

Modelling Scenarios for CAP Pillar 1 Area Payments using Macaulay Land Capability for Agriculture (& Less Favoured Area Designations)

Final Report

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Executive Summary

Overview

The research presented in this technical report was undertaken for the Scottish Government (SG) Rural and Environment Analytical Services (REAS) by Macaulay Land Use Research Institute (MLURI) to support the Scottish Government initiated Inquiry into the Future of Support for Agricultural in Scotland that is being led by Brian Pack (the Pack Inquiry). This report presents the materials, methods and some of the key outputs of the research study “Modelling scenarios for CAP Pillar 1 area payments using the Macaulay Land Capability for Agriculture (LCA)” (RERAD/007/09).

In 2009, the Single Farm Payment Scheme (SFPS) was the single largest support scheme to Scottish farmers with a total value of €648 million. For the majority of farmers it is paid on a historic basis based on level of activity in the reference period from 2000 to 2002. Under current European Commission rules for the scheme provisions exist for the scheme to be also administered on an area basis by setting support rates per hectare of eligible land. There are also opportunities to differentiate support rates according to some objective criteria – for example, land quality. Against this background, this research has assessed the redistributive impacts of scenarios where the scheme is designed using the Macaulay Land Capability for Agriculture (LCA) classification system and the Scottish Government Less Favoured Area Support Scheme (LFASS) designations. The project has delivered a definitive analysis of the distributive impacts of alternative scenarios for area payments for all existing claimant businesses and an indicative analysis for the additional areas likely to be included within the scope of an area-based SFP scheme.

Business level analysis of changes to SFP for existing businesses and the estimated newly qualifying area was undertaken for 10 area-based scenarios. Five scenarios were based on varying rates of payment for land in different groups of LCA classes. Three LCA scenarios are taken from the Interim Report and Consultation (LCA-S1 to S3). Two further LCA-based scenarios have also been included. A scenario with a single rate applied to all included land (LCA-S4 Flat Rate) and a scenario where payment rates are highest for land with the least potential (LCA-S5 Reverse). Three scenarios use the Less Favoured Area Support Scheme designations as a basis for setting payment rates for land of different designation (LFA-S1 to S3). These LFA based scenarios are a translation of the interim report LCA scenarios from an LCA basis to an LFA basis. Two additional scenarios indicate the effects of adding a minimum stocking rate eligibility requirement for forage area (as proposed in the Interim Report) these are based on LCA-S1 and LFA-S1 and identified as LCA-S1.sr and LFA-S1.sr. The scenarios are specified in Table 1 and Table 2.

Table 1: LCA Scenario Payment Rates

Class	LCA-S1 Interim	LCA-S1.sr Interim (SR)	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse
1	246.84 €	273.44 €	246.84 €	215.23 €	108.04 €	50.44 €
2						
3.1						
3.2						
4.1						
4.2						
5.1						
5.2	85.44 €	94.65 €	102.81 €	157.87 €		228.00 €
5.3						
6.1	28.48 €	31.55 €	28.48 €	28.48 €		370.05 €
6.2						
6.3						32.57 €
7						0 €

Table 2: LFA Scenario Payment Rates

Class	LFA-S1 Interim Report	LFA-S1.sr Interim Report	LFA-S2 Consultation A	LFA-S3 Consultation B
Non-LFA	240.96 €	290.80 €	241.09 €	211.64 €
LFA - Standard	117.63 €	141.96 €	118.62 €	120.77 €
LFA - Fragile	65.06 €	78.52 €	63.41 €	70.94 €
LFA - Very Fragile	59.80 €	72.17 €	61.30 €	66.12 €

Caveats to the Analysis

Within the limits of the data and time available it was possible to carry out a thorough analysis that brings out key issues for decision makers. Given the sensitivity of the issue it is essential, however, that the limitations of the analysis are understood so that interpretations of the analysis are soundly based and the remaining uncertainties are recognised. Specific limitations are recognised in the text and summarised at the end of the report (Appendix F). None of the limitations are, however, so severe that they undermine the overall credibility of the analysis in terms of the headline results.

Headline Results

The results presented in this report summarise the impacts of the scenarios at national and regional levels and by farm type. These results are supplemented by a database of more detailed information from scenario analyses and this has been submitted to SG-REAS. Due to the level of information generated from the scenario analysis, the commentary presented in this technical report focuses mainly on highlighting the key results from the analysis and where comparison between data tables is necessary to derive better understanding of the results.

Existing and New Claims

The research estimates that out of 5,403,448 ha with SAF claims in 2009, 4,354,660 ha of land are currently used to activate SFPS entitlements. Of the currently claimed SAF area the estimate is that 4,972,035 ha would be included in

an area based scheme. A further (maximum) new area of 1,002,494 ha could also be included in the scheme to give a total (maximum) area for payment of 5,974,530 ha.

The new area would receive 17-22% of current budget depending on the scenario (see Section 5.2, Table 14). The effect of the new claims is that average payments per ha fall from €149 to €108 (see Section 5.8, Table 51 and Table 52).

Overall Redistribution

In all the scenarios for area payments that were analysed there are significant redistributions of support across regions and farm types. Redistribution is defined in the report as the sum of the increases and decreases in payment for all businesses. The redistributive impacts are largest for scenarios that pay higher rates of support for land with lower agricultural potential relative to the baseline (e.g. LCA-Reverse), but remains substantial even where the highest payments are made to the best quality land (Interim , Consultations A and Bⁱ). The groupings of land classes and differences in support rates per hectare change the relative magnitudes of redistribution but much less than the decision to replace the current historic model for Pillar 1 payments with an area based scheme.

Redistribution within Regions and Farm Types

There are substantial redistributions within farm types and regions for all the scenarios assessed (see Section 5.2). The nature of this redistribution is from those with currently larger entitlements (likely reflecting more intensive use of land) to those with smaller or no entitlements. For example under LCA-S1, the LFA (Sheep and Cattle) Farm Type sees a small net gain of €0.9 million, but within this farm type the total amount moving from businesses experiencing a decrease amounts to €69.8 million and the total going to businesses experiencing an increase amounts to €63.9 million for current claimants and a further €6.8 million for those receiving no payment in the baseline.

At the regional level, similar patterns are observed. For example, for Scenario LCA-S1, businesses in Perth and Kinross see a net change of €0.9 million. The total amount moving from businesses experiencing a decrease amounts to €13.7 million. This is balanced by the total going to businesses experiencing an increase amounting to €10.1 million for current claimants and a further €4.4 million for those receiving no payment in the baseline.

Redistribution across Regions and Farm Types

In all but one case (Scenario LFA-S1.sr for Eastern Scotland) there is a consistent reduction in SFP for Eastern Scotland, Southwest Scotland and North Eastern Scotland (see Table 20 in Section 5.2) and increases for Highlands and Islands. However, care needs to be taken when commenting on regional effects. While Highlands and Islands region sees increases in SFP in all scenarios, at NUTS3ⁱⁱ level the Orkney Islands see a net reduction in total payments. There are significant contrasts between regions, for example in LCA-S1 the region that sees the largest net increase is Caithness and Sutherland (€25.1 million) with the greatest net reduction in Dumfries and Galloway (€39.3 million).

ⁱ Note that while the structure and intent of the Interim and Consultation scenarios have been maintained the specific payment rates have changed as a result of incorporating within the analysis the additional areas likely to be included in a new scheme.

ⁱⁱ NUTS3 = Nomenclature of territorial units for statistics level 3. Figure 9 shows a map of the regions described.

For analysis by farm typesⁱⁱⁱ it is apparent that for all scenarios tested some farm types see net reductions in SFP (see Table 15). This includes Cattle and sheep (Lowland), Cereals, Dairy, General Cropping, and Mixed. Farm types with consistent increases include Cattle and sheep (LFA) and Other (mainly Specialist Grass and Forage), except where a stocking rate eligibility criterion is applied (LCA-S1.sr and LFA-S1.sr).

Changes in Distribution of Payments

With all the scenarios for area payments, there are more businesses that see their total payments increase compared to those that see a decline. For example, for Scenario LCA-S1 Interim Report, of the separate businesses that can be identified in the analysis 61% experience an increase in support and 39% a decline in support. Given the fixed budget, however, the average magnitude of increases is smaller than the reductions.

Stocking Rate Effects

Adding an eligibility criterion that limits claimed areas to those with a stocking rate of 0.12 livestock units per ha (~1 sheep per ha) excludes ~1.39 million ha from receipt of payments. This is equivalent to some €62.8 million or 10% of the overall budget for LCA-S1.sr and €110.6 million or 17% for LFA-S1.sr. This allows payments for eligible land to be scaled up by that amount. This scaling up reduces redistribution, marginally in the case of the LCA-S1.sr but substantially in the case of the LFA-S1.sr.

Acknowledgments

The authors acknowledge the support given to the research team by Brian Pack and the Inquiry Committee, and the Scottish Government REAS and Rural Payments and Inspectorate Directorate (RPID) staff.

ⁱⁱⁱ As defined in the June Agricultural Census.

1 Introduction

This research was undertaken for the Rural and Environment Analytical Services (REAS) by Macaulay Land Use Research Institute (MLURI) to support the Scottish Government initiated Inquiry into the Future of Support for Agriculture in Scotland being led by Brian Pack (the Pack Inquiry). This technical report presents the materials, methods and outputs of the research study “Modelling scenarios for CAP Pillar 1 area payments using the Macaulay Land Capability for Agriculture (LCA)” (RERAD/007/09).

In 2009, the Single Farm Payment (SFP) was the single largest support scheme with a total value of €648 million (around 75% of CAP Pillar I). For the majority of farmers it is paid on a historic basis based on level of activity in the reference period from 2000 to 2002. Under current European Commission rules for the scheme provisions exist for the scheme to be also administered on an area basis by setting support rates per hectare of eligible land. There are also opportunities to differentiate support rates according to some objective criteria – for example, land quality. Against this background, this research has assessed the redistributive impacts of scenarios where the scheme is designed using the Macaulay Land Capability for Agriculture (LCA) classification system and the Scottish Government Less Favoured Area Support Scheme (LFASS) designations.

1.1 Objectives

The project was required to deliver following key objectives:

1. Identification of land likely to be eligible for Pillar 1 support under an area payments model;
2. Analysis of five scenarios for an area-based payment scheme based on the Macaulay LCA classification;
3. Analysis of three scenarios for an area-based payment scheme based on LFA classifications;
4. Analysis of two additional scenarios that include stocking rate eligibility criteria presented in the Inquiry’s Interim Report^{iv}.

The first objective was achieved in two parts. First, on the basis of land use, the area that would be included for businesses currently in receipt of SFP was assessed. In some cases this is substantially different from the area used to activate current entitlements. Secondly, from the remaining agricultural area (as defined by June Agricultural Census (JAC) holdings) the new land that would be included and excluded was assessed. This is a key step in the analysis since payment rates per unit of land crucially depend on the area over which payment is made.

The second and third objectives required the implementation of an analytical framework of data and methods to support the use of the LCA and LFA as a basis for differentiating payments on the basis of land quality and to estimate the consequences, per business. The framework enabled the evaluation of alternative scenarios against a common historical baseline, in particular the redistributive effects of alternative payment regimes at national and regional scales and by farm type.

The fourth objective required modifying the analytical framework to include the consequences for distribution of payments of adding a stocking rate eligibility criterion to two of the existing scenarios – one using LCA and the other using LFA. An overview of the analytical framework is set out below.

^{iv} <http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/inquiry/interim/interim>

1.2 Overview of the Analytical Framework

The analytical framework for the analysis for this report is set out in Figure 1 with three phases of development and use: Data Collation, Data Integration and Scenario Analysis.

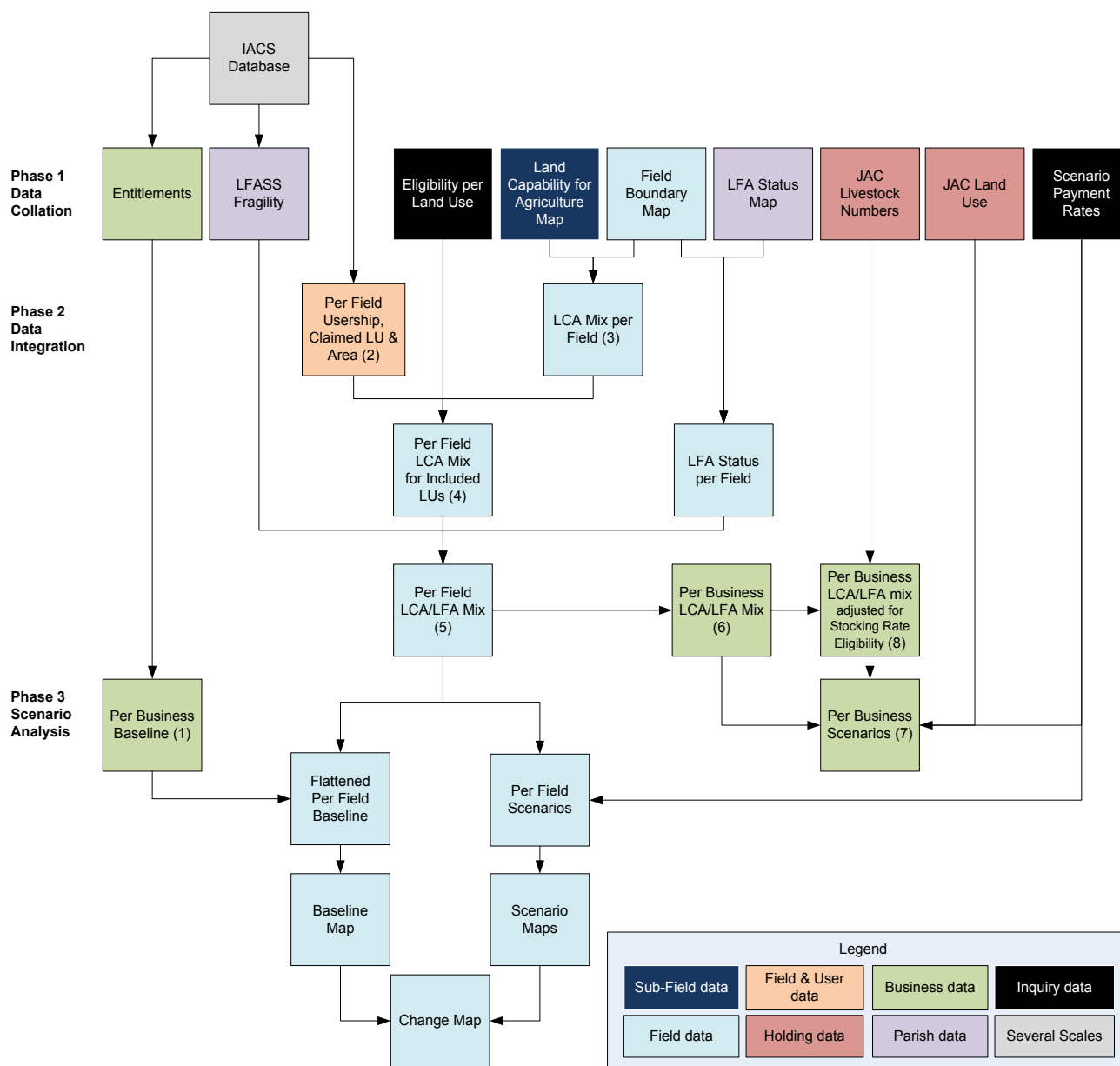


Figure 1: Overview of analysis

1.2.1 Data Collation

In this phase the following datasets were brought together in an Oracle database (for tabular data) and ArcInfo GIS^v (for map data):

- Macaulay LCA map – a 13-level classification of agricultural potential, used as a basis for setting support rates for the different scenarios of area payments, see Section 2.1.

^v Geographical Information System

- LFA map showing LFA Status – a three-level classification of natural handicap, used here as an alternative to the LCA as a basis for defining payments, see Section 2.1.
- Integrated Administration and Control System (IACS) database – this provides details of Ownership, Seasonal Renting and Land Use – see Section 2.3. The IACS database was also the source of the LFASS Fragility Markers.
- Entitlements – payments and entitlement areas per business from 2009 – see Section 2.3.1.
- Field Boundary map – geographical definition of the land parcels being used by each business, see Section 2.3.3.
- Included and Excluded Land Uses – decisions by the Inquiry Team on which land uses should be included when determining the area of land that makes up a business that will be eligible for area payments – see Section 3.2.
- Livestock Numbers, per holding (from JAC) – supports stocking rate eligibility analysis – see Section 3.6.
- Scenario Payment Rates – the groupings of LCA and LFA classes and their associated payments per ha – see Section 4.1.

1.2.2 Data Integration

This phase had the goal of deriving a dataset defining the mix of LCA/LFA areas for each business. This required the following steps (numbers in the text key to Figure 1):

1. Defining the Per Business Baseline as sum of Entitlements.
2. Deriving and cross checking, for each mapped field – who is using the land (owner, renter or shared use), for what (the land use) and the area currently being claimed.
3. Defining the LCA mix for each field (a GIS overlay of LCA and Field Boundary map).
4. Combining (3) with Included Land Uses data to define the LCA mix only for Included Land.
5. Adding LFA Status and Fragility Codes to create a field-level LCA/LFA mix dataset. This provides the basis for mapping alternative payments scenarios per field in Phase 3.
6. Grouping the Per Field LCA/LFA Mix data to business level using the ownership/rental relationships between field and business from (2) above.
7. Using JAC holding data to estimate for the unmapped agricultural area the LCA/LFA mix – see Section 3.4.
8. Using the JAC livestock numbers per business to reduce the Included area of grazing land if a specified minimum stocking rate was not achieved.

1.2.3 Scenario Analysis

In this phase the LCA/LFA Mix dataset (from Phase 2) is used with the Scenario Payments Rates data to derive payments per business. Comparison is then made between the Per Business Baseline and each of the alternative scenarios. These business level analyses are then summarised at Scotland, region and farm type level for all scenarios.

The maps of Payment Scenarios use the Per Field LCA/LFA mix dataset with the Scenario Payments Rates to calculate a payment for each land parcel. This is then used with the Included area for each parcel to derive an individual payment rate (in €/ha). This is also helpful in resolving how to represent multiple claimants per land parcel (up a maximum of 237). The Baseline Map is less simple to derive since payments are not tied to land parcels. In this case the business level payment is averaged over all the land parcels that make up a business. This does create a usable baseline but one that has some significant limitations (these are further discussed in Section 6 and Appendix A.3). Finally Change Maps are also derived (scenario minus baseline so negative numbers indicate reduced payments).

The rest of the report is organised as follows:

- Section 2 – Materials, sets out the data used as the basis for the analysis.
- Section 3 – Methods, provides more detail on analysis outlined above.
- Section 4 – Scenario Analysis, sets out the scenarios used.
- Section 5 – Results, contains a series of tables summarising the consequences per Scenario.
- Section 6 – Mapped Results, presents maps of payment distribution and change from the baseline.
- Section 7 – Key Findings summarises the results from the project.
- Technical Appendices - Contains information dealing with implementation issues.

2 Materials

The level of detail in both this Materials section and the Methods section that follows is intended to:

- assist the reader in understanding the basis of the scenario analysis;
- flag where assumptions have been made by the Inquiry Team to enable the analysis;
- identify where results are indicative since decisions have not yet been made;
- note where there are limitations in the analysis and where reasonable or worst-case^{vi} assumptions had to be made.

To limit the quantity of material presented in the main body of the report, extensive use has also been made of Technical Appendices. These contain detailed descriptions of computations, data quality issues and intermediate results. The latter are results that show the consequences of varying some of the assumptions (e.g. how a stocking rate eligibility criterion is implemented or which land uses are included). These intermediate results can be helpful in assessing the robustness of the analysis and in other cases in supporting the interpretation of the scenario analyses.

The following sections outline the key features of the datasets used for the analysis of the alternative area-based payment scenarios.

2.1 The Land Capability for Agriculture Classification

The Macaulay LCA classification was first published in 1982. The classification and guidelines were developed and tested over a period of several years in collaboration with the then Department and Colleges of Agriculture in Scotland and with the Agricultural Development and Advisory Service (ADAS) and the soil science community in England and Wales.

The classification ranks land on the basis of its *potential* productivity and cropping flexibility determined by the extent to which its physical characteristics (soil, climate and relief) impose long-term restrictions on its agricultural use. There are seven classes, Class 1 offering the highest potential flexibility of agricultural use and Class 7 land being of very limited agricultural value (see Figure 2). Classes 1-4 comprise land suited to arable cropping, with decreasing opportunities for arable crops from Class 1 to Class 4. Class 4 land is land suited primarily for grassland with only short arable breaks. Class 5 land is capable of use as improved grassland with very limited opportunities for the occasional pioneer crop. Class 6 land is capable only of use as rough grazing with no realistic potential for improvement. Classes 3 and 4 are subdivided into two divisions and Classes 5 and 6 into three divisions (again see Figure 2).

^{vi} Worst-case assumptions in the context of this report mean assumptions that maximise the area eligible for payment. These assumptions were preferred by the Inquiry Team since it means that payment rates would not require later revision down (with consequent reductions in payments to all businesses) simply because additional areas of land are identified as requiring inclusion. In most cases worst-case is qualified in the text for clarity.

The map in Figure 2 shows the 1:250,000 scale LCA dataset. It should be noted that a “hybrid” of 1:250,000 scale mapping and 1:50,000 scale mapping was used in the building of the scenarios. The geographic coverage of the 1:50,000 scale mapping can be seen in Figure 3. The 1:50,000 scale mapping is preferred since it provides a finer resolution of conditions in those regions with more intensive management regimens.

