

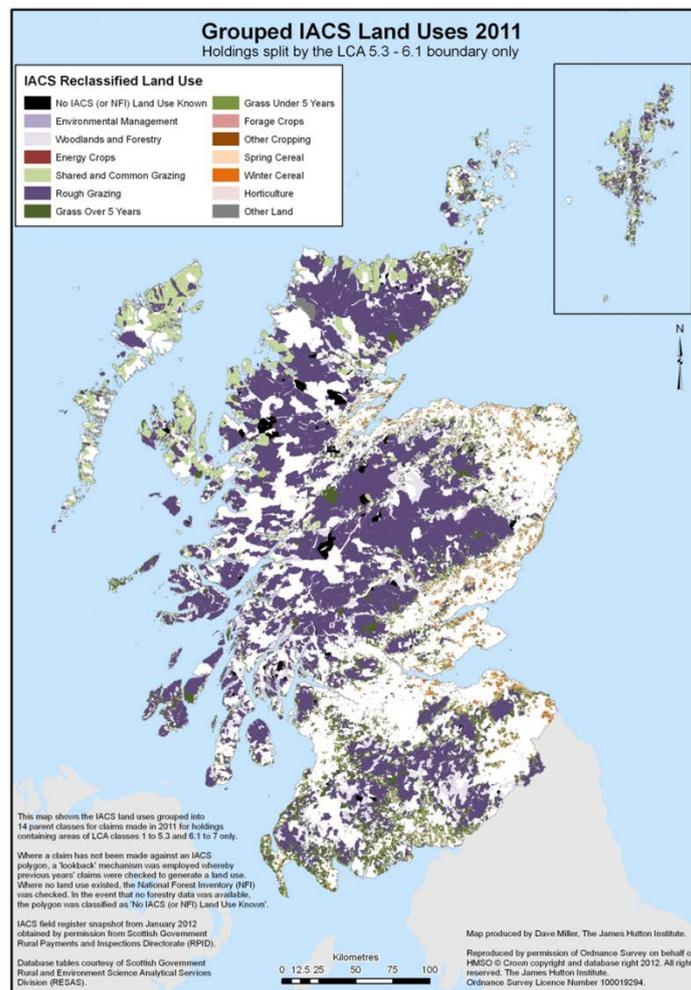
Future CAP Payments

Determining the land use and farm-type mixes of land capability for agriculture class groupings in the regions of Scotland and the characteristics of holdings containing both land capability for agriculture classes 1 to 5.3 and 6.1 to 7 land.

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EXECUTIVE SUMMARY

This document reports research conducted for Scottish Government (SG) by the James Hutton Institute to support the development of options for the regionalisation of area-based single farm payments (SFP). One of the bases on which regionalisation could occur is the Macaulay Land Capability for Agriculture (LCA). There was interest in characterising the relationship between the mapped LCA classes and the activities being undertaken, defined in terms of land use as recorded in the Integrated Administration and Control System (IACS) and the economically significant enterprises identified by the Farm Type in the June Agricultural Census (JAC). One of the regionalisation options being considered is the use of two zones defined by LCA classes 1 to 5.3 and LCA classes 6.1 to 7. There was interest in identifying and characterising those holdings and businesses with land in both zones, termed here the “split holdings or businesses”. The research recombined datasets used in previous analyses, for example the Pack Inquiry deliberations.

From the cross tabulations of land use and LCA (see charts from page 5 onwards) it is clear that there is a relationship but that it is neither strict nor simple and is context dependent with the same quality of land serving different purposes between regions. Attention in previous analyses has focused on LCA class 5 and its divisions. Across these divisions there is a transition from land use dominated by improved pastures (LCA5.1) to land use dominated by semi-natural rough grazing (LCA5.3). There are also strong regional differences in the degree to which the potential for improvement of LCA 5.3 land has been realised. Indeed in terms of land use there is little to differentiate LCA 5.3 from 6.1. For a two zone system, it would be possible to argue based on land use for a transition between classes 5.1 and 5.2, 5.2 and 5.3 or 6.1 and 6.2.

From the LCA versus farm type analysis (see charts from page 21 onwards) it is clear that while it is possible to characterise holdings based on their main economic activity, in many cases these holdings also own land of other qualities and use this land for other purposes. This is particularly evident for the cereals farm type. As with land use, there is little in terms of farm type to differentiate LCA class 5.3 land from class 6.1 at a Scotland wide level. There are more significant differences in farm type between LCA class 3.1 and 3.2, 3.2 and 4.1, 4.2 and 5.1, and 6.1 and 6.2. It is thus possible to question if the 5.3 to 6.1 transition is the best choice for defining two zones or indeed if a two zone system adequately differentiates the range and types of activity within Scotland’s farming systems.

The analysis of split holdings had anticipated three populations of holdings, LCA class 1 to 5.3 only, LCA class 6.1 or above and split holdings. The results, however, showed that there were a very small number of holdings¹ with only LCA class 6.1 and above (see map on page 40). In almost any holding there are areas of improvable land (less than LCA 5.3) even where current land use does not imply that the potential has been realised. The population of holdings with only LCA class 1 to 5.3 land is substantial (63% of holdings) but these holdings make up less than 20% of the area (see map on page 39). The split holdings by contrast are less numerous but are the great majority of area (74%), see map on page 38. In terms of area the great majority of these split holdings are of farm types Cattle and Sheep LFA or Specialist Grass and Forage (within Other). For the split holdings there is a substantial minority (approximately 4,500 holdings) where less than 10% of the holding area is made up of LCA class 6.1 to 7 and this may present an opportunity to simplify scheme implementation by including such holdings in the LCA class 1 to 5.3 zone.

¹ The business level results are substantially similar to those for holdings.

Table 1: Analysis of Split Holdings

Classification	Count of Holdings	% of Holdings	Area (ha)	% Area
Split Holdings	13,380	30.8%	4,713,715	73.9%
5.3 Minus Holdings	27,448	63.2%	1,241,571	19.0%
6.1 Plus Holdings	2,431	5.6%	410,884	6.2%
Null Holdings ²	179	0.4%	55,840	0.9%
All	43,438	-	6,422,010	-

1. INTRODUCTION

This document is intended to contribute to the development of Scotland’s position during the post-2013 CAP reform process. There were two objectives:

- 1) To quantify the land use and farm-type mix for Land Capability for Agriculture (LCA) classes in the Agricultural Regions of Scotland.
- 2) To quantify the number of businesses and holdings which contain both LCA classes 1 to 5.3 and 6.1 to 7 (referred to here as the split holdings or businesses) and determine their characteristics in terms of region, farm-type, size, cropping and livestock production.

These analyses are intended to inform the development of options for the regionalisation of area-based single farm payments (SFP).

2. METHODS AND ASSUMPTIONS

2.1. Input Datasets

This analysis has been undertaken using land use data taken from the 2011 single application form (SAF) dataset held in the Integrated Administration and Control System (IACS) linked to the January 2012 field boundary dataset (a geographical information systems (GIS) dataset maintained by SG). To allow for meaningful interpretation of the land use data the IACS land use codes (n=101) have been classified into 14 “parent” classes. This classification is the same as was used for the Rural Land Use Study for SG³ but modified to differentiate between temporary grassland (TGRS) and permanent grassland (PGRS), see Appendix 1. The ownership relations between fields, holdings and businesses are based on those defined within IACS. The IACS and field boundary datasets are supplemented by data from the 2011 June Agricultural Census (JAC) and the 2010 December Survey (DS). The key JAC/DS variables are the definition of robust farm type and livestock numbers. Stocking rates (SR) for holdings were determined using the methods previously reported as part of the estimation of area potentially eligible for SFP⁴. The land capability for agriculture mapping used was the hybrid map that combines 1:50,000 scale mapping in the lowlands with 1:250,000 scale in the uplands (see the Final Report for the Pack Inquiry for more detail on the characteristics of the LCA mapping⁵).

2.2. Analyses

Quantifying the land use and farm-type mix for the LCA classes required the overlaying of the land use map with LCA map in a geographical information system (GIS). The resulting output map contains for each mapped field (6.4 M ha), the land use and LCA class combinations present. The map was summarised using MS Excel pivot tables that cross tabulate LCA area (in ha and percentage

² These businesses or holdings are mapped in IACS but have no LCA mapping due to differences in coverage.

³ <http://www.scotland.gov.uk/Topics/Research/About/EBAR/RLUS/RLUSP1>

⁴ <http://www.macaulay.ac.uk/LADSS/reports/Existing%20and%20New%20Recipient%20Analysis%20v3.0%20FINAL.pdf>.

⁵ <http://www.scotland.gov.uk/Publications/2010/11/01153620/0>

terms) and land use. Since the farm-type of each field can be determined from its parent holding it is also possible to cross tabulate LCA against robust farm-type. The cross tabulations are presented both nationally and for each of the 14 agricultural regions.

Quantifying the number of holdings and businesses that are split between the groupings of LCA classes (1 to 5.3 and 6.1 to 7) uses the output dataset from the GIS overlay and summarises the LCA mix for each holding and business (again with an MS Excel pivot). The three sets of holdings/businesses (all LCA class 1-5.3, split and all LCA class 6.1 to 7) are identified, mapped and cross tabulated against region, farm-type, size, crop area, and livestock numbers.

2.3. Limitations of the Analysis

The IACS land use dataset is recorded as of 15th May. While it is possible to generate a field boundary map for this date, previous experience has shown that lags within the process of updating the field boundary map can mean that a later date gives a better match between SAF claims and the GIS mapping. In previous projects the authors have used a field boundary snapshot in mid-January (~18th) the next year (2012). In this case since there have been on-going efforts to improve the GIS mapping with considerable numbers of updates the match between claim and the field boundary map was poorer than previously (86 % of claims). Where a claim could not be matched to a field in the 2012 snapshot it was matched to the 2011 map instead (4.55 % or 292,182 ha of claims). The land uses in the 2012 map were then imputed from the 2011 map. This was the best compromise in terms of ensuring that the integrity of the 2012 field boundaries dataset was maintained while maximising the coverage of land use data. Where field mapping was available but no claim was present then if previous land uses were available from earlier claims these were used with the year noted from which the land use was imputed. Land use from previous years were used in 259,740 ha or 4.04 % of the area again for the sake of completeness of land use coverage. In the main this form of imputation occurred for semi-natural land uses, particularly rough grazing. An additional 194,542.802 ha or 3.03% was accounted for by reference to the National Forest Inventory 2011 map.

The analysis uses the predominant land use for each land parcel. While multiple land uses can be defined per field in SAF claims these have no spatial representation within the field. That is there is no way of determining where within the field each land use occurs. This means that where there are multiple LCA classes and land uses within the same field it is not possible to be certain of their relationship to one another. Predominance was assessed in the 2009 IACS land use data as occurring in ~2% of the mapped area and most often in semi-natural land use classes⁶.

The predominant land use is assumed to apply to the entire field. In some case the claimed land uses make up less than the complete area of the field and it is necessary to extrapolate the use of the remainder. Previous analysis using 2009 data has indicated that the need for extrapolation occurs more often in semi-natural land use classes (~10%) with cropping and grassland less affected (3% and 5% respectively)⁶. Some of this uncertainty could be reduced by combining the IACS land use dataset with other decadal data such as the National Forest Inventory (NFI) but this lay beyond the scope of the current research.

This analysis has used ownership as the basis on which the farm-type of a land parcel is determined. The analysis thus does not account for rental or multiple users of individual fields. As with multiple land uses it is not possible to definitively determine which of potentially multiple LCA classes present are being used by each holding/business. Further analysis could adjust the assignment of fields when there is only a single rental user and “flatten” *pro rata* shares between multiple renters but this was beyond the scope of the current analysis. Given the granularity of analysis these effects are unlikely to substantially undermine the conclusions that may be drawn from the data.

⁶ <http://www.scotland.gov.uk/Publications/2011/05/05085633/0>

3. RESULTS

3.1. Land Use Mix for LCA Classes

The charts on the pages that follow present breakdowns of the land use mix for each of the LCA classes. Two breakdowns of the land use mix are used - the area of each land use present and the percentage of the LCA area that the land use represents. The area-based breakdown allows interpretation of importance of an activity within a region. Inter-regional comparisons are, however, compromised by the greatly differing region sizes (with resulting rescaling of the area axis). While common scales can be used for inter-regional comparison this tends to obscure relevant detail in all but the largest regions. The percentage-based breakdown allows interpretation of the importance of an activity within each LCA class. It should be noted that when an LCA class has a very small area then interpretation of the percentage breakdowns should be treated with caution since discrepancies between the mapping scales of LCA and field boundaries may introduce artefacts which are a significant part of a very small area. This is particularly notable for small areas of LCA class 7 land. The area and percentage breakdowns are presented as pairs for Scotland as a whole and for the Agricultural Regions (see Figure 1).

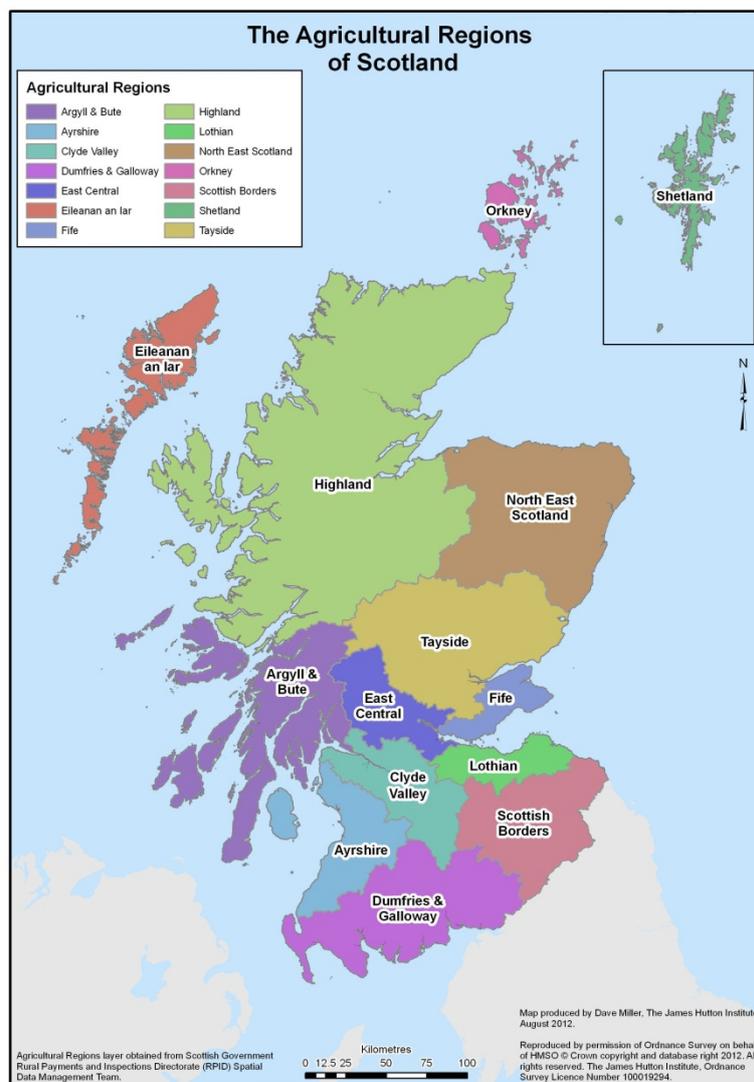
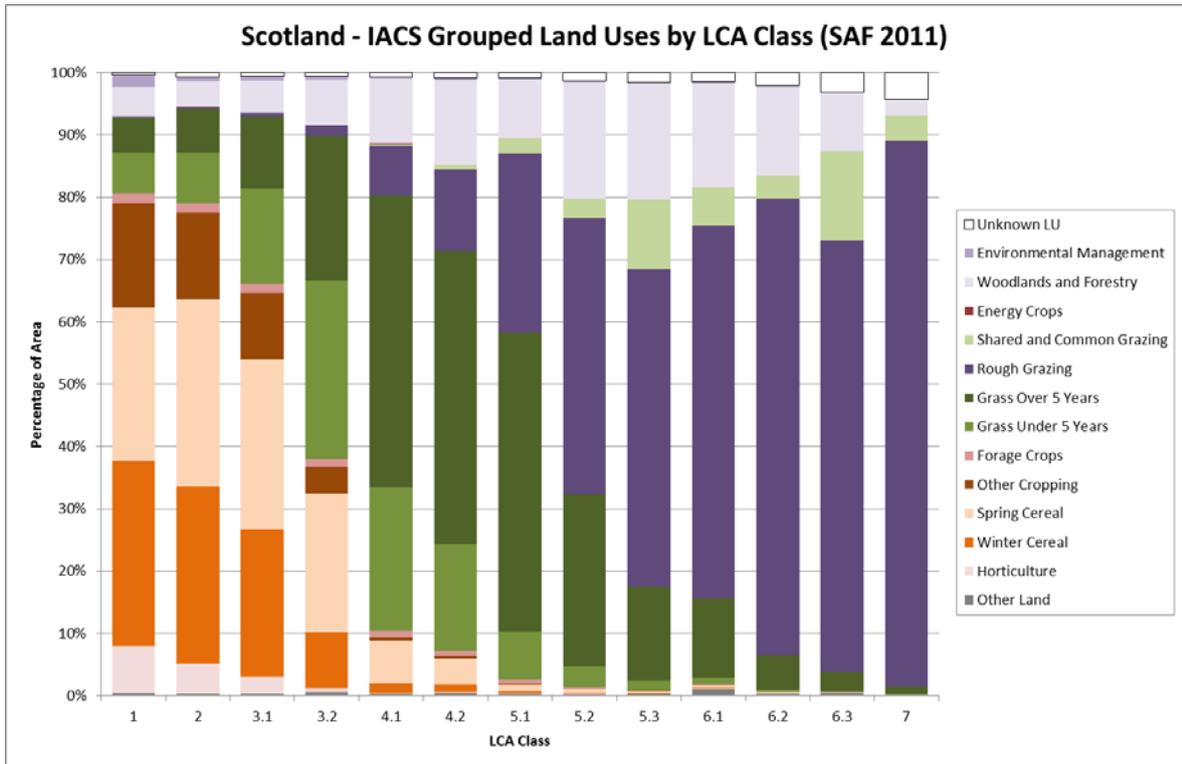
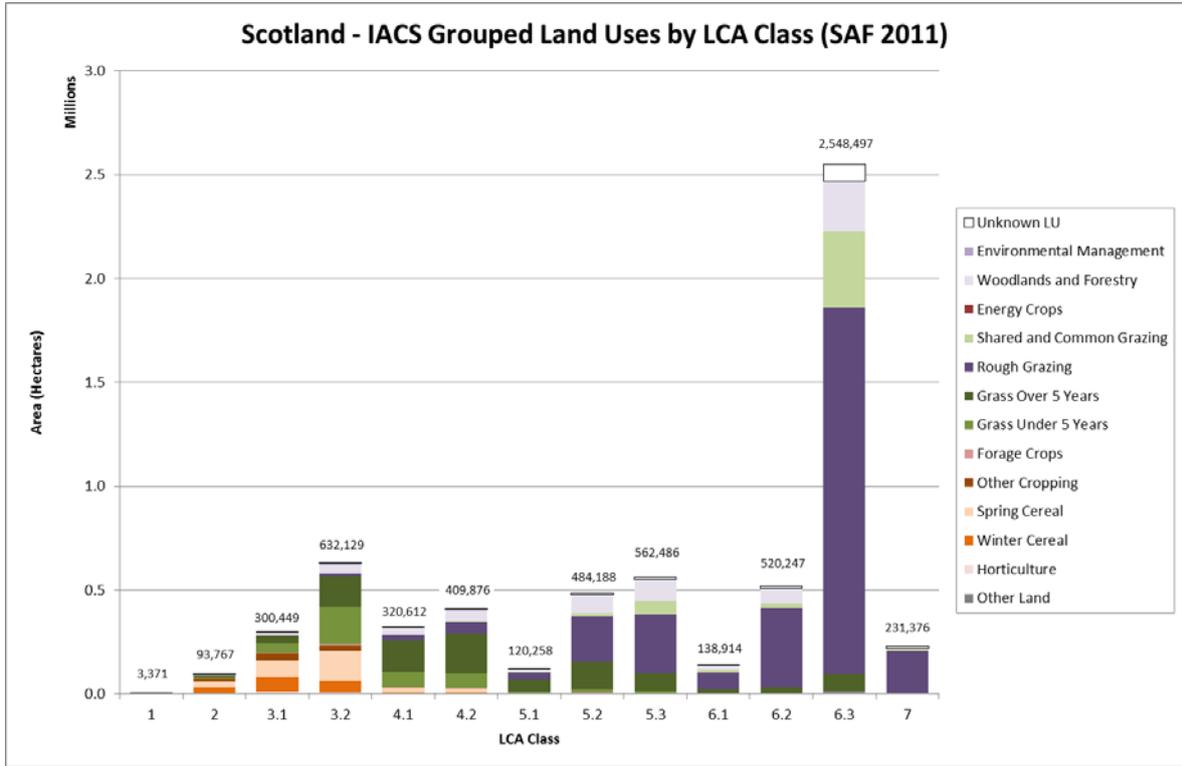
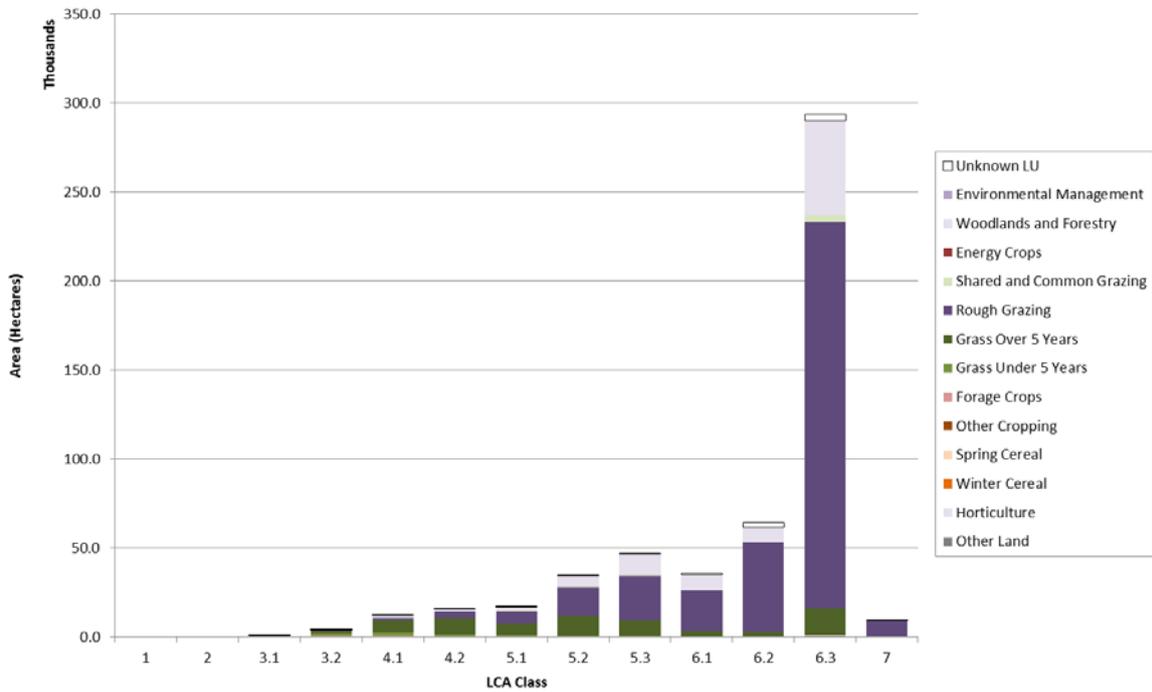


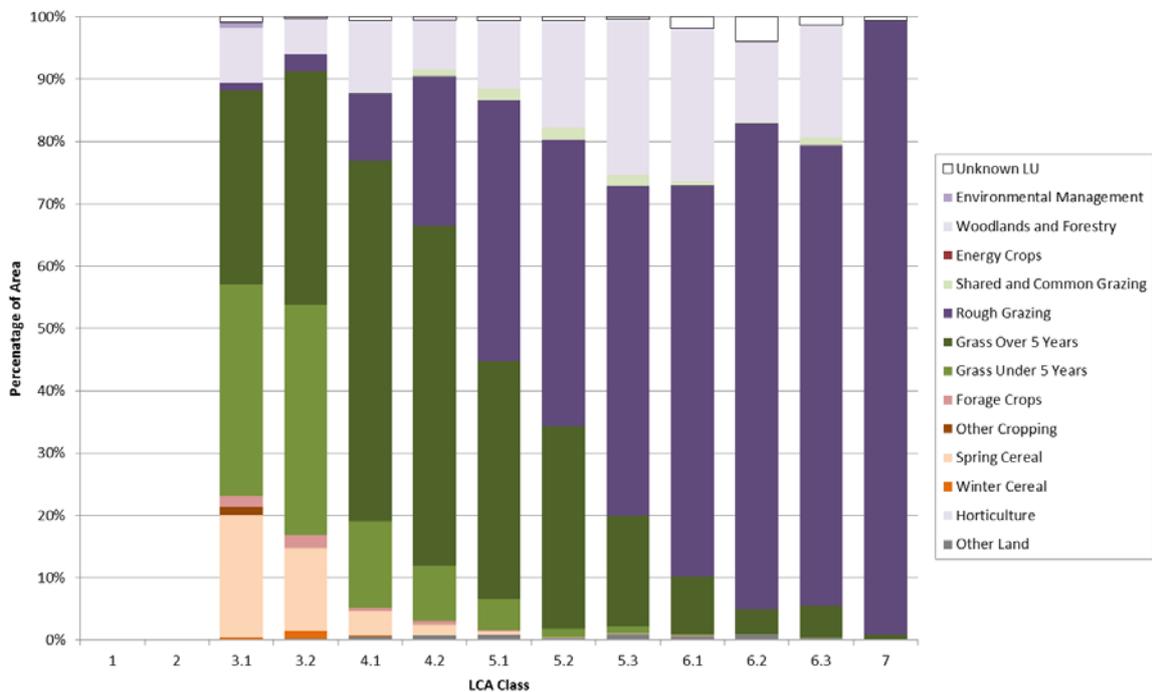
Figure 1: Agricultural Regions of Scotland

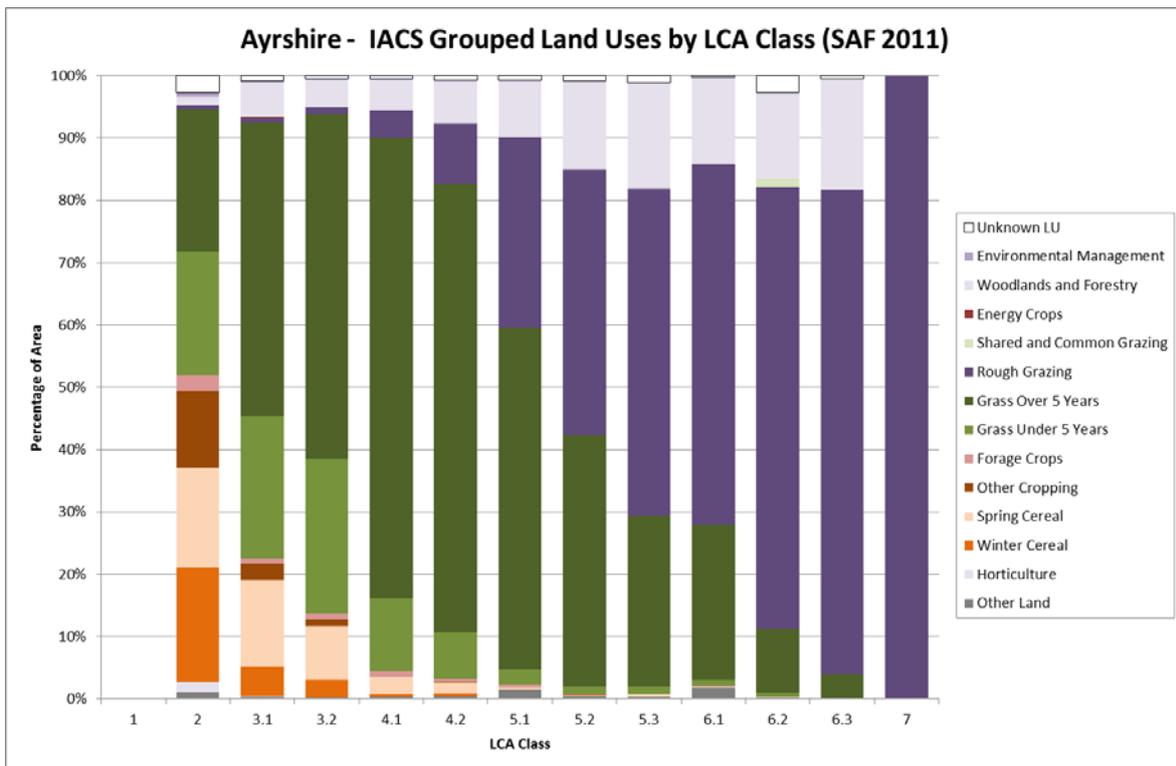
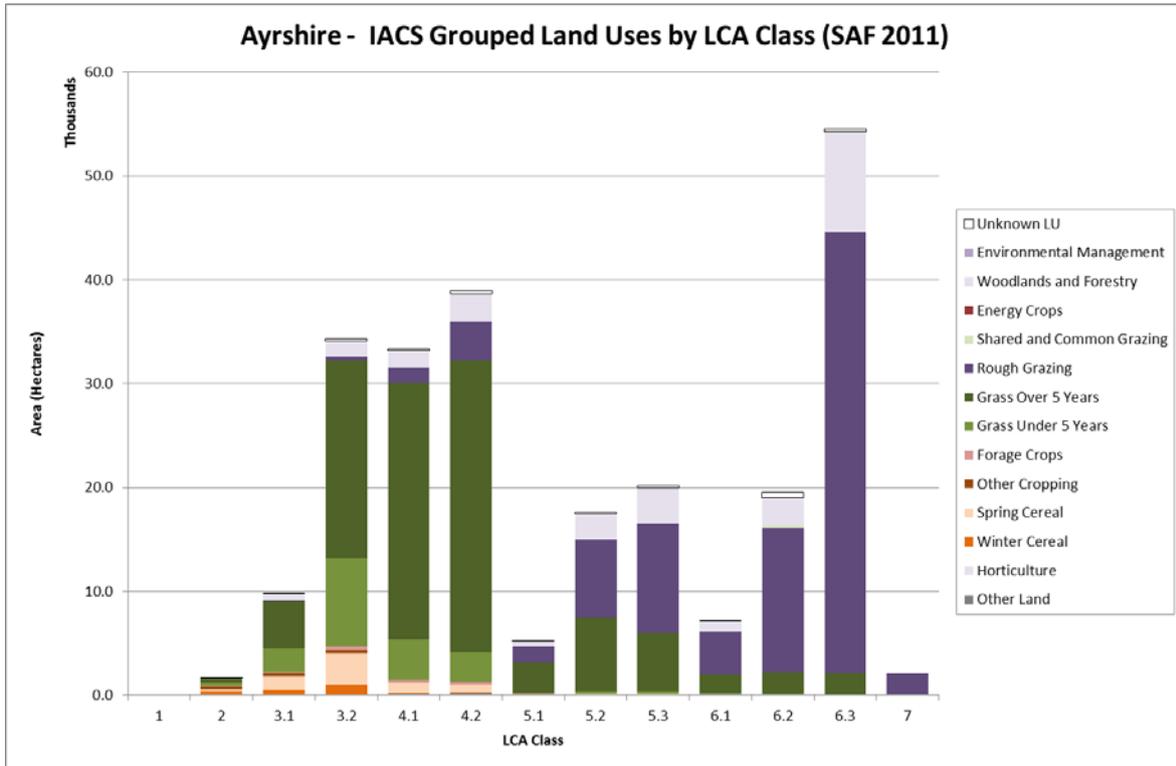


