wellbeing of Scottish coastal communities? **And Moreover**, what is the evidence for the equally common assertion that rural communities are more sensitive to this decline in fisheries **than are compared with** urban communities?

In this paper we attempt to quantify the links between economic dependency and fishing in FDCs in Scotland. To conduct this study we used the Scottish Index of Multiple Deprivation (SIMD) (a policy tool employed to target resources to areas suffering from deprivation), to test whether there is a relationship between a change in fisheries employment and volume and value of fisheries landings, and a change in deprivation. We quantify the economic elements of well-being, drawing on findings from key informant interviews to contextualise this data, and then discuss the implications of our findings for the concept of FDC.

2. KEY CONCEPTS

Although social wellbeing has been described as a fuzzy concept that means different things to different people (White 2008; Coulthard et al. 2011), some common ground is emerging. Wellbeing is a positive, inclusive concept that is as relevant for the wealthy as for the poor, **but its flipside** is traditionally **linked to the targets of more** negative development concepts such as poverty and social exclusion. (White, 2008). Wellbeing affects us all;

"Wellbeing is a state of being with others, which arises where human needs are met, where one can act meaningfully to pursue one's goals, and where one can enjoy a satisfactory quality of life"
(McGregor 2008, p.1)

When exploring what makes up wellbeing, two dimensions are **prominent posed**;

"At a simple level, this can be seen in terms of a contrast between the familiar 'objective' indicators on income, nutrition, life expectancy etc with the 'subjective' dimensions of how individuals feel about their health and economic status"
(White, 2008: 3)

However, because the 'subjective' elements of wellbeing are impossible to measure in this case study of Scottish FDCs through lack of relevant data, we focus only on the 'objective' elements – in particular on income and employment criteria. The key concept in this paper is 'deprivation', which, like the terms poverty and social exclusion, has negative connotations, by contrast to the positive

connotations of wellbeing. Like wellbeing, however, deprivation is a multifaceted concept, and this paper focuses on two of the seven dimensions of material deprivation in the Scottish Index of Deprivation (see below) termed as 'objective' in the social wellbeing literature; access to material goods and social opportunities. Because it includes social opportunities, deprivation is a broader concept than poverty. Like wellbeing, deprivation is a relative concept that is defined by the societal norms and expectations from the societal group being measured.

"Deprivation takes many different forms in every known society. People can be said to be deprived if they lack the types of diet, clothing, housing, household facilities and fuel and environmental, educational, working and social conditions, activities and facilities which are customary, or at least widely encouraged and approved, in the societies to which they belong"
(Townsend P 1987, p.126)

The material goods element in deprivation refers to the ability to obtain food, suitable clothing, shelter and fuel. This is relatively clear, measurable and has a clear link to income. The social opportunity element in deprivation is **much** less tangible, **and** shaped by local situation, location, and culture, and is **much** less well represented than indicators of material deprivation in large data sets, **though but** it has a clear link to employment. The Scottish Index of Multiple Deprivation (SIMD) is used to target resources to deprived areas and is the only database at a Scotland level that focuses on wellbeing. It is a relative scale which ranks areas from most (1) to least deprived (6,505). The SIMD targets areas by highlighting the top 5%, 10%, and 15% most deprived communities nationwide. It measures multiple deprivation, and the rankings are an amalgamation of seven weighted domains: income; employment; health; education; access to services; crime; and housing, with the highest weighting being given to the first two domains as Townsend explains:

"while people experiencing some forms of deprivation may not all have low income, people experiencing multiple or single but very severe forms of deprivation are in almost every instance likely to have very little income and little or no other resources."
(Townsend, 1987:217)

The *Income* domain or 'income deprived', is a combination of benefit claims available to individuals on low income. The *Employment* domain, or 'employment deprived', is a combination of all benefit claims available to people of working age (16-65) who are not in employment. Whilst income is measured in monetary terms and employment is seen as a means of obtaining income, both are important factors in overall well-being. It is well documented that worklessness is associated with poor physical and mental health and wellbeing, but the nature, quality of work and its social context are **also** important provisos (Waddell & Burton 2006). **However, our** estimations of wellbeing/deprivation only include income and employment because in this case study, they were the only data sets that could be compared over time.