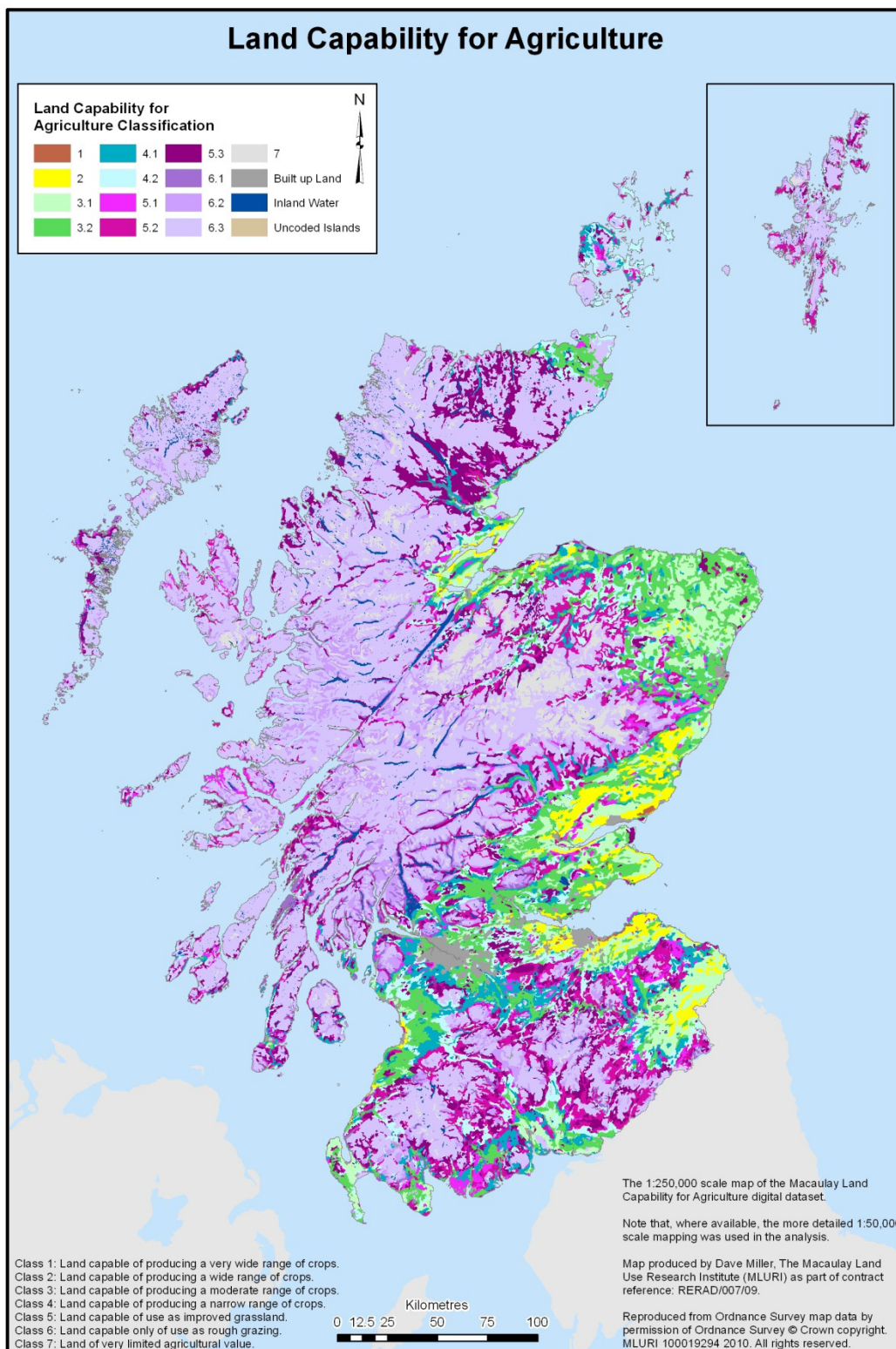


Figure 2: LCA Map

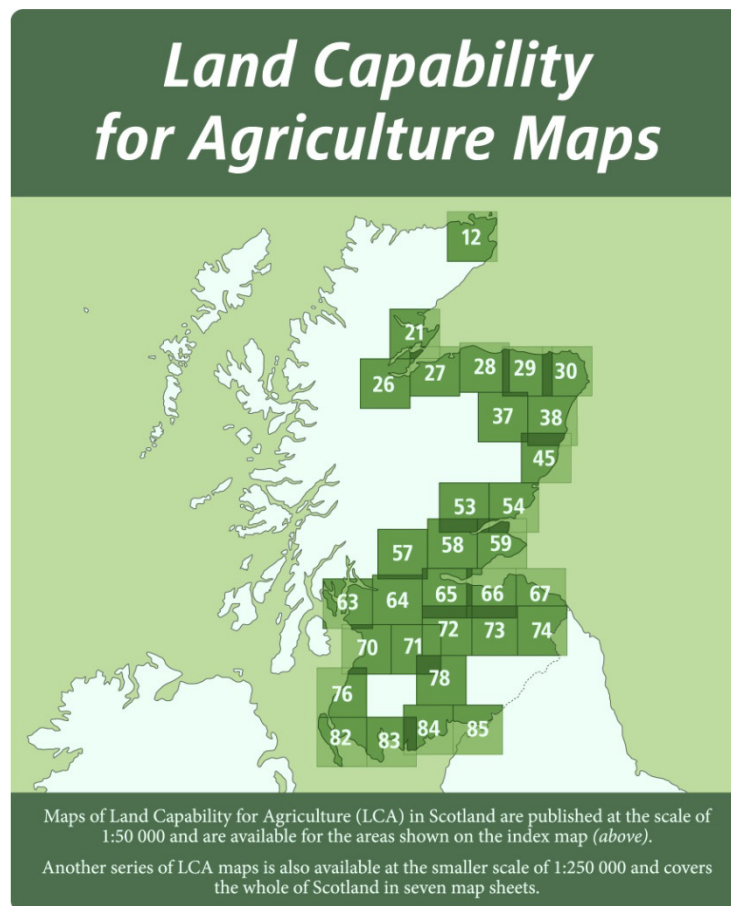


Figure 3: Coverage of 1:50,000 scale mapping

The LCA classification has a number of important assumptions underlying it and these are listed below:

- It is intended to assess the value of land for agriculture.
- It assesses the capability and *potential* of land for agriculture. It is not based on current use although there is often a strong relationship between the two. The biggest potential mismatch is in Class 5; LCA expresses the *potential* of the land as capable of improved pasture whereas the *actual* land use is often rough grazing.
- Land management is linked to a number of factors, the physical properties of the land being only one of them. It is also linked to farm size and structure, location, access to markets, prevailing market prices for different products, financial incentives, the personal and social circumstances and aspirations of different farmers and to the financial position of each business. Determining a national management standard is therefore very difficult but land should be assessed under a *satisfactory level of management*.
- Land which has limitations that can be removed or reduced at economic cost should be classified on the severity of the remaining limitations.

Each LCA class describes the range of agricultural activities possible within them; it cannot and does not state whether these activities, which are often determined by factors other than land capability, are actually taking place. As described in the assumptions, social and economic factors make the level and type of agricultural activity almost impossible to predict. However, the LCA classification provides an unbiased objective assessment of the biophysical capacity of land for agricultural use. It is entirely independent of any form of bias that land ownership might impose on land use choice or management (e.g. owner occupier, tenant, institutional ownership, and age), incentive schemes or market conditions. In that sense it removes the more transitory elements of land use.

2.2 Less Favoured Area Designations

The Less Favoured Area (LFA) scenarios that are described within this report combine two classifications: the LFA Status (Non-LFA, Disadvantaged, or Severely Disadvantaged) reflecting land quality and the parish Fragility Indicator (Standard, Fragile, or Very Fragile) reflecting how peripheral they are with respect to agricultural markets. The map shown in Figure 4 presents the intersection of these classifications.

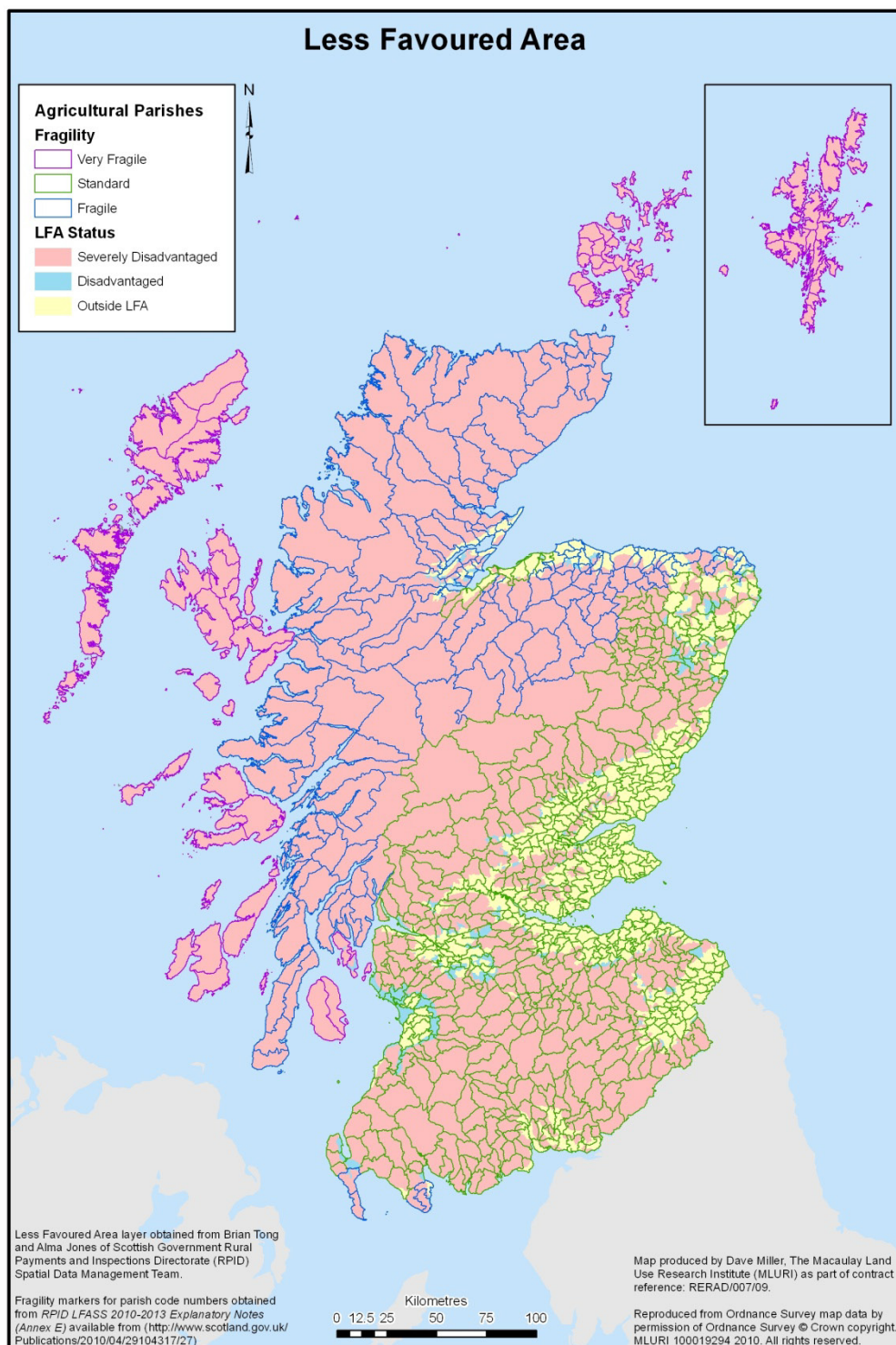


Figure 4: LFA Map

The LFA status and Fragility designations were combined to give the four classes as shown in Table 3.

Table 3: LFA & Fragility combinations

	Standard	Fragile	Very Fragile
Non-LFA	Non-LFA		
Disadvantaged	LFA – Standard	LFA – Fragile	LFA – Very Fragile
Severely Disadvantaged			

2.3 IACS Data

In addition to the LCA and LFA maps several other datasets held as tables within the IACS database had to be collated and integrated within the analytical framework to support the scenario analysis. Figure 5 shows the key entities and their relationships. Note in particular those used with an Oracle database and those used within the ArcInfo GIS. The scenarios analysis as noted previously is done at business level; therefore much of the effort in data integration was to ensure that data from different levels of aggregation e.g. field, farm, business, parish etc. were consistent.

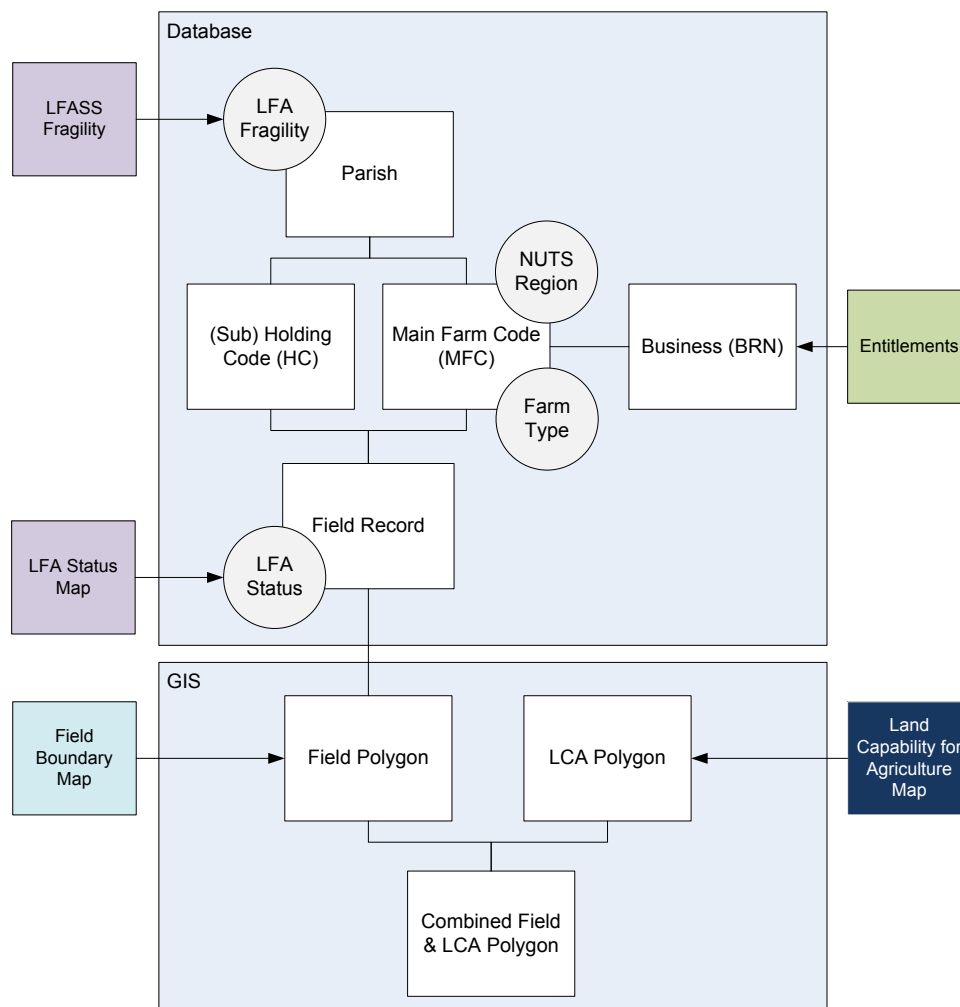


Figure 5: IACS and other datasets used within the analytical framework

The following sections provide more detail on the use made of these IACS datasets.

2.3.1 Baseline – Current SFPS Entitlements

It is important to be aware that, although single farm payment scheme (SFPS) entitlement is activated by an area claim, the entitlement was not calculated on an area basis but instead from the mix of business-level activities (e.g. arable area, stock numbers and types etc) during the reference period from 2000 to 2002. The baseline used within this report is the total value of SFPS entitlements that were held per business in 2009, in Euros, pre-modulation^{vii} and excluding Scottish Beef Cattle Scheme (SBCS) deductions or payments. The total baseline SFPS budget is approximately €648 million and is made up of 4.35 million entitlements each of which is activated by a claim of 1 ha. Entitlements *are not* tied to specific fields but instead are *activated* by claims made in any land used by the business that owns the entitlement.

2.3.2 IACS Field Claims

The Interim Report by the Inquiry proposed that, unlike in the Baseline, the SFPS area payment be linked directly to fields and that land use is the basis for inclusion or exclusion of a field or part thereof. Since under the current scheme, and in the future, payments will be made to *users* of land, the scenario analysis must account for land that is owned and used and also land that is rented and used.

The claim data provided by the IACS(3) (Permanent Land) sheet (Figure 6) that forms part of the Single Application Form (SAF), provides the necessary land use and user data for permanent (i.e. owned and used) land. The claim data provided by the IACS(4) (Seasonal Land) sheet (also Figure 6), that also forms part of the SAF, provides the necessary land use and user data for seasonal (i.e. rented and used) land.

The figure displays two forms side-by-side, labeled 'PERMANENT LAND' and 'SEASONAL LAND'. Both forms are part of the 'Rural Payments and Inspections Directorate' and are used for claiming entitlements. They contain sections for 'Basic Information', 'Land Use', and 'Entitlements'. The 'PERMANENT LAND' form has a 'Total' section at the bottom right. The 'SEASONAL LAND' form has a 'Total' section at the bottom right. Both forms include instructions on how to complete them and a signature line.

Figure 6: IACS Permanent and Seasonal Land Forms

The land use data from these SAF forms is used to determine whether land is included for payment or whether it is excluded. See Section 3.2 for the methodology used and Appendix A.1 and Appendix A.2 for the included and excluded land use lists, respectively. For a regional analysis of the claimed areas, including an analysis of cross-regional rentals, see Appendix B.

^{vii} Pre-modulated entitlement means the value of the SFPS entitlement before any transfer of EU CAP funds from Pillar 1 (direct payments and market support) to Pillar 2 (Rural development and agri-environment measures).

2.3.3 Field Boundary Maps

Area payment in the scenarios requires field level mapping for two reasons:

- To allow quality control checks to ensure that field claims do not exceed the field area; and
- To enable integration with the LCA classification.

Combining LCA with the IACS field polygons^{viii} is a GIS operation that provides a breakdown of the LCA areas that are contained in each field. The January 2010 IACS field boundary dataset was used since it gives the most up to date and largest coverage (compare with the alternatives 2008 or 2009 in Table 4). The Field Boundary Maps link to the IACS Field Records Table, using field identifiers (FIDs) integrating the database and GIS analyses (again see Figure 5). Due to differing time lines for the collection of SAF data and the updating of the GIS maps there are a small number of discrepancies between the FIDs recorded on the SAF and those recorded in the GIS dataset. Where possible the SAF records were updated using the more recent GIS data.

Table 4: IACS Field Polygon datasets

Dataset	Number of records	Gross Areas (ha)
Jan 2008	414,510	5,785,962
Jan 2009	428,304	6,187,879
Jan 2010	434,222	6,307,994

With linkage established between the GIS mapping and the IACS SAF datasets, Scenario maps can be accurately prepared since payment is directly linked to each field. Preparing a map of the Baseline at field level is more problematic, this is dealt with in a 'Baseline Flattening' process (See Appendix A.3).

^{viii} Polygon is the term used to define an area feature stored in the GIS (i.e. the field boundary mapping). It may be used interchangeably with 'land parcel' throughout the report.

3 Methodology

This section expands on the overview of the Analytical Framework in Section 1.2, focusing on two aspects:

- Data Collation.
- Data Integration.

3.1 Data Collation - IACS Data Quality Checks

SAF data is collected and organised in the IACS database to support existing Scottish Government business processes. While the IACS datasets are the best available to support this research, they have some limitations when it comes to modelling area payments (e.g. data being available only for those businesses that have made a claim).

One issue of particular concern was to ensure that seasonal rentals are recorded identically by both the owner (on IACS(3) Permanent Land) and the renter (on IACS(4) Seasonal Land). Since these forms are not filled in by the same person the data recorded on these sheets in some cases does not match. Four forms of mismatch were identified:

- Seasonal claims with no corresponding owner Land Let Out to Others (LLO) claim
- LLO claim with no corresponding seasonal claims
- Seasonal claims exceeding owner LLO claim
- LLO claim exceeding seasonal claims

It was also important to ensure that any single field claim does not exceed the known field area (as defined by the Field Boundary Map). Furthermore, since there can be multiple claimants per field, it was also important to ensure that the sum of all claims for a field do not exceed the field area. These issues are overcome by applying the quality control measures detailed in Table 5. Further detail regarding the LLO issues is detailed in Appendix A.5.

Table 5: Multi-step adjustment of SAF data

Step	Description	Assumption	Solution
A	Seasonal claim with no corresponding owner LLO	Seasonal claim valid. Owner LLO has not been entered.	Impute owner LLO to match the seasonal claim.
B	Total claim exceeds field area (IACS(3) claims)	Over- or double-claiming.	Reduce areas (in the following order) to match field area: i) Owner LLO; ii) Shared/Commons; iii) Owner own use
C	Seasonal claim exceeds owner LLO	Owner LLO valid but some over- or double-claiming of seasonal land	Reduce the seasonal claim to match LLO claim.
D	Owner LLO with no corresponding seasonal claim	Owner LLO valid. All seasonal claims have been omitted.	Impute seasonal claim to match the difference between LLO and seasonal claim.
	Owner LLO exceeding seasonal claims	Owner LLO valid. Some seasonal claims have been omitted.	

3.2 Data Integration - Defining Included, Excluded and New Areas

The total area of Scotland is broken down into Mapped or Unmapped areas (using the IACS Field Boundary Map). The Mapped areas are made up of land parcels with active IACS claims in 2009 and unclaimed land parcels. Where there is an active claim the land use is known. For these parcels their area (or parts thereof) are included or excluded based on criteria defined in the Included and Excluded Lands Uses dataset (items 1 and 2 in Figure 7). The

remaining Unclaimed land is all assumed to be included to give a worst-case in terms of the area over which payments would have to be spread (item 3 in Figure 7).

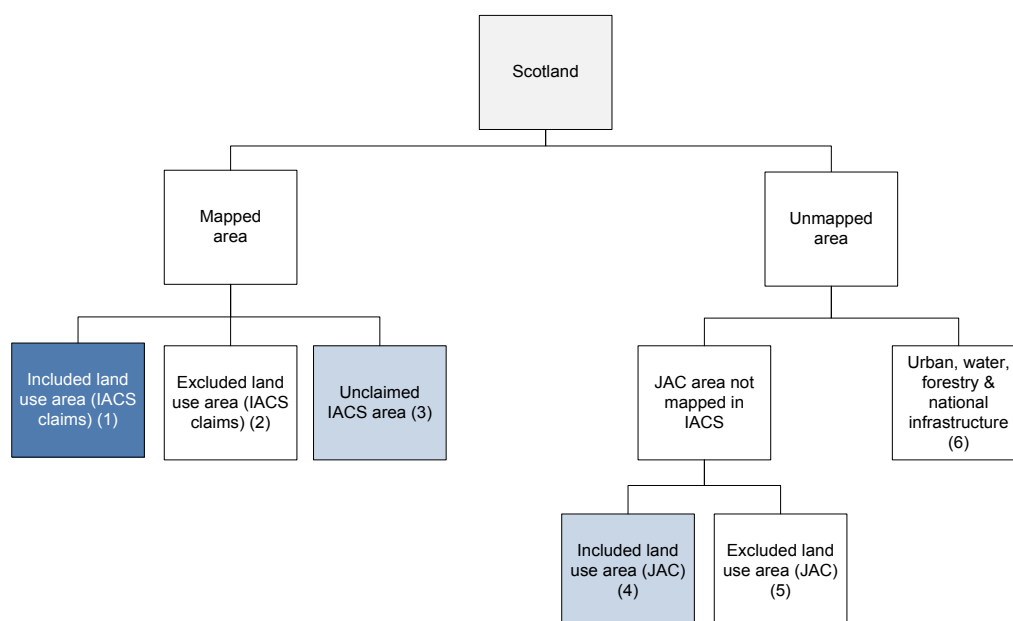


Figure 7: Defining the Included and Excluded and New Areas

The Unmapped area refers to the area of Scotland that is not part of the IACS Field Boundary Map. JAC provides holding level data for all agricultural holdings in Scotland whether or not they make a SAF claim (and are thus included in IACS). By comparing the list of holdings contained in the JAC (2009) with the list of holdings that are included in the IACS Field Boundary Map it was possible to identify all those additional holdings that could be included if an area-based scheme were to be implemented. The estimate for the Unmapped area from JAC is 173,632 ha. Using the JAC land use data and applying the same land use Inclusion and Exclusion criteria used for the Mapped area gives an Unmapped (Included) area of 158,631 ha (item 4 in Figure 7) and Unmapped (Excluded) area of 15,476 Ha (item 5 in Figure 7). Most of the Unmapped (Included) area has a farm type Other (predominantly Specialist Grass and Forage), and is in the Highlands and Islands (NUTS2) region. The area would also include many Minor holdings^{ix}.

For the purposes of reporting and comparison the Unmapped (Included) area is treated as a single record in the analysis with no Region or Farm Type identified. While with further analysis it would be possible refine the JAC based analysis this was beyond the scope of the project.

The remainder of the Unmapped area of Scotland (i.e. urban, water, forestry and infrastructure) is excluded and assigned the remaining LCA area (item 6 in Figure 7). Table 6 summarises the Included and Excluded area using as row numbers the items that were referred to in Figure 7 (above).

^{ix} A minimum size criterion would, however, exclude these holdings.