Argyll & Bute - IACS Grouped Land Uses by LCA Class (SAF 2011)

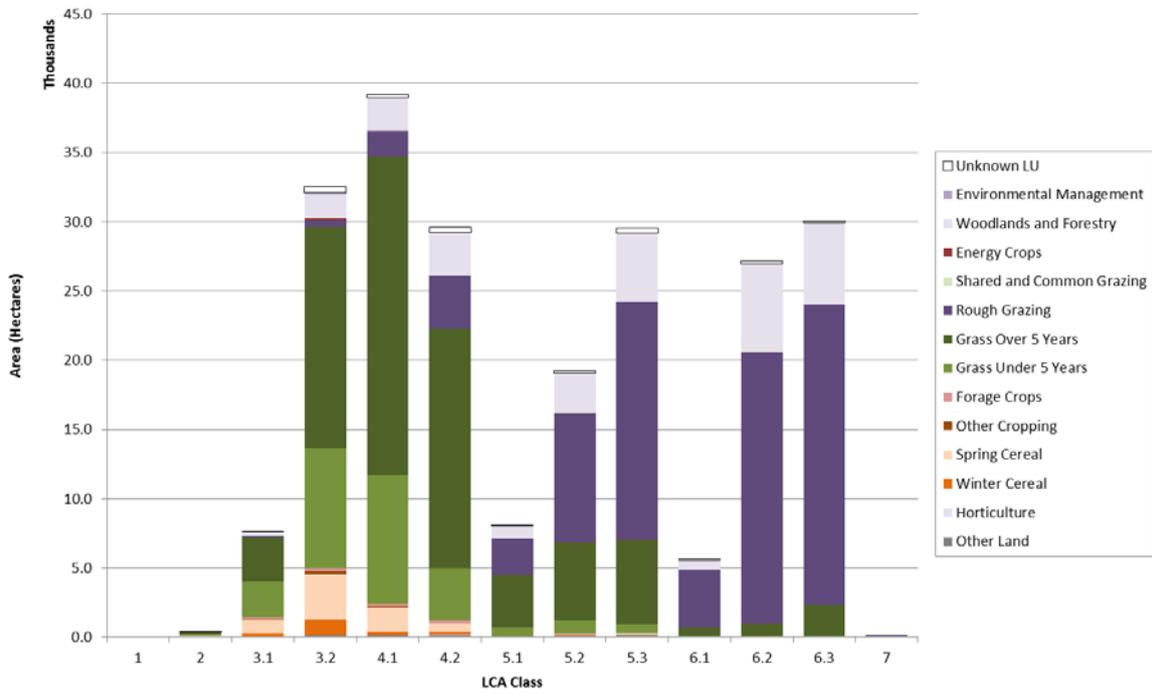


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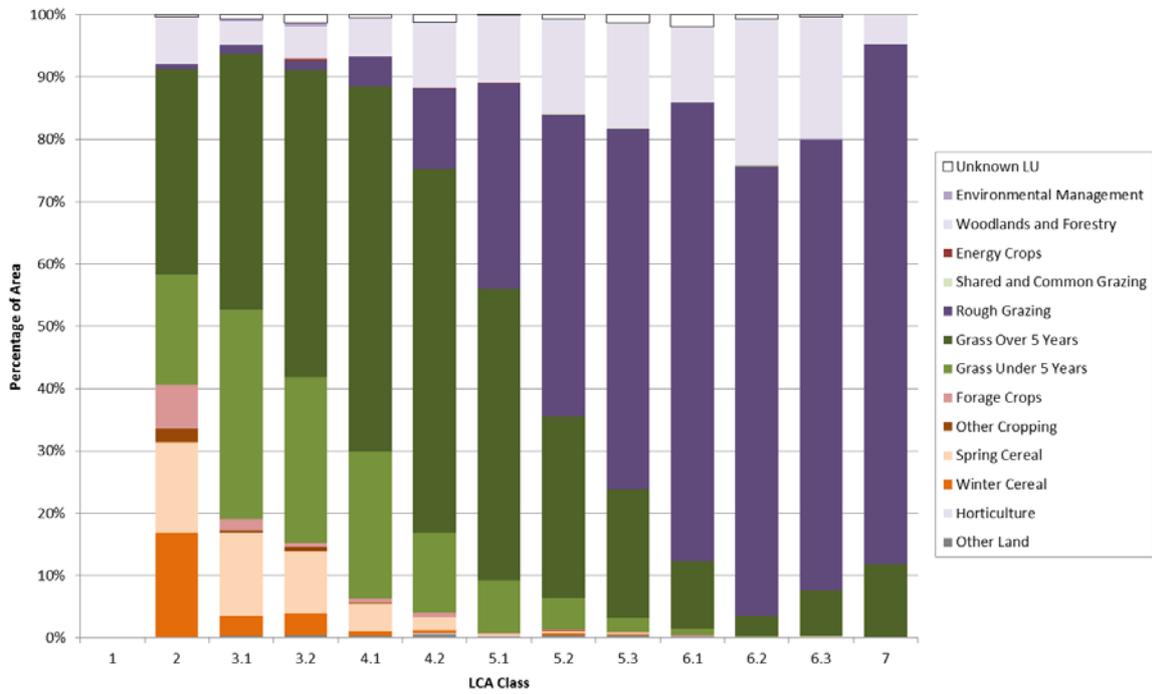


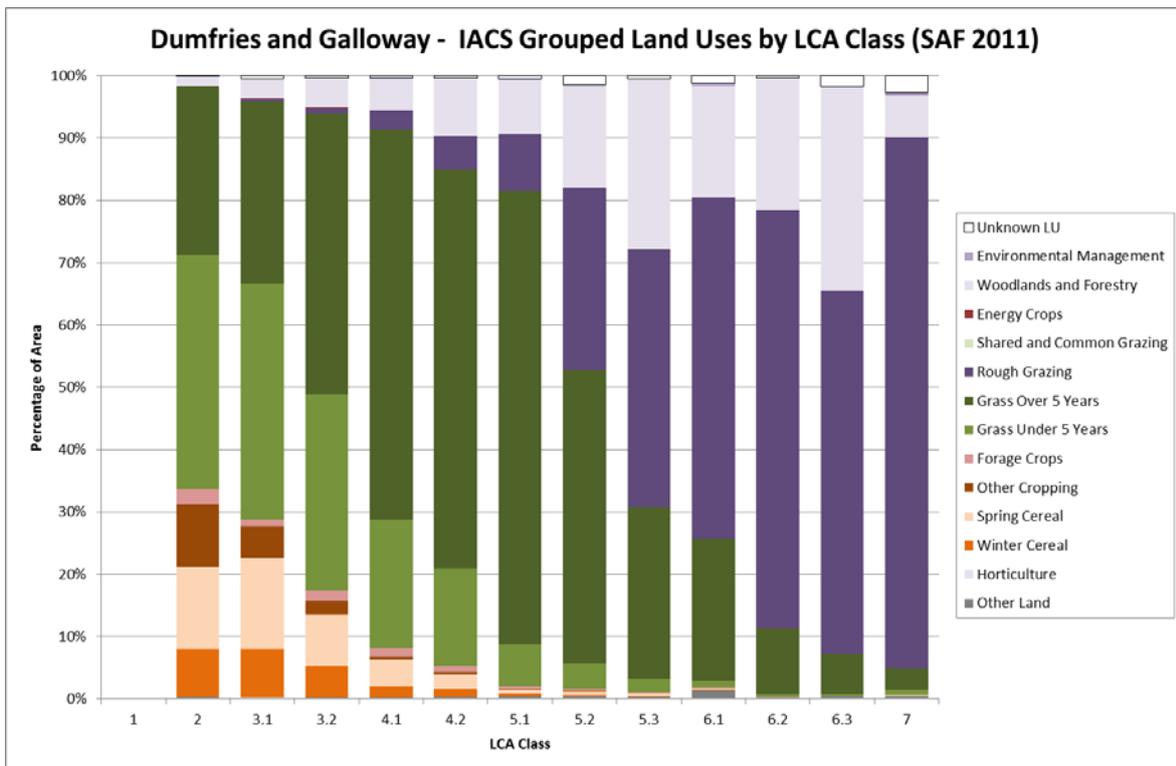
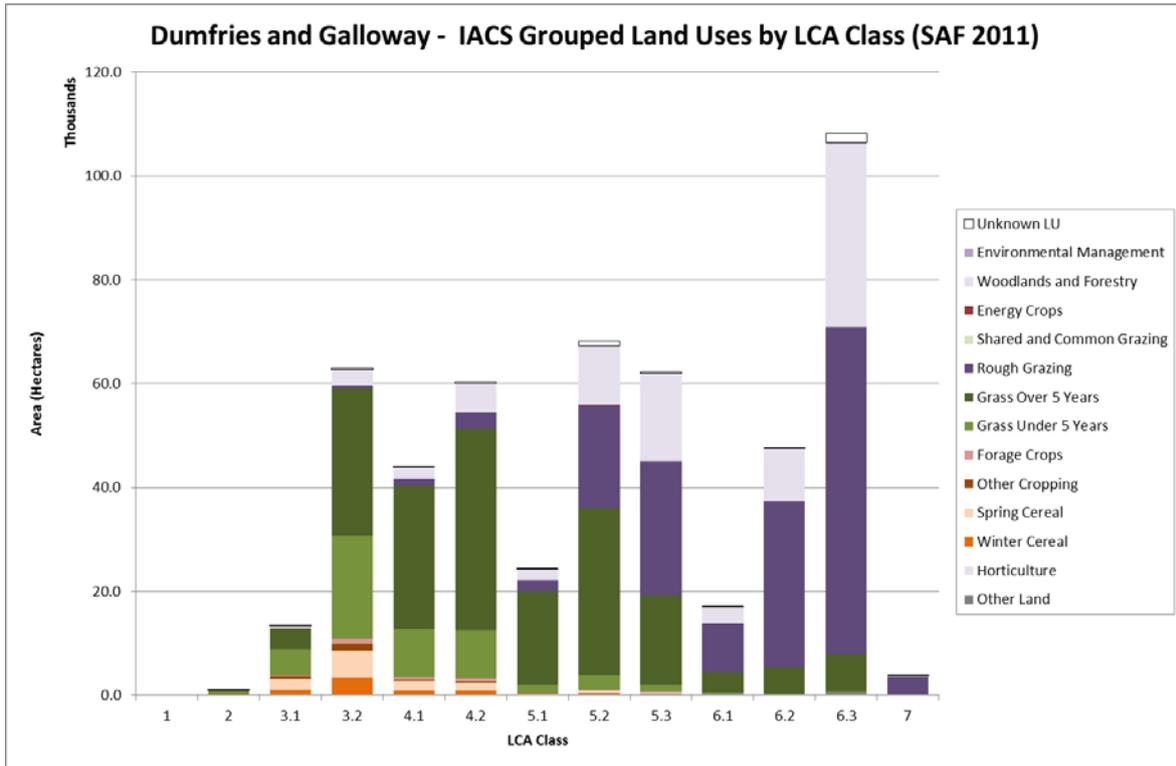


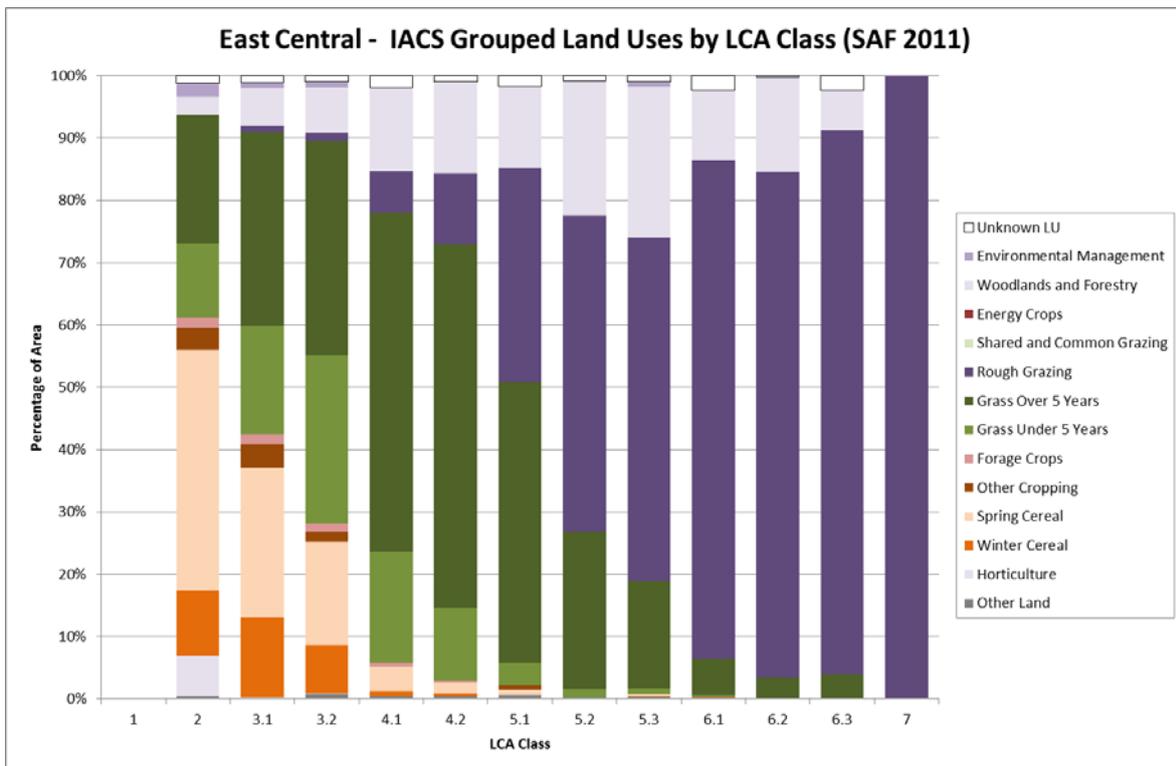
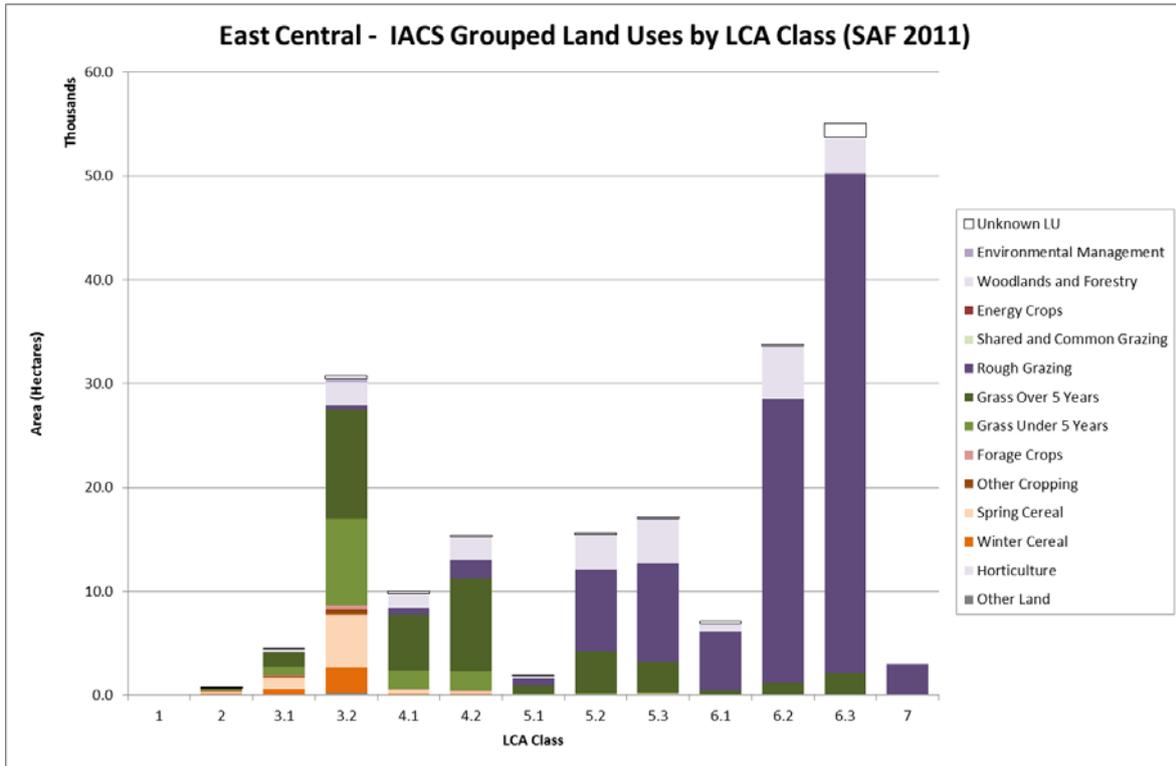
Clyde Valley - IACS Grouped Land Uses by LCA Class (SAF 2011)

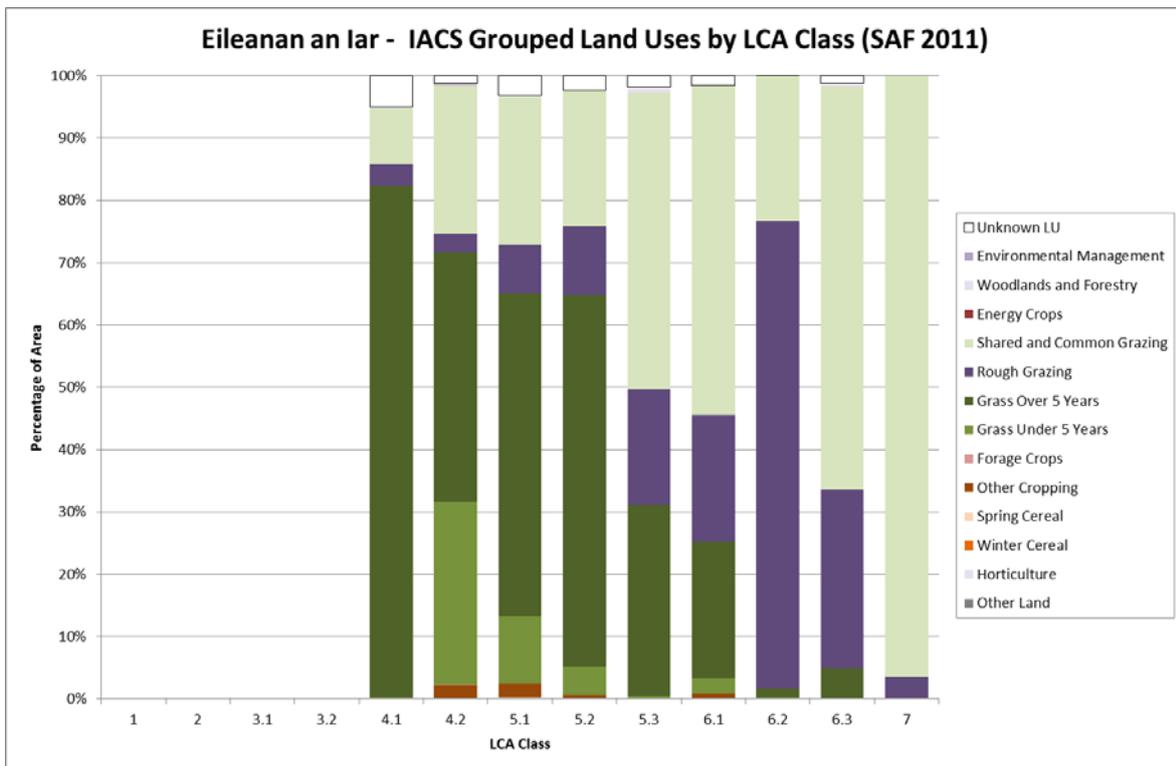
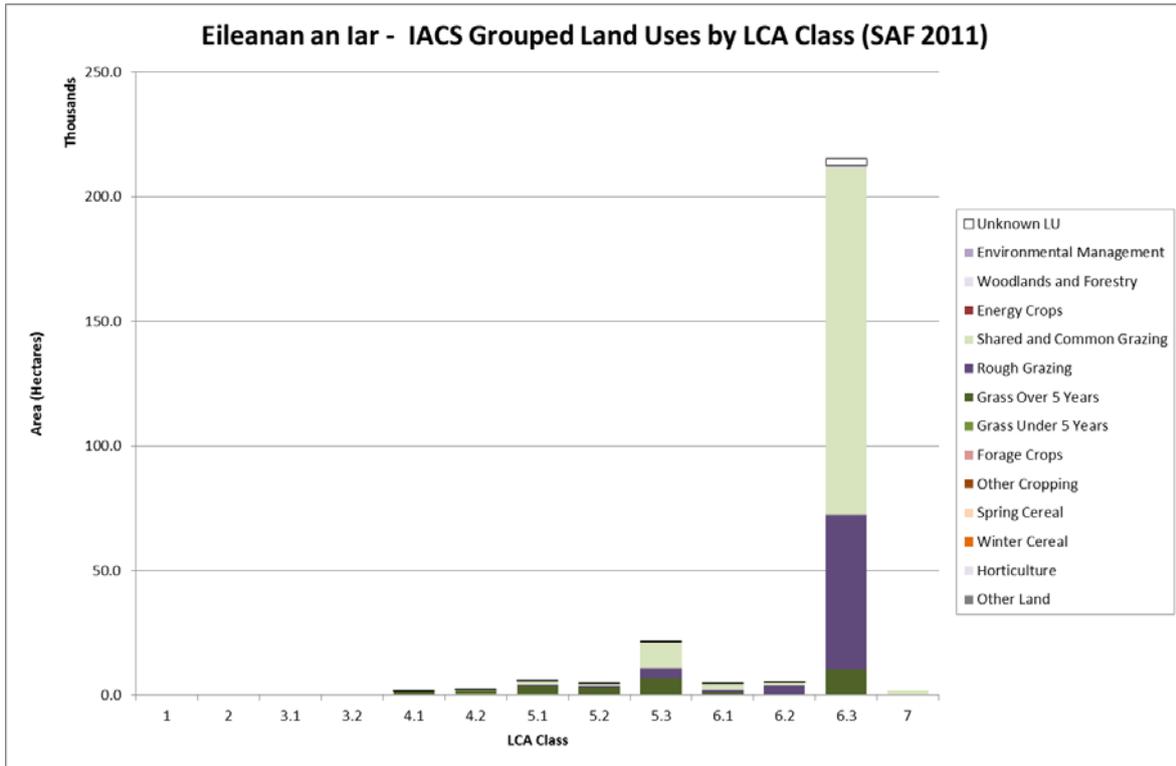