When classifying 'Fisheries Dependent Communities' (FDC) we also used exclusively economic criteria **one** to indicate dependence on fishing. This is controversial, in that it ignores another **potential** criterion **a** of dependence – that of social or cultural dependence – i.e. having an identity that depends on past rather than present fisheries, and so may remain strong despite a decline or cessation of fishing activity in an area. But social/cultural identity criteria are very difficult to

measure because of the absence of data, and so we have used economic criteria despite recognizing the limitations of selecting communities purely on active fishing activity rather than on areas that identify themselves with fishing.

3. METHODS

This analysis used three datasets; 1) SIMD rankings for the years 2004, 2006, 2009 and 2012 and employment and income scores which contribute to the SIMD and measuring the period 2001 to 2012 for all fishing units; 2) fish landings by volume and value from 2001 to 2012; and 3) fisheries employment figures from 2001 to 2012. Data was collated at its most disaggregated scale to capture smaller harbours, creeks or island communities along with major fishing ports. *When considering economic activity we have only used landings data, rather than onshore fishing activity (processing, transport, and servicing) because due to this data is not be available.*

The SIMD uses *the category of* 'data unit' in its analysis which represents a geographical area. A data unit signifies population *density of* between 600 to 1000 people, so a cluster of units in one area represents a town while one large unit represents rural terrain with low population density. *Theise* data *was are* combined with the second data set - landings and fishing employment data - which are classified by port or creek to create 'fishing units' for comparison with 'coastal units' and 'non-coastal units'.

For identifying coastal and non-coastal units, Marine Scotland (in a previous project) ran an analysis using a method developed by the Marine Management Organisation (2011) who defined English coastal areas as areas within 10km of the coast, including estuary and river limits to include transitional waters. When this was applied in Scotland, it resulted in the inclusion of some areas not considered as coastal, such as Glasgow and Stirling owing to the Clyde and Firth rivers; *flowing far inland*. Secondary analysis which excluded estuaries and rivers was felt to be a more accurate representation for Scotland. Because of the large size of some west coast data zones, only data zones *which that* bordered the coast or had >50% of their area within 10 km were classified. This resulted in 52.2% of Scotland's data zones and 51.8% of its population classified as coastal. This data was then combined with the port data to identify fishing units.

Matching fisheries data and polygon data was problematic due to the diversity of the Scottish coastline which rendered some systematic techniques *which were* suitable for one stretch of coast inappropriate for another. We therefore selected 'fishing' units on a visual interpretation of polygon surrounding a port, which was common on the east coast, or by selecting the unit in which a port was located, which was common on the west coast due to low population density. We recognise that this method does not identify where fishers or people working in fisheries live, but since we are interested in whether an area is suffering from deprivation due to a change in economic activity related to fisheries, we feel that this must be gauged as an area-wide effect rather than a household effect.

To explore the relationship between declining fisheries opportunities and economic wellbeing, we required time-series data over a large spatial scale which limited us to landings and employment in the capture sector which are geographically tied to creeks and ports. - This was limited to the last 12 years, due to the unreliability of landings data in the 1990s and the incompatibility of the databases

used to collate this data pre-2000. To combine this with the SIMD, only two domains - income and employment scores, could be compared. The other five domains (crime, education, health, housing, and access), are problematic because of a change in the data collection methods over the period. The income and employment scores, which are presented as percentage changes for claimants between years, are analysed in this study, along with the change in overall ranking in the SIMD by year.

Landings data was taken from the Fisheries Information Network (FIN) a Marine Scotland database populated by port authorities. A threshold of ports with total landings >£500,000 in the last 10 years was set to exclude ports that have relatively limited financial links to fisheries. Landings data were clustered to coincide with the SIMD surveys and comparison were made between 2004, 2006, 2009 and 2012. This was then plotted in SPSS against the two domains which makes up the SIMD, as well as against pre-defined groups to look at the relationship with urban (population of >3000) fishing units vs. rural (<3000) fishing units *(see appendix for port classification)*. One-way *analysis of variance* (ANOVA) and t-tests were used to establish differences between groups and Pearson product-moment correlation to look for significant relationships. In the case of the correlations, extreme outliers were recoded to the nearest value.

As for the key informant interviews, the objective was to get a diverse range of views on the importance of fisheries from experts and stakeholders from a range of industries, such as tourism, energy and policy and planning. Overall, 16 interviews were conducted, five in Stornoway, an urban port, two in Barra, six in Ullapool and three in Lochinver, all rural ports. Interviews were conducted in an informal manner with 15 open questions based around four themes: 1) composition of activity/fishing in the area; 2) employment; 3) sustainability and; 4) changes in the fisheries. Interview durations ranged from 40 minutes to 2 hours, depending on the time interviewees had available.