Table 6: Scotland area breakdown

No.	Description	Area (ha)			
1	IACS Claimed	Mapped	Existing	Included	4,972,035
2	IACS Claimed	Mapped	Existing	Excluded	431,413
3	IACS Unclaimed	Mapped	New	Included	844,338
4	JAC	Unmapped	New	Included	158,156
5	JAC	Unmapped	New	Excluded	15,476
6	Remaining area of Scotland	Unmapped	N/A	Excluded	1,125,017
	TOTAL Scotland				7,546,436

Out of 5,403,448 ha with SAF claims in 2009 (Items 1 and 2 in Table 6), 4,354,660 ha of land is used to activate current entitlements. Of the currently claimed SAF area 4,972,035 ha would be included if an area-based scheme were implemented (Item 1 in Table 6). A further (maximum) area of 1,002,494 ha could also be Included in the scheme (Items 3 and 4 in Table 6). This estimate assumes all IACS Unclaimed land is Included despite the land use not being known (Item 3 in Table 6)^x. The Included area for payment is 5,974,530 ha^{xi} (Items 1, 3 and 4 in Table 6), and the Excluded area is 1,571,907 ha (Items 2, 5 and 6 in Table 6).

3.3 Determining the LCA Mix for the Mapped Areas

To implement the LCA-based scenarios it is necessary to know the LCA mix for each field. In a simple case (any single or unknown land use) the LCA mix for the whole field is derived in a GIS by overlaying the Field Boundary Map and the LCA map (see Figure 5). If, however, both included and excluded land uses (and possibly unclaimed areas) are present in a single land parcel then it is not certain on which LCA class the included, excluded and unknown areas occur. An algorithm was devised to allocate the areas of LCA classes present in the field to each of:

- included
- unclaimed (and hence no land use known)
- excluded

The allocation algorithm uses a worst-case scenario for payments strategy by allocating the best LCA land to the included area first; then to the unclaimed area; and lastly allocating the lowest potential LCA land to the excluded area. For example, consider a single field with a field polygon area of 26 ha. From the claim data we can identify that 5 ha of the field is used for spring barley (included) and 8 ha is woodland (excluded) leaving 13 ha for which we cannot identify a land use. Suppose also that the LCA breakdown for the field is 2 ha of LCA class 2; 10 ha of LCA class 3.1; and 14 ha of LCA class 4.2. This would result in the allocation of the LCA land shown in Table 7.

Table 7: Allocation algorithm example

	LCA 2	LCA 3.1	LCA 4.2	Total
Included (ha)	2	3		5
Unclaimed (ha)		7	6	13
Excluded (ha)			8	8
Total (ha)	2	10	14	26

^x It is known through visual comparison of IACS Field Boundary Map data and Ordnance Survey MasterMap data that the IACS Unclaimed area includes some areas of excluded land use such as forestry. Further data integration could address this issue.

^{xi} By way of comparison the Economic Report on Scottish Agriculture (2009 edition) reports the total agricultural area of Scotland at 5.92 million hectares when farm woodland is excluded.

3.4 Determining the LCA Mix for the Unmapped Area

Similarly the LCA mix for the Unmapped Area needs to be determined. However, since there is no land parcel mapping for this area, determining the LCA mix by GIS overlay was not readily possible. What is known is the mix of LCA classes that are outwith the IACS Mapped Area. Therefore the LCA mix for the JAC Unmapped Area is estimated from this remaining LCA area using the same worst case for payment assumption detailed above. This has the consequence that the areas of the highest potential LCA classes are all included (those most likely to be used for agriculture), see Table 8 (row 4). While this is a necessary assumption for budgeting purposes, it is important to note that the dominant land use for this included JAC land is rough grazing. Since this is unlikely to be on the best quality land, it is likely that the LCA mix assumed for the Unmapped (Included) JAC overstates the amount of money that will go to this land. Further investigation of the unmapped JAC LCA mix would require modifications to the analytical framework and was considered beyond the scope of the project.

Table 8: Scotland area LCA breakdown (in thousands of hectares)

No.	Description	1	2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	6.3	7
1	IACS Claimed (included)	3	87	274	559	273	333	103	373	422	109	406	1,875	155
2	IACS Claimed (excluded)	0	2	9	29	18	34	7	50	53	11	40	156	23
3	IACS Unclaimed (included)	0	5	17	43	28	41	9	56	81	16	61	443	44
4	JAC (included)	1	16	42	98	1	-	-	-	-	-	-	-	-
5	JAC (excluded)	-	-	-	-	15	-	-	-	-	-	-	-	-
6	Remaining area of Scotland (excluded)	-	-	-	-	40	72	20	95	129	44	114	580	31
		4	109	342	729	376	481	139	574	686	179	621	3,054	252

3.5 Data Integration - Determining the LFA Mix for the Mapped and Unmapped Areas

While determining the LCA mix is a complex GIS and database operation, determining the LFA mix is less complicated. Each land parcel has an LFA Status and a Fragility Code. The LFA Status for the land parcel is derived from the LFA Status Map. The Fragility Code for a land parcel is inherited from the parish via the main or sub-holding (see Figure 5). The LFA Status and Fragility classifications are combined to give four LFA land classes (see Section 2.2 and LFA map in Figure 4).

The LFA mix is calculated after the excluded land has been removed from the dataset; therefore rows 2, 5 and 6 of the Scotland area breakdown (Table 6) cannot be reported. Table 9 thus shows the LFA breakdown for included land only (in thousands of hectares).

Table 9: LFA Breakdown (in thousands of hectares)

No.	Description	Non-LFA	LFA - Standard	LFA - Fragile	LFA – Very Fragile	Total
1	IACS Claimed (included)	629	1,904	1,751	687	4,972
3	IACS Unclaimed (included)	52	253	385	155	844
4	JAC (included)	158	0	0	0	158
		839	2,157	2,137	842	5,975

3.6 Data Integration - Using Stocking Rate as an Eligibility Criterion

An issue identified by the Inquiry Team is that with an area-based scheme, payments could be made to businesses with areas of grazing land but few or no livestock present. The Interim Report proposed the use of minimum stocking rate criterion, that would reduce the eligible area until the stocking rate criterion was met or all the area

deemed ineligible (where no stock are present). This section details how the effects of adding a stocking rate criterion are estimated using, for illustrative purposes, the minimum stocking rate of 0.12 LSU/ha proposed in the Interim Report.

3.6.1 Overview of Calculations

For the calculation of stocking rate the number and type of livestock for each business must be known. The Single Application Form (SAF) does not provide the necessary livestock data; however the JAC *does* provide detailed holding level livestock data which can be aggregated up to business level.

Before performing the stocking rate calculation the JAC livestock numbers for each business were converted into equivalent livestock units by applying the following formula:

$$\text{Livestock Units} = (\text{Cattle} * \text{Cattle Weighting}) + (\text{Sheep} * \text{Sheep Weighting})$$

The analysis contained in this report was based on the following livestock unit coefficients:

- 1.00 livestock units for all cattle excluding those under 1 year;
- 0.12 livestock units for all sheep excluding lambs.

The IACS(3) (permanent land) and IACS(4) (seasonal land) sheets (see Section 2.3.2, on page 21) allow for a grazing area to be derived from the following IACS crop codes:

- COMMON GRAZING
- SHARED GRAZING
- ROUGH GRAZING
- GRASS OVER 5 YEARS
- GRASS UNDER 5 YEARS
- OPEN WOODLAND (GRAZED)

Stocking rate is given as a number of livestock units (LSU) per Ha and is calculated for each business as follows:

$$\text{Stocking Rate} = \text{Total LSU} / \text{Grazing Area}$$

Lambs and calves are omitted from the calculation since a livestock unit usually denotes a cow with calf at foot or ewe including a lamb. This eligibility criterion exclusion is applied, per business, by reducing the eligible grazing area until the stocking rate is equal to the minimum stocking rate.

With these weightings, grazed area definition and a 0.12 LSU/ha minimum stocking rate threshold, 1,393,683 ha became ineligible. Of this area, 1,006,497 ha (72%) applies to businesses that were not in receipt of payment in the baseline year. Most exclusion occurs in Highlands and Islands (72%). By farm type Cattle and sheep (LFA) farm type makes up the majority (60%) of the excluded area with the Other farm type (predominantly Specialist Grass and Forage) next (23%). See Appendix D.2 for the detail of the stocking rate exclusions.

The results of the stocking rate eligibility calculation are sensitive to the coefficients used, particularly the sheep weighting (see Appendix D.1 for more detail). The LFASS and the SAC Farm Management Handbook (FMH) both provide some alternative weighting structures that could be considered. These and the quality of livestock data used could give differing results.

The analysis makes the assumption that farmer behaviour will remain the same in the future. It fair to expect that changes to the support landscape and market conditions are highly likely to influence farmer decisions regarding animal numbers and stocking rates so any payment rate scheme including stocking rate as a criterion would need to be responsive to these factors.

4 Scenario Analysis

The business-level analysis of changes to SFP was undertaken for 10 area-based scenarios (Table 10). Five scenarios were based on varying rates of payment for groups of LCA classes. Three are taken from the Interim Report and Consultation (LCA-S1 to S3). Two further LCA-based scenarios have also been included - a scenario with a single rate applied to all included land (LCA-S4 Flat Rate) and a scenario where payment rates are highest for land with the least potential (LCA-S5 Reverse). Another three scenarios use the Less Favoured Area Support Scheme designations as a basis for setting payment rates for land of different designation (LFA-S1 to S3). These LFA based scenarios are a translation of the interim report LCA scenarios from an LCA basis to an LFA basis. Two additional scenarios illustrate the effects of adding a minimum stocking rate eligibility requirement (as proposed in the Interim Report). These are additional analyses based on LCA-S1 and LFA-S1.

Table 10: Scenarios

Reference	Source/Description
LCA-S1	Interim Report
LCA-S1.sr	Interim Report (adjusted to include stocking rate eligibility)
LCA-S2	Consultation A
LCA-S3	Consultation B
LCA-S4	Flat Rate Scheme
LCA-S5	Reverse Payment Scheme
LFA-S1	Translation from LCA-S1
LFA-S1.sr	Translation from LCA-S1 (adjusted to include stocking rate eligibility)
LFA-S2	Translation from LCA-S2
LFA-S3	Translation from LCA-S3

4.1 Payment Rates

Table 11 shows the payment rate (€/ha) schemes that were applied to the LCA scenarios with the total area of each land class.

Table 11: LCA payment rates

Class	Area (ha)	LCA-S1 Interim	LCA-S1.sr Interim (SR)	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse
1	4,196	246.84 €	273.44 €	246.84 €	215.23 €	108.04 €	50.44 €
2	106,836						
3.1	333,508						
3.2	700,082						
4.1	301,705						
4.2	374,586						
5.1	112,504	85.44 €	94.65 €	102.81 €	157.87 €		228.00 €
5.2	429,938						
5.3	502,945						
6.1	124,219	28.48 €	31.55 €	28.48 €	28.48 €		370.05 €
6.2	467,116						
6.3	2,318,445						
7	198 447						
							0 €

Table 12 shows the payment rates that were applied to the LFA scenarios along with the total area of each.

Table 12: LFA payment rates

Class	Area	LFA-S1 Interim Report	LFA-S1.sr Interim Report	LFA-S2 Consultation A	LFA-S3 Consultation B
Non-LFA	838,866	240.96 €	290.80 €	241.09 €	211.64 €
LFA – Standard	2,157,075	117.63 €	141.96 €	118.62 €	120.77 €
LFA – Fragile	2,136,439	65.06 €	78.52 €	63.41 €	70.94 €
LFA – Very Fragile	842,151	59.80 €	72.17 €	61.30 €	66.12 €

4.2 Calculating Scenario Area Payments

The area payment using the LCA and LFA designations was calculated per field and per scenario by multiplying the LCA/LFA areas contained within each field by the respective payment rate as defined in Table 11 (LCA) and Table 12 (LFA).

The Interim Report scenarios (LCA-S1 and LFA-S1) are used as the basis for the stocking rate scenarios (LCA-S1.sr and LFA-S1.sr). Since the eligible area is reduced in the stocking rate scenarios the payment rates are increased to ensure that the full budget is spent. For a more detailed description of this process see Appendix D.4.

The result of these calculations is a field level area payment dataset which forms the basis of the mapped analysis, Section 6. However, the key comparative analysis in this report is to assess changes from the baseline at a business level. The field level area payment dataset is therefore aggregated up to business level and tabulated by farm-type and region. The business-level comparative analysis is presented as a series of tables in Section 5.

5 Results

The tables of results on the following pages summarise for the baseline and for each scenario the area payment data nationally and by region, farm type, LCA class and LFA class. The regional summaries use the Nomenclature of Units for Territorial Statistics (NUTS) regions. Scotland is a single NUTS1 region. The NUTS2 regions (Figure 8) divide Scotland into four distinct regions and the NUTS3 regions (Figure 9) into 23 nested within them.

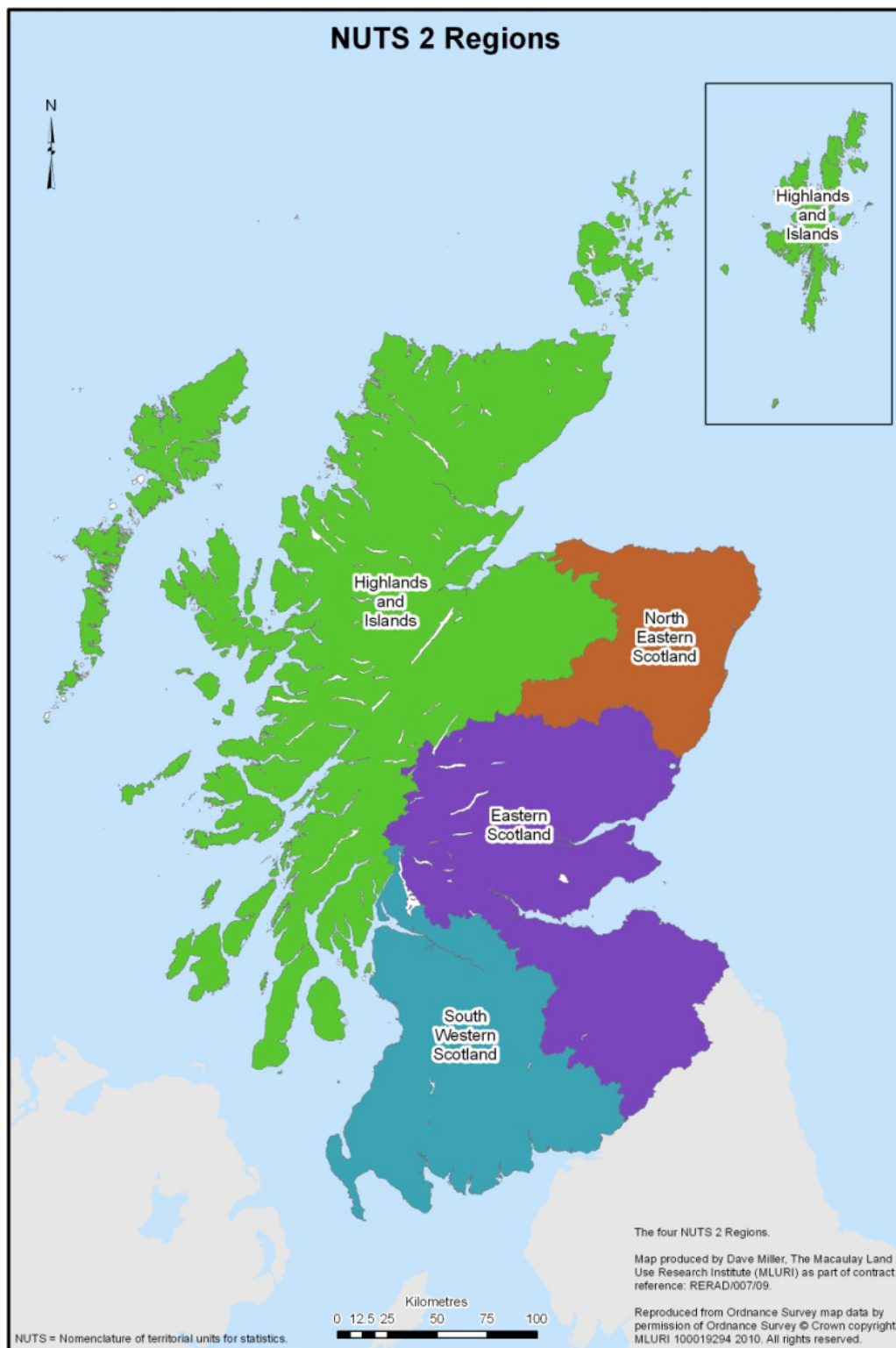


Figure 8: NUTS2 Regions of Scotland

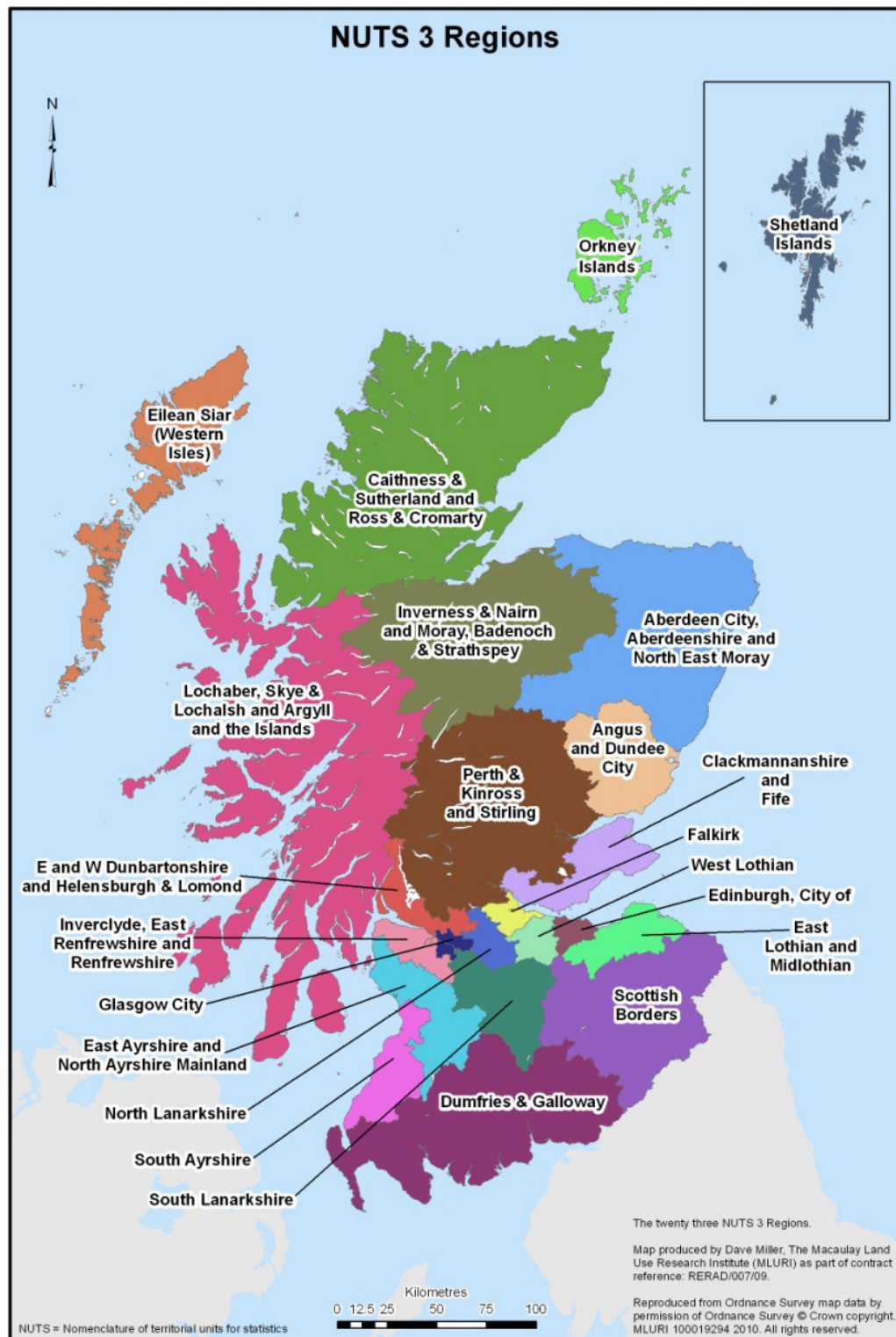


Figure 9: NUTS3 regions of Scotland

The location of the main farm is used as a proxy for the location of the business and, since it was not possible to resolve a main farm code for some businesses, the regional identifier is missing for 8% of the included area.

Businesses are classified on a sectoral basis using the Robust Farm Type from JAC. The Farm Type for a business is that of the JAC holding that corresponds to the IACS main farm code of the business. This solution is simple but using only the main farm to represent the whole business may be misleading where financially significant sub-holdings are excluded from the Farm Type classification. The Farm Type is missing for 15% of the included area.

5.1 Interpreting the Results Tables

The scenario analysis generates very large volumes of data that need to be carefully summarised. The summaries employed here have been developed with the Inquiry Team and REAS colleagues to present a consistent and hopefully an informative view of the scenario analysis.

Six indicators are used:

1. Change in Payment (payments under scenario minus baseline payments) (Section 5.2)
2. Number of Businesses receiving increased or reduced payments (Section 5.3)
3. Percentage of Businesses receiving increased or reduced payments (as above) (Section 5.4)
4. Total Payment (€) (Section 5.5)
5. Average Payment per Business (€) (Section 5.7)
6. Average Payment per ha (€) (Section 5.8)

Each of these indicators is summarised at national level and further broken down by JAC Robust Farm Type and NUTS2 and NUTS3 regions.

For the first three indicators a series of tables is provided as illustrated in Figure 10. First the net effect of scenarios is presented (item 1 in Figure 10). This combines increases and reductions to give an overall outcome. Then payments to new areas are highlighted. In the results tables these new areas are identified as “zero baseline” (item 2 in Figure 7), since they are a special case of businesses who receive no SFPS payment in the baseline but who would potentially be eligible under the area based schemes being considered^{xii}. Having presented the changes for the zero baseline areas the net effect of scenarios for current claimants is presented (item 3 in Figure 10). Finally significant increases and reductions are presented (items 4 and 5 in Figure 10). Significant is defined in consultation with the Inquiry Team and REAS as a change of 20% or more from the baseline.

For the remaining indicators a simpler summary format is used with only Farm Type and Regional breakdowns.

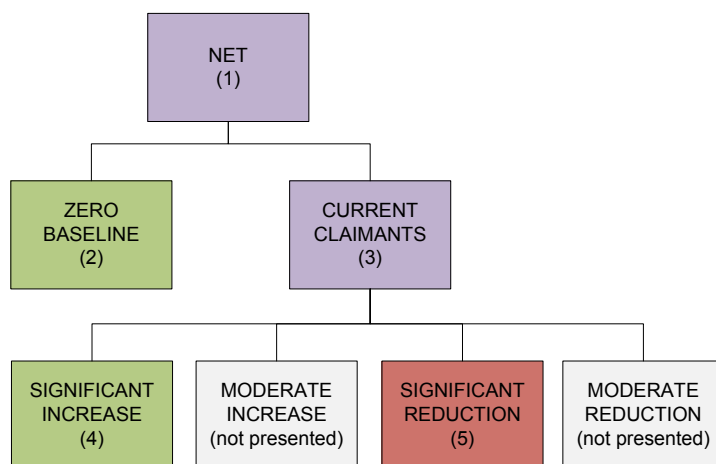


Figure 10: Interpreting the Change in Payment tables

^{xii} Note that for budgeting purposes the zero baseline maximises the estimate of the area included and assumes the best quality land. This is likely to mean that the estimates for the zero baseline payments are larger than would occur in practice.

5.2 Change in Payment

Table 13 shows, for each scenario, the redistributive impacts of the scenarios relative to the baseline of current payments which are based on a historic model. For each scenario, it shows the total amount moving to, and away from, businesses that experience an increase and a decrease in payments relative to the baseline. It also disaggregates the total amounts in increases and reductions into bands according to size of the change in payment relative to the baseline. That is the total amount in increases and reductions is grouped into significant increases and reductions; i.e. increases or reduction of business level payments by more than 20% relative to the baseline, and moderate increases and reductions, i.e. those that are less than 20% relative to the baseline^{xiii}.