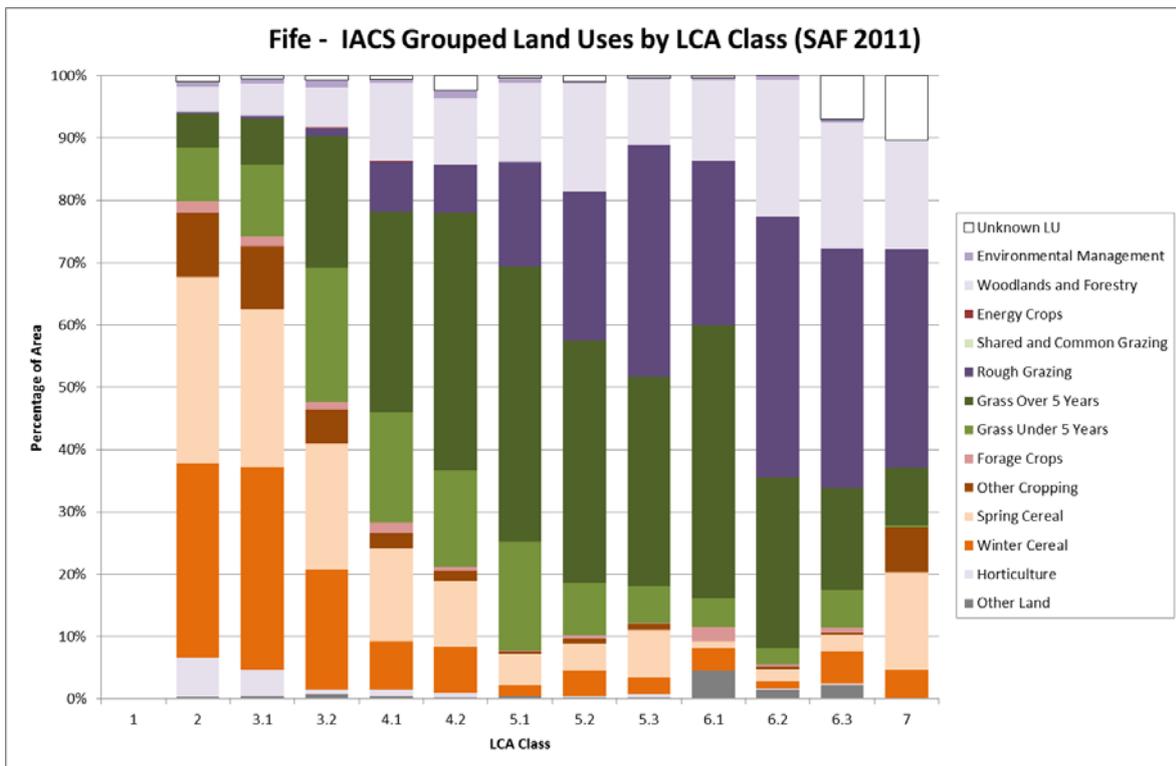
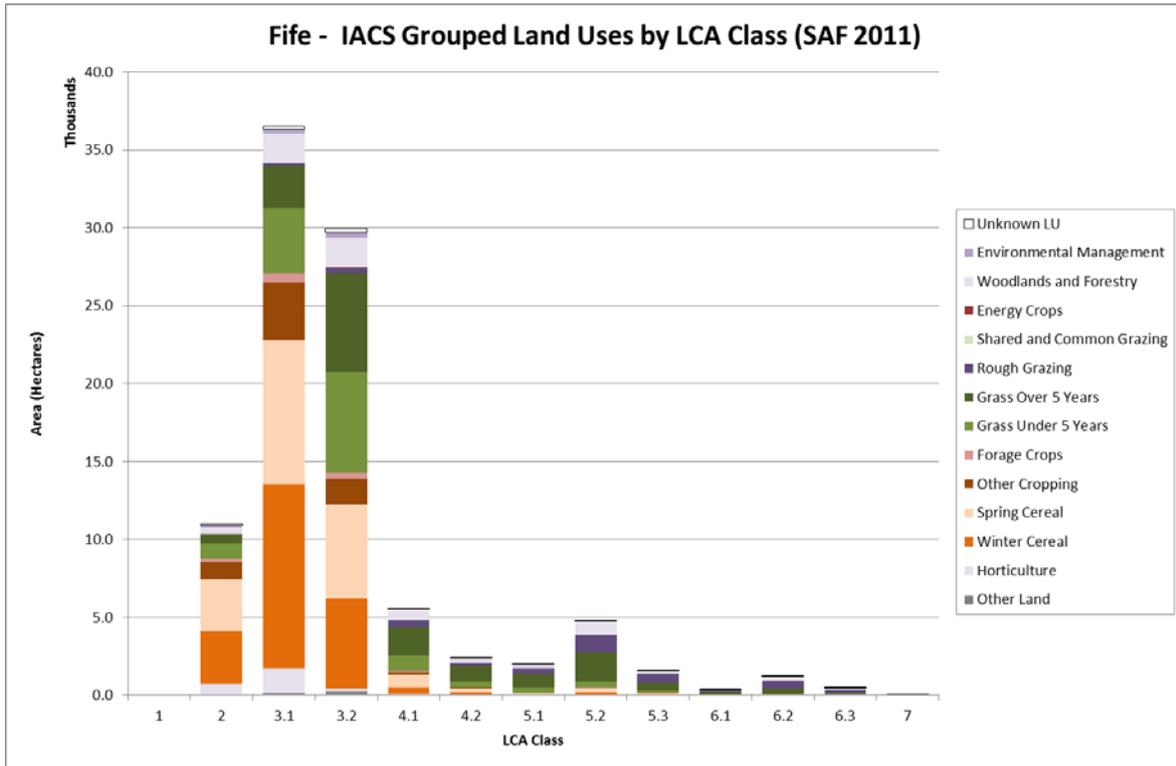
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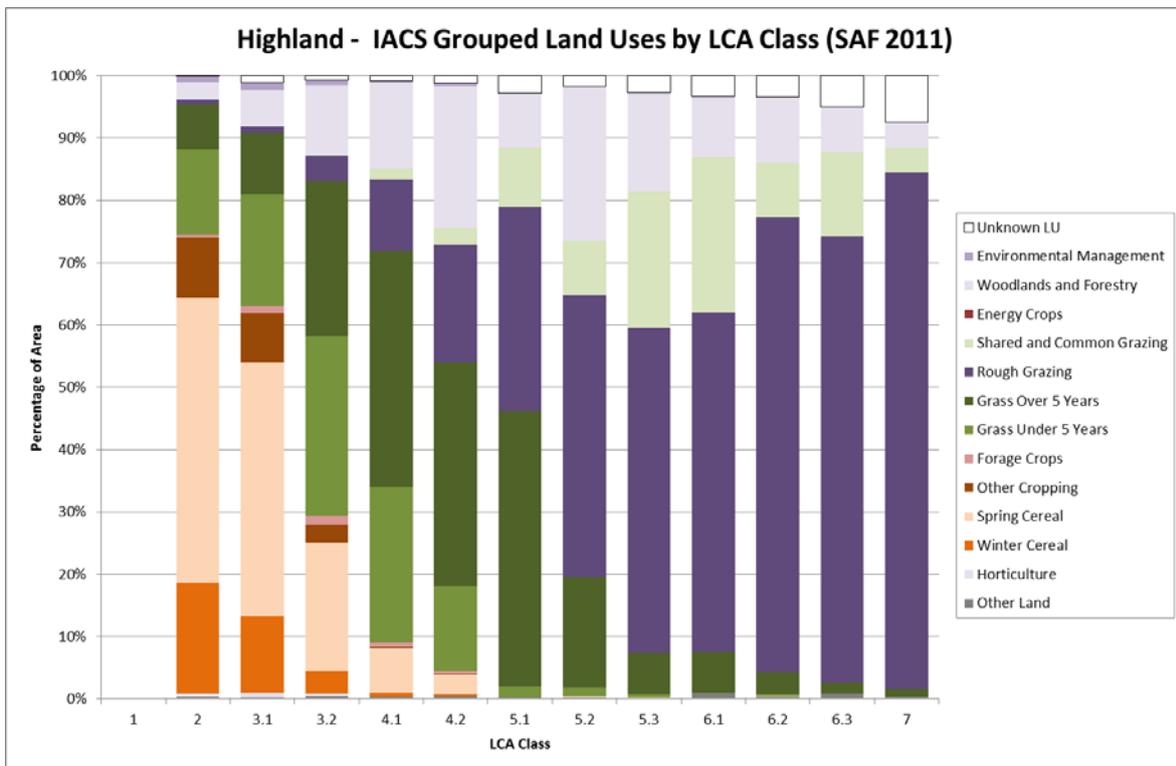
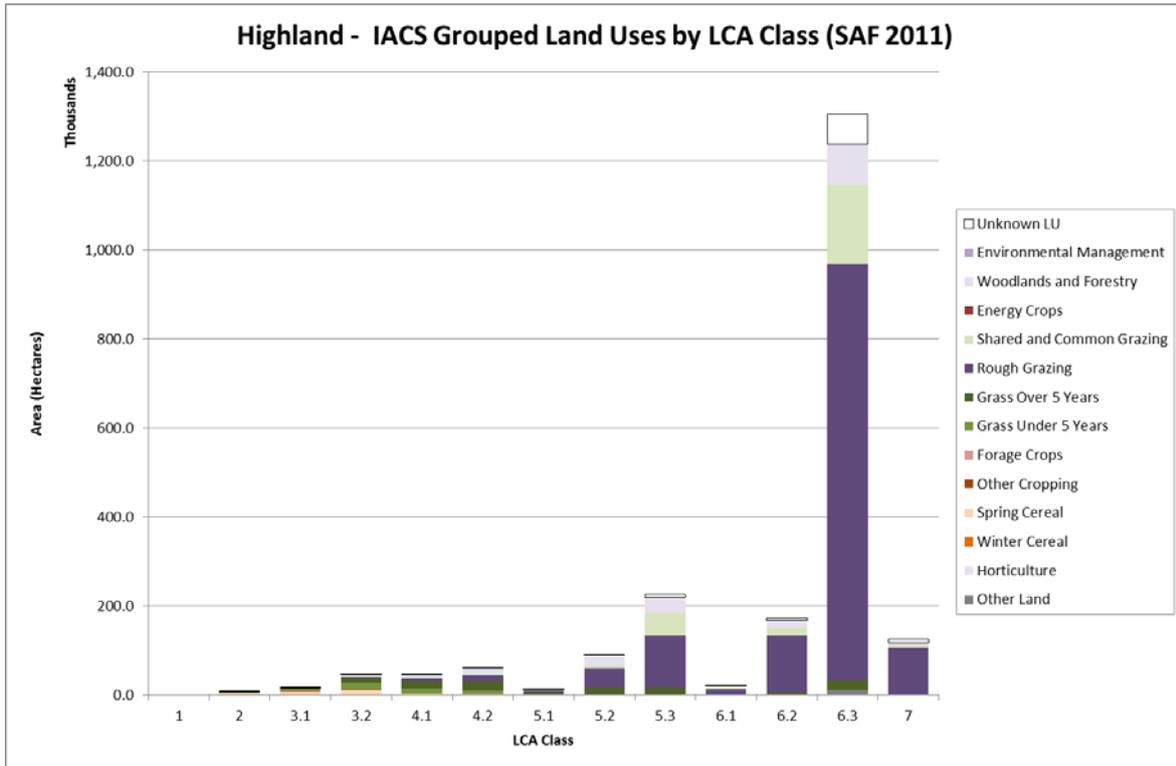


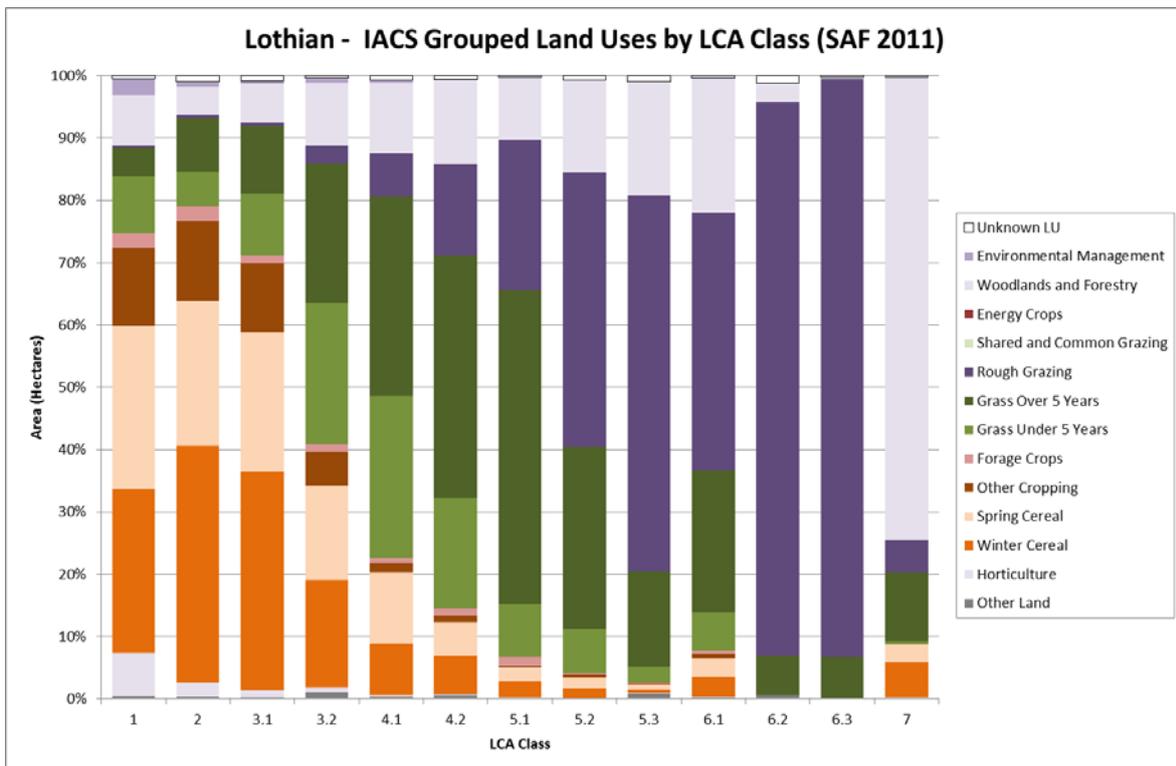
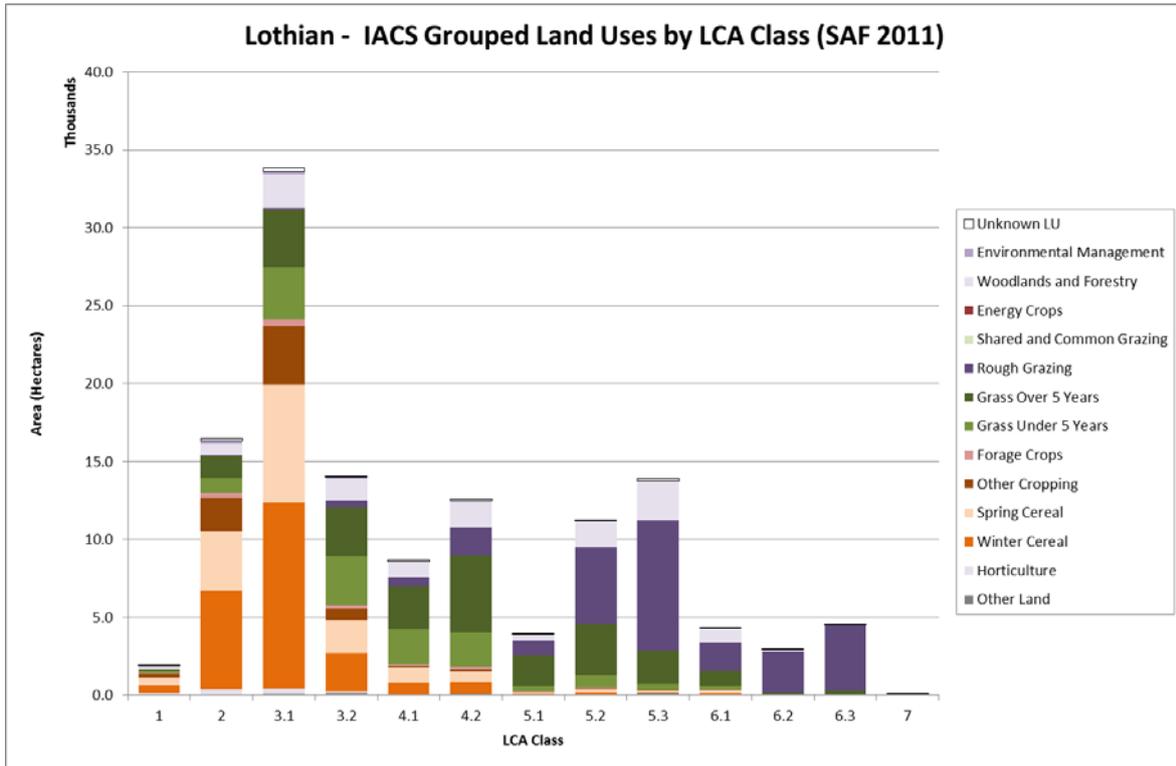


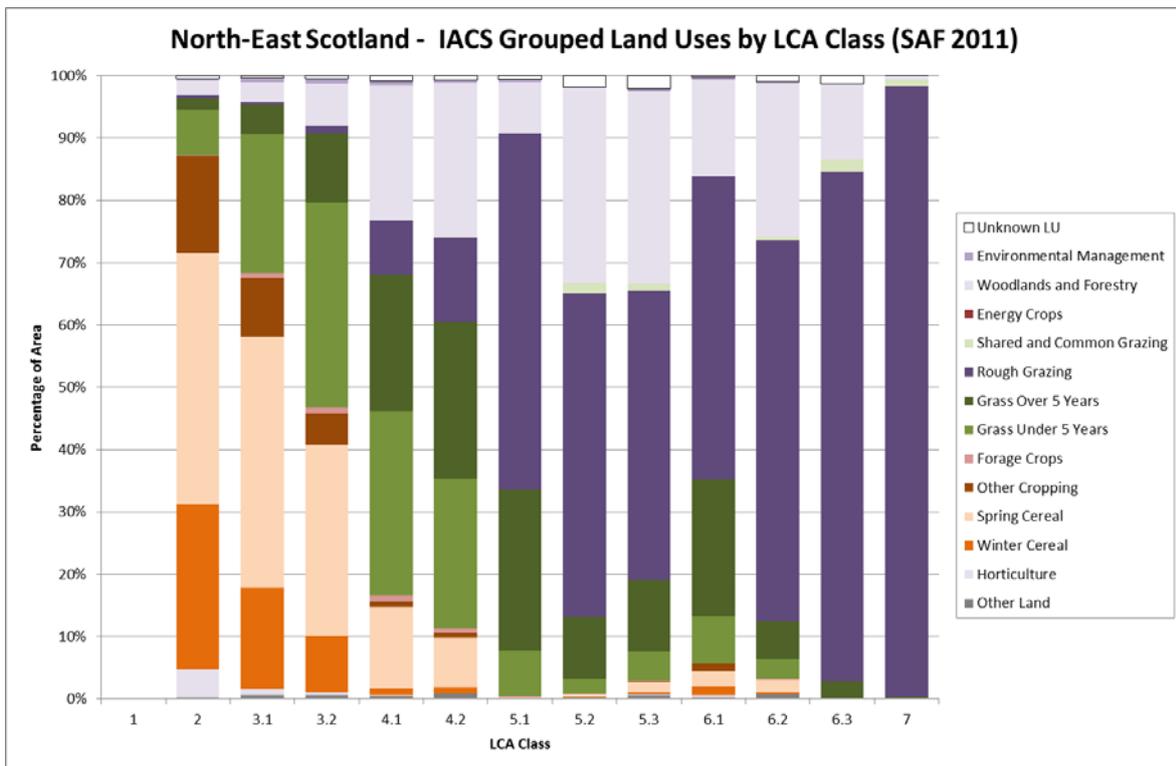
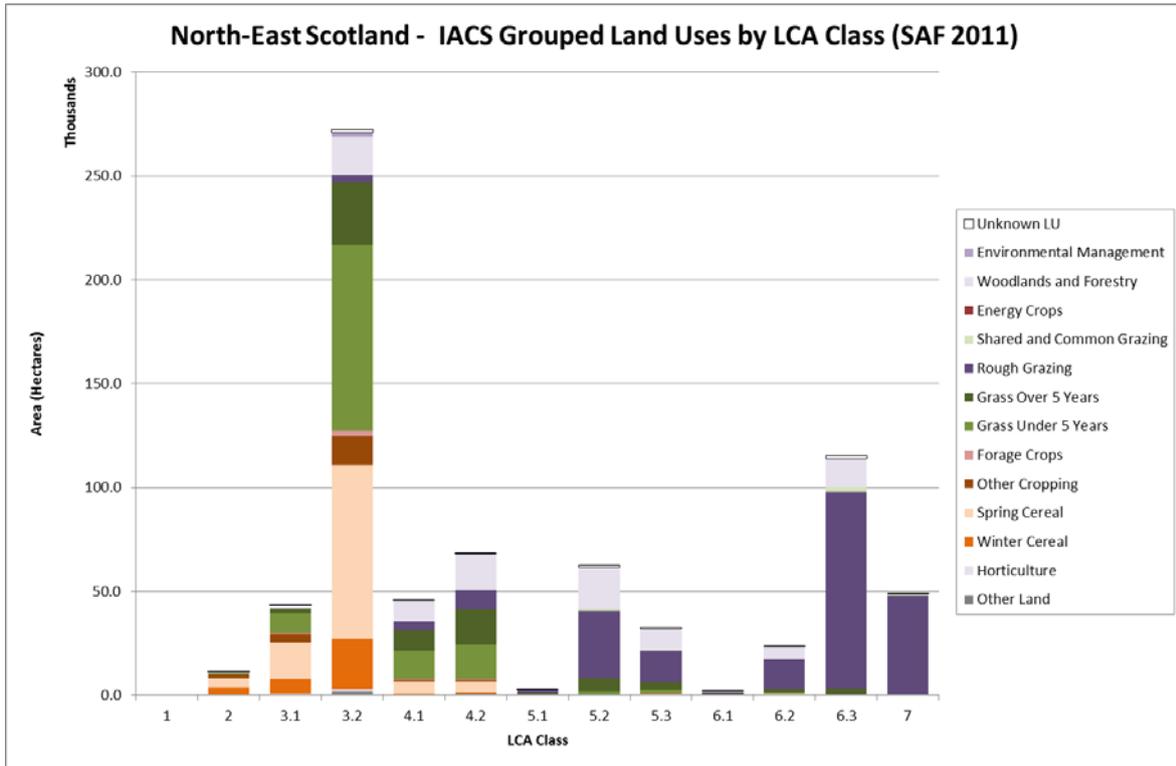


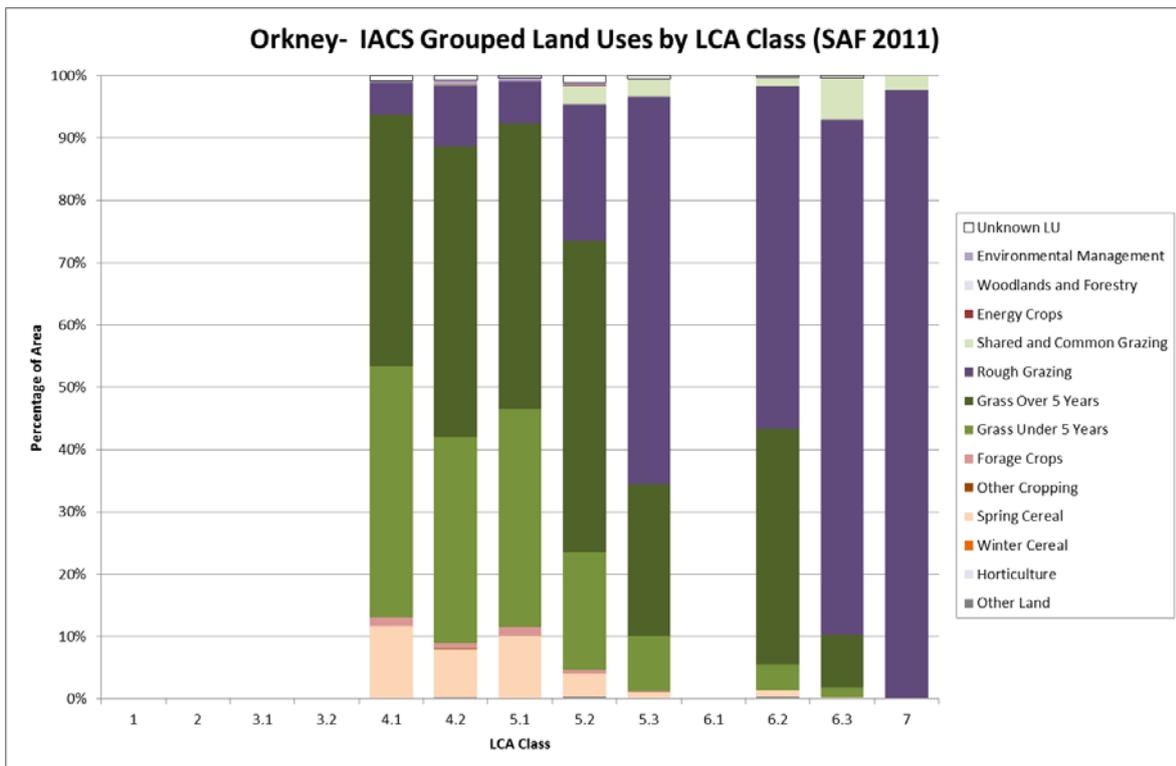
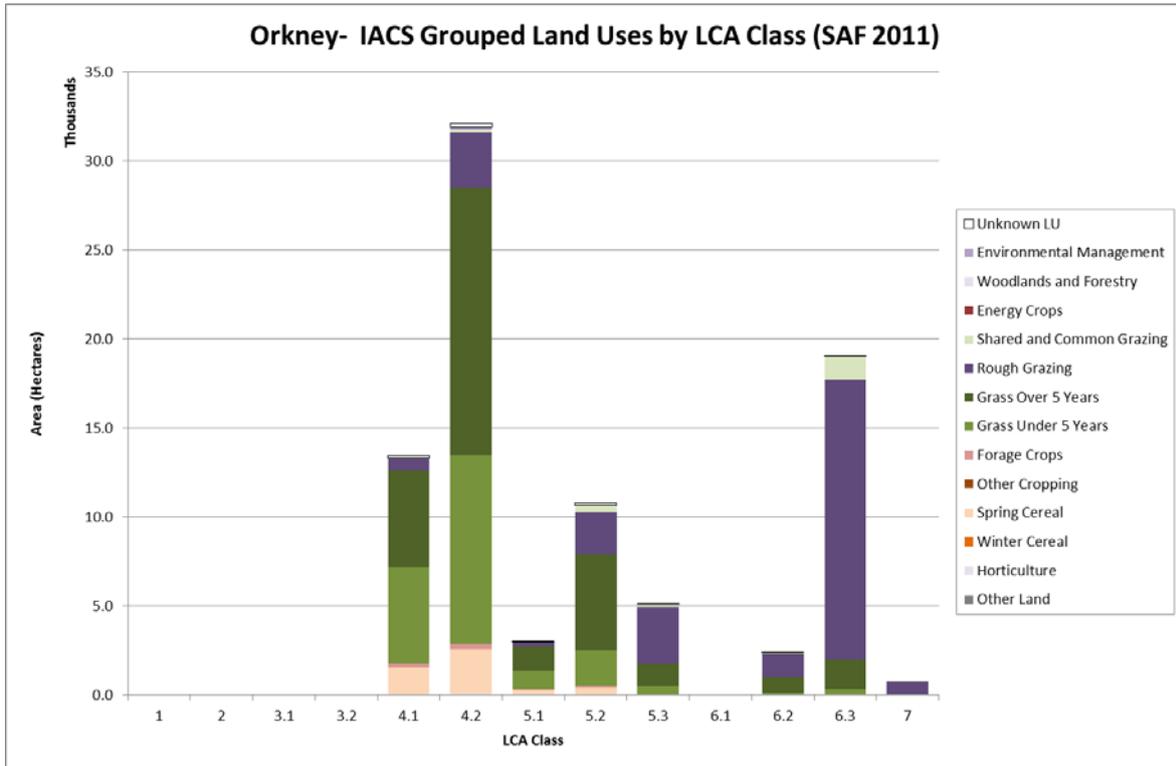


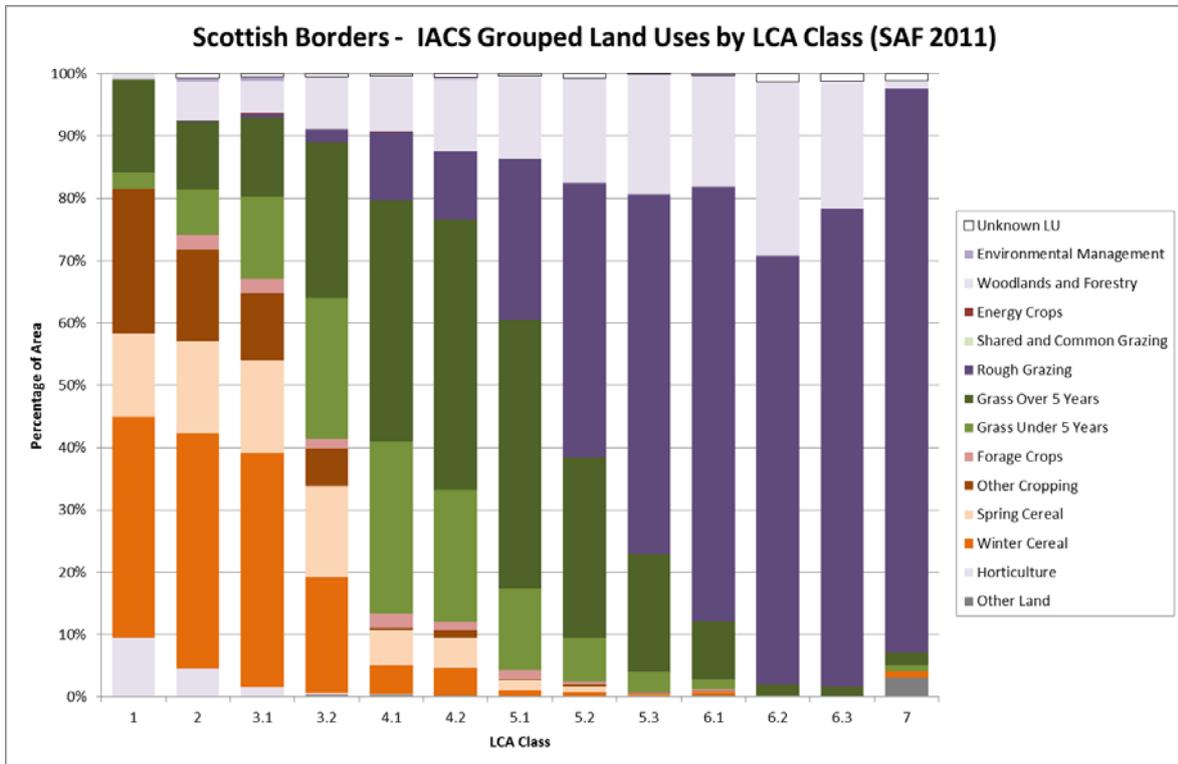
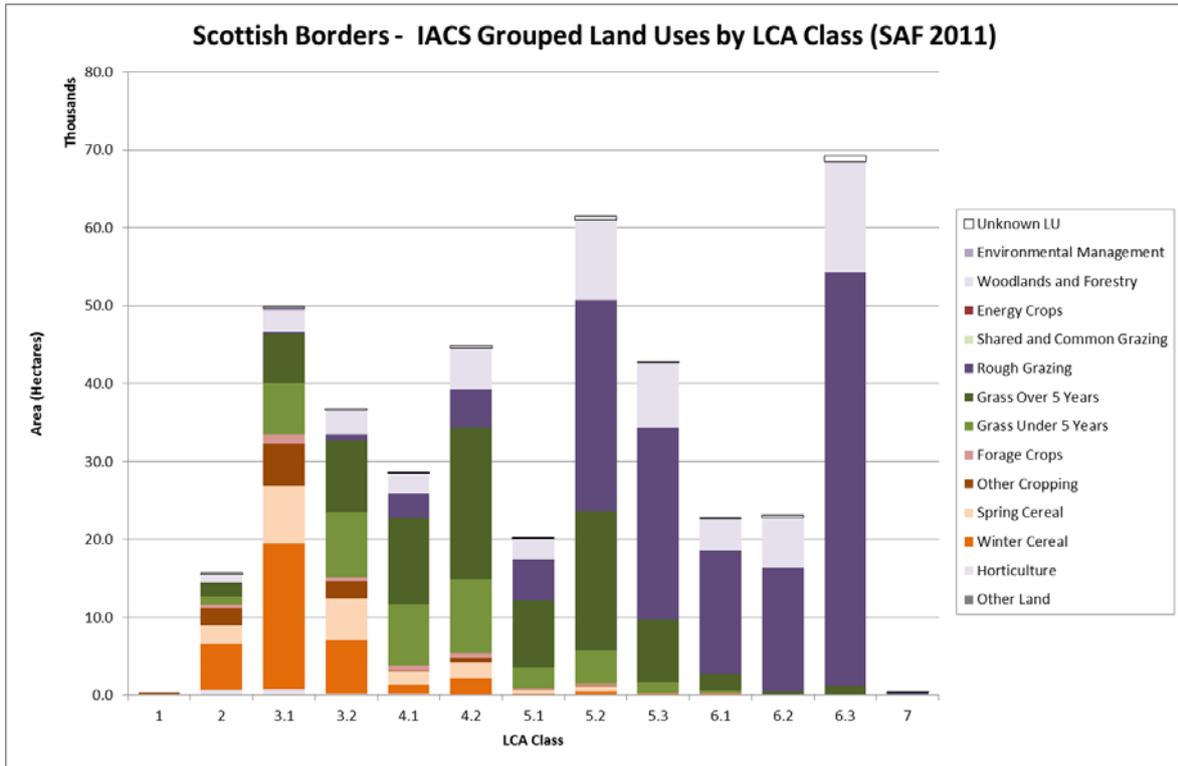