4. RESULTS

4.1 Scottish Index of Multiple Deprivation

Scotland has 6,505 data units for the whole country: 3,428 are coastal units as defined by Marine Scotland, and the remaining 3,077 are non-coastal units. Of the coastal units, 324 were identified as having a financial link to fisheries, hereafter known as fishing units and the remaining 3,104 as non-fisheries coastal units, hereafter known as coastal units.

Table 1: Percentage of units classified as the most deprived by fishing, coastal and non-coastal areas. Number of units in brackets

	2004			2006			2009			2012		
	Fish	Coast	Non-coast	Fish	Coast	Non-coast	Fish	Coast	Non-coast	Fish	Coast	Non-coast
5%	1%	1.8%	8.7%	3.4%	2.7%	8%	4%	2.9%	7.2%	3.4%	2.8%	7.5%
	(3)	(55)	(267)	(11)	(84)	(245)	(13)	(90)	(222)	(11)	(86)	(232)
10%	5%	5.3%	15.3%	5.8%	6.7%	13.6%	6.8%	7.1%	13.3%	6.8%	6.6%	13.7%
	(15)	(164)	(471)	(19)	(209)	(177)	(22)	(219)	(409)	(22)	(206)	(422)
15%	7.1%	9.1%	21.7%	9.9%	10.3%	19.4%	10.5%	11.3%	19.1%	10.5%	11.3%	19.2%
	(24)	(284)	(667)	(32)	(320)	(598)	(34)	(352)	(589)	(34)	(350)	(591)

Of the 324 fishing units, 34 were listed in Scotland's 15% most deprived areas in 2012 (up from 24 in 2004 (Table 1)). This equates to 10.5% of all fishing units - up from 7.1% in 2004, compared to a rise

from 9.1% to 10.5% in coastal units, while non-coastal units experienced a downward trend from 21.7% in 2004 to 19.2% in 2012. This suggests that before 2004, fishing areas had been performing better than coastal and non-coastal areas, with lower overall rates of severe multiple deprivation, but that fishing units experienced a substantial change in rankings between 2004 and 2006 with a large increase in units in the bottom 15%, and they are now on par with other coastal units. As this is a relative ranking, it could indicate either an increase in deprivation in these units, or improvements in non-coastal areas, which have all taken place during the period (21.7% to 19.4%) which would reduce other units in the rankings.

In order to measure the difference between these three groups, we ran a one-way between-group analysis of variance (ANOVA) on the employment and income scores which contribute to the ranking data. Results for both income and employment scores showed highly significant differences $p > .001$ (Table 2), however the mean scores between groups for both income and employment was very small as calculated using the eta squared which was .003 for income and .005 for employment. This is most probably due to the large sample size ($n = 19,527$) and therefore these significant results need to be treated with caution.

Table 2: One-way between-group ANOVA for income and employment scores. Due to violation of the Levene's test for homogeneity, Brown-Forsythe results are presented.

	Income			Employment		
	Fishing	Coastal	Non coastal	Fishing	Coastal	Non coastal
F	37.251 (2, 5144.1)**			53.952 (2, 4965.3)**		
Mean and SD	.196 (2.756)	.251 (2.739)	-.119 (3.453)	-.067 (2.466)	-.038 (2.388)	-.429 (3.046)

Post-hoc comparison using Tukey HSD showed for income that the difference was significant between non-coastal units ($M = -.119$ $SD = 3.453$) with both fishing ($M = .196$ $SD = 2.756$) and coastal ($M = .251$ $SD = 2.739$) units, but was not significant between fishing and coastal units. This was also the case for employment with a mean for non-coastal units ($M = -.429$ $SD = 3.046$) compared to fishing ($M = -.067$ $SD = 2.47$) and coastal ($M = -.038$ $SD = 2.388$) (Table 2). Therefore the changes in income and employment benefit scores were similar between fishing and coastal units, but differed significantly with non-coastal units. Non-coastal units had lower means which suggests they experienced a decrease in income and employment claims, whilst fishing and coastal units saw a very small increase.