The table shows that total increases in business level payments (row 1) under scenario LCA-S1 will amount to some €203 million and the total amount in reduction in business level payments (row 5) will amount to some €205 million. The key result across all scenarios is that the total amount of significant reductions (row 6) are much higher than the increases (rows 3 and 4) for all scenarios reflecting the movement of money from businesses with claims in the baseline to those businesses without claims in the baseline (i.e. zero baseline increases). At national level this means that existing businesses will see a reduction in total support under area payment.

Total redistribution (row 8) is the total change in payment across all current claimants (i.e. excluding zero baseline changes^{xiv}) and is made up of significant (row 9^{xv}) and moderate redistribution (row 10^{xvi}). Comparing rows 9 and 10 shows the relative redistributive effects for each scenario.

Table 13: Change in payment - summary

Change (Millions)		LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
1	Total Increases	203 €	190 €	205 €	224 €	346 €	371 €	282 €	251 €	281 €	292 €
2	Zero Baseline Increases	110 €	115 €	111 €	110 €	126 €	104 €	127 €	140 €	126 €	125 €
3	Significant Increases	87 €	68 €	88 €	109 €	218 €	265 €	152 €	108 €	152 €	164 €
4	Moderate Increases	5 €	7 €	5 €	4 €	2 €	2 €	3 €	4 €	3 €	3 €
5	Total Reductions	-205 €	-192 €	-207 €	-226 €	-348 €	-373 €	-284 €	-254 €	-284 €	-294 €
6	Significant Reductions	-181 €	-165 €	-184 €	-210 €	-344 €	-369 €	-271 €	-239 €	-271 €	-285 €
7	Moderate Reductions	-24 €	-27 €	-24 €	-16 €	-4 €	-3 €	-13 €	-15 €	-13 €	-9 €
8	Redistribution	297 €	268 €	301 €	339 €	568 €	640 €	439 €	366 €	438 €	460 €
9	Significant Redistribution	268 €	233 €	272 €	319 €	562 €	634 €	423 €	346 €	422 €	449 €
10	Moderate Redistribution	29 €	34 €	29 €	21 €	6 €	6 €	16 €	20 €	16 €	11 €

^{xiii} It is of course not possible on a percentage basis to band the significance of the increased payments to businesses with a zero baseline.

^{xiv} These were excluded since they are constant for all scenarios and since it is not possible to assess their significance in percentage terms.

^{xv} Significant redistribution equals the absolute sum of significant reductions and significant increases.

^{xvi} Moderate redistribution equals the absolute sum of moderate reductions and moderate increases.

It is important to note that increases do not precisely match reductions due to a difference between baseline total budget of €648 million and calculated scenario budgets which are approximately €645 million. This discrepancy is due to issues with mapping urban areas, inland water, coasts and small islands (see Appendix G for further information on these issues).

Table 14 expresses the change in payment as a percentage of the total budget. Excepting LCA-S4 and LCA-S5, the LCA scenarios have a less redistributive effect than the LFA scenarios (see row 8). The table also shows that, at national level, the scenarios that include stocking rate exemptions (see row 8 and columns LCA-S1.sr and LFA-S1.sr) are less redistributive than their counterparts (see row 8 and columns LCA-S1 and LFA-S1) with LCA-S1.sr being the least redistributive scenario of all with a significant redistribution of 36% (see row 9). LCA-S1, LCA-S1.sr and LCA-S2 show larger moderate redistribution (row 10) and smaller significant (row 9) redistribution than the other scenarios.

Table 14: Change in payment - summary (%)

Change (% of budget)		LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
1	Total Increases	31%	29%	32%	35%	53%	57%	43%	39%	43%	45%
2	Zero Baseline Increases	17%	18%	17%	17%	19%	16%	20%	22%	20%	19%
3	Significant Increases	13%	11%	14%	17%	34%	41%	23%	17%	23%	25%
4	Moderate Increases	1%	1%	1%	1%	0%	0%	0%	1%	0%	0%
5	Total Reductions	-32%	-30%	-32%	-35%	-54%	-58%	-44%	-39%	-44%	-45%
6	Significant Reductions	-28%	-25%	-28%	-32%	-53%	-57%	-42%	-37%	-42%	-44%
7	Moderate Reductions	-4%	-4%	-4%	-3%	-1%	-1%	-2%	-2%	-2%	-1%
8	Redistribution	46%	41%	46%	52%	88%	99%	68%	56%	68%	71%
9	Significant Redistribution	41%	36%	42%	49%	87%	98%	65%	53%	65%	69%
10	Moderate Redistribution	5%	5%	5%	3%	1%	1%	2%	3%	2%	2%

The net increase or reduction per scenario is shown by farm type in Table 15. In most scenarios the direction of the net gain or loss is the same. One notable result is the difference between LFA-S1 and LFA-S1.sr for the Cattle & sheep (LFA) farm type where a net gain of €18.3 million becomes a €0.1 million net loss when the stocking rate criterion is applied. This shows that a significant amount of land in the Cattle and sheep (LFA) farm type category is unlikely to meet the minimum stocking rate eligibility criteria of 0.12 LU/ha. Scenarios LCA-S4 and LCA-S5, the flat rate and reverse scenarios, respectively, report larger redistributions between farm types when compared to the other scenarios setting rates to favour the better quality land.

Table 15 is useful for giving an overall view but masks significant detail. The following tables show the increases for the zero baseline (Table 16) and for current claimants the net effects (Table 17), significant increases (Table 18) and significant reductions (Table 19).

Table 16 shows the breakdown of the zero baseline increases per scenario and farm type. As might be expected, a large proportion of the gain is classified as farm type missing since these will be new businesses for which we do not have farm type data at present.

Table 15: Change in payment by farm type - net increase/reduction

Change - Net (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle & sheep (LFA)	0.9 €	-1.2 €	0.5 €	23.8 €	82.2 €	136.2 €	18.3 €	-0.1 €	18.6 €	32.7 €
Cattle & sheep (Lowland)	-6.9 €	-5.6 €	-6.9 €	-8.4 €	-13.7 €	-15.1 €	-8.8 €	-6.6 €	-8.8 €	-9.8 €
Cereals	-23.4 €	-26.0 €	-23.4 €	-30.9 €	-57.2 €	-68.4 €	-33.2 €	-31.6 €	-33.2 €	-38.3 €
Dairy	-23.4 €	-19.0 €	-24.2 €	-27.4 €	-43.1 €	-45.2 €	-38.1 €	-32.7 €	-38.0 €	-38.7 €
General Cropping	-13.9 €	-12.9 €	-13.8 €	-19.8 €	-42.6 €	-50.6 €	-15.6 €	-11.9 €	-15.5 €	-21.1 €
Horticulture	0.2 €	0.1 €	0.2 €	0.2 €	-0.2 €	-0.4 €	0.1 €	0.0 €	0.1 €	0.0 €
Mixed	-25.8 €	-20.6 €	-25.8 €	-31.2 €	-52.4 €	-59.1 €	-41.5 €	-35.0 €	-41.5 €	-43.5 €
Other ^{xvii}	21.0 €	6.1 €	21.5 €	23.8 €	48.6 €	39.2 €	32.4 €	13.4 €	32.0 €	34.9 €
Specialist Pigs	0.0 €	0.0 €	0.0 €	0.0 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €
Specialist Poultry	0.7 €	0.2 €	0.7 €	0.6 €	0.3 €	0.6 €	0.4 €	0.2 €	0.4 €	0.4 €
Farm type missing	68.4 €	76.5 €	69.1 €	67.1 €	75.9 €	60.7 €	83.6 €	101.8 €	83.5 €	81.1 €
Grand Total	-2.3 €	-2.3 €	-2.3 €	-2.3 €	-2.3 €	-2.3 €	-2.5 €	-2.5 €	-2.5 €	-2.5 €

Table 16: Change in payment by farm type – zero baseline increase

Change - Zero Baseline Increases (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	6.8 €	6.1 €	6.8 €	7.3 €	9.8 €	8.7 €	7.3 €	5.5 €	7.3 €	7.8 €
Cattle and sheep (Lowland)	0.7 €	0.8 €	0.7 €	0.6 €	0.3 €	0.2 €	0.6 €	0.7 €	0.6 €	0.5 €
Cereals	1.9 €	1.9 €	1.9 €	1.8 €	1.2 €	1.4 €	1.6 €	1.8 €	1.6 €	1.6 €
Dairy	0.7 €	0.7 €	0.7 €	0.6 €	0.3 €	0.3 €	0.4 €	0.5 €	0.4 €	0.4 €
General Cropping	1.2 €	1.0 €	1.2 €	1.2 €	0.7 €	0.7 €	1.1 €	1.0 €	1.1 €	1.0 €
Horticulture	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €	0.2 €	0.2 €	0.2 €	0.2 €
Mixed	1.5 €	1.0 €	1.5 €	1.5 €	3.0 €	1.7 €	2.1 €	0.8 €	2.0 €	2.2 €
Other	18.8 €	16.4 €	19.0 €	20.1 €	32.7 €	26.2 €	25.2 €	22.9 €	25.0 €	26.5 €
Specialist Pigs	0.2 €	0.2 €	0.2 €	0.2 €	0.2 €	0.2 €	0.2 €	0.1 €	0.2 €	0.2 €
Specialist Poultry	0.7 €	0.7 €	0.7 €	0.7 €	0.4 €	0.4 €	0.5 €	0.5 €	0.5 €	0.5 €
Farm type missing	77.6 €	85.9 €	78.3 €	75.9 €	76.6 €	63.5 €	87.5 €	105.5 €	87.5 €	84.4 €
Grand Total	110.4 €	115.0 €	111.4 €	110.2 €	125.6 €	103.6 €	126.7 €	139.5 €	126.4 €	125.2 €

^{xvii} The Other farm type is made up predominantly (96%) of Specialist Grass and Forage, but see Table 61 in Appendix C, on page 112 for a full listing.

The category “Farm type missing” includes new estimated area that is not currently mapped. Therefore it was assumed that this area is paid at the highest payment rate under the ‘worst case for payment’ strategy adopted for this analysis. This means that the payments to this category are likely to have been overestimated (if the entire category were instead paid at the lowest rate then this would reduce the payment from €77.6 million to €25.2 million for LCA-S1). Note that it was also necessary to assume that the entire “Farm type missing” category also met the stocking rate criterion, so the category sees an increase in payments in LCA-S1.sr and LFA-1.sr. The consequence of reductions in payment to the farm type missing category would be a modest increase in overall payment rates.

Table 17 shows, by farm type, the net increase/reduction for current SFPS claimants. This table is a better indication of the effect on existing businesses since the increases for businesses with zero payment in the baseline have been discounted.

Table 17: Change in payment by farm type – net increase/reduction excluding zero baseline increase

Change - Net excluding Zero Baseline (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle & sheep (LFA)	-5.9 €	-7.2 €	-6.3 €	16.5 €	72.4 €	127.6 €	11.0 €	-5.7 €	11.3 €	24.9 €
Cattle & sheep (Lowland)	-7.6 €	-6.3 €	-7.6 €	-9.0 €	-14.0 €	-15.3 €	-9.4 €	-7.2 €	-9.4 €	-10.3 €
Cereals	-25.3 €	-27.9 €	-25.4 €	-32.7 €	-58.4 €	-69.8 €	-34.9 €	-33.4 €	-34.8 €	-39.9 €
Dairy	-24.1 €	-19.8 €	-24.9 €	-28.0 €	-43.4 €	-45.5 €	-38.5 €	-33.2 €	-38.4 €	-39.1 €
General Cropping	-15.1 €	-13.9 €	-15.0 €	-21.0 €	-43.3 €	-51.3 €	-16.6 €	-12.9 €	-16.6 €	-22.1 €
Horticulture	-0.1 €	-0.2 €	-0.1 €	-0.1 €	-0.4 €	-0.7 €	-0.2 €	-0.2 €	-0.2 €	-0.2 €
Mixed	-27.3 €	-21.6 €	-27.4 €	-32.7 €	-55.3 €	-60.8 €	-43.6 €	-35.8 €	-43.5 €	-45.7 €
Other	2.2 €	-10.3 €	2.5 €	3.7 €	15.8 €	13.0 €	7.1 €	-9.5 €	6.9 €	8.4 €
Specialist Pigs	-0.2 €	-0.2 €	-0.2 €	-0.2 €	-0.3 €	-0.3 €	-0.2 €	-0.2 €	-0.2 €	-0.2 €
Specialist Poultry	-0.1 €	-0.5 €	-0.1 €	-0.1 €	-0.2 €	0.2 €	-0.1 €	-0.3 €	-0.1 €	-0.1 €
Farm type missing	-9.2 €	-9.4 €	-9.3 €	-8.8 €	-0.7 €	-2.8 €	-3.9 €	-3.6 €	-4.0 €	-3.3 €
Grand Total	-112.6 €	-117.3 €	-113.6 €	-112.4 €	-127.8 €	-105.9 €	-129.2 €	-142.0 €	-129.0 €	-127.7 €

Reductions are shown in most cases, which is to be expected with a fixed budget and an increasing number of claimants and area. Cattle & sheep (LFA), Other and Specialist Poultry show net increases in some of the scenarios.

Table 18 shows the total amount of increases in payments by farm type for businesses having significant increases in payments relative to baseline (note: this does not include the zero baseline increases). It shows that Cattle and sheep (LFA) is by far the biggest gaining farm type.

Table 18: Change in payment by farm type – significant increases

Change - Significant Increases (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	60.9 €	49.7 €	61.9 €	82.0 €	171.0 €	217.8 €	115.1 €	85.0 €	115.1 €	125.9 €
Cattle and sheep (Lowland)	1.3 €	1.7 €	1.3 €	1.0 €	0.4 €	0.5 €	1.1 €	1.6 €	1.1 €	0.9 €
Cereals	3.5 €	2.2 €	3.5 €	3.3 €	3.7 €	3.5 €	3.6 €	1.7 €	3.6 €	3.5 €
Dairy	1.6 €	2.3 €	1.4 €	1.3 €	0.7 €	1.6 €	0.6 €	1.0 €	0.6 €	0.6 €
General Cropping	5.5 €	4.9 €	5.6 €	5.7 €	6.0 €	7.6 €	7.8 €	5.9 €	7.8 €	7.4 €
Horticulture	0.2 €	0.2 €	0.2 €	0.2 €	0.3 €	0.2 €	0.2 €	0.1 €	0.2 €	0.2 €
Mixed	2.4 €	2.8 €	2.4 €	2.3 €	2.6 €	3.3 €	1.9 €	1.9 €	1.9 €	2.0 €
Other	8.0 €	1.9 €	8.2 €	9.5 €	22.5 €	20.0 €	13.8 €	3.2 €	13.6 €	15.0 €
Specialist Pigs	0.0 €	0.0 €	0.0 €	0.0 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.0 €
Specialist Poultry	0.3 €	0.1 €	0.3 €	0.3 €	0.4 €	0.8 €	0.4 €	0.4 €	0.4 €	0.5 €
Farm type missing	3.1 €	2.6 €	3.1 €	3.5 €	10.4 €	9.0 €	7.3 €	6.7 €	7.2 €	7.8 €
Grand Total	86.9 €	68.2 €	88.1 €	109.0 €	218.0 €	264.6 €	151.8 €	107.6 €	151.6 €	163.7 €

Table 19 shows the significant reductions in payments relative to the baseline. It shows large reductions in payments to Cattle and sheep (LFA) businesses which, in some cases, more or less balance the increases shown in Table 18. This shows that there is a large redistribution between Cattle and sheep (LFA) farms. Other sizeable reductions are shown for Mixed, Cereals, Dairy and General Cropping.

Table 19: Change in payment by farm type – significant reductions

Change - Significant Reductions (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	-62.2 €	-51.7 €	-63.5 €	-61.8 €	-97.3 €	-89.7 €	-103.2 €	-89.7 €	-102.8 €	-100.0 €
Cattle and sheep (Lowland)	-8.7 €	-7.7 €	-8.7 €	-9.8 €	-14.3 €	-15.8 €	-10.3 €	-8.6 €	-10.3 €	-11.0 €
Cereals	-23.5 €	-24.6 €	-23.8 €	-33.6 €	-62.0 €	-73.3 €	-35.2 €	-30.9 €	-35.2 €	-42.0 €
Dairy	-24.3 €	-20.3 €	-25.1 €	-28.5 €	-43.9 €	-47.1 €	-38.8 €	-33.6 €	-38.7 €	-39.4 €
General Cropping	-16.7 €	-15.0 €	-16.7 €	-23.9 €	-49.2 €	-58.8 €	-21.0 €	-16.2 €	-21.0 €	-27.3 €
Horticulture	-0.3 €	-0.3 €	-0.3 €	-0.3 €	-0.7 €	-0.9 €	-0.4 €	-0.4 €	-0.4 €	-0.4 €
Mixed	-26.9 €	-20.8 €	-27.2 €	-33.3 €	-57.8 €	-63.9 €	-44.4 €	-35.8 €	-44.3 €	-47.0 €
Other	-5.7 €	-12.1 €	-5.7 €	-5.7 €	-6.6 €	-6.9 €	-6.6 €	-12.6 €	-6.5 €	-6.5 €
Specialist Pigs	-0.2 €	-0.2 €	-0.2 €	-0.2 €	-0.4 €	-0.4 €	-0.3 €	-0.2 €	-0.3 €	-0.3 €
Specialist Poultry	-0.3 €	-0.6 €	-0.3 €	-0.3 €	-0.6 €	-0.7 €	-0.5 €	-0.7 €	-0.5 €	-0.5 €
Farm type missing	-12.0 €	-11.7 €	-12.1 €	-12.1 €	-11.1 €	-11.8 €	-10.9 €	-10.2 €	-10.9 €	-10.9 €
Grand Total	-180.9 €	-165.1 €	-183.5 €	-209.6 €	-343.9 €	-369.4 €	-271.4 €	-238.7 €	-270.7 €	-285.3 €

Table 20 shows the total net change in payment for each scenario by NUTS2 and NUTS3 region, including zero baseline increases. There is a regional bias in the redistribution of payments in favour of the Highlands & Islands. The net redistribution is reduced in scenarios applying the minimum stocking rate requirements, in particular Eastern Scotland shows a net increase under LFA-S1.sr. Highlands & Islands shows a net increase in all of its sub-regions except the Orkney Islands which would see a reduction in all scenarios. Perth & Kinross shows net increases in most scenarios despite Eastern Scotland as a whole showing a net loss.

Table 20: Change in payment by region - net increase/reduction

Change - Net (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	-31.5 €	-26.3 €	-32.5 €	-36.2 €	-67.0 €	-48.1 €	-7.5 €	2.9 €	-6.6 €	-16.1 €
Angus & Dundee City	-3.4 €	-2.8 €	-3.5 €	-5.1 €	-11.3 €	-10.3 €	0.2 €	0.9 €	0.3 €	-1.8 €
Borders	-14.8 €	-11.0 €	-15.7 €	-14.6 €	-27.9 €	-17.0 €	-14.1 €	-5.5 €	-13.8 €	-15.6 €
City of Edinburgh	-0.7 €	-0.6 €	-0.7 €	-0.8 €	-1.3 €	-0.9 €	-0.4 €	0.0 €	-0.4 €	-0.5 €
Clackmannanshire & F	-7.9 €	-6.9 €	-8.1 €	-10.2 €	-18.0 €	-19.6 €	-7.5 €	-4.8 €	-7.5 €	-9.8 €
East & Midlothian	-4.3 €	-3.4 €	-4.4 €	-5.1 €	-10.8 €	-10.7 €	-4.6 €	-2.8 €	-4.6 €	-5.8 €
Falkirk	-0.2 €	0.0 €	-0.3 €	-0.5 €	-2.0 €	-2.3 €	-1.2 €	-0.8 €	-1.2 €	-1.3 €
Perth & Kinross and	0.9 €	-0.8 €	1.1 €	1.3 €	7.0 €	15.5 €	21.9 €	17.1 €	22.3 €	20.7 €
West Lothian	-1.1 €	-0.8 €	-1.1 €	-1.3 €	-2.8 €	-2.8 €	-1.7 €	-1.3 €	-1.7 €	-1.9 €
Highlands & Islands	54.0 €	32.6 €	56.1 €	73.2 €	172.8 €	150.8 €	65.3 €	22.2 €	63.6 €	79.6 €
Caithness & Sutherland	25.1 €	13.7 €	27.7 €	34.6 €	61.2 €	41.0 €	28.0 €	7.0 €	26.6 €	32.4 €
Inverness & Nairn an	13.1 €	10.1 €	14.2 €	15.9 €	26.1 €	21.7 €	11.3 €	4.8 €	10.6 €	13.2 €
Lochaber, Skye & Loc	14.4 €	8.1 €	12.9 €	18.4 €	66.1 €	77.0 €	28.2 €	14.1 €	27.9 €	33.4 €
Orkney Islands	-4.7 €	-3.9 €	-4.8 €	-5.2 €	-9.1 €	-9.7 €	-13.3 €	-12.7 €	-13.1 €	-12.7 €
Shetland Islands	0.1 €	0.1 €	0.6 €	2.2 €	7.8 €	7.8 €	1.5 €	1.9 €	1.7 €	2.3 €
Western Isles	6.0 €	4.4 €	5.6 €	7.2 €	20.6 €	12.9 €	9.6 €	7.2 €	9.9 €	11.0 €
North Eastern Scotland	-32.5 €	-29.1 €	-31.9 €	-40.7 €	-74.9 €	-87.0 €	-57.6 €	-52.0 €	-57.4 €	-60.2 €
Aberdeen City, Aberd	-32.5 €	-29.1 €	-31.9 €	-40.7 €	-74.9 €	-87.0 €	-57.6 €	-52.0 €	-57.4 €	-60.2 €
South Western Scotland	-50.0 €	-43.0 €	-51.8 €	-51.6 €	-78.5 €	-49.7 €	-65.8 €	-50.4 €	-65.1 €	-64.7 €
Dumfries & Galloway	-39.3 €	-35.9 €	-40.5 €	-38.5 €	-50.2 €	-33.8 €	-44.1 €	-35.8 €	-43.8 €	-43.5 €
E & North Ayrshire M	-3.3 €	-2.3 €	-3.5 €	-4.3 €	-8.3 €	-6.7 €	-6.6 €	-4.8 €	-6.5 €	-6.5 €
E & W Dunbartonshire	-0.7 €	-0.4 €	-0.7 €	-0.7 €	-0.2 €	3.2 €	0.3 €	0.9 €	0.3 €	0.4 €
Glasgow City	0.0 €	0.0 €	0.0 €	0.0 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €
Inverclyde, East Ren	-1.6 €	-1.2 €	-1.8 €	-1.8 €	-3.4 €	-2.4 €	-2.7 €	-2.1 €	-2.6 €	-2.7 €
North Lanarkshire	0.2 €	0.4 €	0.2 €	0.1 €	-1.4 €	-1.3 €	-1.0 €	-0.7 €	-1.0 €	-1.0 €
South Ayrshire	-3.3 €	-2.5 €	-3.2 €	-3.7 €	-7.5 €	-5.6 €	-5.2 €	-3.6 €	-5.2 €	-5.4 €
South Lanarkshire	-2.3 €	-1.0 €	-2.3 €	-2.6 €	-7.5 €	-3.1 €	-6.3 €	-4.2 €	-6.2 €	-6.0 €
Regional identifier missing	57.8 €	63.5 €	57.9 €	53.1 €	45.4 €	31.8 €	63.0 €	74.8 €	63.0 €	58.9 €
Grand Total	-2.3 €	-2.3 €	-2.3 €	-2.3 €	-2.3 €	-2.3 €	-2.5 €	-2.5 €	-2.5 €	-2.5 €

Table 21 shows for each of the scenarios the regional distribution of total payments to businesses having no payment in the baseline. The results show that where the region is identified most payments to zero-baseline businesses are made in the Highlands & Islands. A large proportion of the increase is for businesses where regional identification data is unavailable, which was to be expected since most of this will be for new businesses for which we do not have data at present.