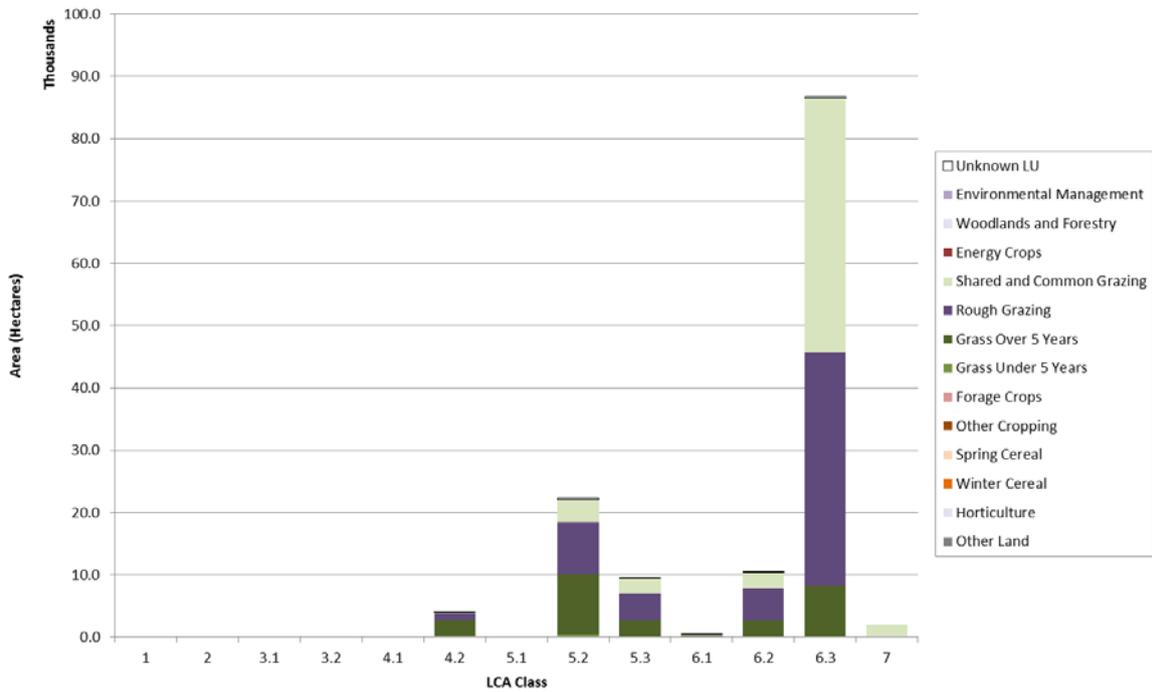




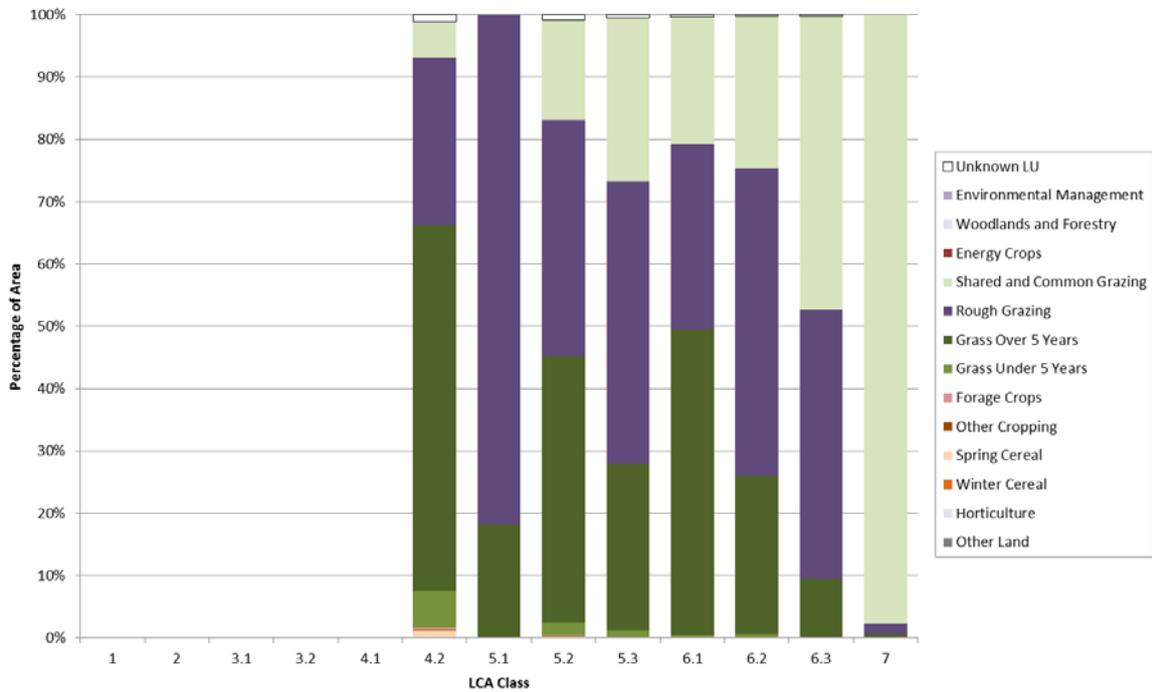


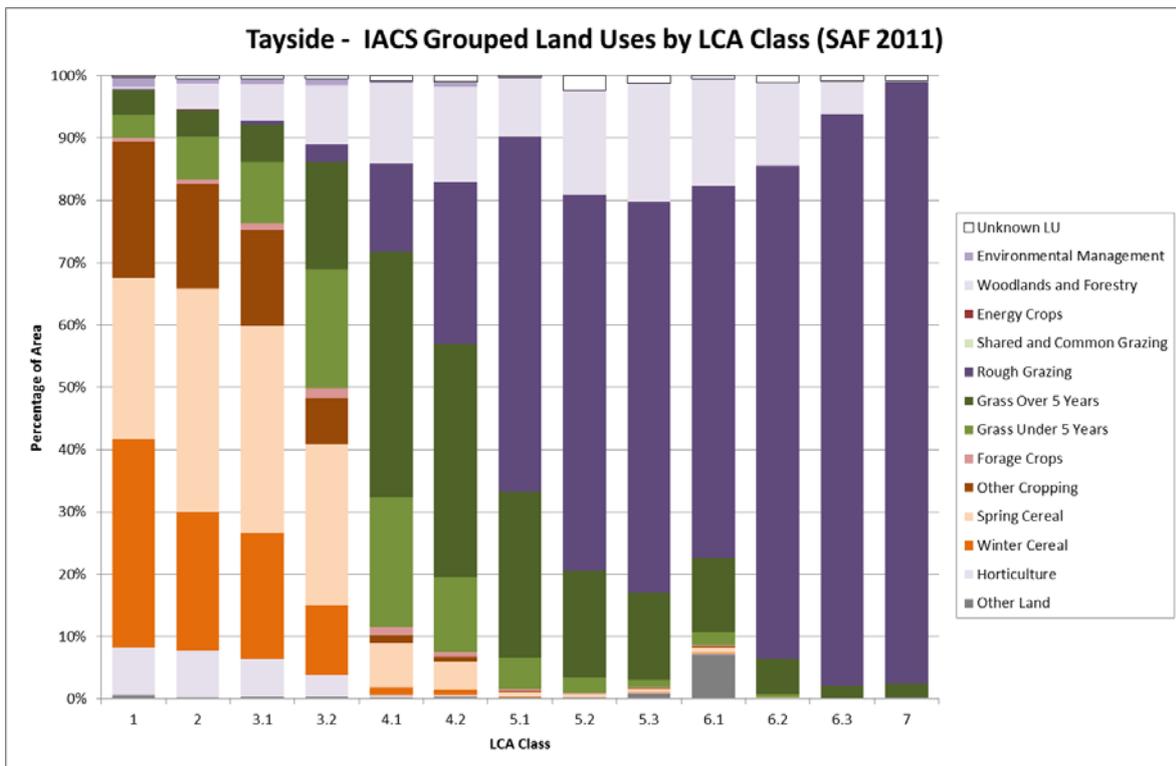
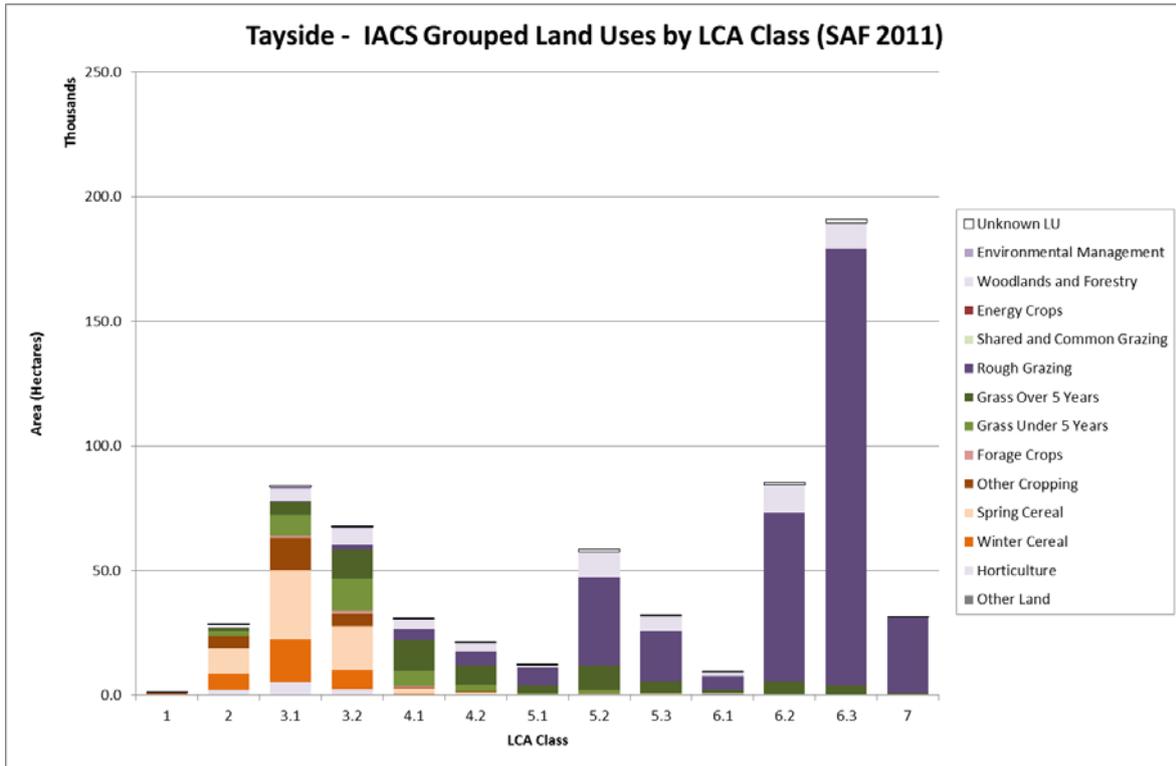


Shetland - IACS Grouped Land Uses by LCA Class (SAF 2011)



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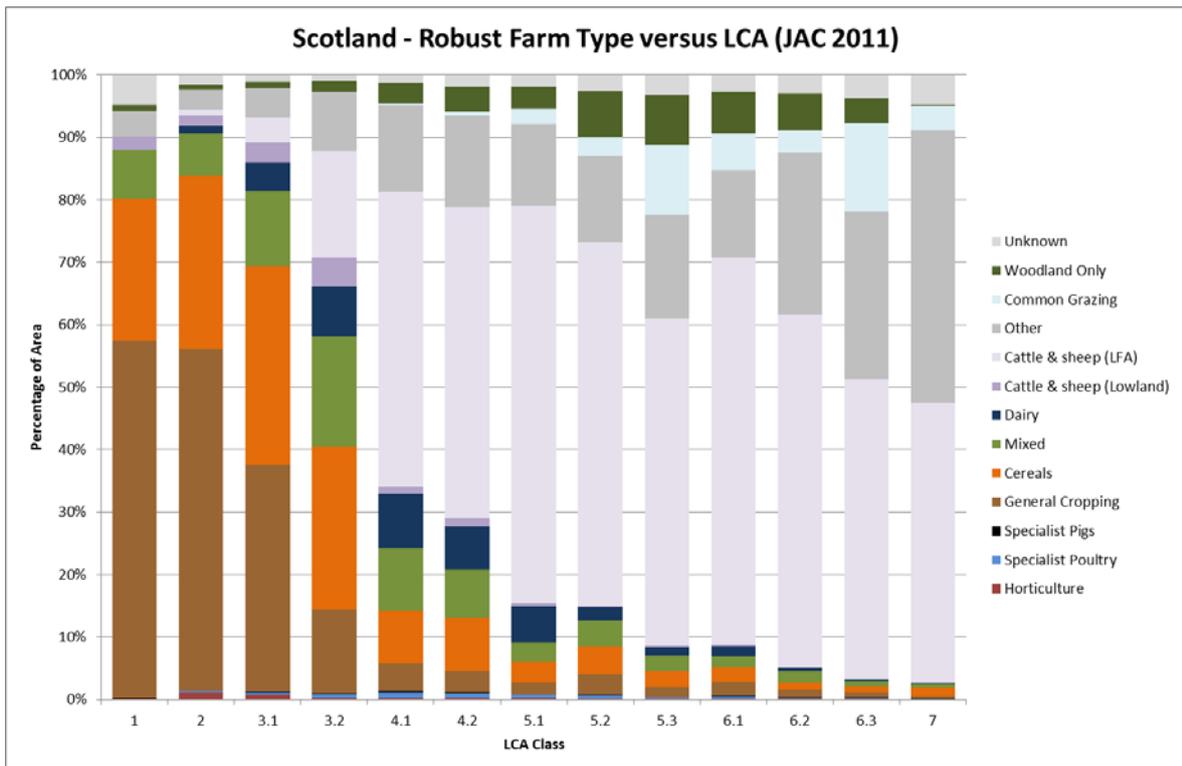
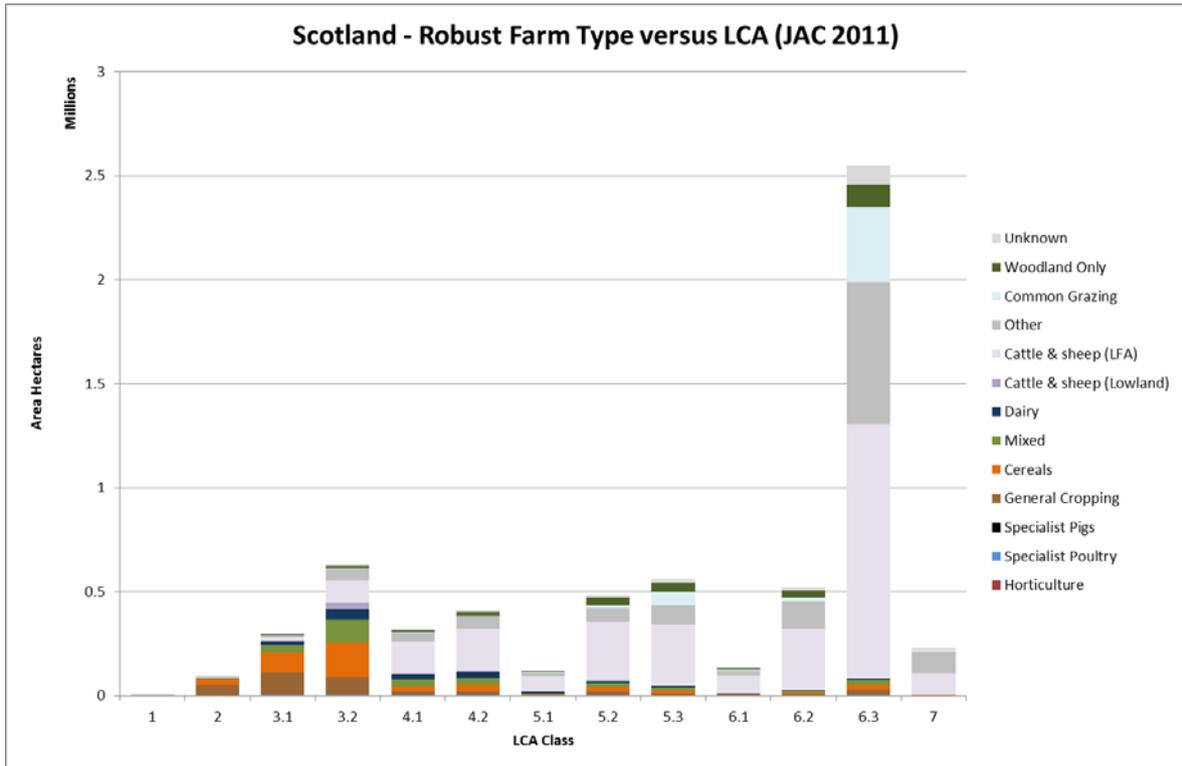




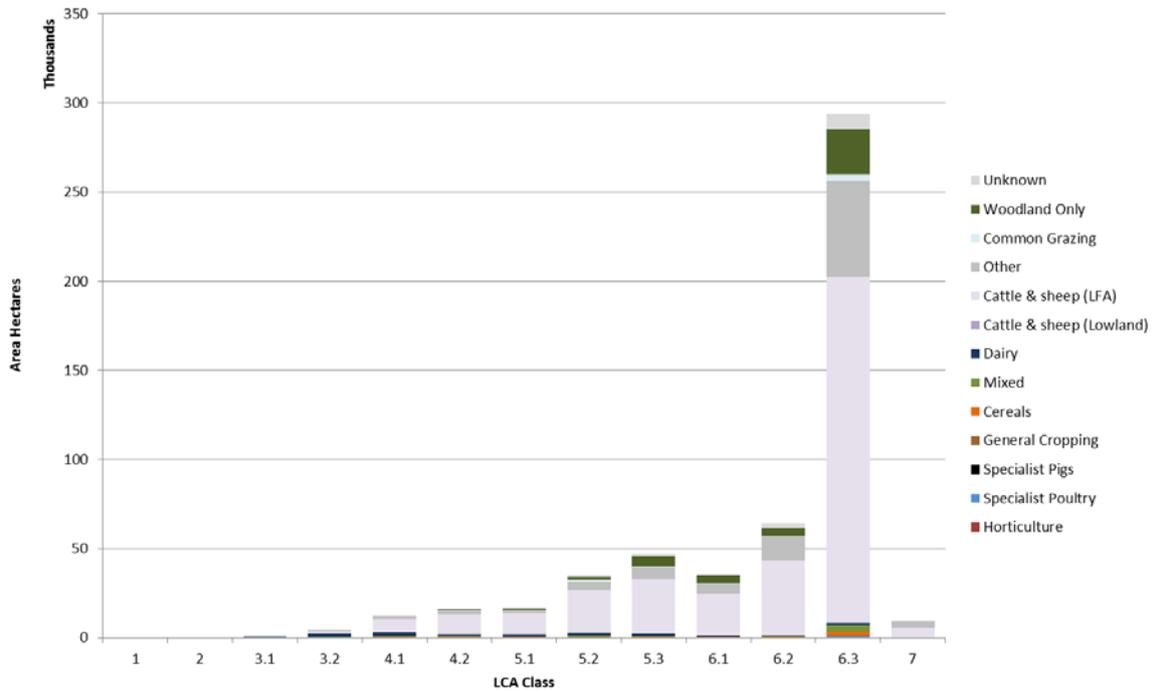
3.2. Robust Farm Type vs. LCA

Robust Farm Type for a holding is defined in the JAC based on the gross marginal financial value of the outputs from a holding. The type reflects the most important outputs from a holding but may not reflect the entire range of enterprises present. Thus a holding classified as a cereal farm may also have other land of lower quality devoted to other activities such as livestock or woodland. When farm type is cross tabulated against LCA this means that farm types (such as cereals) associated with better quality lands appear against higher numbered LCA classes (i.e. lower quality land). This does **not** mean that the **land uses** occur on the LCA classes in question. Rather that the holding within which these activities occur also owns/uses lower quality land for purposes that do not change the farm type classification of the holding. This is a key aspect in the interpretation of LCA and its relationship to business or holding structures. While some holdings are relatively homogenous in terms of their LCA mix, there are others (and not only those of larger sizes) that have a wider range of LCA classes present. This may reflect smaller pockets of poorer quality land (e.g. organic soils within holdings in the lowlands of the NE of Scotland) or holdings lying across significant changes in relief or geology (e.g. between the lowlands of the Mearns and the uplands to the north). Particularly for LCA classes with very small areas, interpreting the percentage chart needs to be undertaken carefully since in this case small mismatches between the mapped data sets may generate artefacts or significant proportions of the class may be owned by a small number of holdings that means the class can be dominated by one or two farm types.

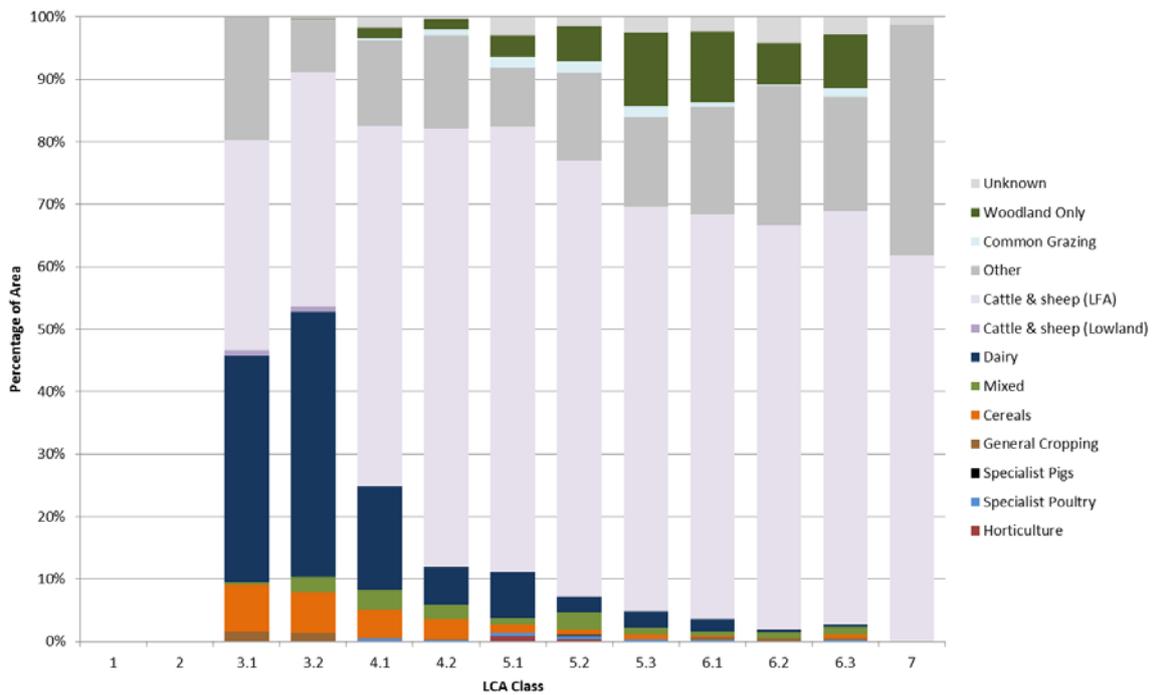
The figures that follow present the areas and percentages of each farm type per LCA class for Scotland as a whole and for the Agricultural Regions. In addition to the robust farm types defined by JAC two other classes have been added – Common Grazing and Woodland Only holdings. These holdings appear in IACS but not in JAC so it has been necessary to derive their farm types as part of this analysis. Where more than 90% of a holding is defined as Common Grazing in IACS and does not appear in JAC then this has been classified as a Common Grazing. It should be noted that within IACS there are also areas of rough grazing that have no farm type defined. It is a possibility that these areas and associated improved grasslands are also part of common grazings since the area explicitly included within IACS is smaller than the overall estimated area of common grazings (even accounting for those areas known to be outwith the IACS mapping). There are 56,526 of 78,118 ha of rough grazing in otherwise unclassified holdings that occur where rough grazing makes up 95% or more of the holding. Since there remained uncertainty over the nature of these holdings, however, the decision was ultimately taken to include this area within the Unknown Farm Type class. The Woodland Only holdings were similarly defined as holdings where more than 90% of the land is recorded as woodland classes. Note that in some cases where land use data has come only from NFI then a holding could be misclassified since the classification does not take into account unknown land uses in determining the percentage of woodland cover. While inspection of the data to date has not highlighted this as major issue further analysis would be required to determine the extent. Finally there is the Unknown Farm Type, 116,689 ha (<2%) where the issues are similar to the previous class but there is land use data present which could be used to derive a farm type. This land would include the 78,118 ha of rough grazing that could be part of common grazings or the 'Other' robust farm type.