To explore this suggestion over time we plotted the three groups by years. Figure 2 shows that all units saw a decrease or no movement in claims for both income and employment between 2004 and 2006. Between 2006 and 2009, income claims increased for all units and employment claims decreased for all units, but the degree of these changes is different for each group. The reverse is observed between 2009 and 2012 with fishing units experiencing a decrease in income claims, and a similar level of increase in employment claims (Fig. 2). Fishing units do not appear to have extreme cases (outliers) which suggests no extreme change in the percentage of claims, however this may be due to the difference in sample size and should be treated with caution.

Figure 2: Boxplots showing interquartile range and median value of areas by year from income (left) and employment (right). Boxplots below the 0 line have experienced a reduction in the percentage of people claiming those type of benefit and those above the line the opposite is the case. The circles represent outliers which extend more than 1.5 box-lengths from the edge of the box and stars represent extreme outliers which extend more than three box-lengths.

Having established that fishing units and coastal units appear to be behaving differently to non-coastal units we decided to look in more detail at the fishing units and the difference between rural and urban fishing units by years to see whether one of them is experiencing higher rate of change in income and employment scores.

Figure 3: Boxplots of interquartile range, median values and outliers of fishing units plotted against change in income scores (left) and employment scores (right) by rural and urban ports broken down by years.

Figure 3 displays these in boxplots which suggest that urban areas have a higher percentage of benefit claims than rural areas for both income and employment. - Urban units also appear to have more outliers than rural, suggesting some of the changes experienced in some units are much higher in urban fishing units.

To establish whether these observations are significant we ran independent-sample t-tests to compare the income and employment scores between rural and urban units in each year. We found significant difference between the changes in income scores; rural ($M = -.87$ $SD = 2.26$) and urban ($M = .051$ $SD = 2.82$; $t(325) = -2.99$, $p = .003$ two-tailed) in the period 04-06, however the magnitude of difference (-9.23) was small with an eta squared = .02. This was also the case for the employment with rural ($M = -.458$ $SD = 1.82$) and urban ($M = .165$ $SD = 2.75$; $t(304) = -2.45$, $p = .015$ two tailed) for the period 04-06, but again with a small effect, eta squared = .02. No significant difference were found between rural and urban ports for both income and employment scores in 06-09, or for income score in 09-12, but a significant difference was found in employment with rural ($M = .22$ $SD =$

1.40) and urban ($M = 1.42$ SD = 2.40; $t(319.9) = -5.73$, $p = .001$ two tailed) and with a large effect, with an eta squared = .13.

To explore whether these trends are linked to fishing we plotted the rural and urban changes in the income and employment scores against the changes in fisheries employment and landings data over the same period.

Figure 4: Scatter plot of change in income scores against change in value of landings (left) and changes in employment scores against change in number employed in fisheries (graph presented over is 2006-2009 data only - only two plots are presented here due to the similarity in patterns). Value at 2011 prices.

Scatterplots were produced for all variables by years, which were all highly scattered and showed no relationship (Fig. 3), therefore it came as no surprise that Pearson product-moment correlation coefficients confirmed this for both income and landings (Table 3) and employment and jobs in fisheries (Table 4). Urban units appear to be showing the direction that we would expect, however this is very weak and not significant, whilst rural units show no direction at all. We produced plots for both groups and each period, but due to similar patterns emerging we have only presented the two outputs above as an example of our finding.

Table 3: Pearson product-moment correlation of change in landing value against changes in income scores of all fishing units, all rural fishing units and all urban fishing units.

Value of landings	2004-2006	2006-2009	2009-2012
change in all fishing units	$r = .098$, $n = 103$, $p = .324$	$r = .001$, $n = 117$, $p = .989$	$r = -.035$, $n = 118$, $p = .710$
change in rural units	$r = -.143$, $n = 77$, $p = .215$	$r = .129$, $n = 90$, $p = .227$	$r = .009$, $n = 91$, $p = .936$
change in urban units	$r = .309$, $n = 26$, $p = .124$	$r = -.195$, $n = 27$, $p = .330$	$r = -.245$, $n = 27$, $p = .219$

Table 4: Pearson product-moment correlation of change in the number of jobs in fishers against changes in employment scores of all fishing units, all rural fishing units and all urban fishing units.