Table 21: Change in payment by region – zero baseline increase

Change - Zero Baseline Increases (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	11.6 €	12.1 €	11.7 €	12.0 €	11.6 €	15.7 €	15.1 €	17.1 €	15.2 €	14.8 €
Angus & Dundee City	1.3 €	1.3 €	1.3 €	1.2 €	0.9 €	0.9 €	1.5 €	1.6 €	1.5 €	1.4 €
Borders	3.3 €	3.5 €	3.3 €	3.5 €	3.3 €	4.8 €	4.1 €	4.8 €	4.1 €	4.0 €
City of Edinburgh	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €
Clackmannanshire & F	1.1 €	1.1 €	1.1 €	1.0 €	0.7 €	0.8 €	1.2 €	1.3 €	1.2 €	1.1 €
East & Midlothian	0.6 €	0.6 €	0.6 €	0.6 €	0.3 €	0.4 €	0.6 €	0.6 €	0.6 €	0.5 €
Falkirk	0.5 €	0.4 €	0.5 €	0.5 €	0.3 €	0.4 €	0.3 €	0.4 €	0.3 €	0.3 €
Perth & Kinross and	4.4 €	4.6 €	4.5 €	4.8 €	5.8 €	8.3 €	7.0 €	7.9 €	7.1 €	7.0 €
West Lothian	0.4 €	0.4 €	0.4 €	0.3 €	0.2 €	0.2 €	0.3 €	0.3 €	0.3 €	0.3 €
Highlands & Islands	24.2 €	21.5 €	24.8 €	27.9 €	56.9 €	41.4 €	34.4 €	30.9 €	34.0 €	37.5 €
Caithness & Sutherland	9.4 €	7.9 €	9.9 €	11.3 €	24.0 €	14.7 €	14.7 €	12.2 €	14.3 €	15.9 €
Inverness & Nairn an	6.6 €	5.9 €	6.9 €	7.5 €	12.1 €	9.8 €	7.9 €	6.7 €	7.7 €	8.4 €
Lochaber, Skye & Loc	4.4 €	4.3 €	4.3 €	5.0 €	10.9 €	10.8 €	6.4 €	6.8 €	6.4 €	7.0 €
Orkney Islands	0.5 €	0.5 €	0.5 €	0.5 €	0.3 €	0.3 €	0.2 €	0.2 €	0.2 €	0.2 €
Shetland Islands	0.4 €	0.4 €	0.4 €	0.5 €	0.9 €	0.8 €	0.5 €	0.6 €	0.5 €	0.6 €
Western Isles	2.9 €	2.6 €	2.9 €	3.2 €	8.7 €	5.1 €	4.8 €	4.5 €	4.9 €	5.3 €
North Eastern Scotland	6.7 €	6.8 €	6.8 €	6.6 €	5.1 €	4.2 €	5.7 €	5.9 €	5.7 €	5.7 €
Aberdeen City, Aberd	6.7 €	6.8 €	6.8 €	6.6 €	5.1 €	4.2 €	5.7 €	5.9 €	5.7 €	5.7 €
South Western Scotland	9.1 €	9.5 €	9.1 €	9.6 €	8.7 €	11.3 €	9.8 €	11.2 €	9.9 €	10.0 €
Dumfries & Galloway	4.1 €	4.3 €	4.2 €	4.8 €	5.0 €	6.5 €	5.6 €	6.5 €	5.6 €	5.7 €
E & North Ayrshire M	1.0 €	1.1 €	1.0 €	1.0 €	0.7 €	0.7 €	0.8 €	0.8 €	0.8 €	0.8 €
E & W Dunbartonshire	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €	0.3 €
Glasgow City	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €
Inverclyde, East Ren	0.4 €	0.4 €	0.4 €	0.4 €	0.3 €	0.4 €	0.4 €	0.3 €	0.4 €	0.4 €
North Lanarkshire	0.7 €	0.8 €	0.7 €	0.7 €	0.4 €	0.4 €	0.4 €	0.5 €	0.5 €	0.5 €
South Ayrshire	0.9 €	1.0 €	0.9 €	1.0 €	0.8 €	1.1 €	0.9 €	1.1 €	0.9 €	0.9 €
South Lanarkshire	1.5 €	1.6 €	1.5 €	1.5 €	1.2 €	1.7 €	1.4 €	1.7 €	1.4 €	1.4 €
Regional identifier missing	58.8 €	65.1 €	59.0 €	54.0 €	43.3 €	31.0 €	61.7 €	74.4 €	61.7 €	57.4 €
Grand Total	110.4 €	115.0 €	111.4 €	110.2 €	125.6 €	103.6 €	126.7 €	139.5 €	126.4 €	125.2 €

Table 22 shows, by region, the net change in payment excluding zero baseline increases – the effect on current claimants. The biggest reductions tend to occur in South Western Scotland, particularly in Dumfries and Galloway when looking at NUTS3 regions. The Highlands & Islands shows net increases in almost all cases with the exception of the Orkney Islands.

Table 22: Change in payment by region - net change excluding zero baseline increase

Change - Net excluding Zero Baseline (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	-43.1 €	-38.3 €	-44.2 €	-48.3 €	-78.6 €	-63.9 €	-22.6 €	-14.2 €	-21.8 €	-30.8 €
Angus & Dundee City	-4.7 €	-4.1 €	-4.8 €	-6.3 €	-12.2 €	-11.2 €	-1.3 €	-0.8 €	-1.2 €	-3.2 €
Borders	-18.0 €	-14.5 €	-18.9 €	-18.1 €	-31.1 €	-21.8 €	-18.2 €	-10.2 €	-17.9 €	-19.7 €
City of Edinburgh	-0.8 €	-0.7 €	-0.8 €	-0.9 €	-1.3 €	-0.9 €	-0.5 €	-0.1 €	-0.4 €	-0.6 €
Clackmannanshire & F	-9.0 €	-8.0 €	-9.2 €	-11.2 €	-18.7 €	-20.5 €	-8.7 €	-6.2 €	-8.7 €	-10.9 €
East & Midlothian	-4.9 €	-4.0 €	-5.0 €	-5.7 €	-11.1 €	-11.1 €	-5.2 €	-3.4 €	-5.2 €	-6.4 €
Falkirk	-0.7 €	-0.4 €	-0.7 €	-1.0 €	-2.3 €	-2.7 €	-1.5 €	-1.1 €	-1.5 €	-1.7 €
Perth & Kinross and	-3.6 €	-5.4 €	-3.4 €	-3.5 €	1.2 €	7.2 €	14.8 €	9.3 €	15.2 €	13.7 €
West Lothian	-1.4 €	-1.2 €	-1.4 €	-1.6 €	-3.0 €	-2.9 €	-2.0 €	-1.6 €	-2.0 €	-2.1 €
Highlands & Islands	29.8 €	11.1 €	31.3 €	45.3 €	115.9 €	109.3 €	30.8 €	-8.8 €	29.6 €	42.2 €
Caithness & Sutherland	15.7 €	5.8 €	17.8 €	23.3 €	37.2 €	26.3 €	13.4 €	-5.3 €	12.4 €	16.5 €
Inverness & Nairn and	6.5 €	4.3 €	7.3 €	8.4 €	14.0 €	11.9 €	3.4 €	-1.9 €	2.9 €	4.7 €
Lochaber, Skye & Loch	10.0 €	3.9 €	8.6 €	13.4 €	55.2 €	66.2 €	21.8 €	7.3 €	21.5 €	26.4 €
Orkney Islands	-5.2 €	-4.4 €	-5.3 €	-5.7 €	-9.4 €	-10.0 €	-13.4 €	-12.9 €	-13.3 €	-12.9 €
Shetland Islands	-0.3 €	-0.3 €	0.2 €	1.7 €	6.9 €	7.0 €	1.0 €	1.3 €	1.2 €	1.7 €
Western Isles	3.1 €	1.8 €	2.8 €	4.1 €	11.9 €	7.8 €	4.8 €	2.7 €	5.0 €	5.7 €
North Eastern Scotland	-39.2 €	-35.9 €	-38.7 €	-47.3 €	-79.9 €	-91.2 €	-63.2 €	-57.9 €	-63.1 €	-65.9 €
Aberdeen City, Aberdeen	-39.2 €	-35.9 €	-38.7 €	-47.3 €	-79.9 €	-91.2 €	-63.2 €	-57.9 €	-63.1 €	-65.9 €
South Western Scotland	-59.1 €	-52.5 €	-61.0 €	-61.2 €	-87.3 €	-61.0 €	-75.6 €	-61.6 €	-75.0 €	-74.7 €
Dumfries & Galloway	-43.4 €	-40.2 €	-44.7 €	-43.3 €	-55.2 €	-40.3 €	-49.7 €	-42.3 €	-49.4 €	-49.2 €
E & North Ayrshire and	-4.3 €	-3.4 €	-4.5 €	-5.3 €	-9.0 €	-7.4 €	-7.4 €	-5.7 €	-7.3 €	-7.2 €
E & W Dunbartonshire	-1.0 €	-0.8 €	-1.0 €	-1.0 €	-0.5 €	2.9 €	-0.1 €	0.6 €	0.0 €	0.0 €
Glasgow City	0.0 €	0.0 €	0.0 €	0.0 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €
Inverclyde, East Renfrew	-2.0 €	-1.6 €	-2.2 €	-2.2 €	-3.7 €	-2.9 €	-3.0 €	-2.4 €	-3.0 €	-3.0 €
North Lanarkshire	-0.5 €	-0.4 €	-0.5 €	-0.6 €	-1.8 €	-1.7 €	-1.5 €	-1.2 €	-1.4 €	-1.5 €
South Ayrshire	-4.2 €	-3.5 €	-4.2 €	-4.7 €	-8.3 €	-6.7 €	-6.1 €	-4.6 €	-6.1 €	-6.3 €
South Lanarkshire	-3.8 €	-2.6 €	-3.8 €	-4.1 €	-8.7 €	-4.8 €	-7.7 €	-5.9 €	-7.6 €	-7.4 €
Regional identifier missing	-1.0 €	-1.6 €	-1.1 €	-1.0 €	2.1 €	0.8 €	1.4 €	0.4 €	1.3 €	1.5 €
Grand Total	-112.6 €	-117.3 €	-113.6 €	-112.4 €	-127.8 €	-105.9 €	-129.2 €	-142.0 €	-129.0 €	-127.7 €

Table 23 shows that the total change in payments for businesses having an increase in their payment by more than 20% relative to the baseline is significant across all regions for all the scenarios. Here we see that Highlands & Islands is the NUTS2 region that is likely to see the majority of significant increases in payments although this is reduced in the stocking rate scenarios. Eastern Scotland also sees large increases in some scenarios.

Table 23: Change in payment by region – significant increases

Change - Significant Increases (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	18.4 €	17.1 €	18.2 €	22.6 €	41.6 €	67.9 €	48.3 €	42.4 €	48.8 €	49.3 €
Angus & Dundee City	3.1 €	2.6 €	3.0 €	3.5 €	5.5 €	9.4 €	7.0 €	5.2 €	7.1 €	7.0 €
Borders	3.4 €	4.1 €	3.1 €	4.6 €	6.5 €	16.7 €	7.9 €	10.7 €	8.0 €	8.2 €
City of Edinburgh	0.1 €	0.2 €	0.1 €	0.1 €	0.2 €	0.7 €	0.5 €	0.7 €	0.5 €	0.5 €
Clackmannanshire & F	0.8 €	0.9 €	0.8 €	0.8 €	0.9 €	1.9 €	1.2 €	1.5 €	1.2 €	1.1 €
East & Midlothian	1.0 €	1.1 €	1.0 €	1.4 €	1.2 €	2.7 €	1.4 €	1.6 €	1.4 €	1.4 €
Falkirk	0.3 €	0.4 €	0.3 €	0.3 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €
Perth & Kinross and	9.4 €	7.4 €	9.5 €	11.5 €	26.9 €	35.7 €	29.7 €	22.0 €	30.0 €	30.5 €
West Lothian	0.4 €	0.5 €	0.4 €	0.5 €	0.3 €	0.6 €	0.5 €	0.5 €	0.5 €	0.5 €
Highlands & Islands	52.0 €	33.9 €	53.5 €	68.4 €	152.2 €	148.9 €	76.9 €	35.9 €	75.8 €	86.8 €
Caithness & Sutherland	21.6 €	12.5 €	23.5 €	30.2 €	50.6 €	41.6 €	28.4 €	9.6 €	27.5 €	31.4 €
Inverness & Nairn an	9.6 €	7.4 €	10.3 €	12.1 €	21.2 €	19.8 €	10.9 €	5.0 €	10.6 €	12.2 €
Lochaber, Skye & Loc	14.8 €	8.8 €	13.6 €	17.7 €	60.1 €	70.7 €	29.9 €	15.4 €	29.7 €	34.0 €
Orkney Islands	1.0 €	1.2 €	1.0 €	1.0 €	0.9 €	1.0 €	0.3 €	0.2 €	0.3 €	0.3 €
Shetland Islands	1.3 €	1.3 €	1.7 €	2.9 €	7.2 €	7.6 €	2.1 €	2.3 €	2.2 €	2.7 €
Western Isles	3.7 €	2.6 €	3.4 €	4.6 €	12.1 €	8.2 €	5.3 €	3.5 €	5.5 €	6.2 €
North Eastern Scotland	6.6 €	6.4 €	6.9 €	6.9 €	7.1 €	8.4 €	7.8 €	6.0 €	7.8 €	7.9 €
Aberdeen City, Aberd	6.6 €	6.4 €	6.9 €	6.9 €	7.1 €	8.4 €	7.8 €	6.0 €	7.8 €	7.9 €
South Western Scotland	8.4 €	10.1 €	8.1 €	9.5 €	12.4 €	35.8 €	15.1 €	20.4 €	15.4 €	15.8 €
Dumfries & Galloway	2.2 €	2.7 €	2.3 €	2.9 €	5.0 €	15.0 €	6.3 €	9.1 €	6.4 €	6.6 €
E & North Ayrshire M	1.9 €	2.2 €	1.9 €	1.9 €	2.3 €	4.8 €	2.6 €	3.2 €	2.7 €	2.7 €
E & W Dunbartonshire	0.7 €	0.8 €	0.6 €	0.7 €	1.7 €	5.2 €	1.9 €	2.3 €	1.9 €	1.9 €
Glasgow City	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €	0.0 €
Inverclyde, East Ren	0.7 €	0.8 €	0.6 €	0.7 €	0.6 €	1.2 €	0.7 €	1.0 €	0.7 €	0.8 €
North Lanarkshire	0.4 €	0.5 €	0.4 €	0.4 €	0.1 €	0.3 €	0.1 €	0.2 €	0.1 €	0.1 €
South Ayrshire	0.7 €	0.9 €	0.7 €	0.8 €	0.8 €	2.7 €	1.0 €	1.4 €	1.1 €	1.1 €
South Lanarkshire	1.8 €	2.1 €	1.6 €	2.2 €	2.0 €	6.6 €	2.4 €	3.1 €	2.5 €	2.6 €
Regional identifier missing	1.4 €	0.9 €	1.4 €	1.5 €	4.7 €	3.6 €	3.7 €	2.9 €	3.7 €	4.0 €
Grand Total	86.9 €	68.2 €	88.1 €	109.0 €	218.0 €	264.6 €	151.8 €	107.6 €	151.6 €	163.7 €

Table 24 shows, by region, the significant reductions in payment per scenario. Here businesses in the Highlands & Islands see the smallest reductions. Across all scenarios the NUTS3 regions Aberdeen City & Aberdeenshire, Borders and Dumfries & Galloway and to some extent Perth and Kinross tend to see the largest total amount moving away from businesses relative to the baseline.

Table 24: Change in payment by region – significant reductions

Change - Significant Reductions (millions)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	-52.8 €	-46.3 €	-53.9 €	-65.7 €	-119.7 €	-131.2 €	-64.2 €	-49.9 €	-63.9 €	-76.2 €
Angus & Dundee City	-6.3 €	-5.3 €	-6.3 €	-8.8 €	-17.6 €	-20.6 €	-7.1 €	-5.1 €	-7.1 €	-9.5 €
Borders	-18.3 €	-15.7 €	-19.0 €	-21.1 €	-37.5 €	-38.2 €	-24.3 €	-18.9 €	-24.2 €	-27.0 €
City of Edinburgh	-0.8 €	-0.8 €	-0.8 €	-0.9 €	-1.6 €	-1.6 €	-0.8 €	-0.7 €	-0.8 €	-0.9 €
Clackmannanshire & F	-8.7 €	-7.4 €	-8.8 €	-11.1 €	-19.6 €	-22.4 €	-8.8 €	-6.5 €	-8.8 €	-11.3 €
East & Midlothian	-5.0 €	-4.0 €	-5.2 €	-6.8 €	-12.3 €	-13.8 €	-5.8 €	-3.9 €	-5.8 €	-7.4 €
Falkirk	-0.8 €	-0.7 €	-0.9 €	-1.2 €	-2.4 €	-2.8 €	-1.5 €	-1.1 €	-1.5 €	-1.7 €
Perth & Kinross and	-11.4 €	-11.1 €	-11.3 €	-13.8 €	-25.6 €	-28.3 €	-13.5 €	-11.8 €	-13.4 €	-15.9 €
West Lothian	-1.6 €	-1.3 €	-1.6 €	-1.9 €	-3.3 €	-3.6 €	-2.3 €	-2.0 €	-2.3 €	-2.5 €
Highlands & Islands	-20.3 €	-20.6 €	-20.2 €	-21.4 €	-35.9 €	-39.2 €	-45.6 €	-43.9 €	-45.7 €	-44.2 €
Caithness & Sutherland	-5.0 €	-5.6 €	-4.9 €	-6.3 €	-13.4 €	-15.1 €	-14.7 €	-14.3 €	-14.9 €	-14.7 €
Inverness & Nairn and	-2.7 €	-2.8 €	-2.6 €	-3.2 €	-7.0 €	-7.7 €	-7.4 €	-6.6 €	-7.5 €	-7.5 €
Lochaber, Skye & Loch	-4.5 €	-4.8 €	-4.7 €	-4.0 €	-4.9 €	-4.5 €	-8.2 €	-8.2 €	-8.2 €	-7.5 €
Orkney Islands	-5.9 €	-5.1 €	-6.0 €	-6.4 €	-10.2 €	-10.9 €	-13.6 €	-13.0 €	-13.5 €	-13.1 €
Shetland Islands	-1.6 €	-1.6 €	-1.4 €	-1.0 €	-0.4 €	-0.5 €	-1.1 €	-1.1 €	-1.0 €	-0.9 €
Western Isles	-0.6 €	-0.8 €	-0.6 €	-0.5 €	-0.2 €	-0.4 €	-0.6 €	-0.7 €	-0.6 €	-0.5 €
North Eastern Scotland	-41.5 €	-37.3 €	-41.2 €	-51.9 €	-86.8 €	-99.6 €	-69.6 €	-61.6 €	-69.6 €	-73.0 €
Aberdeen City, Aberd	-41.5 €	-37.3 €	-41.2 €	-51.9 €	-86.8 €	-99.6 €	-69.6 €	-61.6 €	-69.6 €	-73.0 €
South Western Scotland	-64.1 €	-58.5 €	-65.8 €	-68.2 €	-98.9 €	-96.6 €	-89.7 €	-81.0 €	-89.4 €	-89.5 €
Dumfries & Galloway	-44.1 €	-40.8 €	-45.5 €	-45.1 €	-59.9 €	-55.2 €	-55.5 €	-50.9 €	-55.3 €	-55.3 €
E & North Ayrshire M	-5.7 €	-5.0 €	-5.8 €	-6.8 €	-11.2 €	-12.2 €	-9.9 €	-8.7 €	-9.9 €	-9.9 €
E & W Dunbartonshire	-1.5 €	-1.5 €	-1.6 €	-1.7 €	-2.1 €	-2.3 €	-1.9 €	-1.7 €	-1.9 €	-1.9 €
Glasgow City	0.0 €	-0.1 €	0.0 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €	-0.1 €
Inverclyde, East Ren	-2.5 €	-2.3 €	-2.7 €	-2.7 €	-4.2 €	-4.1 €	-3.8 €	-3.3 €	-3.7 €	-3.8 €
North Lanarkshire	-0.8 €	-0.8 €	-0.7 €	-0.9 €	-1.9 €	-2.0 €	-1.5 €	-1.4 €	-1.5 €	-1.5 €
South Ayrshire	-4.4 €	-3.9 €	-4.4 €	-5.2 €	-8.8 €	-9.3 €	-7.0 €	-6.0 €	-7.0 €	-7.2 €
South Lanarkshire	-5.0 €	-4.1 €	-5.0 €	-5.8 €	-10.6 €	-11.5 €	-10.1 €	-8.9 €	-10.0 €	-9.9 €
Regional identifier missing	-2.2 €	-2.3 €	-2.4 €	-2.5 €	-2.6 €	-2.8 €	-2.3 €	-2.4 €	-2.3 €	-2.4 €
Grand Total	-180.9 €	-165.1 €	-183.5 €	-209.6 €	-343.9 €	-369.4 €	-271.4 €	-238.7 €	-270.7 €	-285.3 €

Figure 11 gives an alternative way of comparing the distribution of change in payment across the scenarios by plotting the lower, median and upper quartile values for change in payments. The results show that the LCA scenarios (excluding LCA-S4 and LCA-S5) have a smaller difference between the upper and lower quartiles than the LFA scenarios. Of particular interest is that the stocking rate scenarios (LCA-S1.sr and LFA-S1.sr) narrow the difference between the upper and lower quartiles and bring the median closer to zero than the equivalent scenarios which do not implement a stocking rate criterion (LCA-S1 and LFA-S1). The chart shows that all scenarios have smaller increases at the upper quartile in comparison to the reductions at the lower quartile but this is more pronounced in the LFA scenarios.