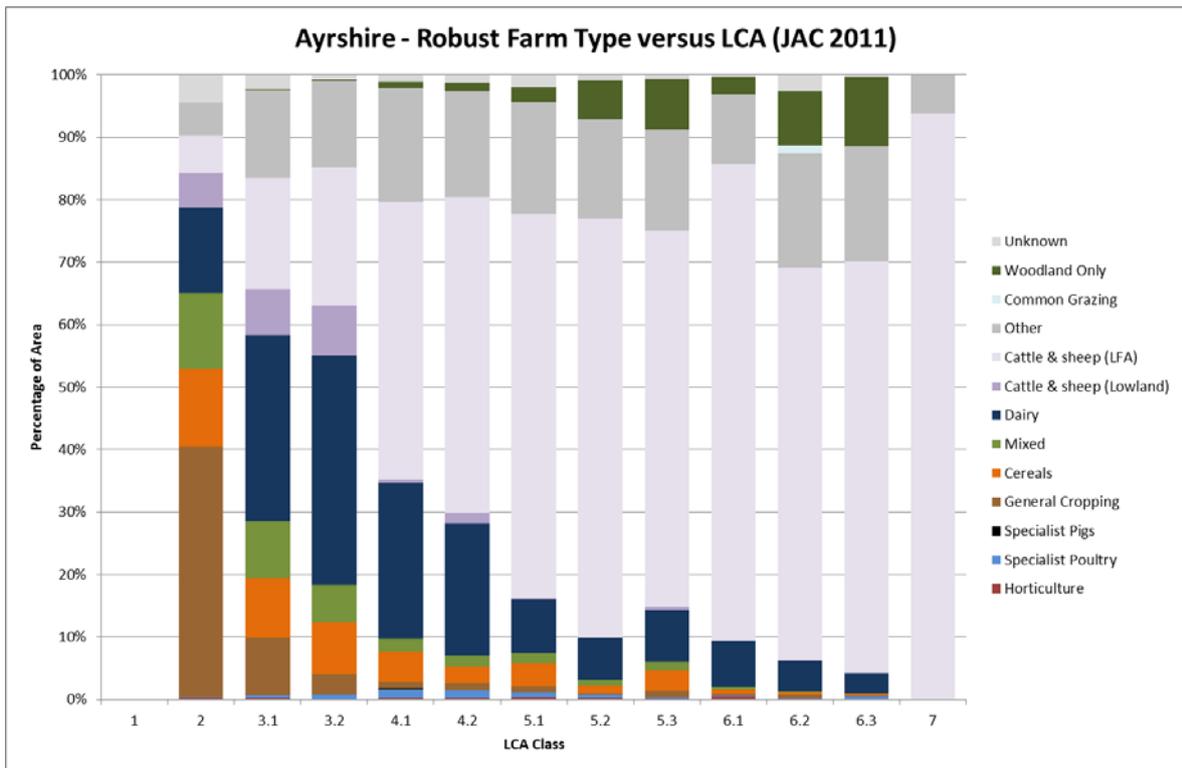
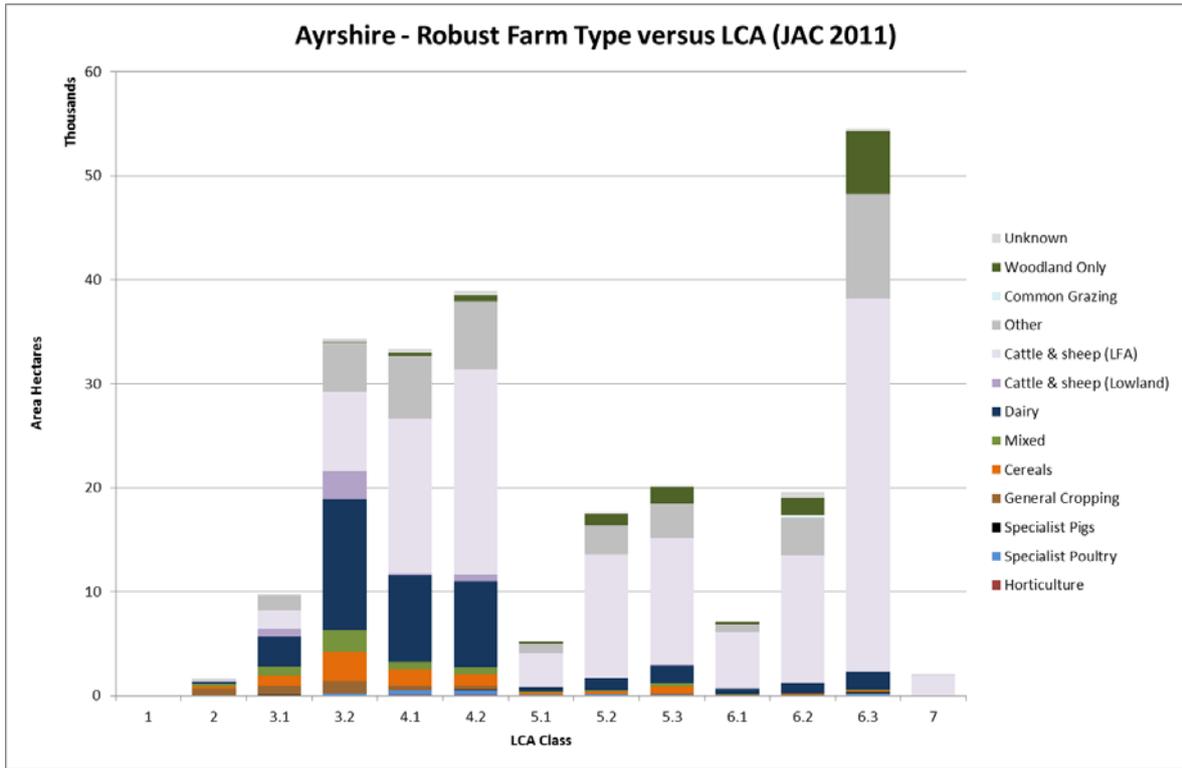


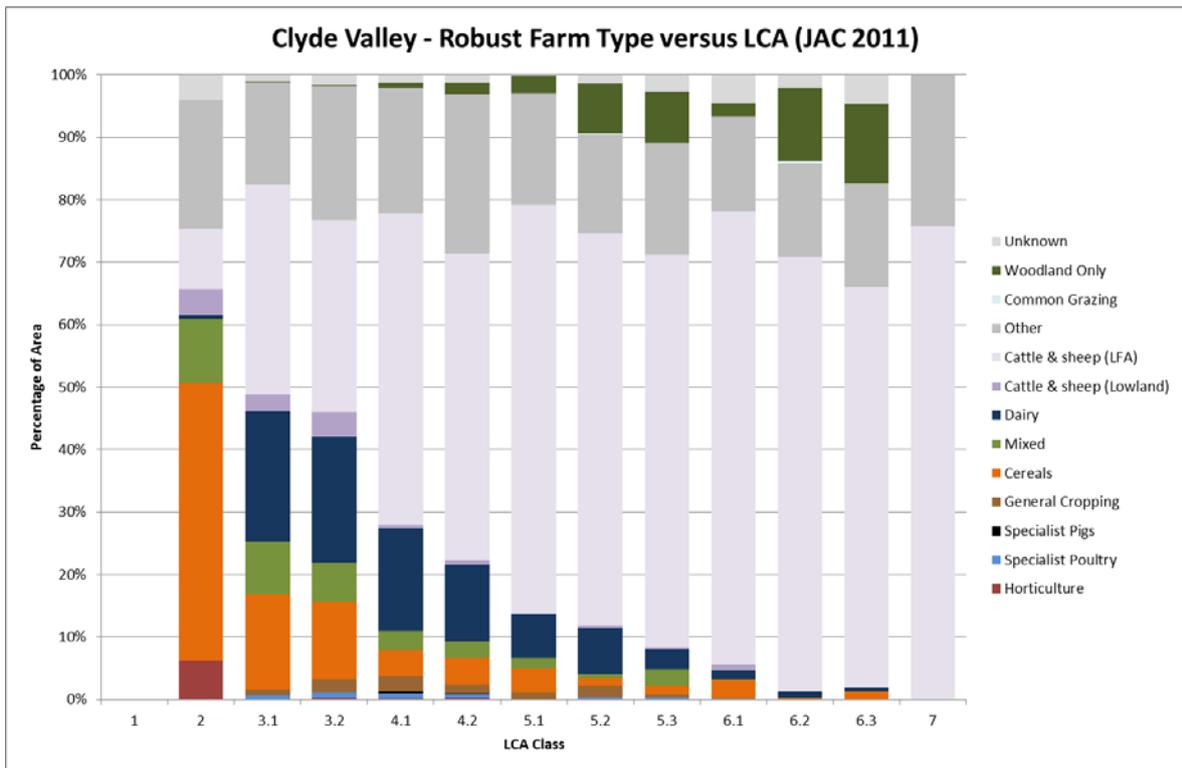
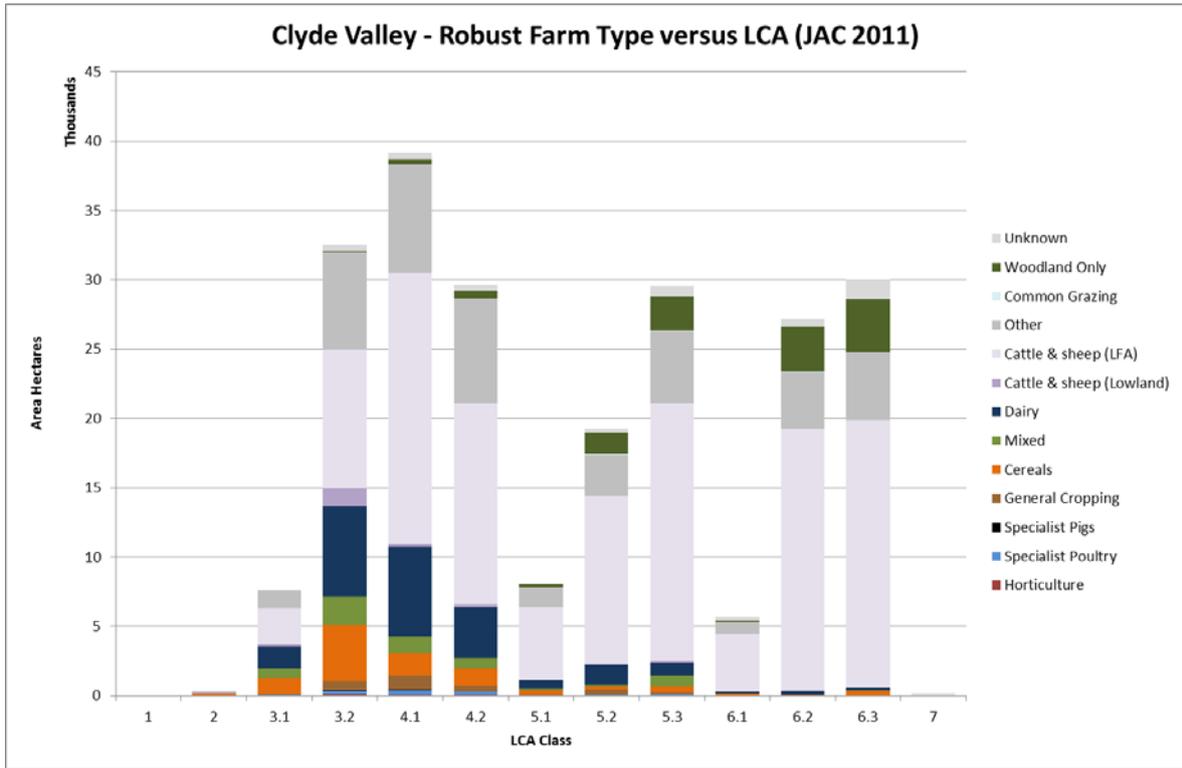
Argyll & Bute - Robust Farm Type versus LCA (JAC 2011)



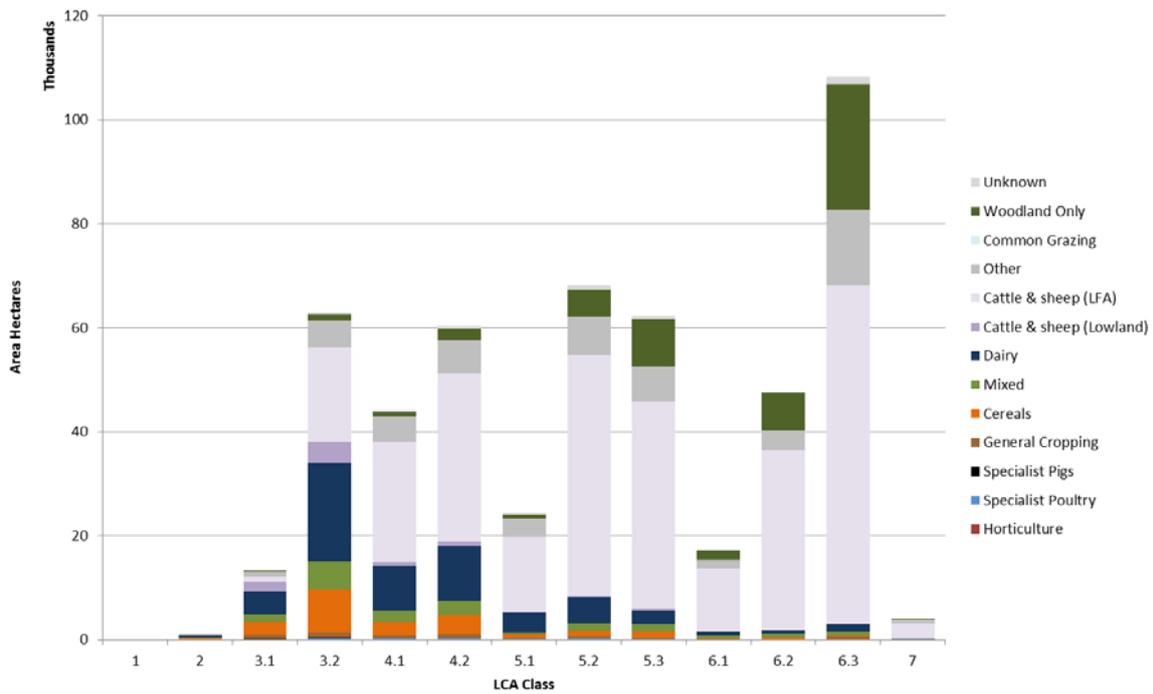
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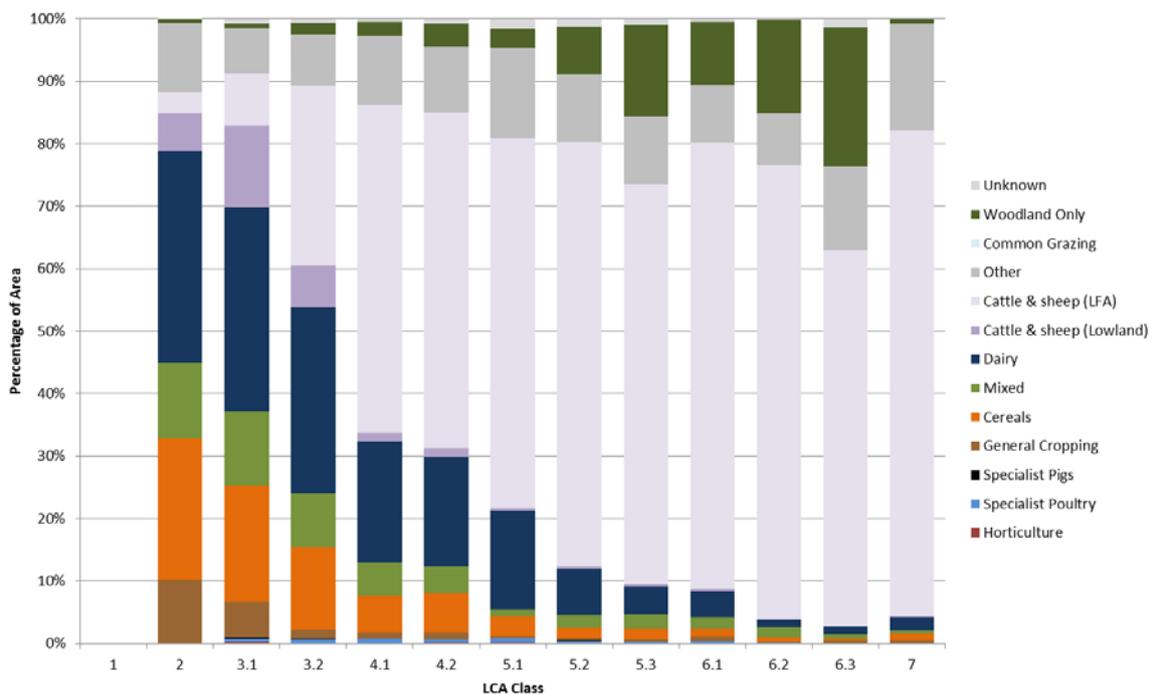


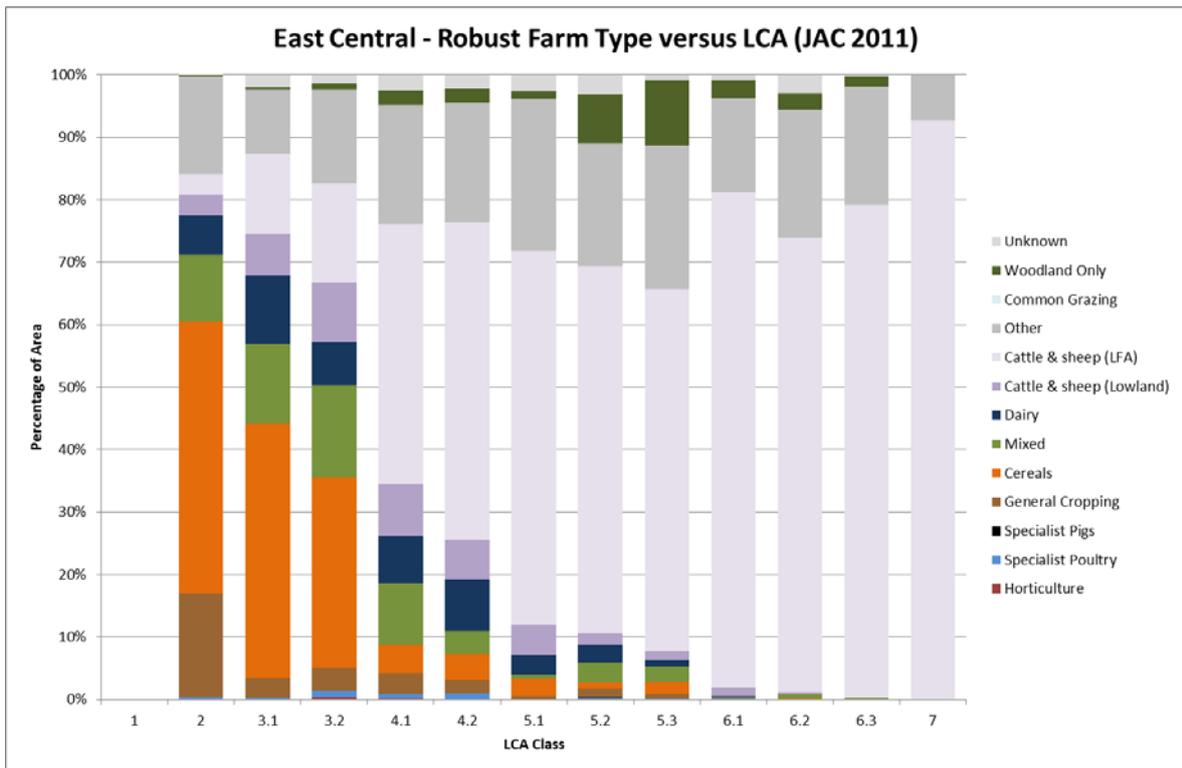
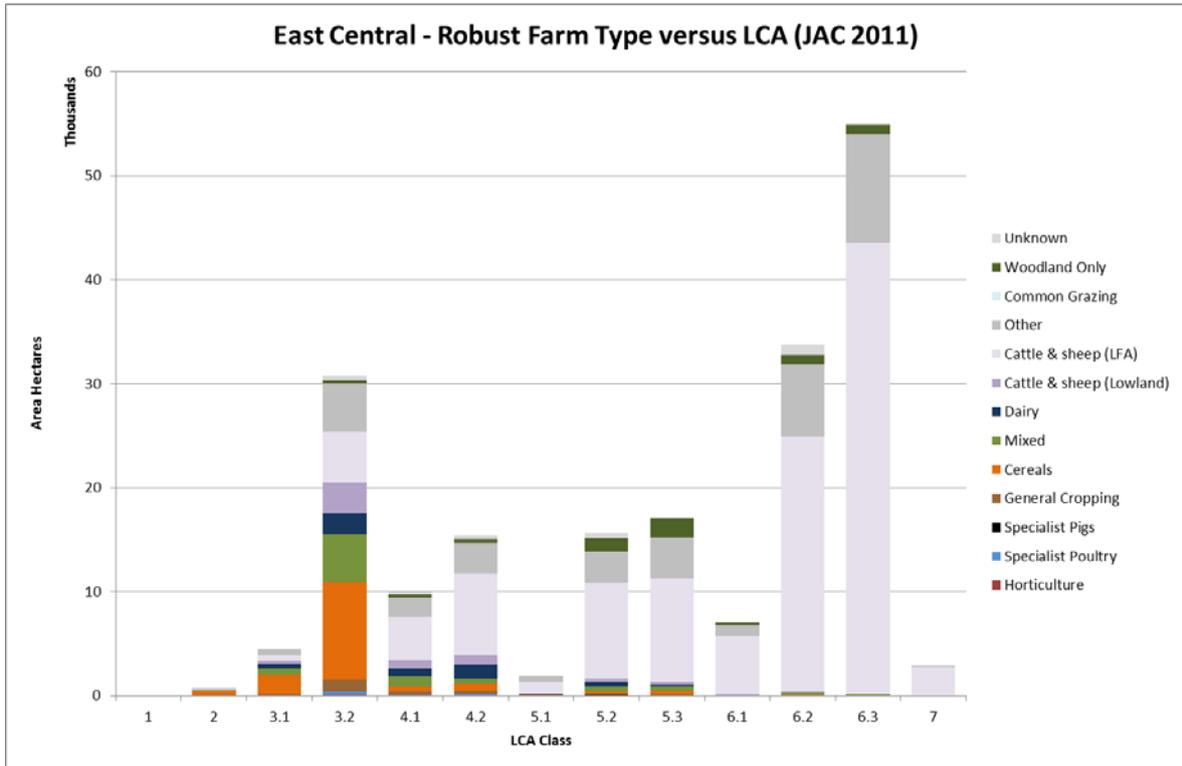


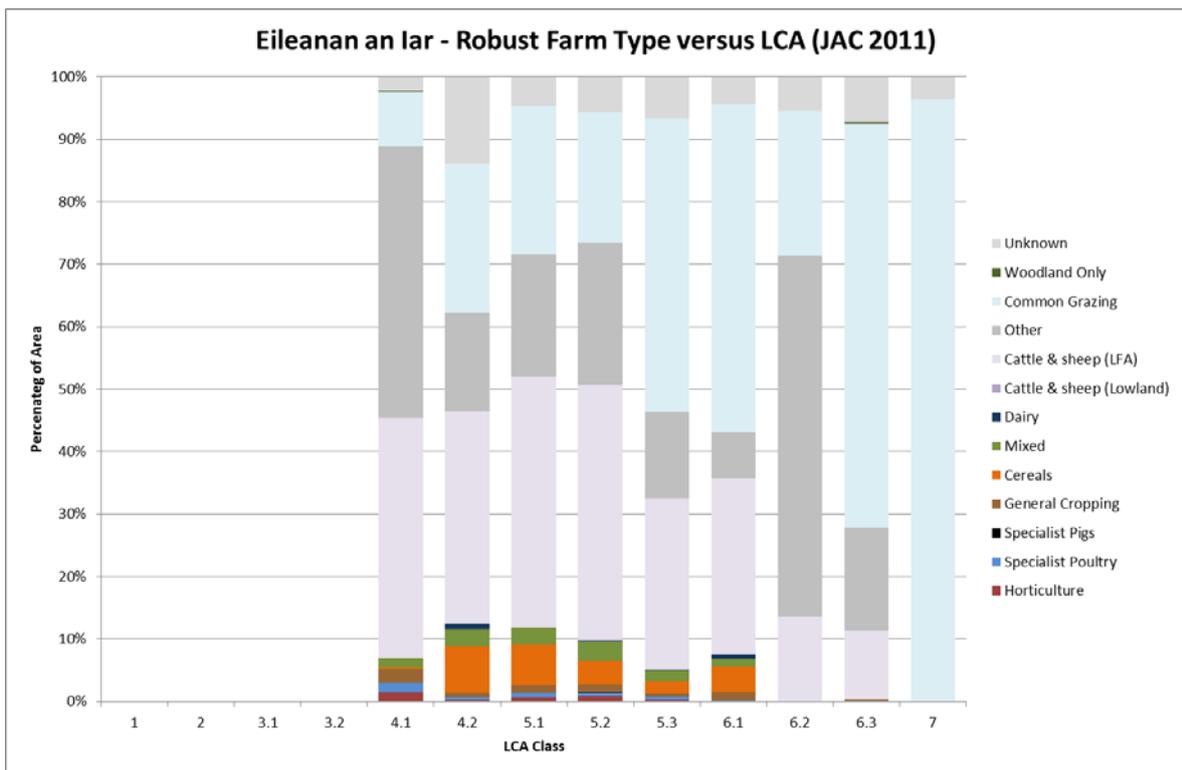
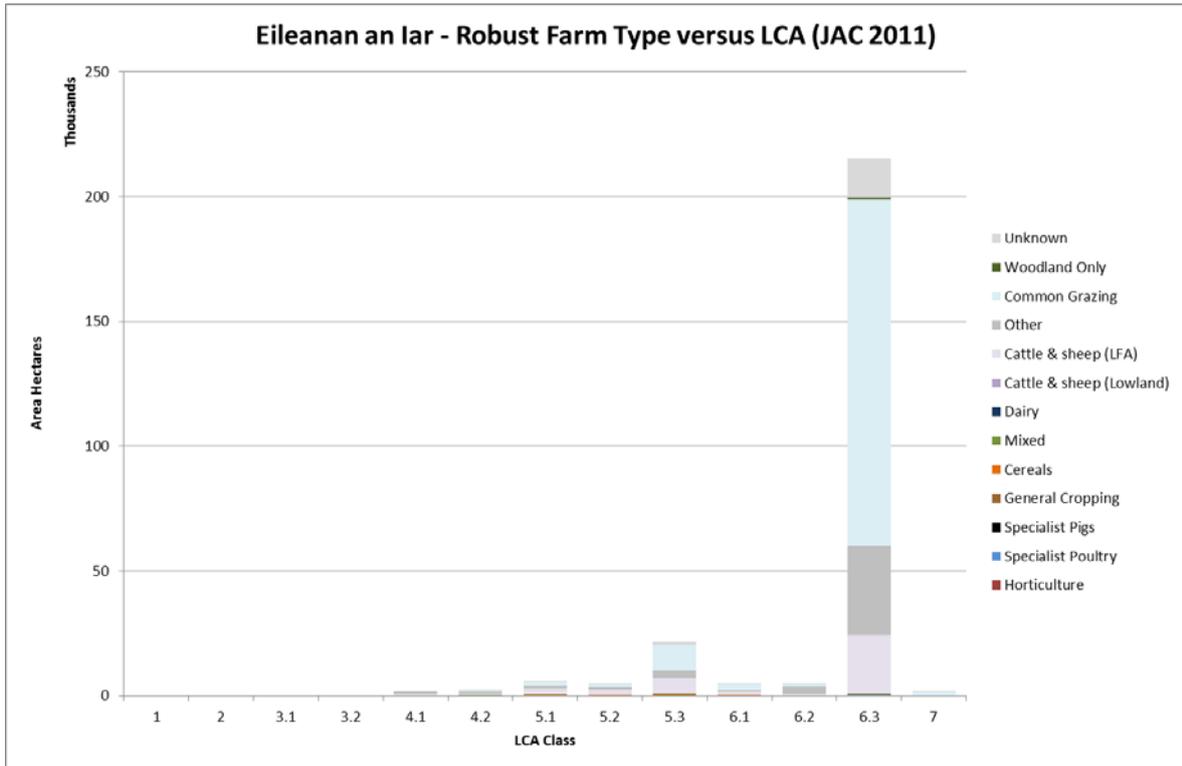
Dumfries & Galloway - Robust Farm Type versus LCA (JAC 2011)

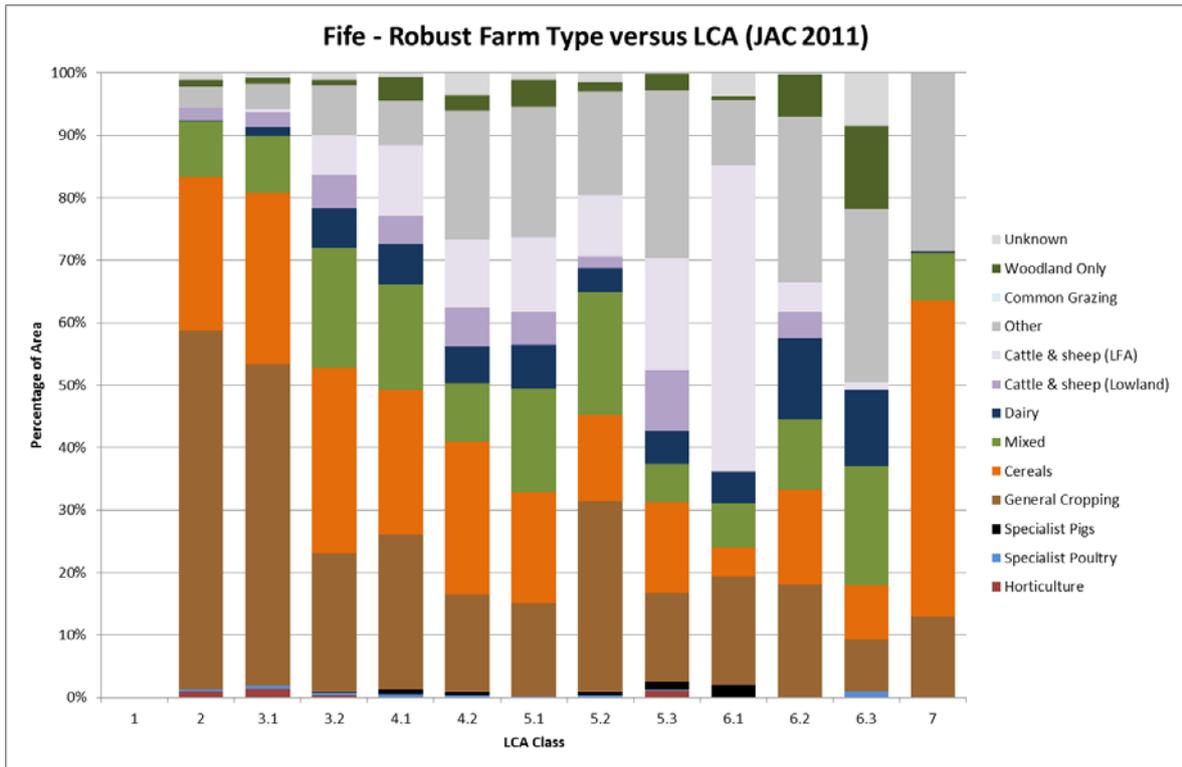
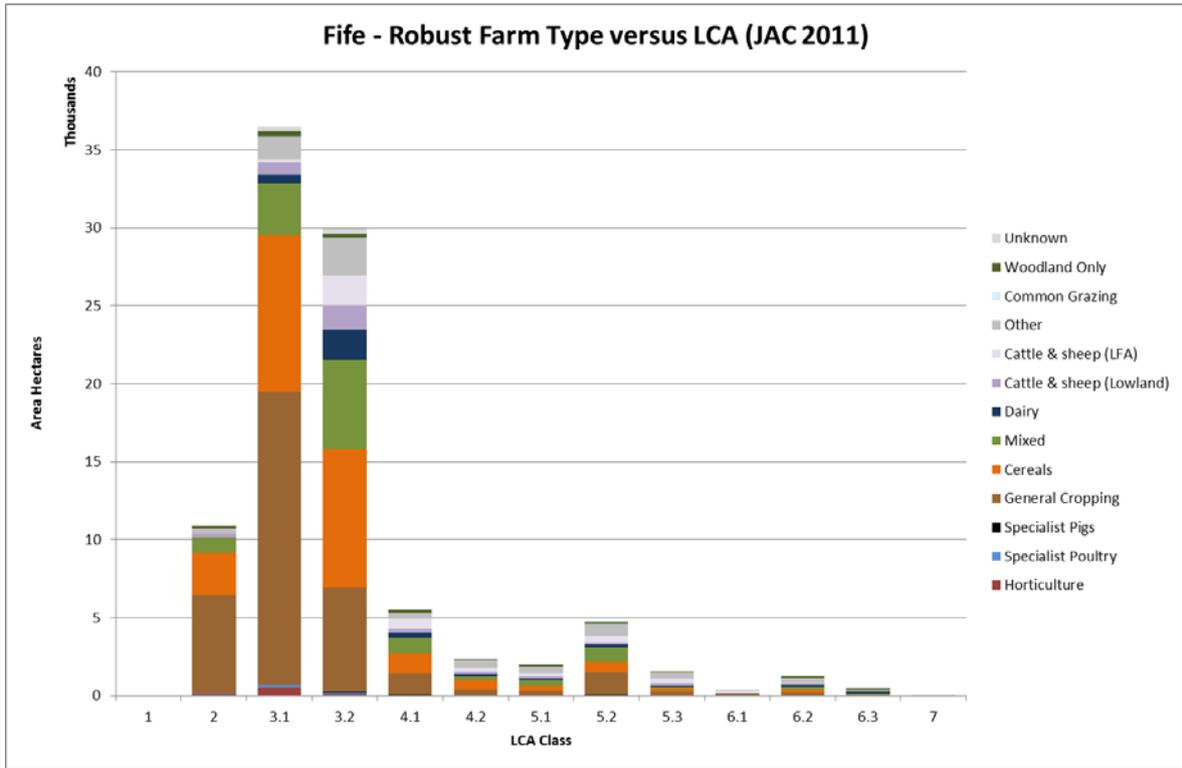