Number of fisheries jobs	2004-2006	2006-2009	2009-2012
change in all fishing units	$r = -.066$, $n = 117$, $p = .479$	$r = -.014$, $n = 117$, $p = .878$	$r = -.052$, $n = 117$, $p = .578$
change in rural units	$r = -.072$, $n = 91$, $p = .495$	$r = .025$, $n = 91$, $p = .817$	$r = -.032$, $n = 91$, $p = .762$
change in urban units	$r = -.098$, $n = 26$, $p = .634$	$r = -.222$, $n = 26$, $p = .275$	$r = -.113$, $n = 26$, $p = .582$

4.2 Key Informant Interviews

To complement and contextualise the quantitative analysis, key informant interviews were used to identify wider benefits to the individual and/or society from maintaining income and employment in the fishing industry. From these interviews, three key themes emerged: 1) the importance of fisheries to a location's identity and benefits to tourism; 2) dependency of marine industries on skills obtained from fishing activity; and 3) increasing dependence of fisheries on foreign crew.

The links to a location's identity and the benefits to tourism were discussed in two of the four specific case studies. Both cases stated that their economic dependency is no longer in fishing, but that their ability to attract tourism was intrinsic to the 'hustle and bustle' of an active port. In remote regions, interviewees that said that their local identity is closely linked to employment and that in these locations the status of an active fishing port is important for maintaining this. One case felt that this was so important that they were willing to undergo lengthy health and safety procedures to maintain an open port for local people and visitors: without this they felt social cohesion would suffer to the detriment of all.

The inter-dependency of marine industries was openly discussed in one case study and alluded to in the other case studies. The importance of fisheries employment for young jobseekers was expressed so they could obtain their sea-faring certifications and most importantly 'sea legs' and compete for the range of careers at sea. The stepping-stone nature of local inshore vessels for giving local youths experience at sea which can increase chances of employment in other maritime careers, such as the Royal and Merchant Navy, marine research/engineering, the offshore oil and gas industry and the marine renewable sector was highlighted as an important function in fishing communities. This was considered especially important in rural locations.

Finally interviewees discussed the prevalence of foreign crews, especially in the mobile sector. Due to the problem of local recruitment, skippers have been recruiting foreign crews for a number of years with positive experiences of acceptance of modest wage rates, willingness to work hard, and high quality of seamanship. However, according to interviewees, many trawler skippers now feel that some local foreign crews (especially and increasingly, Eastern Europeans) are less reliable and more prone to substance abuse than other foreign workers, which hinders the smooth running of vessels and safety at sea.

5. DISCUSSION

The key questions under investigation in this paper are whether fishing communities are suffering hardship or multiple deprivation because of a decline in fisheries; and if so, whether this decline has affected rural ports more than urban ports. The SIMD ranking data showed that in the early 2000s, fishing units appeared to be suffering less from multiple deprivation compared with coastal and non-coastal units, but that more recent data showed a sharp increase in the number of fishing units in the bottom 15% between 2004 and 2006. This was at a time when catches (both volume and value) had started to recover after having reached their lowest level in 2001, though employment in fisheries continued to decline. However, there did not seem to be a relationship in rural areas between the decline in catches and a change in income or employment benefits scores: it did not appear that those communities which had experienced an increase in the percentage of people making benefit claims had experienced a decline in catches. Whilst we did see the expected negative relationship for urban units in both the income and employment scatterplots, the relationship was not significant and very weak, therefore we cannot conclude that a decline in change in fishing income or employment is linked to an increase in change in claimants in urban areas.

The lack of any correlation between fisheries change and a change in income and employment scores in any of the fishing units is an interesting and potentially important result, suggesting that

the concept of FDC may be waning in importance, economically if not politically. However, before we draw such a conclusion, it is important to consider four weaknesses in the analysis associated with the available data. Firstly, the SIMD has been criticised *by some* for not properly identifying deprivation in rural areas due to the dispersion of deprived groups over such large geographical areas, *though this criticism but this has been refuted by the others* (Scottish Government, 2010); *which is a concern in this analysis*. Secondly, in the SIMD the number of low-income benefit claims is used as a proxy for low-income households rather than, for example, *as an actual measures-measure* of income per household. The number of claimants of key benefits may not be sensitive to the coping mechanism of fishing/rural communities because it is difficult to measure deprivation if alternative employment status such as self-employed and seasonal work contributes to household income, since claims may not be made even if households qualify. Annual household income would be a better, if a more challenging, measure to collect. Thirdly, while the SIMD measures seven elements of deprivation, we have only used two of them - income and employment - because the five other domains (crime, education, housing, health, and access) cannot be compared over time due to changes in the data collection methods. Some of these five elements may mitigate the social conditions surrounding a decline in fisheries, but income and employment claims may be too broad to detect this change. The fourth weakness in this analysis is linked to the third, in that because it restricts itself to economic criteria in measuring dependency, it omits any assessment of the cultural aspects which FDCs are believed to cherish. Supporters of ideas around 'sense of place' will find this analysis wanting as the value that the fishing industry provides to a community's identity and culture, has not been picked up in these metrics.