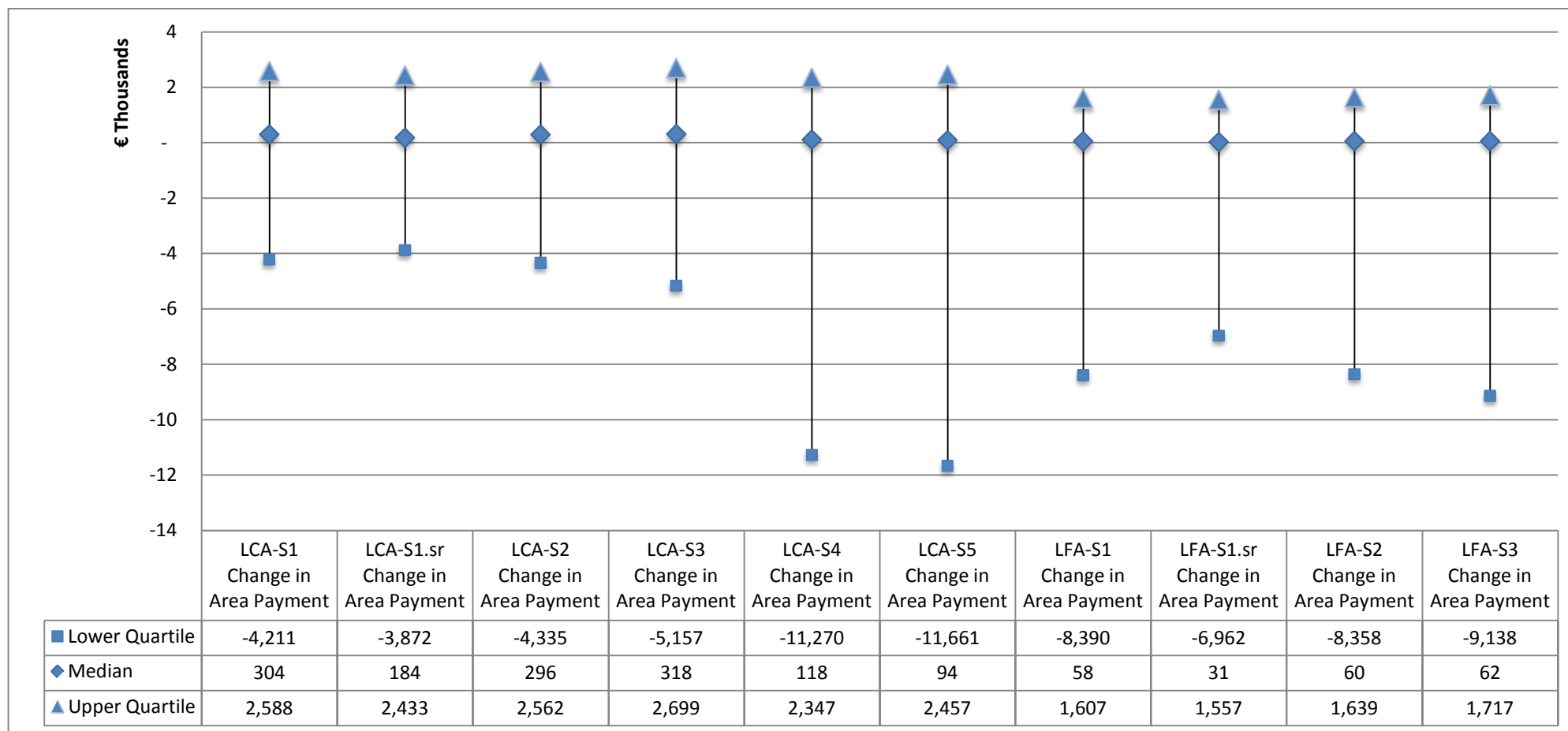


Figure 11: Change in payment - quartile analysis

5.3 Change in Payment – number of businesses

In this section the consequences of the scenarios are analysed in terms of the numbers of businesses affected. The approach is the same as in the previous section with an overall summary (Table 25) and then a breakdown by robust farm type and region. For the farm type breakdown the tables are organised as follows: overall number of businesses (Table 26), number of businesses with zero baseline increases (Table 27), net number of businesses^{xviii} for current claimants (Table 28) and also for current claimants the number of businesses with significantly increased payments (Table 29) and significantly reduced payments (Table 30). For regional breakdowns the same types of table are also presented (see Table 31 to Table 35). Note that the assumed new areas (see Section 3.4) are excluded from the figures presented here as the area is not differentiated on a per-business basis. The number of businesses within the zero-baseline category is therefore substantially under-reported and as a consequence an overall number of businesses is not presented.

Table 25 shows for each scenario: the total number of businesses whose payment has increased (row 1) which is made up of zero baseline increases (row 2), significant increases (row 3) and moderate increases (row 4). The table also shows the total number of businesses whose payment has been reduced (row 5). This is made up of significant reductions (row 6) and moderate reductions (row 7). Increases and reductions are classified as significant where there is a change of more than $\pm 20\%$ from the baseline payment levels. Total redistribution (row 8) is the number of businesses where change occurs (excluding zero baseline changes^{xix}) this is made up of significant (row 9) and moderate redistribution (row 10). Comparing rows 9 and 10 shows the relative redistributive effects for each scenario.

Table 25: Change in payment summary - number of businesses

Change (number of businesses)		LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
1	Total Increases	17,393	16,835	17,368	17,327	16,013	16,029	15,602	15,586	15,650	15,634
2	Zero Baseline Increases	8,843	8,843	8,843	8,843	8,843	8,843	8,843	8,843	8,843	8,843
3	Significant Increases	6,536	5,863	6,511	6,770	6,291	6,389	5,436	5,244	5,473	5,628
4	Moderate Increases	2,014	2,129	2,014	1,714	879	797	1,323	1,499	1,334	1,163
5	Total Reductions	11,262	11,820	11,287	11,328	12,642	12,626	13,053	13,069	13,005	13,021
6	Significant Reductions	7,130	7,540	7,170	8,152	11,385	11,631	10,516	10,280	10,480	10,937
7	Moderate Reductions	4,132	4,280	4,117	3,176	1,257	995	2,537	2,789	2,525	2,084
8	Total Redistribution	19,812	19,812	19,812	19,812	19,812	19,812	19,812	19,812	19,812	19,812
9	Significant Redistribution	13,666	13,403	13,681	14,922	17,676	18,020	15,952	15,524	15,953	16,565
10	Moderate Redistribution	6,146	6,409	6,131	4,890	2,136	1,792	3,860	4,288	3,859	3,247

^{xviii} The difference between the counts of businesses with increased payments and those with reduced payments.

^{xix} These were excluded since they are constant for all scenarios and since it is not possible to assess their significance in percentage terms.

Table 25 shows that in all cases there are more increases in payment than reductions when zero baseline increases are included. When zero baseline increases are excluded, however, then there are more reductions. Comparatively the LCA scenarios tend to have fewer businesses seeing significant reductions when compared with the LFA scenarios.

Table 26 shows the difference between the number of businesses receiving increased payments and the number of businesses receiving reduced payments in the scenarios relative to the baseline. Positive numbers mean there are more businesses with increasing payments than decreasing payments (relative to the baseline), negative numbers mean there are more reductions than increases. The most significant result is the large positive net effect for the number of businesses in the Other farm type as well as for Cattle & Sheep (LFA). These categories have more businesses that receive increased payments than receive reduced payments. The table also shows that the net effect for Dairy, Mixed, Cereals and General Cropping farm types is a negative one, for these farm types more businesses are likely to see reduced payments in each of the scenarios relative to the baseline. Comparatively the LCA scenarios tend to have fewer businesses seeing significant reductions when compared with the LFA scenarios.

Table 26: Change in payment by farm type – net number of businesses increasing/reducing

Change - Net (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle & sheep (LFA)	2310	2712	2308	2908	2244	2560	536	1126	616	958
Cattle & sheep (Lowland)	176	262	176	78	-258	-372	64	170	64	-18
Cereals	-776	-1022	-780	-1004	-1466	-1546	-1156	-1170	-1156	-1286
Dairy	-670	-540	-692	-754	-994	-974	-966	-894	-964	-966
General Cropping	-524	-502	-528	-702	-964	-966	-682	-380	-680	-804
Horticulture	229	209	231	233	209	199	223	199	225	213
Mixed	-571	-439	-569	-695	-1009	-997	-955	-793	-953	-987
Other	4534	3024	4524	4514	4246	4166	4160	2938	4166	4170
Specialist Pigs	40	30	40	36	32	30	32	32	32	32
Specialist Poultry	445	313	437	431	385	373	395	293	395	397
Farm type missing	938	968	934	954	946	930	898	996	900	904

The net number of businesses is useful for getting a view of the bigger picture but these figures mask compensating increases and reductions. These effects are detailed in the next four tables.

Table 27 shows the number of businesses with no payments in the baseline by farm type. The baseline is constant for all scenarios so the number of businesses which have a payment of zero in the baseline remains the same in all scenarios. Again the most significant number of zero baseline businesses who would be included have farm type Other. Table 28 shows, by farm type, the net number of businesses gaining under each of the scenarios of those currently claiming the SFP (zero baseline increases have been discounted and negative values represent number of net losses).

Table 27: Change in payment by farm type - number of businesses with a zero baseline and increase

Change - Zero Baseline Increases (number of businesses)	All Scenarios
Cattle and sheep (LFA)	1411
Cattle and sheep (Lowland)	256
Cereals	330
Dairy	52
General Cropping	254
Horticulture	224
Mixed	186
Other	4190
Specialist Pigs	44
Specialist Poultry	400
Farm type missing	1496

The overall picture in Table 28 is of more current recipients having a reduction in payment compared to those who gain, with the exception of the Cattle and Sheep (LFA), but only for the LCA based scenarios. It is worth noting that this net positive impact for Cattle and Sheep (LFA) is less pronounced than when the zero-baseline increases are included. The increased rates of payment per ha that arise from the use of the stocking rate criterion (see Section 3.6) has, for most farm types, a marginal effect in reducing the number of businesses with reduced payments. The exceptions are the Other class with a reversal; from 334 net increases to 1166 net reductions and Cattle and Sheep (LFA) moving from 899 to 1301 net increases (using scenario LCA-S1 and LCA-S1.sr as a example).

Table 28: Change in payment by farm type - net number of businesses excluding zero baseline increases

Change - Net excl. Zero Baseline (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle & sheep (LFA)	899	1301	897	1497	833	1149	-875	-285	-795	-453
Cattle & sheep (Lowland)	-80	6	-80	-178	-514	-628	-192	-86	-192	-274
Cereals	-1106	-1352	-1110	-1334	-1796	-1876	-1486	-1500	-1486	-1616
Dairy	-722	-592	-744	-806	-1046	-1026	-1018	-946	-1016	-1018
General Cropping	-778	-756	-782	-956	-1218	-1220	-936	-634	-934	-1058
Horticulture	5	-15	7	9	-15	-25	-1	-25	1	-11
Mixed	-757	-625	-755	-881	-1195	-1183	-1141	-979	-1139	-1173
Other	344	-1166	334	324	56	-24	-30	-1252	-24	-20
Specialist Pigs	-4	-14	-4	-8	-12	-14	-12	-12	-12	-12
Specialist Poultry	45	-87	37	31	-15	-27	-5	-107	-5	-3
Farm type missing	-558	-528	-562	-542	-550	-566	-598	-500	-596	-592

Table 29 shows, by farm type, the number of currently claiming businesses receiving a significant increase in payments. It shows that for all scenarios there are large numbers of businesses that see significant increases in payments (relative to their baseline entitlement). Again it is for the Cattle and Sheep (LFA) where the largest number of increases is seen. Note that even for farm types where more businesses see a reduction in payments (e.g. Cereals in Table 28), there are still businesses which see significant increases in payments.

Table 29: Change in payment by farm type - number of businesses with significant increase

Change - Significant Increases (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	4283	4323	4269	4676	4776	4947	3767	4030	3799	4016
Cattle and sheep (Lowland)	272	300	273	240	106	69	221	274	221	199
Cereals	303	203	300	249	121	93	183	142	183	155
Dairy	119	161	114	98	43	48	53	69	53	49
General Cropping	165	142	166	138	70	73	134	145	134	111
Horticulture	40	32	40	40	31	30	27	29	28	28
Mixed	259	292	256	240	161	168	156	182	159	152
Other	804	167	799	799	719	701	662	142	663	680
Specialist Pigs	10	6	11	10	7	7	7	7	7	6
Specialist Poultry	81	27	79	78	54	54	55	18	55	57
Farm type missing	200	210	204	202	203	199	171	206	171	175

Table 30 shows, by farm type, the number of businesses that will be in receipt of a significantly reduced payment relative to the baseline. The numbers of businesses being affected is significant across all farm types but most pronounced for the more “intensive” farm types – Cereals, Dairy, General Cropping and Mixed. The numbers of Cattle and Sheep (LFA) with reduced payments, when combined with the effects shown in Table 29, means that there would be significant redistribution within this farm type.

Table 30: Change in payment by farm type - number of businesses with significant reduction

Change - Significant Reductions (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	2794	2463	2802	2685	3749	3701	4452	4060	4419	4251
Cattle and sheep (Lowland)	299	258	301	358	594	682	395	318	393	426
Cereals	827	962	838	1288	1884	1946	1316	1193	1312	1581
Dairy	698	567	713	810	1061	1061	1021	937	1021	1032
General Cropping	502	495	499	804	1269	1289	665	526	665	921
Horticulture	28	46	25	29	46	56	37	50	37	38
Mixed	796	621	801	957	1323	1334	1178	1012	1175	1232
Other	409	1295	413	440	639	703	645	1373	648	650
Specialist Pigs	10	15	11	14	19	22	18	19	18	19
Specialist Poultry	35	111	36	38	67	80	63	120	62	60
Farm type missing	732	707	731	729	734	757	726	672	730	727

The following set of five tables present the regional breakdown of the number of businesses receiving increased or reduced payments.

Table 31 shows, by region, the net number of businesses whose payment is increasing (negative values represent the net number of businesses with a reduction in payments). This table shows that across all scenarios there are more businesses in the Highlands and Islands that see an increase in payment compared to those with a reduction relative to the baseline. This effect is concentrated in Caithness and Sutherland, Lochaber, Skye and Lochalsh and the Western Isles. However for LFA-based scenarios there are more businesses in Orkney that see a reduction in payment compared to those with an increase. South West Scotland sees the number of businesses receiving increased payments slightly exceed the number of businesses receiving reduced payments for Scenarios LCA-S1 and LCA-S2; however for the other scenarios more businesses receive reduced payments. Most of the negative impact is focused on Dumfries & Galloway, which has many more businesses that receive reduced payments than businesses that receive increased payments. Eastern Scotland and North Eastern Scotland both see broadly negative impacts, with the Borders, Clackmannanshire & Fife and Angus & Dundee all having relatively large negative impacts.

Table 31: Change in payment by region - net number of businesses increasing/reducing

Change - Net (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	-171	-75	-201	-397	-1299	-1115	-429	79	-419	-709
Angus & Dundee City	-173	-151	-175	-229	-331	-345	-195	-61	-195	-251
Borders	-108	-52	-130	-86	-296	-138	-158	-26	-152	-174
City of Edinburgh	-15	-11	-13	-17	-23	-23	-15	-13	-15	-17
Clackmannanshire & F	-160	-150	-168	-226	-306	-314	-166	-74	-168	-232
East & Midlothian	-96	-78	-100	-122	-186	-184	-120	-70	-120	-140
Falkirk	46	54	38	32	-28	-26	-16	0	-12	-20
Perth & Kinross and	299	281	311	225	-101	-53	239	309	239	123
West Lothian	36	32	36	26	-28	-32	2	14	4	2
Highlands & Islands	6694	5574	6744	7246	7382	7020	5098	4386	5160	5518
Caithness & Sutherland	1917	1551	1939	1869	1423	1311	1059	811	1039	1105
Inverness & Nairn and	613	577	621	587	339	327	213	225	207	235
Lochaber, Skye & Loch	1526	1322	1468	1774	1958	2080	1316	1202	1330	1434
Orkney Islands	109	113	99	47	-189	-155	-323	-323	-323	-311
Shetland Islands	421	325	519	707	1141	995	661	627	695	775
Western Isles	2108	1686	2098	2262	2710	2462	2172	1844	2212	2280
North Eastern Scotland	-263	-373	-265	-615	-1461	-1577	-1195	-1157	-1187	-1273
Aberdeen City, Aberdeen	-263	-373	-265	-615	-1461	-1577	-1195	-1157	-1187	-1273
South Western Scotland	77	95	11	-29	-1035	-711	-717	-583	-701	-711
Dumfries & Galloway	-314	-334	-348	-298	-574	-314	-448	-376	-444	-458
E & North Ayrshire and	106	100	100	64	-162	-152	-112	-94	-108	-104
E & W Dunbartonshire	62	58	54	52	20	20	34	30	36	38
Glasgow City	4	4	4	4	0	2	2	4	2	2
Inverclyde, East Renfrew	54	72	42	48	-22	0	-8	0	-8	-10
North Lanarkshire	80	86	80	68	4	12	20	30	22	18
South Ayrshire	-12	-20	-10	-24	-152	-136	-78	-70	-76	-78
South Lanarkshire	97	129	89	57	-149	-143	-127	-107	-125	-119
Regional identifier missing	-206	-206	-208	-206	-216	-214	-208	-208	-208	-212

Table 32 shows the regional distribution of businesses which have zero payment in the baseline that receive a payment in the scenarios. The table shows that they are mostly found in the Highlands & Islands area, and are concentrated mainly in Caithness and Sutherland, Lochaber, Skye and Lochalsh. Outside of the Highlands & Islands, Dumfries and Galloway has the greatest number of businesses with zero payment in the baseline that receive a payment under the scenarios.

Table 32: Change in payment by region – number of businesses with a zero baseline and increase

Change - Zero Baseline Increases (number of businesses)	All Scenarios
Eastern Scotland	1515
Angus & Dundee City	141
Borders	402
City of Edinburgh	9
Clackmannanshire & F	193
East & Midlothian	102
Falkirk	62
Perth & Kinross and	541
West Lothian	65
Highlands & Islands	4548
Caithness & Sutherla	1121
Inverness & Nairn an	430
Lochaber, Skye & Loc	1088
Orkney Islands	321
Shetland Islands	309
Western Isles	1279
North Eastern Scotland	1186
Aberdeen City, Aberd	1186
South Western Scotland	1581
Dumfries & Galloway	713
E & North Ayrshire M	250
E & W Dunbartonshire	63
Glasgow City	3
Inverclyde, East Ren	91
North Lanarkshire	92
South Ayrshire	134
South Lanarkshire	235
Regional identifier missing	13

Table 33 shows the broad impact of each of the scenarios relative to the baseline, in terms of the difference between the number of businesses which receive increased payments in the scenarios compared to those with reduced payments (excluding those businesses which did not receive payment in the baseline). The Highlands and Islands is the only region which has more businesses with increased payments compared to those that see payments fall (for example, 2146 more increases than decreases in LCA-S1); however it is important to note the impact on Orkney, which has more businesses with reduced payments. North East Scotland, Eastern Scotland and South

West of Scotland all see more decreases than increases when zero baseline increases are disregarded, which illustrate the negative impact on payments to businesses that receive payment in the baseline in these areas.

Table 33: Change in payment by region - net number of businesses excluding zero baseline increases

Change - Net excl. Zero Baseline (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	-1686	-1590	-1716	-1912	-2814	-2630	-1944	-1436	-1934	-2224
Angus & Dundee City	-314	-292	-316	-370	-472	-486	-336	-202	-336	-392
Borders	-510	-454	-532	-488	-698	-540	-560	-428	-554	-576
City of Edinburgh	-24	-20	-22	-26	-32	-32	-24	-22	-24	-26
Clackmannanshire & F	-353	-343	-361	-419	-499	-507	-359	-267	-361	-425
East & Midlothian	-198	-180	-202	-224	-288	-286	-222	-172	-222	-242
Falkirk	-16	-8	-24	-30	-90	-88	-78	-62	-74	-82
Perth & Kinross and	-242	-260	-230	-316	-642	-594	-302	-232	-302	-418
West Lothian	-29	-33	-29	-39	-93	-97	-63	-51	-61	-63
Highlands & Islands	2146	1026	2196	2698	2834	2472	550	-162	612	970
Caithness & Sutherla	796	430	818	748	302	190	-62	-310	-82	-16
Inverness & Nairn an	183	147	191	157	-91	-103	-217	-205	-223	-195
Lochaber, Skye & Loc	438	234	380	686	870	992	228	114	242	346
Orkney Islands	-212	-208	-222	-274	-510	-476	-644	-644	-644	-632
Shetland Islands	112	16	210	398	832	686	352	318	386	466
Western Isles	829	407	819	983	1431	1183	893	565	933	1001
North Eastern Scotland	-1449	-1559	-1451	-1801	-2647	-2763	-2381	-2343	-2373	-2459
Aberdeen City, Aberd	-1449	-1559	-1451	-1801	-2647	-2763	-2381	-2343	-2373	-2459
South Western Scotland	-1504	-1486	-1570	-1610	-2616	-2292	-2298	-2164	-2282	-2292
Dumfries & Galloway	-1027	-1047	-1061	-1011	-1287	-1027	-1161	-1089	-1157	-1171
E & North Ayrshire M	-144	-150	-150	-186	-412	-402	-362	-344	-358	-354
E & W Dunbartonshire	-1	-5	-9	-11	-43	-43	-29	-33	-27	-25
Glasgow City	1	1	1	1	-3	-1	-1	1	-1	-1
Inverclyde, East Ren	-37	-19	-49	-43	-113	-91	-99	-91	-99	-101
North Lanarkshire	-12	-6	-12	-24	-88	-80	-72	-62	-70	-74
South Ayrshire	-146	-154	-144	-158	-286	-270	-212	-204	-210	-212
South Lanarkshire	-138	-106	-146	-178	-384	-378	-362	-342	-360	-354
Regional identifier missing	-219	-219	-221	-219	-229	-227	-221	-221	-221	-225

Table 34 shows the number of businesses with significant increases in payments by region under each of the scenarios. The largest numbers of increases are concentrated in the Highlands and Islands.

Table 34: Change in payment by region - number of businesses with significant increase

Change - Significant Increases (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	850	823	842	842	580	716	830	912	833	780
Angus & Dundee City	91	89	91	80	51	56	89	105	89	77
Borders	201	197	197	217	158	235	207	234	210	202
City of Edinburgh	5	5	5	5	2	4	6	7	6	6
Clackmannanshire & F	67	63	66	58	31	32	61	77	61	56
East & Midlothian	44	46	43	40	22	28	36	49	36	32
Falkirk	39	45	37	35	17	16	20	23	20	19
Perth & Kinross and	360	333	360	366	281	329	379	384	379	359
West Lothian	43	45	43	41	18	16	32	33	32	29
Highlands & Islands	4206	3617	4203	4577	4948	4785	3659	3329	3682	3905
Caithness & Sutherland	1149	995	1166	1157	997	966	821	696	810	853
Inverness & Nairn and	341	321	350	348	249	251	187	183	181	196
Lochaber, Skye & Loch	898	781	860	1028	1217	1298	839	812	846	920
Orkney Islands	185	190	180	173	97	90	40	41	42	45
Shetland Islands	448	387	490	600	852	777	546	547	563	615
Western Isles	1185	943	1157	1271	1536	1403	1226	1050	1240	1276
North Eastern Scotland	571	521	575	490	202	173	282	275	281	267
Aberdeen City, Aberdeen	571	521	575	490	202	173	282	275	281	267
South Western Scotland	889	887	871	842	546	699	647	711	658	658
Dumfries & Galloway	294	294	296	302	235	345	276	311	282	280
E & North Ayrshire and	190	184	190	171	92	99	106	116	108	111
E & W Dunbartonshire	48	47	43	45	40	43	43	41	43	45
Glasgow City	3	3	3	3	1	1	1	2	1	1
Inverclyde, East Renfrew	68	69	58	57	34	45	41	48	42	42
North Lanarkshire	44	46	45	40	22	28	25	28	25	25
South Ayrshire	83	76	84	78	38	50	62	59	63	56
South Lanarkshire	159	168	152	146	84	88	93	106	94	98
Regional identifier missing	20	15	20	19	15	16	18	17	19	18

Table 35 shows the number of businesses which experience significant decreases in payment by region for each of the scenarios relative to the baseline. The largest numbers of significant decreases are concentrated in the North East and South West – particularly in Dumfries and Galloway. There are a larger number of businesses that receive significantly less for the LFA-based scenarios.