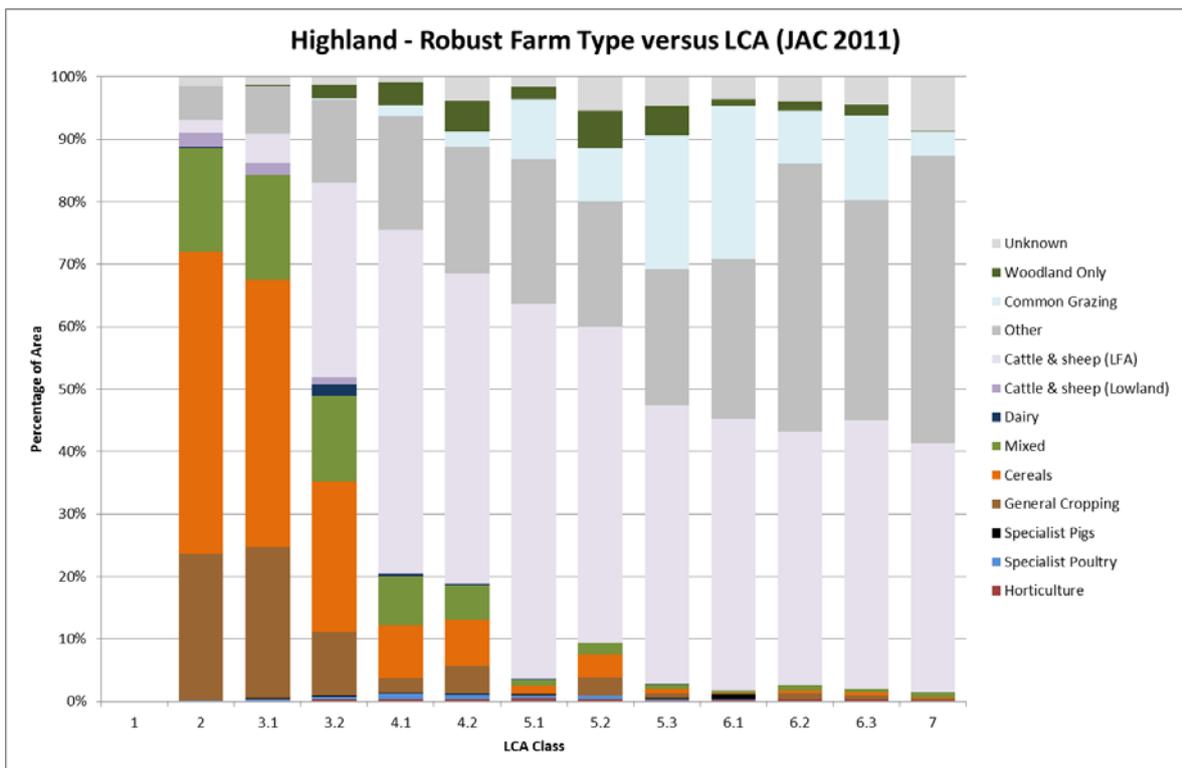
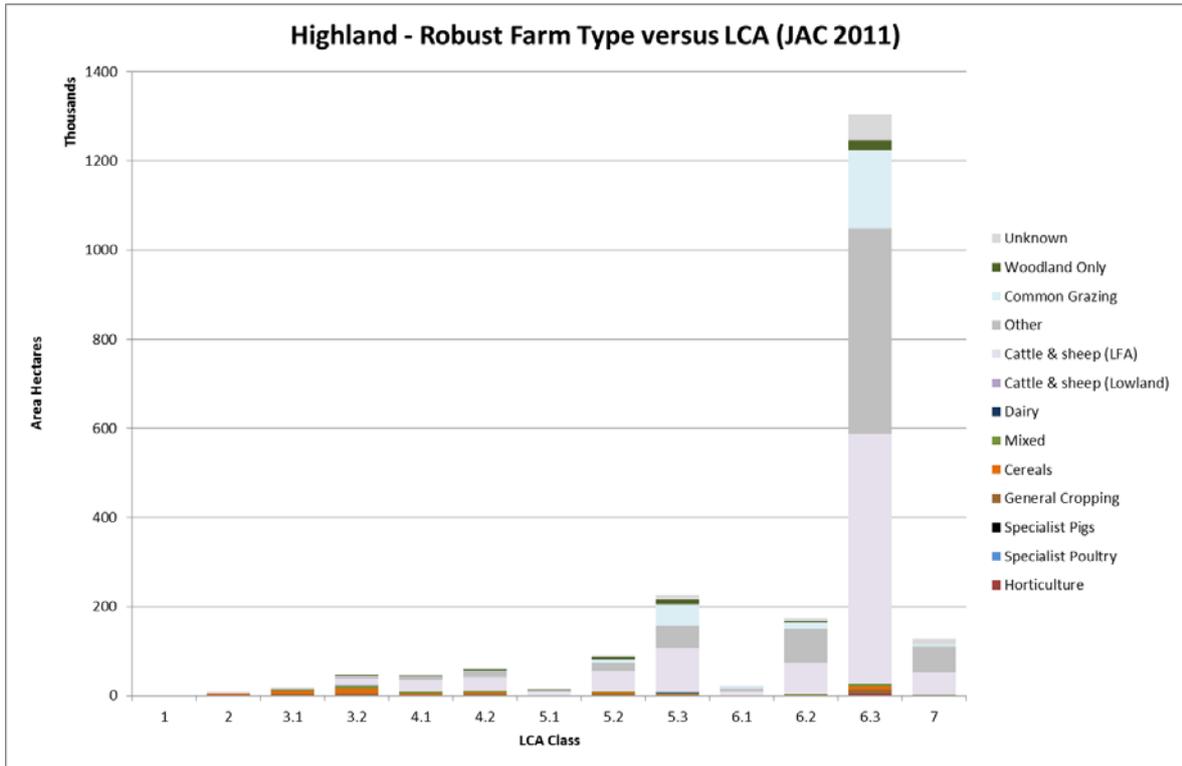
Dumfries & Galloway - Robust Farm Type versus LCA (JAC 2011)

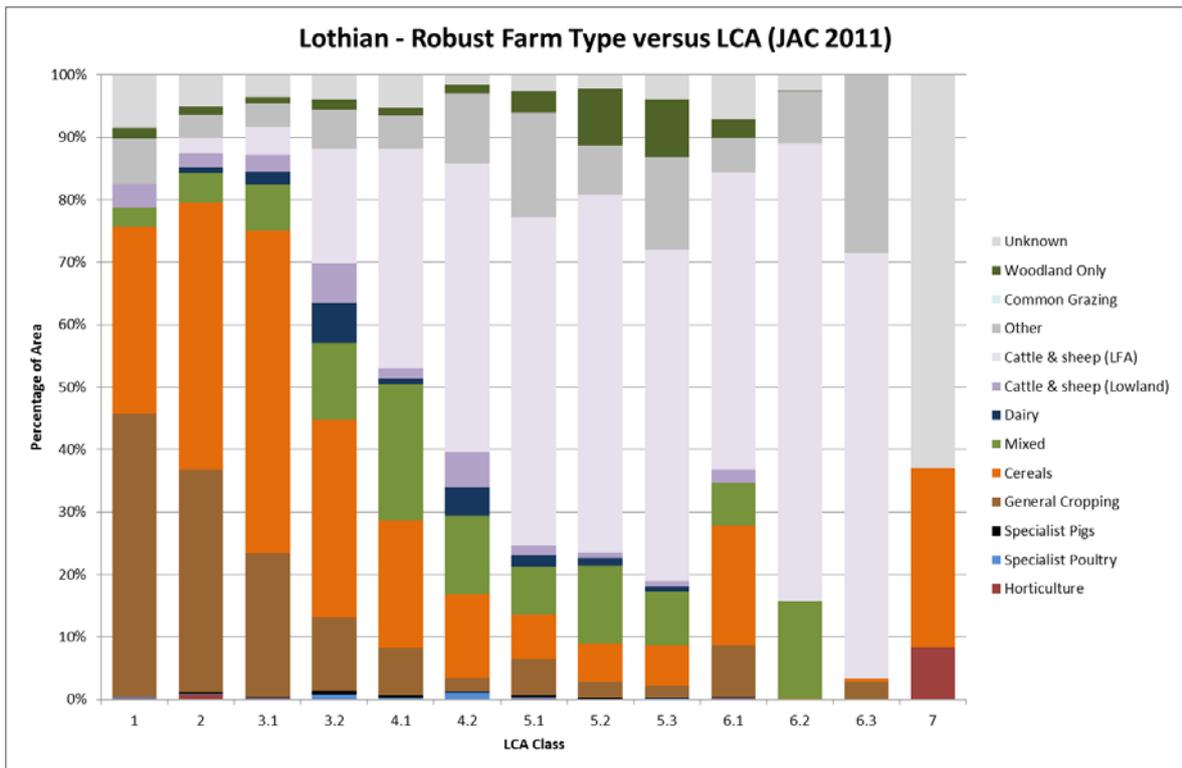
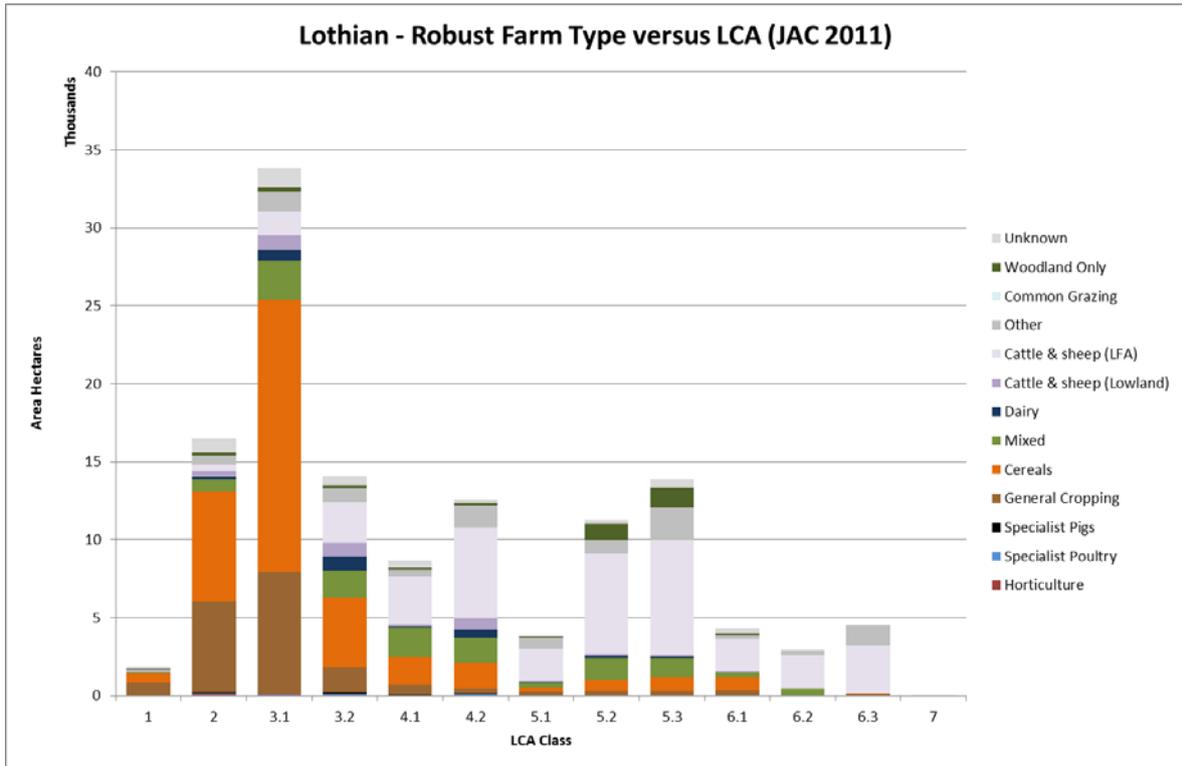


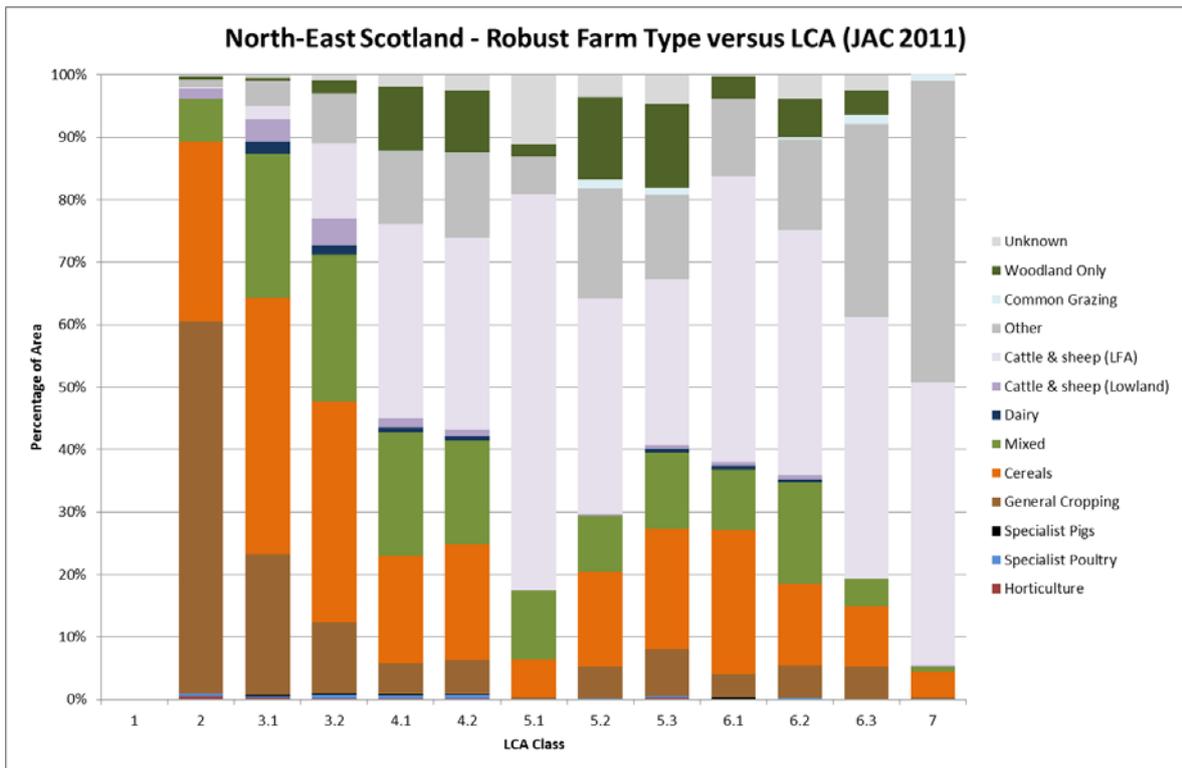
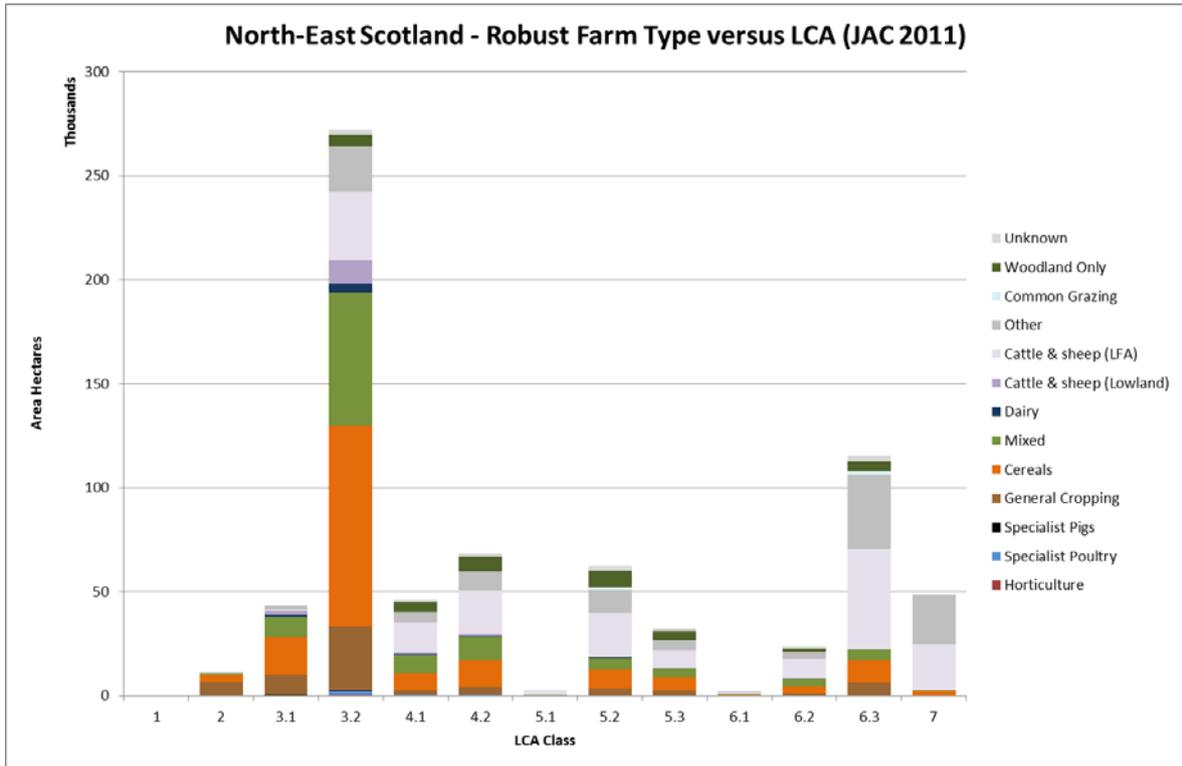


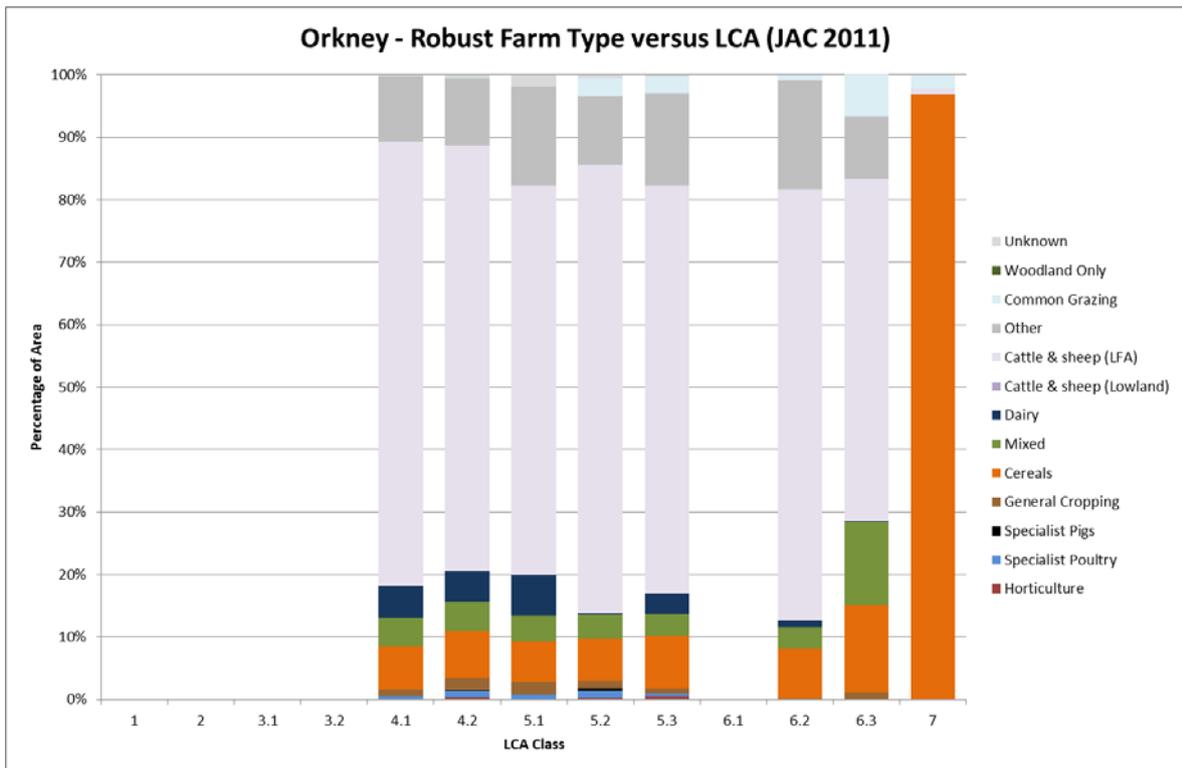
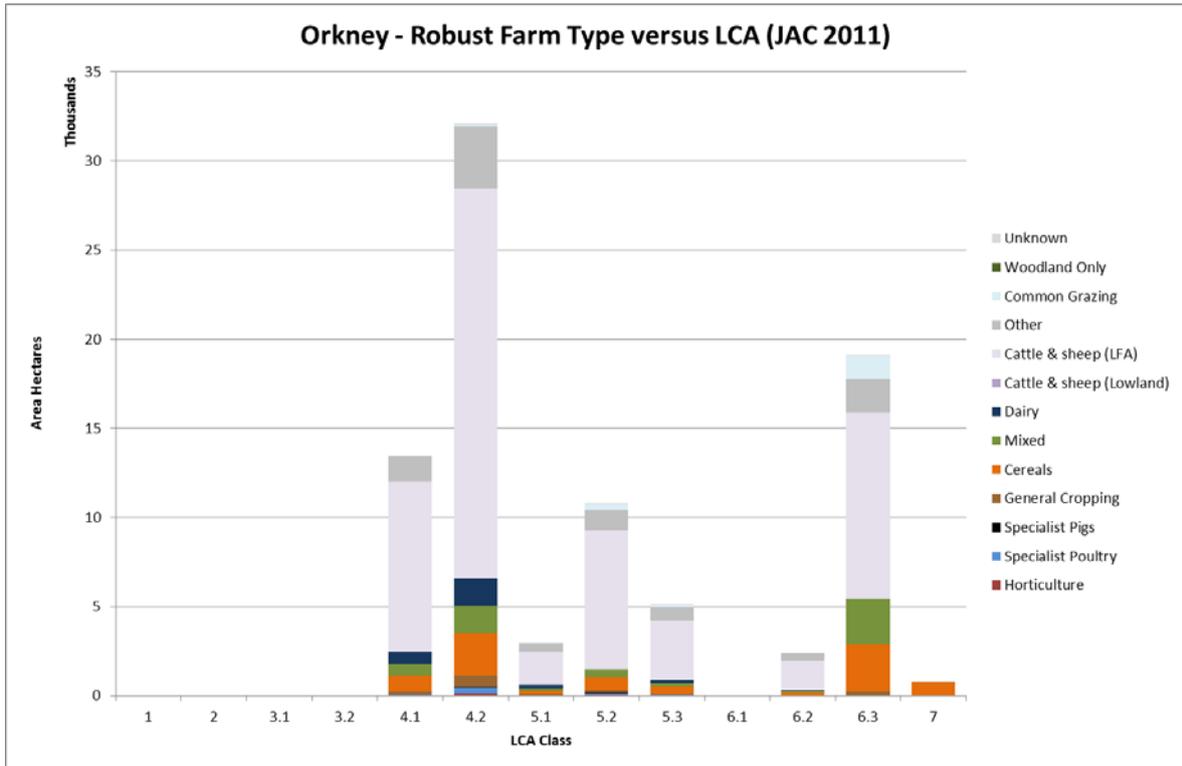


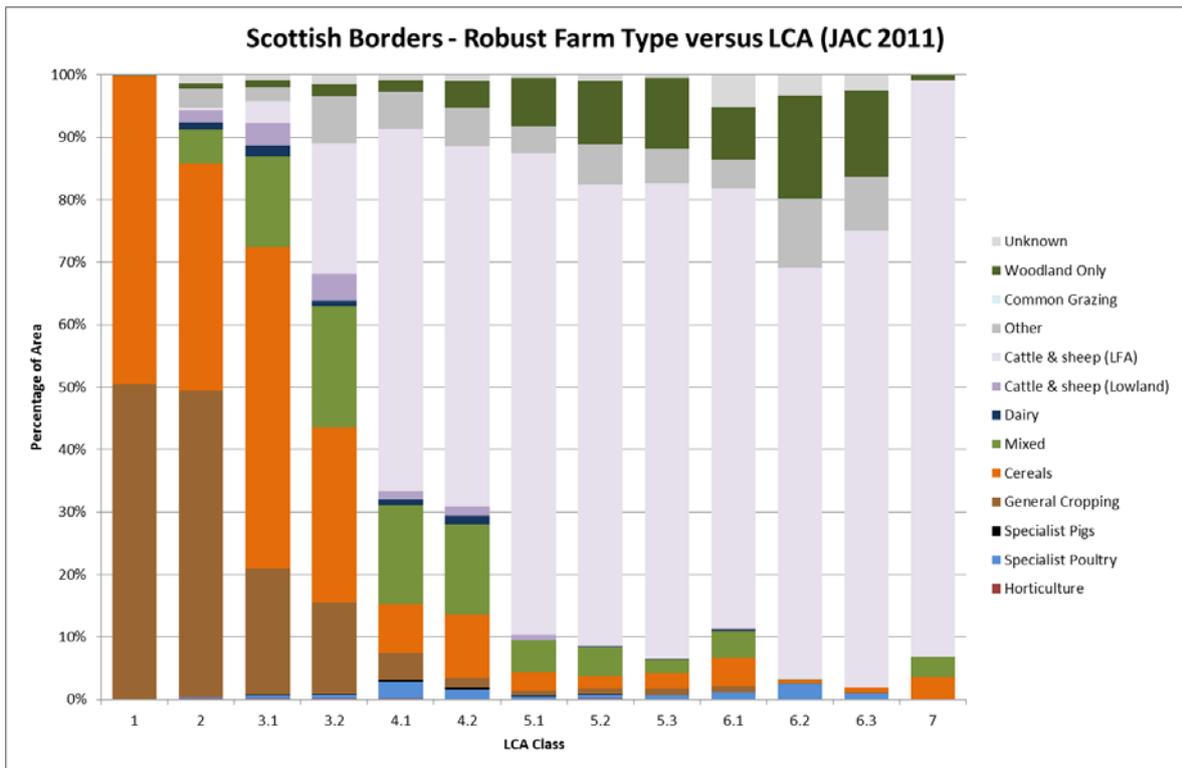
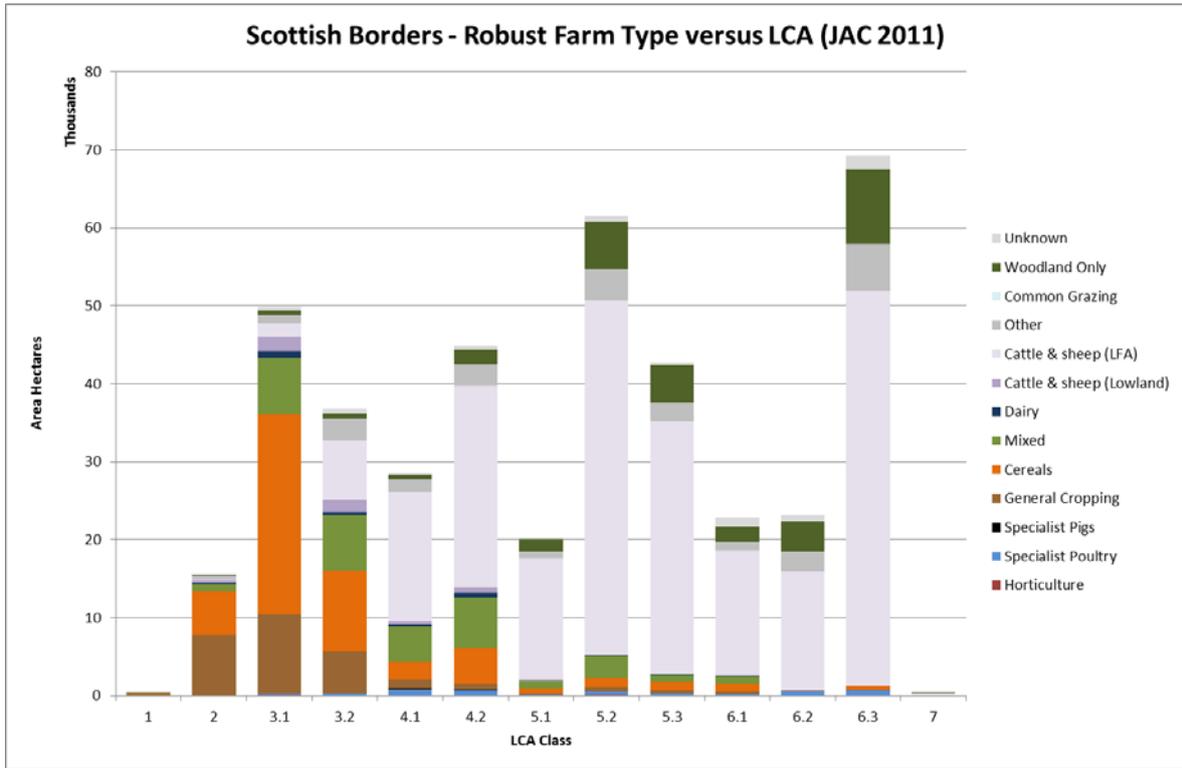