The lack of a clear correlation between changes in fishing activity and deprivation (the main finding of this study) has a number of possible explanations. Firstly, fishing represents a small proportion of overall economic activity in most such communities and other activities provide alternative opportunities. For example, compared to fishing and fishing-related activities, the public sector is a large contributor to economic activity in many remote coastal areas along with tourism and to a lesser extent, traditional industries such as textiles and farming. While changes in fishing are significant for those directly affected, the impacts are small and often incremental and may not be detectable in aggregated data analysis. The presence of other economic activities may also enable transition from fisheries-related employment into other sectors especially the oil and gas industry and the merchant navy. It is sometimes claimed that there is a significant amount of occupational immobility because of the value that fishers place on their communities (OECD, 2007), but these values are more often alluded to than researched, and we feel that more consideration should be given to the other maritime industries when debating dependency in coastal regions. Our interviewees described high levels of mobility between sectors and this diversity was felt as in keeping with the abilities and wellbeing of coastal communities.

Secondly, as mentioned above, pluri-activity within fishing areas may be masking the presence of deprivation. For those not able to take advantage of external employment opportunities, pluri-activity, which means having more than one job, often in different sectors (e.g. farming - *crofting*, fishing and tourism), may be staving off deprivation but masking hardship in these regions. Macro-level data often conceals local dependence on natural resource utilisation and seasonal employment and associated hardship which comes from being dependent on the accumulated income from pluri-

activity (Symes 2000). Thirdly, the short time period that is covered in this analysis may have 'missed' the extreme losses that the fishing industry experienced in the 1980s and 1990s and is therefore not an accurate portrayal of longer-term social decline in fisheries communities.

The difference between urban and rural ports is interesting. These data suggest that there is a higher benefits-claimants score in urban areas than in rural areas, which could reflect the loss in fisheries employment in Scotland's main fishing ports (Peterhead, Fraserburgh and Lerwick) all being classed as urban ports. Rural ports have *all* fared well in terms of the employment benefits-claims indicator with, on average, no movement or a reduction in all years. This would suggest *that* rural areas are not being as affected by the reduction in fisheries employment as are urban areas, although as previously mentioned, pluri-activity may be masking this effect. Both urban and rural areas saw an increase in income-related benefits claims, but this trend was also seen throughout Scotland and is therefore potentially linked to the global recession. The highly significant difference between urban and rural units in the period 2009-12, where rural units on average saw no change, but urban units experienced a significantly larger increase in benefit claims, could reflect problems in the larger section of the fleet. However, further investigation would be required to establish the cause.

Key informant interviewees stressed the importance *t* of their fishing identity and the opportunities it offered for tourism. The need for pluri-activity in rural areas has created a demand in households to diversify into any potential industry and whilst identity is central on a personal level, utilising opportunities and skills to diversify into other marine activities is important for creating income and employment. What these interviewees also allude to is the links and networks that seem to be forming between marine industries. Maritime skills are becoming increasingly important with the expansion of blue growth industries, not only in marine tourism, but also in oil and gas, aquaculture, Royal and Merchant Navy, and understanding the interaction between sectors and their dependency on skilled labour warrants further attention. Anecdotal evidence from these interviews suggests that this interaction plays an important role for young jobseekers, and understanding their dependency on marine employment in general rather than the narrower *sector remit* of fisheries may be beneficial for understanding the role that diverse employment opportunities contributed to a coastal community's wellbeing.

6. CONCLUSION

What do these findings imply for Scotland's 'fisheries-dependent communities'? The evidence of this paper suggests that these areas are, in fact, little dependent on fisheries for income and employment and are increasingly dependent on other sectors and industries. Munro's (ESRC, 2009) work found that the 'highly knowledgeable and skilful people working on boats and in fishing-related industries' now form parts of economically diverse households with many having diversified into other marine industries and many family members working in industries not related to fisheries. This is not to suggest that fishing does not remain important as a source of community identity and a sense of social wellbeing, but such cultural aspects of dependency have not been included in this study, and other studies are needed to examine the cultural role that fishing continues to have in modern coastal communities.