Table 35: Change in area by region – number of businesses with significant reduction

Change - Significant Reductions (number of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	1654	1585	1680	2185	3319	3294	2070	1708	2062	2550
Angus & Dundee City	242	218	243	352	526	536	288	203	288	387
Borders	471	442	483	557	829	767	610	500	610	692
City of Edinburgh	19	20	19	26	36	35	23	18	23	28
Clackmannanshire & F	274	251	279	378	524	534	289	230	288	393
East & Midlothian	153	129	160	224	302	303	181	126	180	241
Falkirk	38	34	39	56	101	103	77	64	77	87
Perth & Kinross and	400	433	400	525	899	900	525	491	519	637
West Lothian	57	58	57	67	102	116	77	76	77	85
Highlands & Islands	1761	2322	1756	1644	2022	2261	2975	3344	2961	2799
Caithness & Sutherland	278	455	276	346	668	738	826	924	837	802
Inverness & Nairn and	123	165	119	148	309	328	374	365	378	374
Lochaber, Skye & Loch	421	515	431	327	307	306	607	674	604	543
Orkney Islands	330	325	334	363	558	568	671	673	668	657
Shetland Islands	285	345	247	182	44	91	185	233	170	153
Western Isles	324	517	349	278	136	230	312	475	304	270
North Eastern Scotland	1481	1490	1473	1934	2780	2908	2451	2315	2444	2558
Aberdeen City, Aberdeen	1481	1490	1473	1934	2780	2908	2451	2315	2444	2558
South Western Scotland	2009	1916	2035	2155	3020	2923	2791	2683	2784	2792
Dumfries & Galloway	1173	1115	1191	1177	1470	1341	1372	1325	1371	1377
E & North Ayrshire and	255	255	260	311	478	499	441	419	437	436
E & W Dunbartonshire	43	49	45	51	78	81	70	71	70	68
Glasgow City	1	1	1	2	3	3	2	2	2	2
Inverclyde, East Renfrewshire	83	78	92	87	142	133	133	120	133	131
North Lanarkshire	48	45	45	51	101	104	91	86	92	91
South Ayrshire	172	166	168	204	299	305	250	234	247	258
South Lanarkshire	234	207	233	272	449	457	432	426	432	429
Regional identifier missing	225	227	226	234	244	245	229	230	229	238

5.4 Change in Payment – percentage of businesses

While the numbers of businesses are significant in terms of the numbers of individuals affected, the significance of these figures can be more difficult to interpret in terms of what share of a sector (as represented by the farm type) or region is being affected by the changes. In this section the data on the numbers of businesses affected are presented as percentages of businesses in each of the farm types and regions. The tables are organised as those in Section 5.3 and the same caveats apply when interpreting these results.

Table 36 shows the percentage of businesses seeing an increase (row 1). This percentage is broken down as follows – increase from a zero baseline (row 2) and for current recipients, a significant increase (row 3) or a moderate increase (row 4). Reductions are handled similarly (rows 5 to 7). The key result is that there are a substantial percentage of businesses that receive increased payments (54-61%) and that the increase is roughly balanced between zero baseline increases (31% for all scenarios) and increases for current claimants (18-23%). The proportions of businesses with reduced payments (31-46%) combined with the fixed budget means that the size of reductions will be larger on average than the increases.

Table 36: Change in payment summary - percentage of businesses

Change (% of all businesses)		LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
1	Total Increases	61%	59%	61%	60%	56%	56%	54%	54%	55%	55%
2	Zero Baseline Increases	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%
3	Significant Increases	23%	20%	23%	24%	22%	22%	19%	18%	19%	20%
4	Moderate Increases	7%	7%	7%	6%	3%	3%	5%	5%	5%	4%
5	Total Reductions	39%	41%	39%	40%	44%	44%	46%	46%	45%	45%
6	Significant Reductions	25%	26%	25%	28%	40%	41%	37%	36%	37%	38%
7	Moderate Reductions	14%	15%	14%	11%	4%	3%	9%	10%	9%	7%

Table 37 shows the net number of businesses with an increase in payment as a percentage of total businesses for each farm type. Again negative numbers are used to show where the percentage of businesses with decreasing payments is larger than the percentage of businesses with increasing payments. This table highlights that the majority of businesses classified as Specialist Poultry, Other and Horticulture, will see an increase in payments. Dairy, Cereal, General Cropping and Mixed farms will see a reduction particularly in the LFA based scenarios.

Table 37: Change in payment by farm type - net percentage of businesses increasing/reducing

Change - Net (% of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle & sheep (LFA)	20%	24%	20%	26%	20%	23%	5%	10%	5%	8%
Cattle & sheep (Lowland)	17%	25%	17%	7%	-24%	-35%	6%	16%	6%	-2%
Cereals	-32%	-42%	-32%	-41%	-60%	-64%	-48%	-48%	-48%	-53%
Dairy	-55%	-44%	-57%	-62%	-82%	-80%	-80%	-74%	-79%	-80%
General Cropping	-32%	-30%	-32%	-43%	-58%	-59%	-41%	-23%	-41%	-49%
Horticulture	72%	66%	73%	74%	66%	63%	70%	63%	71%	67%
Mixed	-32%	-25%	-32%	-40%	-57%	-57%	-54%	-45%	-54%	-56%
Other	79%	53%	79%	78%	74%	72%	72%	51%	72%	72%
Specialist Pigs	54%	41%	54%	49%	43%	41%	43%	43%	43%	43%
Specialist Poultry	81%	57%	79%	78%	70%	68%	72%	53%	72%	72%

While the percentages given above are useful for getting a view of the bigger picture, they mask compensating increases and reductions.

Table 38 shows the number of businesses with a zero payment in the baseline as a percentage of total businesses in each farm type category. The baseline is constant for all scenarios so the percentage of businesses remains the same in all scenarios. Farm types where there has been limited previous support are where it is most likely for zero baseline increases to occur.

Table 38: Change in payment by farm type – percentage of businesses with a zero baseline and increase

Change - Zero Baseline Increases (% businesses)	All Scenarios
Cattle and sheep (LFA)	12%
Cattle and sheep (Lowland)	24%
Cereals	14%
Dairy	4%
General Cropping	15%
Horticulture	71%
Mixed	11%
Other	73%
Specialist Pigs	59%
Specialist Poultry	73%

Table 39 shows, by farm type, the net number of business with an increase in payment as a percentage of total businesses in each of the farm type categories when the businesses with zero payments in the baseline are omitted from the analysis. These figures illustrate the net change for businesses that are currently in receipt of payment.

The key difference here is between the farm types with clear net reductions (Cereals, Dairy, General Cropping and Mixed) set against the apparently more modest changes for other farm types. Again it is important to note that these net figures, however, hide redistribution within farm types (see Table 40 and Table 41).

Table 39: Change in payment by farm type - net percentage of businesses excluding zero baseline increases

Change - Net excl. Zero Baseline (% businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle & sheep (LFA)	8%	12%	8%	13%	7%	10%	-8%	-3%	-7%	-4%
Cattle & sheep (Lowland)	-8%	1%	-8%	-17%	-49%	-59%	-18%	-8%	-18%	-26%
Cereals	-45%	-56%	-46%	-55%	-74%	-77%	-61%	-62%	-61%	-66%
Dairy	-59%	-49%	-61%	-66%	-86%	-85%	-84%	-78%	-84%	-84%
General Cropping	-47%	-46%	-47%	-58%	-74%	-74%	-57%	-38%	-57%	-64%
Horticulture	2%	-5%	2%	3%	-5%	-8%	0%	-8%	0%	-3%
Mixed	-43%	-36%	-43%	-50%	-68%	-67%	-65%	-56%	-65%	-67%
Other	6%	-20%	6%	6%	1%	0%	-1%	-22%	0%	0%
Specialist Pigs	-5%	-19%	-5%	-11%	-16%	-19%	-16%	-16%	-16%	-16%
Specialist Poultry	8%	-16%	7%	6%	-3%	-5%	-1%	-19%	-1%	-1%

Table 40 shows, by farm type, the number of businesses with significant increases in payments as a percentage of total businesses in each of the farm types. The table shows that the Cattle & sheep (LFA) and in some scenarios Cattle & sheep (Lowland) are the farm types with the largest significant increases. Dairy, General Cropping and Cereals farm types have small percentages of businesses seeing significant increases in payments. Generally, the LFA based scenarios produce smaller numbers of businesses gaining as a percentage of total businesses in each farm type.

Table 40: Change in payment by farm type – percentage of businesses with significant increase

Change - Significant Increases (% businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	38%	38%	38%	41%	42%	44%	33%	36%	34%	36%
Cattle and sheep (Lowland)	26%	28%	26%	23%	10%	7%	21%	26%	21%	19%
Cereals	12%	8%	12%	10%	5%	4%	8%	6%	8%	6%
Dairy	10%	13%	9%	8%	4%	4%	4%	6%	4%	4%
General Cropping	10%	9%	10%	8%	4%	4%	8%	9%	8%	7%
Horticulture	13%	10%	13%	13%	10%	9%	9%	9%	9%	9%
Mixed	15%	17%	15%	14%	9%	10%	9%	10%	9%	9%
Other	14%	3%	14%	14%	12%	12%	11%	2%	12%	12%
Specialist Pigs	14%	8%	15%	14%	9%	9%	9%	9%	9%	8%
Specialist Poultry	15%	5%	14%	14%	10%	10%	10%	3%	10%	10%

Table 41 shows, by farm type, the number of businesses that receive a significantly reduced payment under each of the scenarios as a percentage of total businesses in each farm type. The table shows that Dairy, Mixed, Cereals and General Cropping have the highest percentages of businesses with a significantly reduced payment. Generally the LFA based scenarios result in a larger percentage of businesses with a significantly reduced payment.

Table 41: Change in payment by farm type – percentage of businesses with significant reduction

Change - Significant Reductions (% businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	25%	22%	25%	24%	33%	33%	39%	36%	39%	38%
Cattle and sheep (Lowland)	28%	24%	29%	34%	56%	65%	37%	30%	37%	40%
Cereals	34%	40%	34%	53%	77%	80%	54%	49%	54%	65%
Dairy	57%	47%	59%	67%	87%	87%	84%	77%	84%	85%
General Cropping	30%	30%	30%	49%	77%	78%	40%	32%	40%	56%
Horticulture	9%	15%	8%	9%	15%	18%	12%	16%	12%	12%
Mixed	45%	35%	46%	54%	75%	76%	67%	58%	67%	70%
Other	7%	22%	7%	8%	11%	12%	11%	24%	11%	11%
Specialist Pigs	14%	20%	15%	19%	26%	30%	24%	26%	24%	26%
Specialist Poultry	6%	20%	7%	7%	12%	15%	11%	22%	11%	11%

Table 42 shows, by region, the net number of businesses with an increase in payment as a percentage of total businesses in each region, with negative values showing where there are more businesses seeing a reduction in payments. The regions with the largest net reductions are in Eastern Scotland including Angus & Dundee City and City of Edinburgh, although this is likely to be due to small numbers of farms in these areas. Regions seeing a large net increase in payment are in the Highlands and Islands, with the exception of the Orkney Islands.

Table 42: Change in payment by region - net percentage of businesses

Change - Net (% of businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	-3%	-1%	-3%	-7%	-22%	-19%	-7%	1%	-7%	-12%
Angus & Dundee City	-23%	-20%	-23%	-30%	-44%	-46%	-26%	-8%	-26%	-33%
Borders	-7%	-3%	-9%	-6%	-19%	-9%	-10%	-2%	-10%	-11%
City of Edinburgh	-31%	-22%	-27%	-35%	-47%	-47%	-31%	-27%	-31%	-35%
Clackmannanshire & F	-21%	-19%	-22%	-29%	-39%	-40%	-21%	-10%	-22%	-30%
East & Midlothian	-21%	-17%	-22%	-27%	-42%	-41%	-27%	-16%	-27%	-31%
Falkirk	23%	28%	19%	16%	-14%	-13%	-8%	0%	-6%	-10%
Perth & Kinross and	16%	15%	17%	12%	-5%	-3%	13%	17%	13%	7%
West Lothian	17%	15%	17%	12%	-13%	-15%	1%	7%	2%	1%
Highlands & Islands	54%	45%	54%	58%	59%	56%	41%	35%	41%	44%
Caithness & Sutherland	64%	52%	64%	62%	47%	44%	35%	27%	35%	37%
Inverness & Nairn an	55%	52%	56%	53%	31%	29%	19%	20%	19%	21%
Lochaber, Skye & Loc	53%	46%	51%	61%	68%	72%	46%	42%	46%	50%
Orkney Islands	10%	10%	9%	4%	-17%	-14%	-30%	-30%	-30%	-29%
Shetland Islands	32%	25%	39%	54%	86%	75%	50%	47%	53%	59%
Western Isles	68%	54%	68%	73%	87%	79%	70%	60%	71%	74%
North Eastern Scotland	-6%	-9%	-6%	-14%	-33%	-36%	-27%	-26%	-27%	-29%
Aberdeen City, Aberd	-6%	-9%	-6%	-14%	-33%	-36%	-27%	-26%	-27%	-29%
South Western Scotland	1%	2%	0%	-1%	-18%	-13%	-13%	-10%	-12%	-13%
Dumfries & Galloway	-12%	-13%	-13%	-11%	-22%	-12%	-17%	-14%	-17%	-17%
E & North Ayrshire M	12%	11%	11%	7%	-18%	-17%	-12%	-10%	-12%	-11%
E & W Dunbartonshire	31%	29%	27%	26%	10%	10%	17%	15%	18%	19%
Glasgow City	50%	50%	50%	50%	0%	25%	25%	50%	25%	25%
Inverclyde, East Ren	18%	24%	14%	16%	-7%	0%	-3%	0%	-3%	-3%
North Lanarkshire	34%	36%	34%	29%	2%	5%	8%	13%	9%	8%
South Ayrshire	-2%	-4%	-2%	-5%	-29%	-26%	-15%	-13%	-15%	-15%
South Lanarkshire	12%	15%	11%	7%	-18%	-17%	-15%	-13%	-15%	-14%

Table 43 shows, by region, the number of businesses with no payment in the baseline as a percentage of businesses in each region. Businesses which have no payment in the baseline but receive payments in the scenarios account for just over 25% of businesses in the East, North East and South West but around 36% of businesses in the Highlands and Islands region. In some NUTS3 regions the percentage is higher, for example - 39% and 41% for North Lanarkshire and Western Isles respectively.

Table 43: Change in payment by region – percentage of businesses with a zero baseline and increase

Change - Zero Baseline Increases (% businesses)	All Scenarios
Eastern Scotland	26%
Angus & Dundee City	19%
Borders	26%
City of Edinburgh	18%
Clackmannanshire & F	25%
East & Midlothian	23%
Falkirk	32%
Perth & Kinross and	29%
West Lothian	31%
Highlands & Islands	36%
Caithness & Sutherland	37%
Inverness & Nairn and	39%
Lochaber, Skye & Loch	38%
Orkney Islands	30%
Shetland Islands	23%
Western Isles	41%
North Eastern Scotland	27%
Aberdeen City, Aberdeen	27%
South Western Scotland	28%
Dumfries & Galloway	27%
E & North Ayrshire	27%
E & W Dunbartonshire	32%
Glasgow City	38%
Inverclyde, East Renfrew	31%
North Lanarkshire	39%
South Ayrshire	26%
South Lanarkshire	28%

Table 44 shows, by region, the net change in payment as a percentage of total businesses in each of the regions. Again businesses with no payments in the baseline are omitted from the analysis and negative values show where more businesses see a reduction in payments. The table shows that there are more businesses seeing reduced payments in the East, North East and South West of Scotland. The Highlands & Islands area sees more businesses having increased payments with the exception of Orkney (and Inverness and Nairn under LCA-S4 and LCA-S5 and the LFA scenarios).

Table 44: Change in payment by region - net percentage of businesses excluding zero baseline increases

Change - Net excl. Zero Baseline (% businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	-29%	-27%	-29%	-33%	-48%	-45%	-33%	-25%	-33%	-38%
Angus & Dundee City	-42%	-39%	-42%	-49%	-63%	-65%	-45%	-27%	-45%	-52%
Borders	-33%	-30%	-35%	-32%	-46%	-35%	-37%	-28%	-36%	-38%
City of Edinburgh	-49%	-41%	-45%	-53%	-65%	-65%	-49%	-45%	-49%	-53%
Clackmannanshire & F	-45%	-44%	-47%	-54%	-64%	-65%	-46%	-34%	-47%	-55%
East & Midlothian	-44%	-40%	-45%	-50%	-64%	-64%	-50%	-38%	-50%	-54%
Falkirk	-8%	-4%	-12%	-15%	-46%	-45%	-40%	-32%	-38%	-42%
Perth & Kinross and	-13%	-14%	-12%	-17%	-34%	-32%	-16%	-12%	-16%	-22%
West Lothian	-14%	-16%	-14%	-19%	-44%	-46%	-30%	-24%	-29%	-30%
Highlands & Islands	17%	8%	18%	22%	23%	20%	4%	-1%	5%	8%
Caithness & Sutherland	26%	14%	27%	25%	10%	6%	-2%	-10%	-3%	-1%
Inverness & Nairn and	16%	13%	17%	14%	-8%	-9%	-20%	-18%	-20%	-18%
Lochaber, Skye & Loch	15%	8%	13%	24%	30%	34%	8%	4%	8%	12%
Orkney Islands	-20%	-19%	-21%	-25%	-47%	-44%	-60%	-60%	-60%	-58%
Shetland Islands	8%	1%	16%	30%	63%	52%	27%	24%	29%	35%
Western Isles	27%	13%	26%	32%	46%	38%	29%	18%	30%	32%
North Eastern Scotland	-33%	-36%	-33%	-41%	-60%	-63%	-54%	-53%	-54%	-56%
Aberdeen City, Aberdeen	-33%	-36%	-33%	-41%	-60%	-63%	-54%	-53%	-54%	-56%
South Western Scotland	-27%	-26%	-28%	-28%	-46%	-41%	-41%	-38%	-40%	-41%
Dumfries & Galloway	-39%	-40%	-40%	-38%	-49%	-39%	-44%	-41%	-44%	-44%
E & North Ayrshire and	-16%	-16%	-16%	-20%	-45%	-44%	-40%	-38%	-39%	-39%
E & W Dunbartonshire	-1%	-3%	-5%	-6%	-22%	-22%	-15%	-17%	-14%	-13%
Glasgow City	13%	13%	13%	13%	-38%	-13%	-13%	13%	-13%	-13%
Inverclyde, East Renfrew	-13%	-6%	-17%	-15%	-38%	-31%	-33%	-31%	-33%	-34%
North Lanarkshire	-5%	-3%	-5%	-10%	-37%	-34%	-30%	-26%	-29%	-31%
South Ayrshire	-28%	-29%	-27%	-30%	-55%	-52%	-40%	-39%	-40%	-40%
South Lanarkshire	-16%	-13%	-17%	-21%	-46%	-45%	-43%	-41%	-43%	-42%

Table 45 shows the percentage of businesses with significant increases by region, and shows that these businesses are largely concentrated in the Highlands & Islands.

Table 45: Change in payment by region - percentage of businesses with significant increase

Change - Significant Increases (% businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	15%	14%	14%	14%	10%	12%	14%	16%	14%	13%
Angus & Dundee City	12%	12%	12%	11%	7%	7%	12%	14%	12%	10%
Borders	13%	13%	13%	14%	10%	15%	14%	15%	14%	13%
City of Edinburgh	10%	10%	10%	10%	4%	8%	12%	14%	12%	12%
Clackmannanshire & F	9%	8%	9%	7%	4%	4%	8%	10%	8%	7%
East & Midlothian	10%	10%	10%	9%	5%	6%	8%	11%	8%	7%
Falkirk	20%	23%	19%	18%	9%	8%	10%	12%	10%	10%
Perth & Kinross and	19%	18%	19%	20%	15%	18%	20%	21%	20%	19%
West Lothian	20%	21%	20%	20%	9%	8%	15%	16%	15%	14%
Highlands & Islands	34%	29%	34%	37%	40%	38%	29%	27%	29%	31%
Caithness & Sutherland	38%	33%	39%	38%	33%	32%	27%	23%	27%	28%
Inverness & Nairn an	31%	29%	32%	31%	22%	23%	17%	16%	16%	18%
Lochaber, Skye & Loc	31%	27%	30%	36%	42%	45%	29%	28%	29%	32%
Orkney Islands	17%	18%	17%	16%	9%	8%	4%	4%	4%	4%
Shetland Islands	34%	29%	37%	45%	64%	59%	41%	41%	43%	47%
Western Isles	38%	30%	37%	41%	50%	45%	40%	34%	40%	41%
North Eastern Scotland	13%	12%	13%	11%	5%	4%	6%	6%	6%	6%
Aberdeen City, Aberd	13%	12%	13%	11%	5%	4%	6%	6%	6%	6%
South Western Scotland	16%	16%	15%	15%	10%	12%	11%	13%	12%	12%
Dumfries & Galloway	11%	11%	11%	11%	9%	13%	10%	12%	11%	11%
E & North Ayrshire M	21%	20%	21%	19%	10%	11%	12%	13%	12%	12%
E & W Dunbartonshire	24%	24%	22%	23%	20%	22%	22%	21%	22%	23%
Glasgow City	38%	38%	38%	38%	13%	13%	13%	25%	13%	13%
Inverclyde, East Ren	23%	23%	20%	19%	11%	15%	14%	16%	14%	14%
North Lanarkshire	18%	19%	19%	17%	9%	12%	11%	12%	11%	11%
South Ayrshire	16%	15%	16%	15%	7%	10%	12%	11%	12%	11%
South Lanarkshire	19%	20%	18%	17%	10%	10%	11%	13%	11%	12%

Table 46 shows the percentage of businesses that experience a significant decrease in payment by region. The highest percentages of businesses with significant decreases occur in the North East and in South Ayrshire, Orkney, Clackmannanshire & Fife, Dumfries & Galloway, East Lothian and Midlothian. There are more businesses that see significant reductions under the LFA scenarios.

Table 46: Change in payment by region - percentage of businesses with significant reduction

Change - Significant Reductions (% businesses)	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	28%	27%	29%	37%	57%	57%	36%	29%	35%	44%
Angus & Dundee City	32%	29%	32%	47%	70%	71%	38%	27%	38%	51%
Borders	31%	29%	32%	36%	54%	50%	40%	33%	40%	45%
City of Edinburgh	39%	41%	39%	53%	73%	71%	47%	37%	47%	57%
Clackmannanshire & F	35%	32%	36%	49%	68%	69%	37%	30%	37%	51%
East & Midlothian	34%	29%	36%	50%	67%	68%	40%	28%	40%	54%
Falkirk	19%	17%	20%	29%	52%	53%	39%	33%	39%	44%
Perth & Kinross and	21%	23%	21%	28%	48%	48%	28%	26%	28%	34%
West Lothian	27%	28%	27%	32%	49%	55%	37%	36%	37%	40%
Highlands & Islands	14%	19%	14%	13%	16%	18%	24%	27%	24%	22%
Caithness & Sutherla	9%	15%	9%	11%	22%	25%	27%	31%	28%	27%
Inverness & Nairn an	11%	15%	11%	13%	28%	30%	34%	33%	34%	34%
Lochaber, Skye & Loc	15%	18%	15%	11%	11%	11%	21%	23%	21%	19%
Orkney Islands	31%	30%	31%	34%	52%	53%	62%	62%	62%	61%
Shetland Islands	22%	26%	19%	14%	3%	7%	14%	18%	13%	12%
Western Isles	10%	17%	11%	9%	4%	7%	10%	15%	10%	9%
North Eastern Scotland	34%	34%	34%	44%	63%	66%	56%	53%	56%	58%
Aberdeen City, Aberd	34%	34%	34%	44%	63%	66%	56%	53%	56%	58%
South Western Scotland	36%	34%	36%	38%	53%	52%	49%	47%	49%	49%
Dumfries & Galloway	44%	42%	45%	45%	56%	51%	52%	50%	52%	52%
E & North Ayrshire M	28%	28%	29%	34%	52%	55%	48%	46%	48%	48%
E & W Dunbartonshire	22%	25%	23%	26%	39%	41%	35%	36%	35%	34%
Glasgow City	13%	13%	13%	25%	38%	38%	25%	25%	25%	25%
Inverclyde, East Ren	28%	26%	31%	29%	48%	45%	45%	41%	45%	44%
North Lanarkshire	20%	19%	19%	21%	42%	44%	38%	36%	39%	38%
South Ayrshire	33%	32%	32%	39%	57%	58%	48%	45%	47%	49%
South Lanarkshire	28%	25%	28%	32%	53%	54%	51%	51%	51%	51%

5.5 Total Payment

Table 47 shows the total payment by farm type for the baseline and each scenario. In the baseline and in all scenarios Cattle and sheep (LFA) farms receive the largest payment. In the scenarios the cases where farm type is missing receives the next largest payout. This is due to the strategy adopted to give a ‘worst case scenario for payments’ which gives higher rates of payments to this land. The payments for this category are therefore an upper bound for payments to farms in this category. Conversely, the payments for the other farm types could be lower estimates since some of the payment to the category where farm type is missing will in reality be redistributed amongst the farm types. The LCA and LFA interim report scenarios produce broadly similar results by farm type. Some of the differences occur for the Mixed farm type which gets a larger share in the LCA scenarios (9.9% in LCA-S1 and 10.7% in LCA-S1.sr) and Dairy which also gets a larger share in the LCA scenarios (6.3% in LCA-S1 and 7% in LCA-S1.sr).