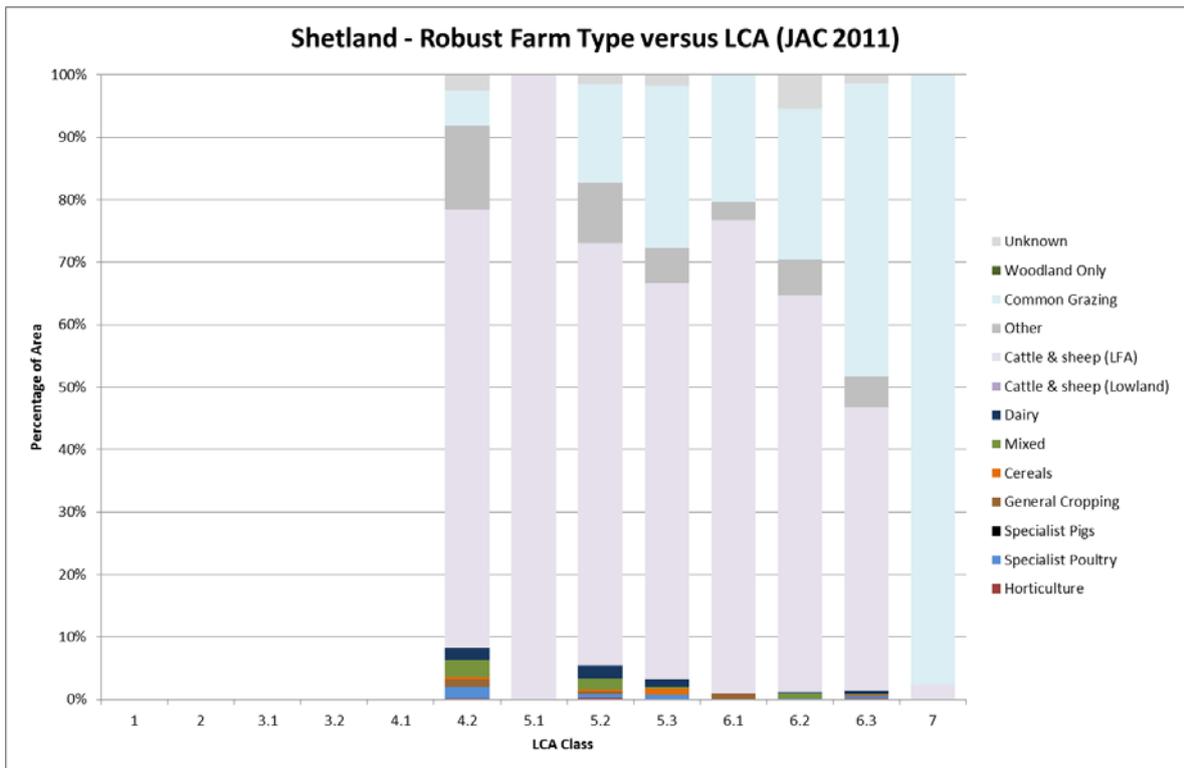
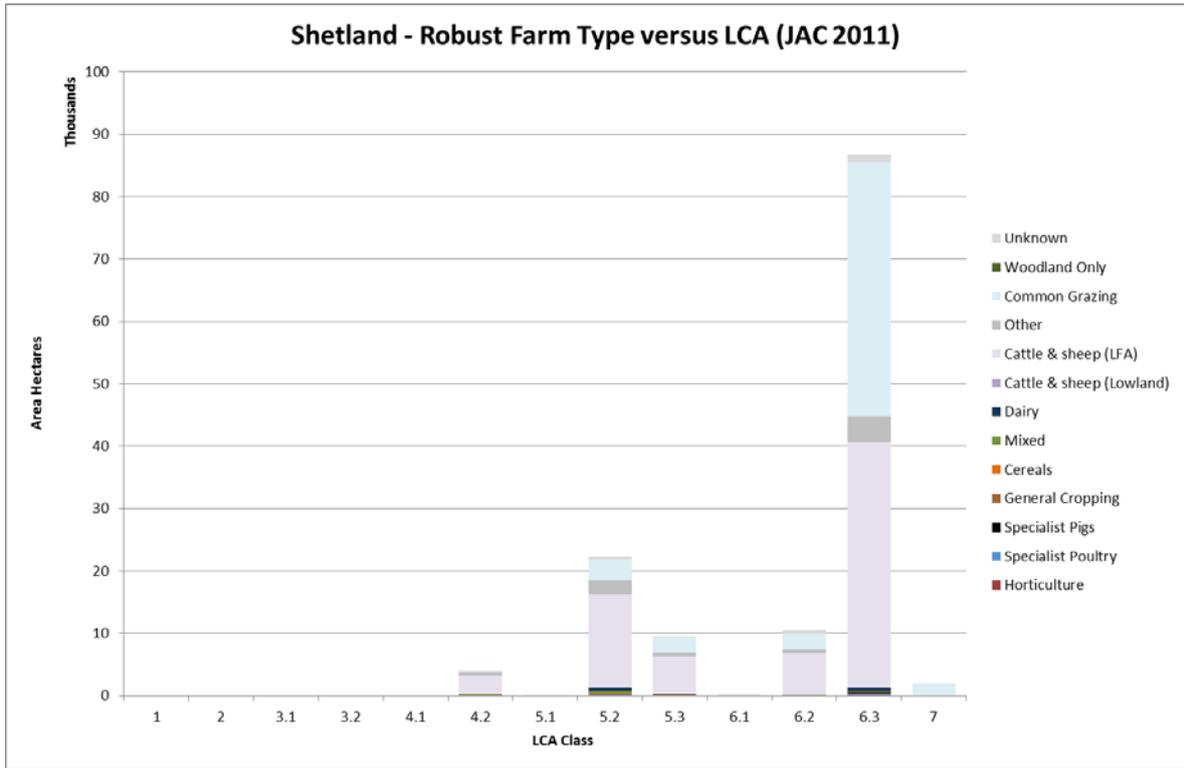


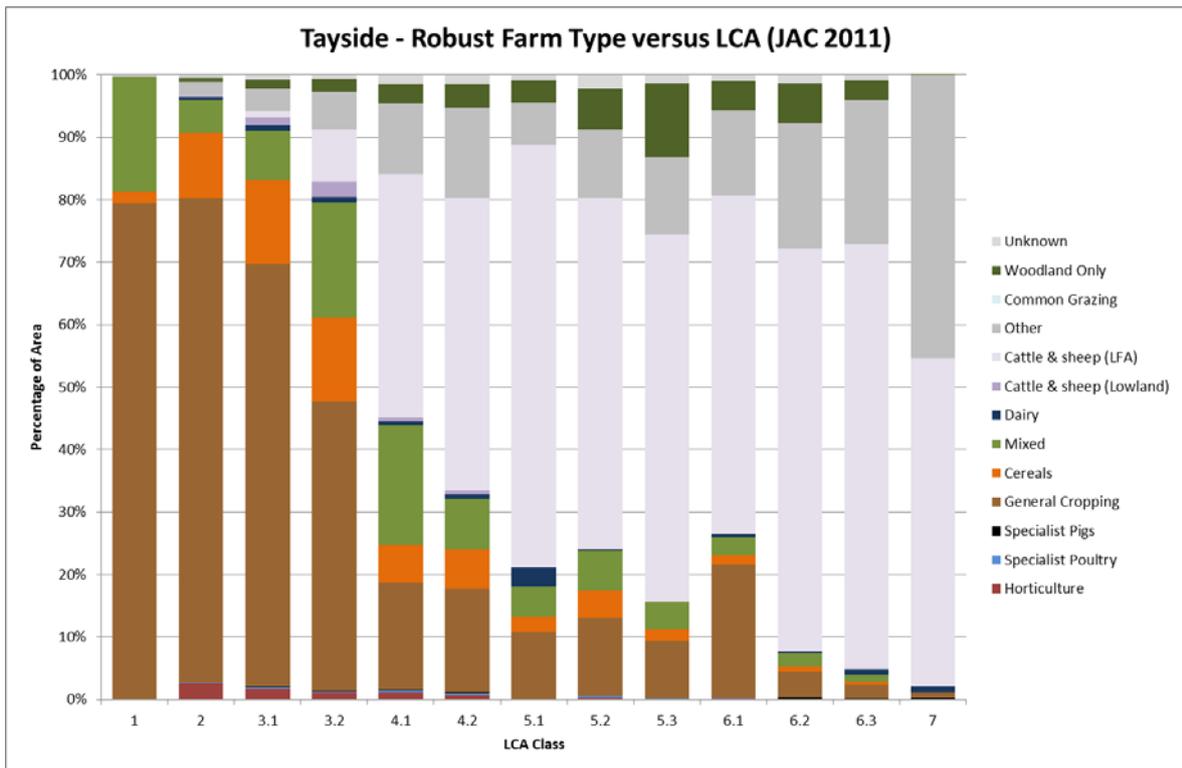
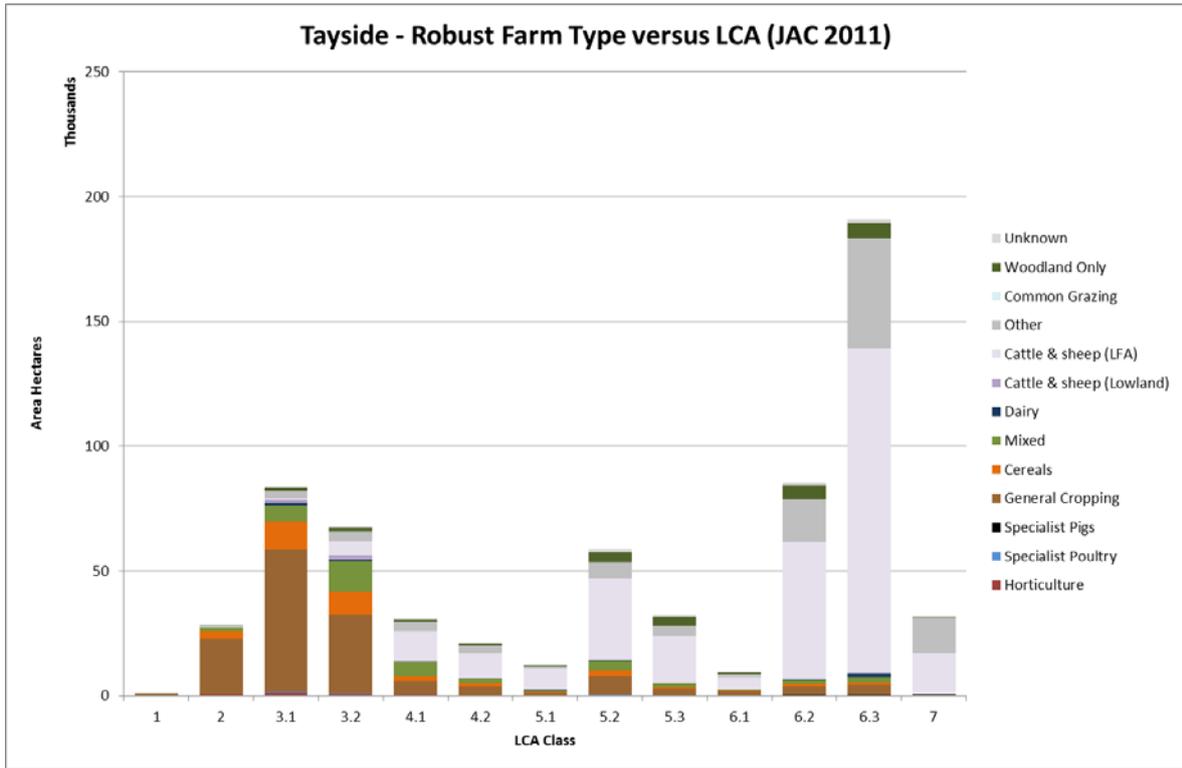












3.3. Identifying Split Businesses and Holdings

This part of the report identifies the businesses and holdings that are split by the use of a boundary defined between LCA class 5.3 and LCA class 6.1.

Table 2 and Table 3 set out the count and area of businesses and holdings for the three classes, Split⁷, LCA 5.3 Minus⁸ and LCA 6.1 Plus⁹. Businesses are defined as groupings of holdings that share a common business reference number (BRN) or main farm code (MFC), where neither BRN nor MFC exist then the holding and business are assumed to be synonymous. By this definition there are 29,408 businesses identifiable by BRN and a further 9,168 holding only units. Comparing Table 2 and

Table 3 there is a marginal increase in the proportions of count and area in the split class but a very similar overall pattern. For this reason the remainder of the paper considers the holding level analysis as the basis for interpretation and drawing conclusions. This decision is reinforced by previous experience¹⁰ in the limitations of attempting to characterise businesses in terms of agricultural region or farm type since these are better defined at holding level¹¹.

The key finding is that there are very few holdings with only LCA 6.1 land or poorer (5.6% of holdings and 6.2% of area). The split holding count is 31% of holdings but makes up 74% of the area. The proportion of holdings with exclusively of LCA 5.3 or below is 63% of holdings but only 19% of area.

Table 2: Counts and areas of split businesses

Classification	Count of Businesses	% of Businesses	Area (ha)	% Area
Split Businesses	12,341	32.0%	4,885,281	76.7%
5.3 Minus Businesses	24,015	62.3%	1,133,515	17.8%
6.1 Plus Businesses	2,070	5.4%	347,375	5.5%
Null Businesses ¹²	150	0.4%	55,840	0.9%
All	38,576	-	6,422,010	-

Table 3: Counts and areas of split holdings

Classification	Count of Holdings	% of Holdings	Area (ha)	% Area
Split Holdings	13,380	30.8%	4,713,715	73.9%
5.3 Minus Holdings	27,448	63.2%	1,241,571	19.0%
6.1 Plus Holdings	2,431	5.6%	410,884	6.2%
Null Holdings ¹²	179	0.4%	55,840	0.9%
All	43,438	-	6,422,010	-

3.4. Mapping Split and Other Holdings

The spatial distributions of the split and exclusive classes are shown in the following maps using the grouped IACS land use data to indicate the nature of activity being undertaken. Each holding is shown in only one of the maps, either the split holdings map or the LCA class 1 to 5.3 map or the LCA class 6.1 or above map.

⁷ Holdings or businesses with both LCA class 1 to class 5.3 land and LCA class 6.1 to class 7 land.

⁸ Holdings or businesses made up exclusively of LCA class 1 to class 5.3 lands.

⁹ Holdings or businesses made up exclusively of LCA class 6.1 to class 7 lands.

¹⁰ See http://www.macaulay.ac.uk/LADSS/cap_flattening.html for a full explanation.

¹¹ The decision also reflects limitations on the time available for the analysis.

¹² These businesses or holdings are mapped in IACS but have no LCA mapping due to differences in coverage.

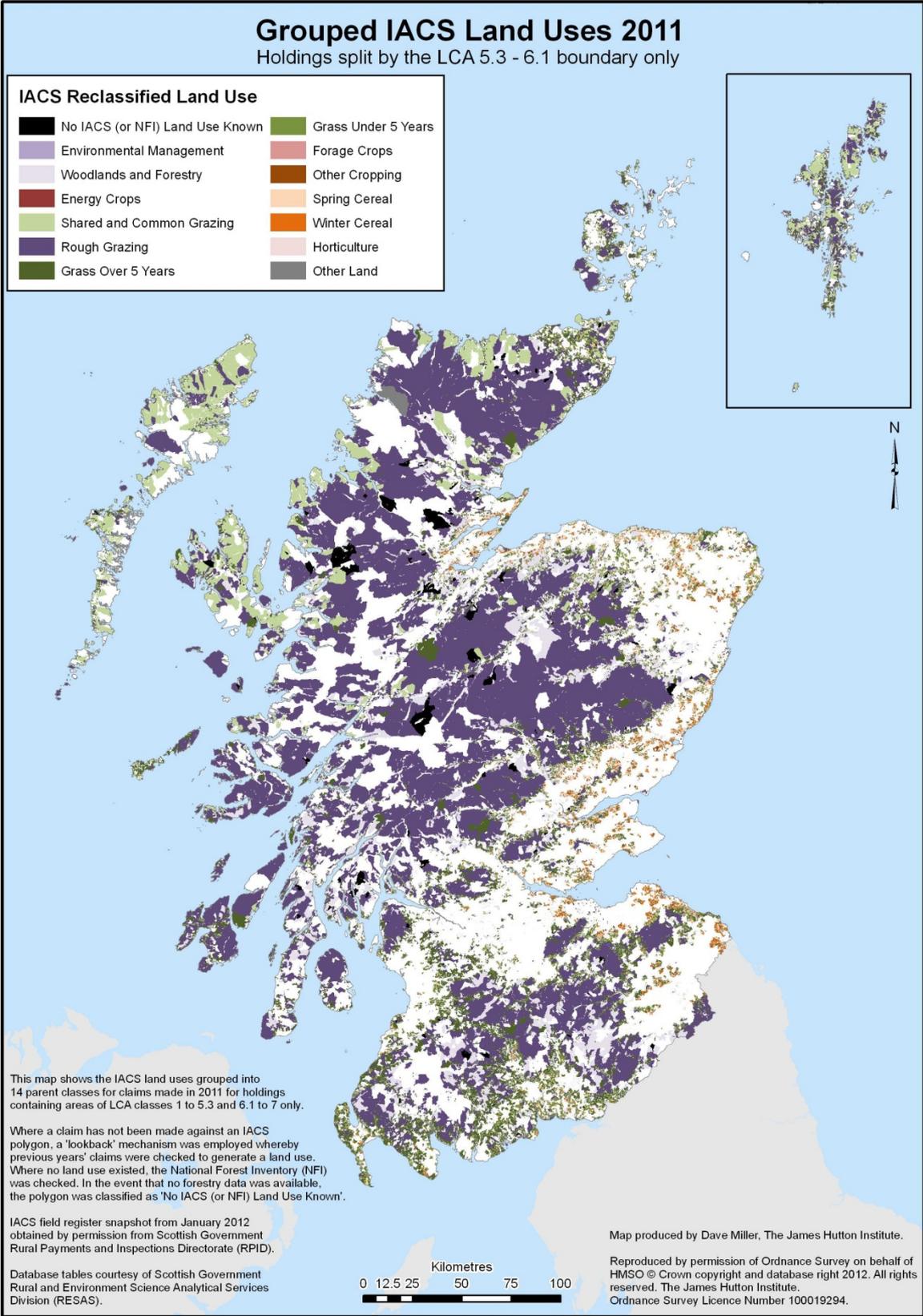


Figure 2: Grouped IACS land uses for holdings split by the LCA5.3 – 6.1 boundary.

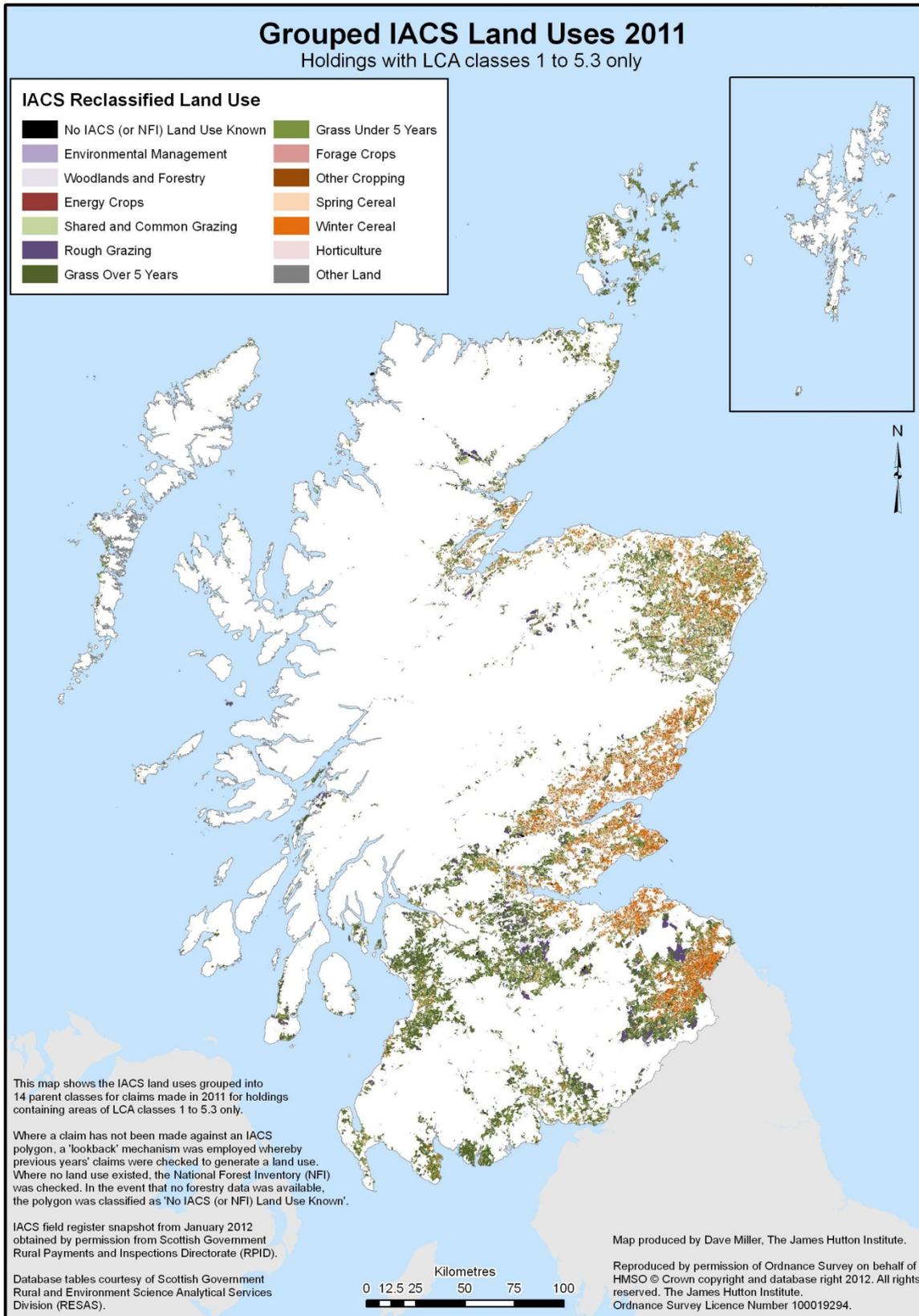


Figure 3: Grouped IACS land uses for holdings with LCA classes 1 to 5.3 only.

Grouped IACS Land Uses 2011

Holdings with LCA classes 6.1 to 7 only

IACS Reclassified Land Use

	No IACS (or NFI) Land Use Known		Grass Under 5 Years
	Environmental Management		Forage Crops
	Woodlands and Forestry		Other Cropping
	Energy Crops		Spring Cereal
	Shared and Common Grazing		Winter Cereal
	Rough Grazing		Horticulture
	Grass Over 5 Years		Other Land

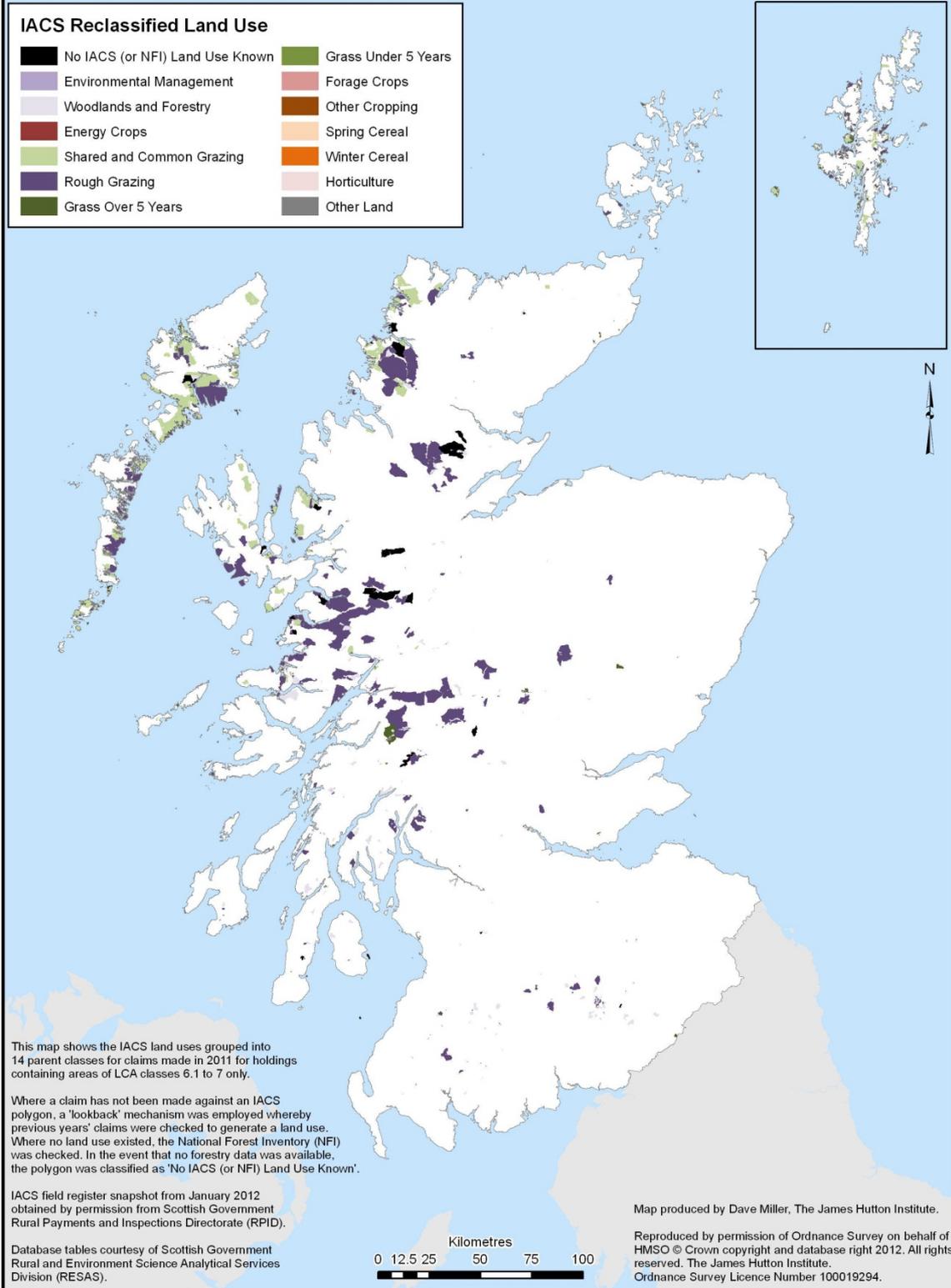


Figure 4: Grouped IACS land uses for holdings with LCA classes 6.1 to 7 only.

3.5. Size Characteristics of Split Holdings

Figure 5 shows the count and accumulated area for seven size classes. The figure emphasises that split holdings are dominated in terms of area by the largest size classes (from >100 to <=1000 ha or from >1000 to <=10,000 ha) but that the >10 to <=100 ha size class has the second largest count of holdings. In terms of size the population of split holdings may thus be argued to contain distinctive sub-populations.



Figure 5

Another way of characterising the split holdings population is in terms of the percentage of LCA class 1 to 5.3 land present in each of the split holdings. The range of percentages of LCA class 1 to 5.3 land has been broken down into classes, e.g. 1-10%, 11-20%. For each of these classes the count and area of the holdings in the class are presented in Figure 6. From this figure it can be seen that there are a considerable number and area of holdings with near exclusive LCA class 1 to 5.3 land present (91-99%). In such cases it might be desirable to include such holdings with the exclusively up to LCA class 5.3 holdings to simplify implementing a scheme.