Comment [T1]: Not listed in References

Another factor that bears on ~~both~~ the economic aspects of FDC is the recent trend toward greater use of foreign crews. This trend challenges the argument that coastal communities are directly dependent on fishing activity at least from the point of view of economic or income dependency. If most jobs in the processing sector and increasingly jobs in capture fisheries are being taken by foreigners, the extent of community dependency on fisheries becomes difficult to ascertain. Deprivation is linked to labour generation at the unskilled end of the market (MMO, 2011), but, if most low wage employment is being effectively outsourced, it may be that fisheries is now contributing little to directly relieving income or employment deprivation, although indirect effects, for example, through local spending, may still be important. Foreign crews are more common on offshore vessels than on static-gear vessels which tend to fish inshore, but further work is required to confirm this. It is also worth recognising that some foreign workers are now settled migrants who have built their lives within amongst Scotland's coastal communities ies y and are important contributors to FDCs.

Whilst the fishing sector is clearly experiencing a shift in labour, much employment in fishing communities is still connected with ~~maritime ne~~-based industries which utilise the diverse range of skills that are gained from an active fishing sector. Maritime careers, such as the Royal and Merchant Navy, marine research/engineering, the offshore oil and gas industry and the marine renewable sector are all important and growing industries in these communities, and we feel the concept of fisheries dependent communities is now too narrow for communities that support not only active fishing ports, but also other dynamic and expanding maritime industries. Maybe 'maritime communities' is a more suitable term for encapsulating this diversity of which fishing is an important contributor, but not the only contributor. As clearly stated by one council member in the Highland and Islands when discussing the term FDC; "it's the description, I think it's frightening... that we have made ourselves dependent on this... where you carry out a function to the point where you have become dependent on something, well-balanced human beings should not be or made to be dependent on any single thing, the most well-balanced communities are those that are permitted and are free to benefit from the natural resources ~~that~~ surrounding them and utilise, harvest and manage them in a way that is sustainable and on-going".

ACKNOWLEDGEMENTS

This work was undertaken as part of a Scottish Government funded internship with the support of Economic and Social Research Council (ESRC). We would like to extend our thanks to Sasha Maguire for his assistance in this work.

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Appendix ee-1

Table 5: List of all port and their classification (4 and over fishing units for urban, 3 and under for rural) in the analysis as either urban or rural ports.

Urban (n = 26)		Rural (n = 89)		
Anstruther	Ardnamurchan and Kilchoan	Garlieston	North Uist	Tingwall
Arbroath	Ardishaig	Glenulig and Salen	Northbay	Tobermory
Ardrossan	Arisaig	Gourdon	Pittenween	Torridon and Applecross
Ayr	Avoch	Gruinard	Port Appin	Uig
Buckle	Back	Helmsdale	Port Ellen	Ullapool
Bute	Bracadele and Carbost	Isle of Whithorn	Port Williams	Vidin
Campbelltown	Breaslete and Lewis	John O'Groats	Portaskalg	Voe and Sullim Voe
Dunbar	Broadford	Johnshaven	Portmahomack	West Burrafirth and Wall
Eyemouth	Brora	Keiss	Portpatrick	West Loch Tarbet
Fraserburg	Burghhead	Kinlochbervie	Portree	Whalsay
Girvan	Burnmouth	Kirkcudbright	Scalloway	Yell and Baltasound
Greenoaks	Burray	Kyle	Scalpay	
Invergordon	Carradale	Kylesku and Scourie	Scrabster	
Kirkwall	Castle Bay	Leverburgh and S. Harris	Scrabster	
Largs	Coll and Tiree	Loch Bule	Skeld	
Lerwick	Cove	Loch Carnan	Sleat	
Macduff	Crail	Lochboisdale	Snizort	
Methil and Leven	Crinan and Tayvallich	Loch Inver and Achilbuie	S. Ronaldsay and Hoy	
North Berwick	Cromarty	Lochs	St Abbs	
Oban	Drummore	Lossiemouth	St Andrews	
Peterhead	Dunvegan	Luing and Balvicar	St Monans	
Stonehaven	Eday and Westray	Lybster	Stromness	
Stranraer	Eriskay	Mallaig	Stronsay and Sanday	
Stronoway	Eshaness and Collefirth	Mid Yell and Cullivoe	Talmine and Eribol	
Troon	Fionniphort, and Bunessan	Montrose	Tarbert	
Wick	Gairloch	Ness	Tayinloan and Gligha	