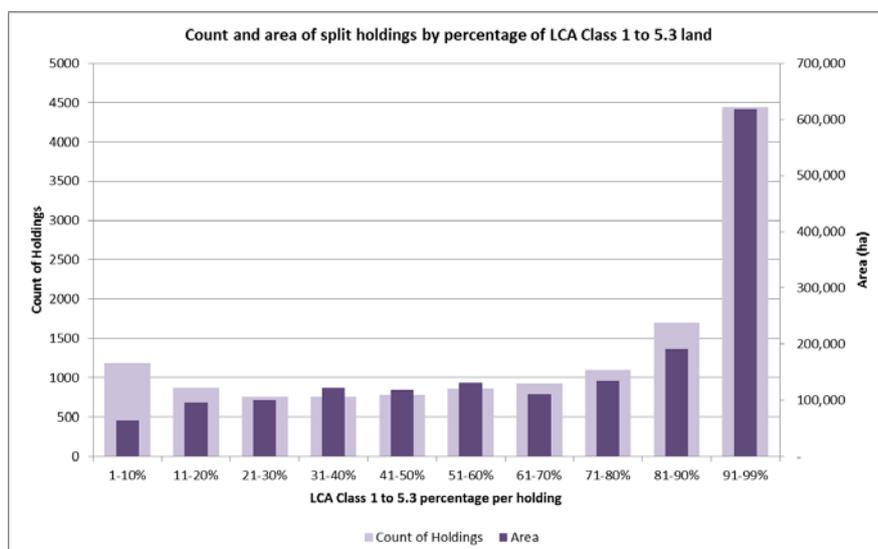


Figure 6

3.6. Regional Characteristics of Split Holdings

Figure 7 presents for each Agricultural Region the area of holdings for each LCA class groupings and the split holdings with the same data as percentages presented in Figure 8.

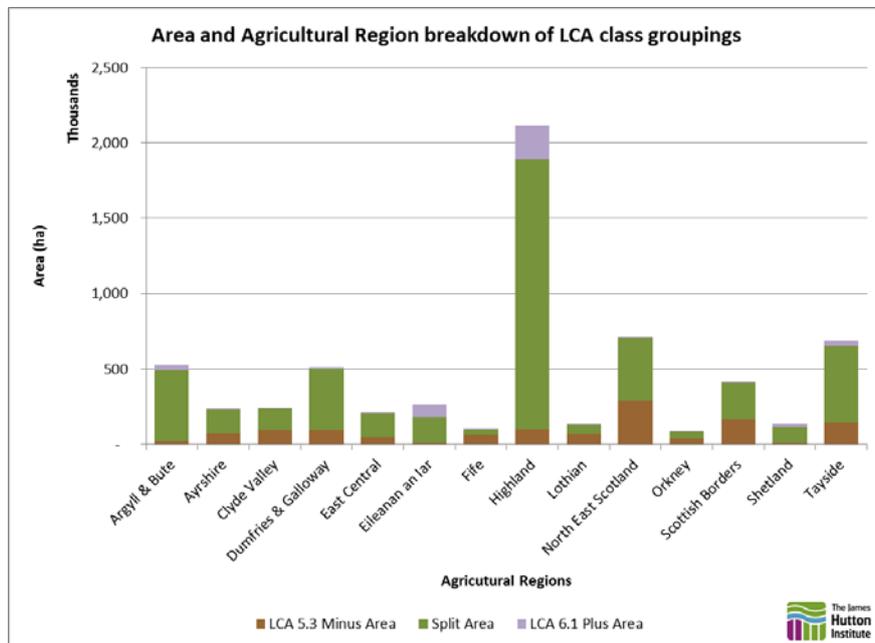


Figure 7

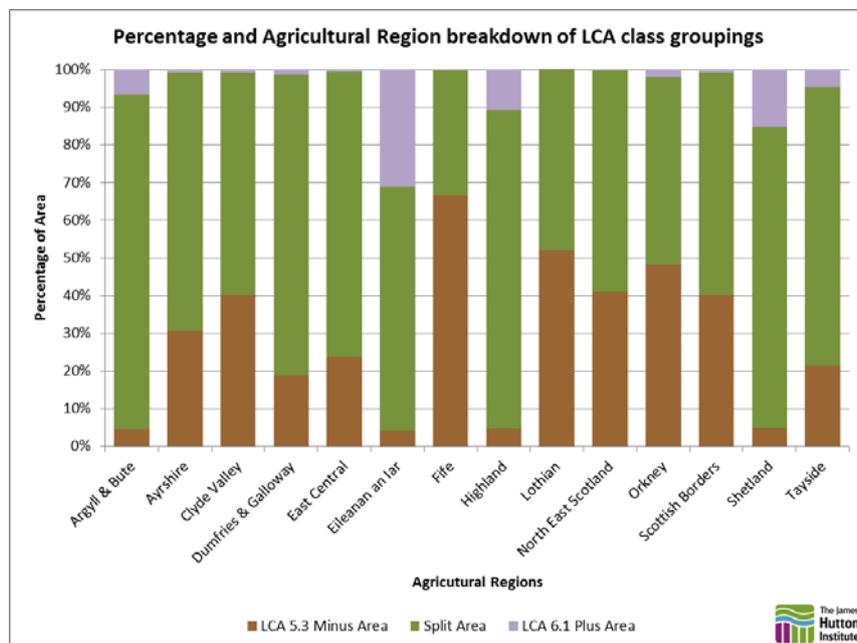


Figure 8

3.7. Robust Farm Type Characteristics of Split Holdings

Figure 9 presents for each robust farm type the area of holdings per LCA class groupings and the split holdings with the same data as percentages presented in Figure 10¹³.

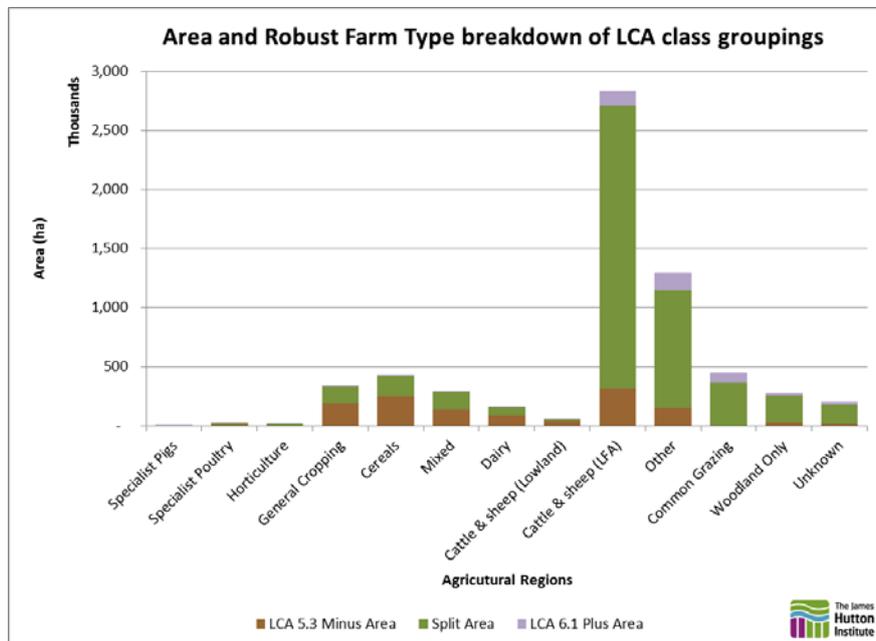


Figure 9

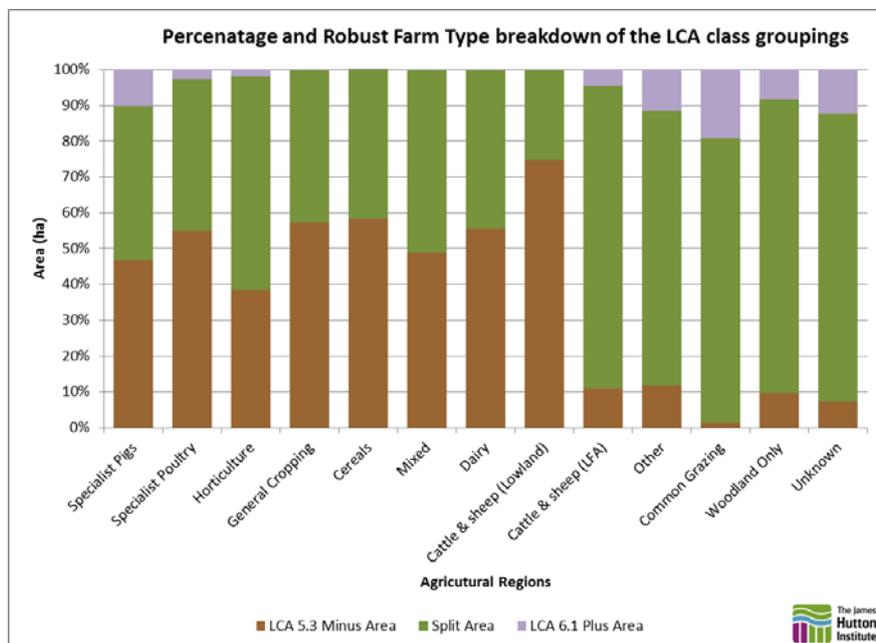


Figure 10

¹³ The area of no farm type may be substantially reduced once the analysis is complete.

3.8. Split Holdings Cross Tabulation by Robust Farm Type and Region

Table 4 presents for the split holdings a cross tabulation by Agricultural Region and Farm Type.

Table 4: Cross tabulation of split holding area (ha) by robust farm type and agricultural region

	Specialist Pigs	Specialist Poultry	Horticulture	General Cropping	Cereals	Mixed	Dairy
Argyll & Bute	-	1,123	363	1,236	3,332	6,243	6,298
Ayrshire	22	579	315	2,442	3,842	1,159	15,451
Clyde Valley	47	46	66	919	2,491	1,217	5,683
Dumfries & Galloway	21	989	195	3,227	11,998	12,116	31,670
East Central	-	86	7	1,042	1,963	7,817	1,520
Eileanan an Iar	10	137	73	262	1,115	431	65
Fife	135	42	-	10,847	7,380	4,703	2,051
Highland	301	2,276	6,527	17,767	28,447	17,185	283
Lothian	51	10	128	7,948	10,911	5,835	239
North East Scotland	333	504	232	37,776	80,495	52,462	2,302
Orkney	-	105	39	368	5,277	4,012	513
Scottish Borders	170	1,938	16	4,405	10,829	13,488	463
Shetland	25	360	84	197	187	453	738
Tayside	698	335	1,197	54,115	9,484	20,604	3,295
All Regions	1,811	8,530	9,243	142,551	177,752	147,723	70,571

	Cattle & sheep (Lowland)	Cattle & sheep (LFA)	Other	Common Grazing	Woodland Only	Unknown	All Farm Types
Argyll & Bute	50	323,724	74,515	5,095	33,252	13,430	468,660
Ayrshire	274	101,509	24,906	264	10,469	1,047	162,278
Clyde Valley	358	93,943	22,218	156	10,715	3,168	141,027
Dumfries & Galloway	3,334	249,427	40,882		49,706	3,795	407,360
East Central	2,613	105,927	30,271		4,551	2,661	158,458
Eileanan an Iar		16,389	20,727	107,182	-	24,393	170,783
Fife	916	3,834	2,454		534	349	33,246
Highland	236	814,168	577,610	199,351	38,216	89,026	1,791,393
Lothian	1,238	29,740	5,116		1,252	1,084	63,553
North East Scotland	3,083	124,820	67,402	3,628	31,630	10,950	415,619
Orkney		27,703	3,602	1,575	-	22	43,215
Scottish Borders	710	164,969	14,537		26,332	6,735	244,593
Shetland		56,472	5,160	40,147		3,993	107,815
Tayside	392	283,283	105,706		20,981	5,625	505,715
All Regions	13,204	2,395,908	995,106	357,398	227,638	166,279	4,713,715

3.9. Land Use Characteristics of Split Holdings

The land use characteristics of the split holdings are set out in the figures below. Figure 11 shows the land use mix for the split holdings area with a dominance of rough grazing, woodlands, shared grazing and woodland. Yet within the split holdings there are significant areas of more intensive land uses (e.g. temporary grasslands and spring cereals as shown in Figure 12).

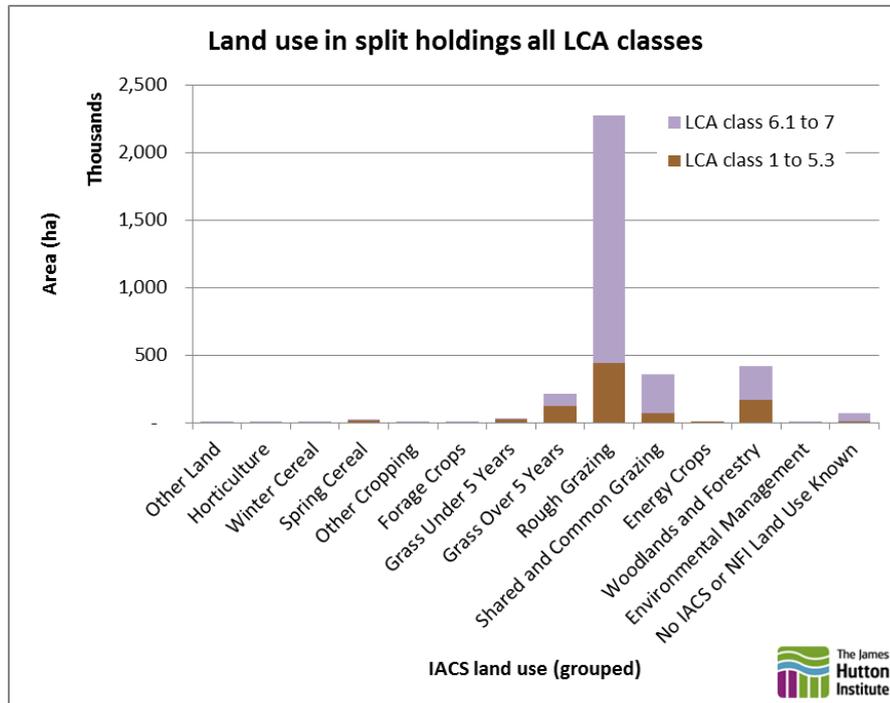


Figure 11

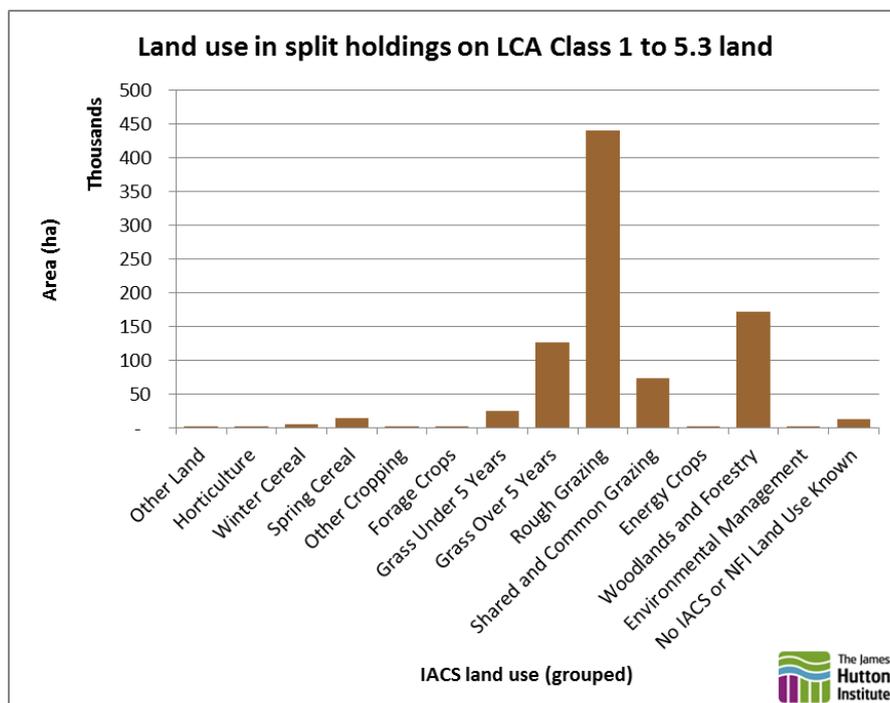


Figure 12

3.10. Stocking Rate Characteristics of Split Holdings

Note that because of field rentals and multiple users per field the SR of any field cannot in all cases simply be assumed to be that of the owner holding as a whole¹⁴. It was therefore inappropriate to simply append SR values to the field level datasets used elsewhere in this report and to summarise on that basis. In this characterisation, the SR for all the forage areas used by each holding (owned and rented fields, exclusively or as shares¹⁵) were combined with data identifying if the field was part of a split holding and the resulting dataset classified to generate the data for the summary graphs.

A summary of livestock present and forage area for the three classes of holding (LCA 5.3 minus only, Split and LCA 6.1 plus) are presented in Figure 13. This shows that while the split holdings have the great majority of forage area they have roughly the same total number of livestock units as the LCA 5.3 minus holdings. In terms of the mix of livestock types the split holdings have a greater proportion of sheep but the majority of livestock in terms of LSU are still cattle. While present in all classes, farmed deer occur in only small numbers.

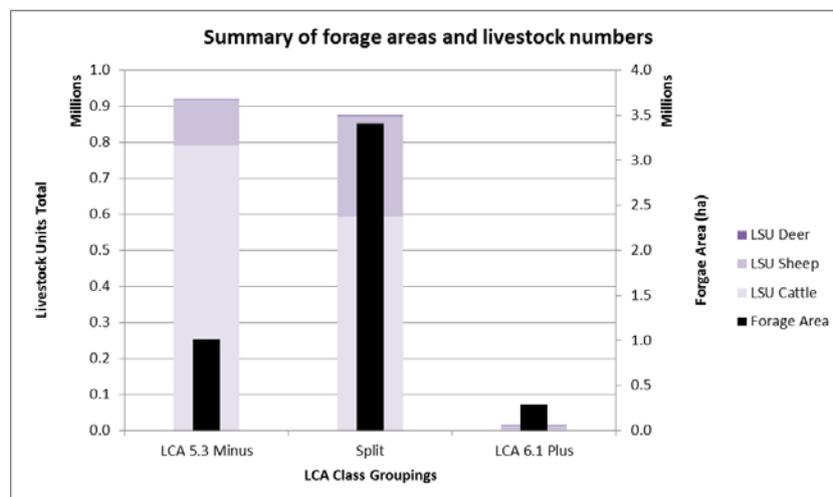


Figure 13

Figure 14 shows for the split holdings the area and count of holdings, in this case classified on the basis of stocking rate ranges. These holding stocking rates are the standardised livestock units per ha for the forage land calculated using the same methodology as employed for the analysis of potential new recipients¹⁶. The figure shows that there is a substantial area (692,746 ha) and number of (n=4,049) where the forage land is not stocked with domestic herbivores. These holdings may well represent sporting estates engaged in long established land management practices but may also contain areas of “naked acres” where livestock have been removed after decoupling of SFP. Above SR=0.0 there is a more even distribution of holding numbers but with slightly greater numbers of holdings occurring in the mid-range SR classes between 0.25 LSU/ha and 2.0 LSU/ha. The SR class with the largest area (841,113 ha) is SR<=0.06, likely reflecting the large areas of lightly stocked LCA class 6.1 plus land included in the split holdings. Beyond this class there is a second

¹⁴ A per field SR value is the area-weighted average of the SRs of each holding using the field (see [http://www.macauley.ac.uk/LADSS/reports/SR-LCA%20v1.2%20\(FINAL\).pdf](http://www.macauley.ac.uk/LADSS/reports/SR-LCA%20v1.2%20(FINAL).pdf)). Such values are needed to map the SR in a geographical information system.

¹⁵ Where a field has multiple users each share is represented by a field-holding combination with a defined area.

¹⁶ <http://www.macauley.ac.uk/LADSS/reports/Existing%20and%20New%20Recipient%20Analysis%20v3.0%20FINAL.pdf>

peak in area at $SR \leq 0.25$ and then steadily declining areas for higher stocking rates. From this figure it is possible to conclude that split holdings have significant diversity of land management practice that would need to be considered in any implementation of an LCA based SFP. As part of this analysis 1,979 split holdings were also identified as having zero forage area. Some of these holdings could have no forage area if woodland only holdings, but in most cases these are likely to be holdings that rent land to others.

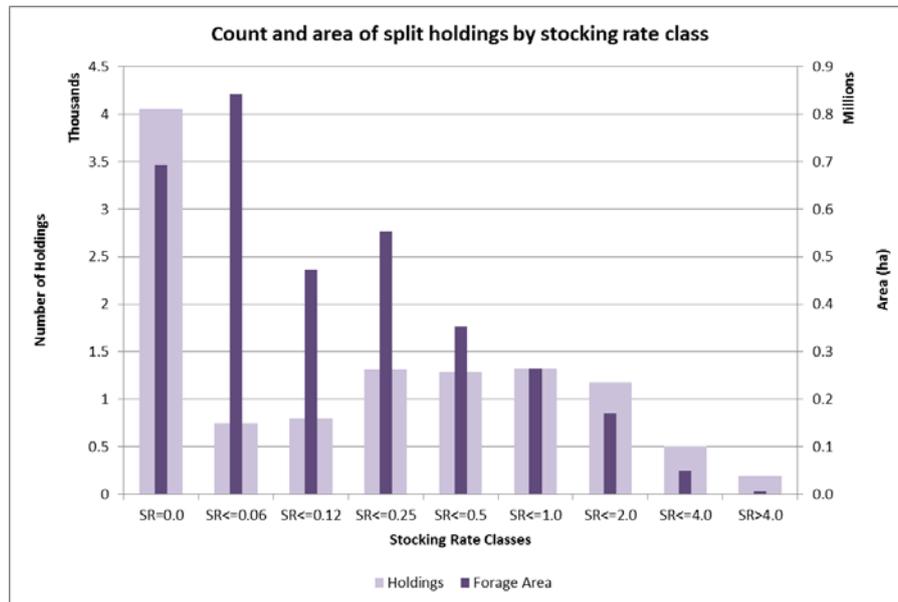


Figure 14

APPENDIX 1 – LAND USE CLASSIFICATION

The table below shows the parent land use class in to which the IACS land uses were grouped. Records shaded green indicate data derived from the National Forest Inventory. For these records, although mapped in IACS no claimed land use could be determined.

Table 5: Reclassification of IACS land use Codes into Parent Classes (14)

Parent Land Use Class	IACS or NFI Description	Count
Energy Crops	MISCANTHUS	1
Energy Crops	NON-FOOD SETASIDE - OILSEED RAPE FOR INDUSTRIAL USE	3
Energy Crops	REED CANARY GRASS	26
Energy Crops	SHORT ROTATION COPPICE	94
Energy Crops	SHORT ROTATION COPPICE ENERGY	5
Energy Crops	WINTER OILSEED RAPE ENERGY	2
Environmental Management	FALLOW	1107
Environmental Management	GREEN COVER MIXTURE	37
Environmental Management	LAND PREVIOUSLY STRUCTURAL SET-ASIDE	13
Environmental Management	LFASS INELIGIBLE ENVIRONMENTAL MANAGEMENT	783
Environmental Management	NORMAL SETASIDE - BARE FALLOW	7
Environmental Management	NORMAL SETASIDE - GREEN COVER MIXTURE	6
Environmental Management	NORMAL SETASIDE - NAT REGEN (AFTER CEREALS)	69
Environmental Management	NORMAL SETASIDE - NAT REGEN (AFTER OTHER CROPS)	4
Environmental Management	NORMAL SETASIDE - NEXT TO WATERCOURSES, HEDGES, WOODS, DYKES AND SSSIs	1
Environmental Management	NORMAL SETASIDE - OWN MANAGEMENT PLAN	10
Environmental Management	NORMAL SETASIDE - PHACELIA	2
Environmental Management	NORMAL SETASIDE - SOWN GRASS COVER	81
Environmental Management	NORMAL SETASIDE - WILD BIRD COVER	1
Environmental Management	POSITIVE ENVIRONMENTAL MANAGEMENT	87
Environmental Management	SFPS BEING CLAIMED ON AGRI-ENVIRONMENTAL OPTIONS	16
Environmental Management	WILD BIRD SEED	608
Environmental Management	NORMAL SETASIDE - MUSTARD	1
Environmental Management	FALLOW LAND FOR MORE THAN 5 YEARS	136
Forage Crops	ARABLE SILAGE FOR STOCK FEED	899
Forage Crops	FIELD BEANS	427
Forage Crops	FODDER BEET	93
Forage Crops	KALE AND CABBAGES FOR STOCKFEED	315
Forage Crops	OTHER CROPS FOR STOCK FEED	363
Forage Crops	PROTEIN PEAS	130
Forage Crops	RAPE FOR STOCK FEED	322
Forage Crops	SWEET LUPINS	21
Forage Crops	TURNIPS/SWEDES FOR STOCK FEED	774
Forage Crops	WHOLE CROP CEREALS	287
Grass Over 5 Years	GRASS OVER 5 YEARS	192429
Grass Under 5 Years	GRASS UNDER 5 YEARS	80042
Horticulture	AROMATIC, MEDICAL AND CULINARY PLANTS	2
Horticulture	ARTICHOKES	6
Horticulture	ASPARAGUS	4
Horticulture	BEANS FOR HUMAN CONSUMPTION	92
Horticulture	BEDDING AND POT PLANTS	1
Horticulture	BILBERRIES (AND OTHER FRUITS OF THE GENUS VACCINIUM)	6
Horticulture	BLACKBERRIES	1
Horticulture	BLACKCURRANTS	26
Horticulture	BRUSSEL SPROUTS	67
Horticulture	BULBS/FLOWERS	79
Horticulture	CABBAGES	33
Horticulture	CALABRESE	125
Horticulture	CARROTS	242
Horticulture	CAULIFLOWER	21
Horticulture	GOOSEBERRIES	1
Horticulture	LEEKS	6
Horticulture	LETTUCE	7
Horticulture	NURSERIES	1
Horticulture	NURSERY - FRUIT STOCK	4
Horticulture	NURSERY - ORNAMENTAL TREES	15
Horticulture	OTHER NURSERY STOCKS	8
Horticulture	OTHER SOFT FRUIT	5
Horticulture	OTHER VEGETABLES	160
Horticulture	PEAS FOR HUMAN CONSUMPTION	676
Horticulture	RASPBERRIES	54

Parent Land Use Class	IACS or NFI Description	Count
Horticulture	REDCURRENTS	1
Horticulture	RHUBARB	14
Horticulture	SHOPPING TURNIPS/SWEDES	188
Horticulture	SOFT FRUIT	9
Horticulture	STRAWBERRIES	94
Horticulture	TOP FRUIT	12
No IACS or NFI Land Use Known	Null Land Use	9721
Other Cropping	LINSEED	24
Other Cropping	MAIZE	365
Other Cropping	MIXED CEREALS	150
Other Cropping	OILSEED RAPE	33
Other Cropping	RYE	5
Other Cropping	SEED POTATOES	1512
Other Cropping	SPRING OILSEED RAPE	166
Other Cropping	TRITICALE	84
Other Cropping	TURF PRODUCTION	62
Other Cropping	WARE POTATOES	1864
Other Cropping	WINTER OILSEED RAPE	3534
Other Land	OTHER LAND	1620
Other Land	PONDS, RIVERS, STREAMS OR LOCHS	556
Other Land	ROADS, YARDS OR BUILDINGS	1683
Other Land	SCREE OR SCRUB	1234
Rough Grazing	ROUGH GRAZING	35199
Shared and Common Grazing	COMMON GRAZING	2205
Shared and Common Grazing	SHARED GRAZING	13
Spring Cereal	SPRING BARLEY	36533
Spring Cereal	SPRING OATS	2230
Spring Cereal	SPRING WHEAT	831
Winter Cereal	WINTER BARLEY	4904
Winter Cereal	WINTER OATS	668
Winter Cereal	WINTER WHEAT	10918
Woodlands and Forestry	Assumed woodland	551
Woodlands and Forestry	Broadleaved	2849
Woodlands and Forestry	Conifer	3854
Woodlands and Forestry	EX STRUCTURAL SET-ASIDE (AFFORESTED LAND ELIGIBLE FOR SFPS)	103
Woodlands and Forestry	Felled woodland	216
Woodlands and Forestry	Ground prepared for new planting	87
Woodlands and Forestry	Low density	4
Woodlands and Forestry	Mixed (predominantly broadleaved)	365
Woodlands and Forestry	Mixed (predominantly conifer)	397
Woodlands and Forestry	NEW WOODLAND (ELIGIBLE FOR SFPS)	290
Woodlands and Forestry	NON-FOOD SETASIDE - TREES SHRUBS AND BUSHES	2
Woodlands and Forestry	NORMAL SETASIDE - 5 YEAR UNDER WGS	6
Woodlands and Forestry	OPEN WOODLAND(GRAZED)	3769
Woodlands and Forestry	STRUCTURAL SETASIDE - EX 5 YEAR STILL IN FWS	1
Woodlands and Forestry	STRUCTURAL SETASIDE - WGS, FWPS OR SFGS	4
Woodlands and Forestry	Shrub	28
Woodlands and Forestry	TREES SHRUBS & BUSHES	3633
Woodlands and Forestry	WOODLAND AND FORESTRY	28905
Woodlands and Forestry	WOODLAND/FORESTRY WITH UNIQUE FIELD IDENTIFIER	1
Woodlands and Forestry	Young trees	763