Table 47: Total payment by farm type

Total Payment (Millions)	Baseline	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	257.3 €	258.2 €	256.1 €	257.8 €	281.1 €	339.5 €	393.5 €	275.6 €	257.2 €	275.9 €	290.0 €
Cattle and sheep (Lowland)	21.0 €	14.1 €	15.4 €	14.1 €	12.6 €	7.3 €	5.9 €	12.2 €	14.4 €	12.2 €	11.2 €
Cereals	96.6 €	73.2 €	70.6 €	73.1 €	65.7 €	39.4 €	28.2 €	63.4 €	65.0 €	63.4 €	58.3 €
Dairy	64.3 €	40.8 €	45.2 €	40.0 €	36.9 €	21.2 €	19.0 €	26.2 €	31.5 €	26.3 €	25.6 €
General Cropping	81.0 €	67.1 €	68.1 €	67.2 €	61.2 €	38.5 €	30.4 €	65.4 €	69.1 €	65.5 €	59.9 €
Horticulture	1.3 €	1.5 €	1.4 €	1.5 €	1.5 €	1.1 €	0.9 €	1.3 €	1.2 €	1.3 €	1.3 €
Mixed	89.4 €	63.6 €	68.8 €	63.6 €	58.2 €	37.1 €	30.3 €	47.9 €	54.5 €	47.9 €	45.9 €
Other	15.2 €	36.1 €	21.3 €	36.7 €	39.0 €	63.7 €	54.4 €	47.5 €	28.6 €	47.1 €	50.1 €
Specialist Pigs	0.5 €	0.5 €	0.5 €	0.5 €	0.5 €	0.4 €	0.5 €	0.5 €	0.5 €	0.5 €	0.5 €
Specialist Poultry	1.5 €	2.2 €	1.7 €	2.2 €	2.1 €	1.7 €	2.1 €	1.9 €	1.7 €	1.9 €	1.9 €
Farm type missing	19.7 €	88.1 €	96.2 €	88.8 €	86.8 €	95.6 €	80.4 €	103.3 €	121.5 €	103.2 €	100.8 €
Grand Total	647.7 €	645.5 €	645.5 €	645.5 €	645.5 €	645.5 €	645.5 €	645.2 €	645.2 €	645.2 €	645.3 €

Figure 12 presents the share of payments for each of the farm types. In this form it is clear how the scenarios alter the distribution of payments between farm types. The substantial increases for Cattle and sheep (LFA) for LCA-S4 and LCA-S5 are evident as is the “squeeze” on Cereals, Dairy and General Cropping.

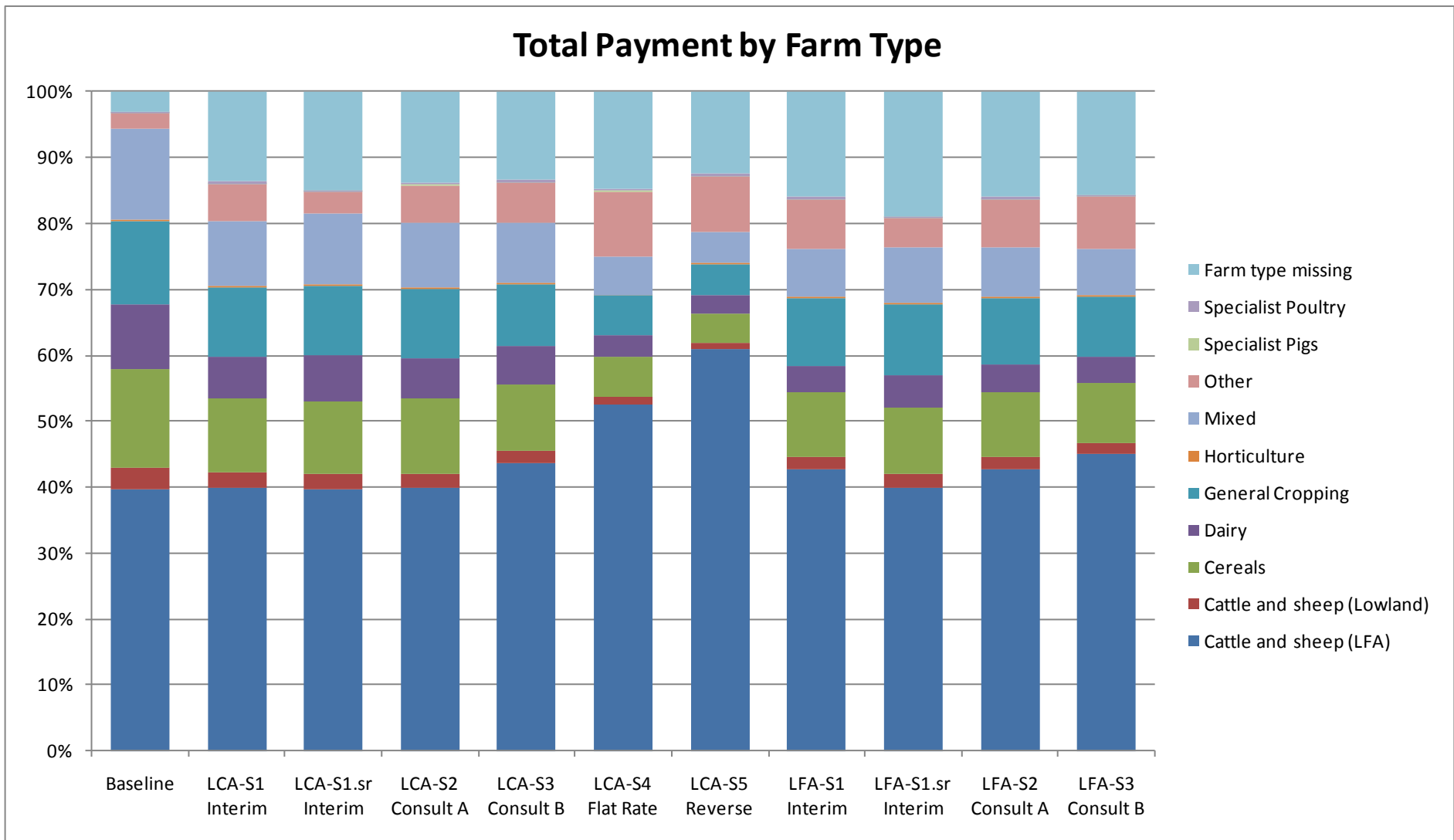


Figure 12: Share of payment by Farm Type

Table 48 shows the total payment by region for the baseline and each scenario. Comparing the baseline with the scenarios shows a movement of payment into the Highlands & Islands region although the stocking rate scenarios LCA-S1.sr and LFA-S1.sr limit this to a degree. When compared with the LCA scenarios, the LFA scenarios tend to favour Eastern Scotland with smaller reductions or, in the case of LFA-S1.sr, a small increase.

Table 48: Total payment by region

Total Payment (Millions)	Baseline	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	221.8 €	190.4 €	195.6 €	189.3 €	185.6 €	154.8 €	173.7 €	214.4 €	224.7 €	215.2 €	205.8 €
Angus & Dundee City	31.4 €	28.0 €	28.6 €	27.9 €	26.3 €	20.1 €	21.0 €	31.5 €	32.2 €	31.6 €	29.5 €
Borders	71.5 €	56.8 €	60.5 €	55.9 €	57.0 €	43.7 €	54.5 €	57.5 €	66.1 €	57.7 €	55.9 €
City of Edinburgh	2.9 €	2.2 €	2.4 €	2.2 €	2.1 €	1.7 €	2.1 €	2.6 €	2.9 €	2.6 €	2.4 €
Clackmannanshire & Fife	30.6 €	22.7 €	23.7 €	22.5 €	20.4 €	12.6 €	10.9 €	23.0 €	25.7 €	23.0 €	20.8 €
East & Midlothian	20.7 €	16.4 €	17.2 €	16.3 €	15.5 €	9.9 €	10.0 €	16.1 €	17.9 €	16.1 €	14.9 €
Falkirk	3.9 €	3.7 €	3.9 €	3.7 €	3.4 €	1.9 €	1.6 €	2.7 €	3.2 €	2.7 €	2.6 €
Perth & Kinross and Stirling	55.2 €	56.0 €	54.4 €	56.3 €	56.5 €	62.2 €	70.7 €	77.1 €	72.3 €	77.5 €	75.9 €
West Lothian	5.7 €	4.6 €	4.9 €	4.6 €	4.4 €	2.8 €	2.9 €	4.0 €	4.4 €	4.0 €	3.8 €
Highlands & Islands	112.6 €	166.6 €	145.2 €	168.7 €	185.8 €	285.4 €	263.3 €	177.8 €	134.7 €	176.2 €	192.2 €
Caithness & Sutherland	33.8 €	58.9 €	47.5 €	61.4 €	68.4 €	95.0 €	74.8 €	61.8 €	40.7 €	60.4 €	66.2 €
Inverness & Nairn and Lochaber, Skye & Lochalsh	20.0 €	33.1 €	30.1 €	34.2 €	35.9 €	46.1 €	41.7 €	31.3 €	24.8 €	30.6 €	33.2 €
Orkney Islands	29.7 €	44.0 €	37.8 €	42.5 €	48.1 €	95.8 €	106.7 €	57.8 €	43.7 €	57.5 €	63.1 €
Shetland Islands	18.6 €	13.9 €	14.7 €	13.8 €	13.4 €	9.5 €	8.9 €	5.3 €	5.9 €	5.5 €	5.9 €
Western Isles	6.4 €	6.5 €	6.5 €	7.0 €	8.6 €	14.2 €	14.2 €	7.9 €	8.3 €	8.1 €	8.7 €
North Eastern Scotland	4.1 €	10.1 €	8.5 €	9.8 €	11.4 €	24.8 €	17.1 €	13.7 €	11.3 €	14.1 €	15.2 €
Aberdeen City, Aberdeen	132.7 €	100.2 €	103.6 €	100.8 €	92.0 €	57.8 €	45.6 €	75.1 €	80.6 €	75.2 €	72.4 €
South Western Scotland	132.7 €	100.2 €	103.6 €	100.8 €	92.0 €	57.8 €	45.6 €	75.1 €	80.6 €	75.2 €	72.4 €
Dumfries & Galloway	176.2 €	126.1 €	133.1 €	124.4 €	124.6 €	97.6 €	126.5 €	110.4 €	125.8 €	111.1 €	111.5 €
E & North Ayrshire	101.1 €	61.8 €	65.2 €	60.5 €	62.6 €	50.9 €	67.3 €	57.0 €	65.3 €	57.3 €	57.6 €
E & W Dunbartonshire & Glasgow City	21.3 €	18.0 €	18.9 €	17.8 €	16.9 €	12.9 €	14.5 €	14.6 €	16.4 €	14.7 €	14.8 €
Inverclyde, East Renfrewshire	5.0 €	4.3 €	4.5 €	4.2 €	4.3 €	4.8 €	8.2 €	5.2 €	5.8 €	5.3 €	5.3 €
North Lanarkshire	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.1 €	0.0 €	0.1 €	0.1 €	0.1 €	0.1 €
South Ayrshire	7.3 €	5.7 €	6.0 €	5.5 €	5.5 €	3.9 €	4.9 €	4.6 €	5.2 €	4.7 €	4.6 €
South Lanarkshire	3.6 €	3.8 €	4.0 €	3.8 €	3.7 €	2.2 €	2.3 €	2.6 €	2.9 €	2.6 €	2.6 €
Regional identifier missing	17.0 €	13.7 €	14.5 €	13.7 €	13.2 €	9.5 €	11.4 €	11.7 €	13.4 €	11.8 €	11.6 €
Grand Total	20.9 €	18.6 €	19.9 €	18.6 €	18.3 €	13.4 €	17.8 €	14.5 €	16.6 €	14.6 €	14.9 €

Figure 13 presents the share of payments for each of the NUTS2 regions. The declining share for South West Scotland is evident as is the increase for Highlands and Islands in the LCA-S4 and LCA-S5 scenarios. It is also worth noting that the LFA-based scenarios maintain the share for Eastern Scotland.

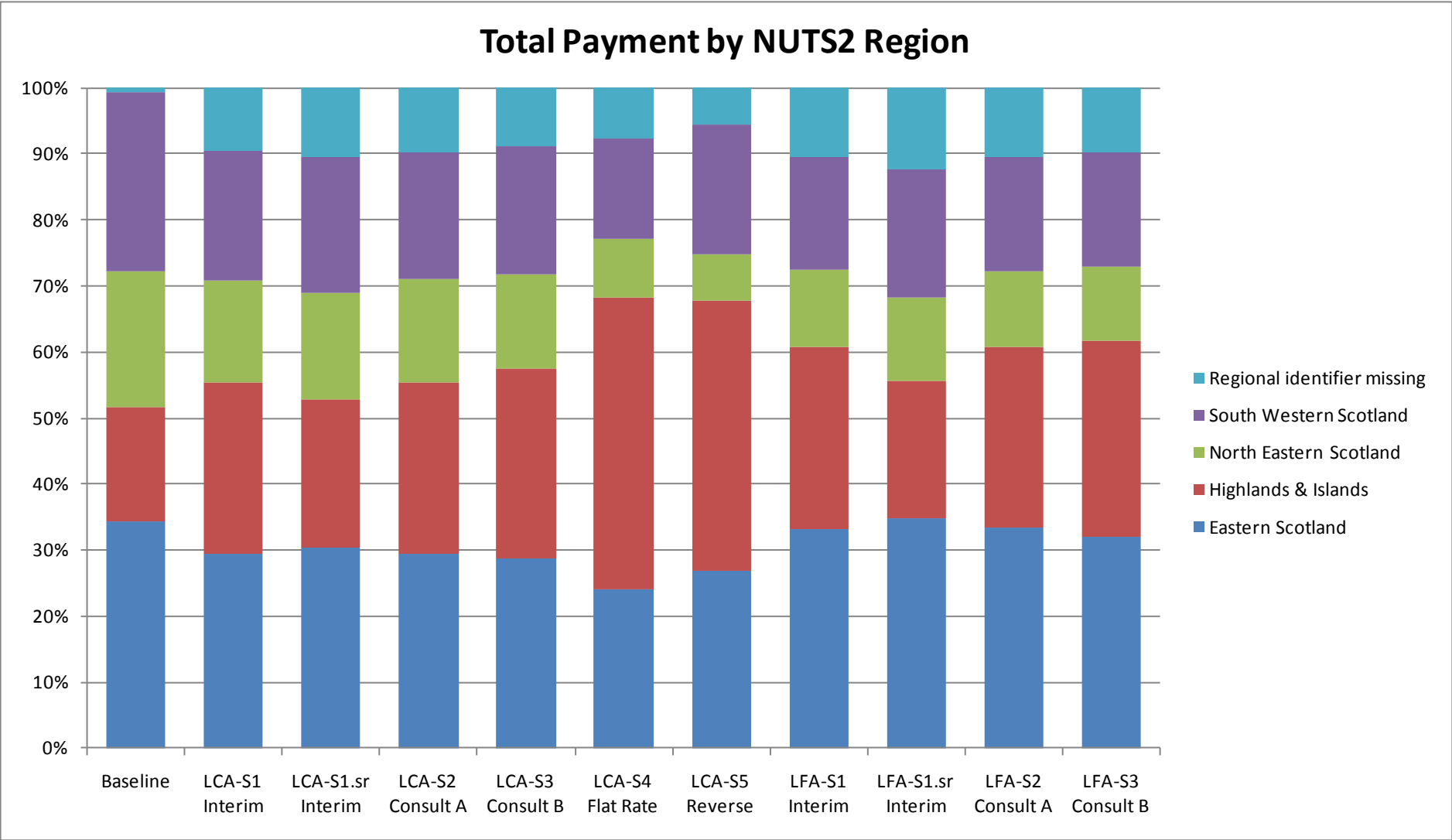


Figure 13: Share of payment by Region

5.6 Distribution of Business Payments

Figure 14 shows a quartile plot for business payments for the baseline and each scenario. It shows that in all cases the lower quartile is increased and the upper quartile decreased; however the size of the change in the upper quartile differs substantially between the scenarios, with LCA-S4, LCA-S5 and LFA scenarios showing the biggest reduction. The median is increased in all cases, ranging from €4,458 to €6,740 in the scenarios. The LFA-based scenarios and the LCA-S4 (Flat Rate) and S5 (Reverse) result in a narrower distribution of payments but this entails more redistribution.

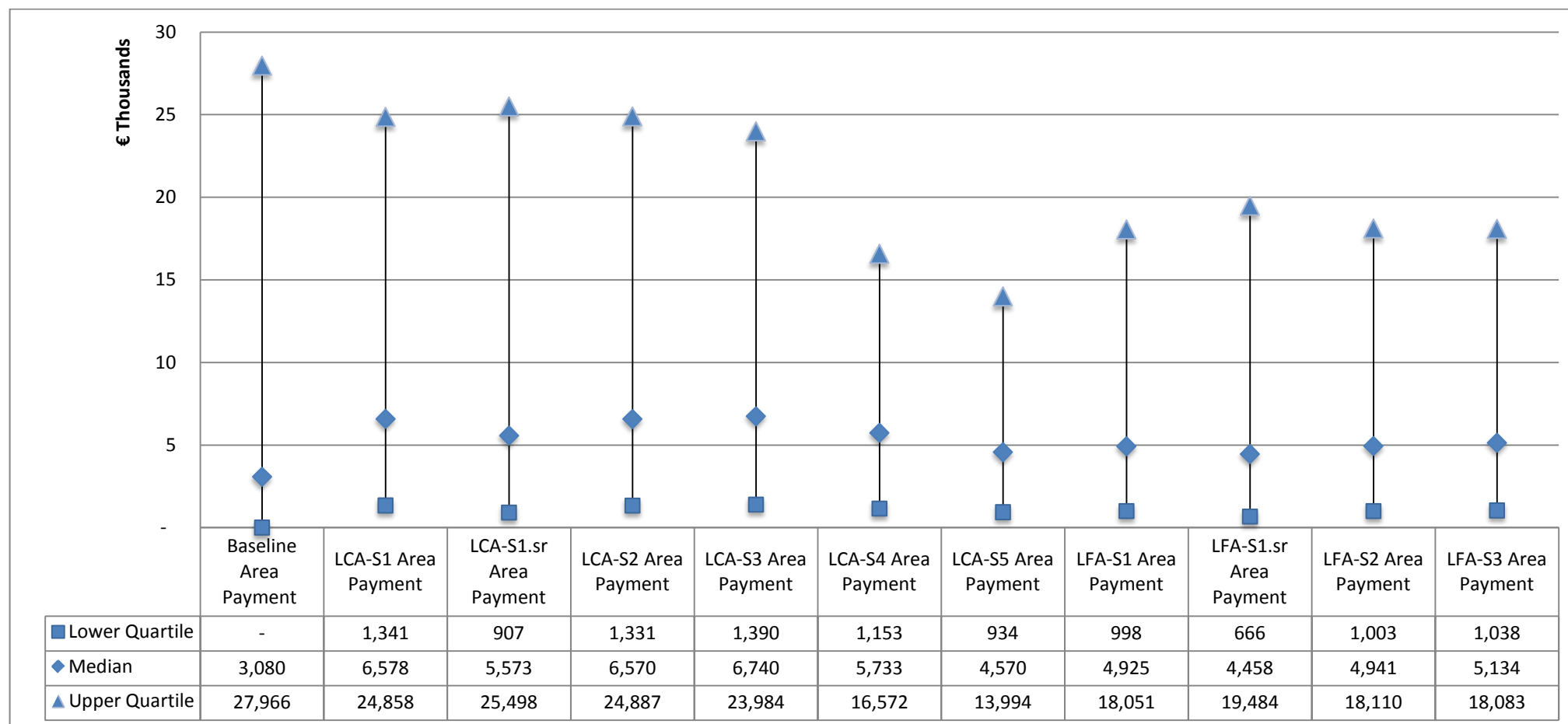


Figure 14: Total business payment - quartile analysis

5.7 Average Business Payment

This section presents average payments to businesses for all the scenarios, which allows for a business level comparison of farm types and regions. It is important to note that the average figures include only the results where individual businesses can be identified – so the estimated new area (from JAC) is excluded. It should also be noted that the baseline and scenario payments are not normally distributed, thus average figures should not be considered in isolation – it is also important to refer to other tables presented in this report.

Table 49 shows the average payment by farm type for the baseline and each scenario. It shows that Dairy, Mixed and General Cropping businesses have the biggest average payment in the baseline. The average Cattle and sheep (LFA) farm will receive around the same or an increased payment in the scenarios while the average business payment for Dairy and Mixed farms will be cut significantly. The main difference between the Interim Report scenarios LCA-S1 and LFA-S1 and their stocking rate equivalents LCA-S1.sr and LFA-S1.sr is in the Dairy, Mixed and Other farm types.

Table 49: Average business payment by farm type

Average Payment	Baseline	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	22,754 €	22,833 €	22,652 €	22,796 €	24,857 €	30,027 €	34,800 €	24,375 €	22,741 €	24,398 €	25,643 €
Cattle and sheep (Lowland)	19,874 €	13,342 €	14,614 €	13,312 €	11,951 €	6,928 €	5,551 €	11,522 €	13,662 €	11,536 €	10,587 €
Cereals	39,718 €	30,108 €	29,045 €	30,077 €	27,017 €	16,198 €	11,586 €	26,057 €	26,733 €	26,062 €	23,971 €
Dairy	52,925 €	33,624 €	37,239 €	32,964 €	30,377 €	17,431 €	15,653 €	21,546 €	25,986 €	21,636 €	21,048 €
General Cropping	49,168 €	40,708 €	41,353 €	40,783 €	37,127 €	23,333 €	18,469 €	39,708 €	41,926 €	39,749 €	36,340 €
Horticulture	4,015 €	4,738 €	4,385 €	4,779 €	4,575 €	3,495 €	2,796 €	4,210 €	3,931 €	4,205 €	4,016 €
Mixed	50,834 €	36,177 €	39,140 €	36,157 €	33,098 €	21,064 €	17,215 €	27,230 €	30,958 €	27,242 €	26,076 €
Other	2,633 €	6,277 €	3,691 €	6,368 €	6,768 €	11,065 €	9,449 €	8,257 €	4,965 €	8,188 €	8,699 €
Specialist Pigs	7,275 €	7,210 €	6,986 €	7,199 €	6,887 €	5,343 €	6,317 €	6,569 €	6,370 €	6,563 €	6,301 €
Specialist Poultry	2,719 €	3,910 €	3,040 €	3,933 €	3,805 €	3,174 €	3,775 €	3,473 €	3,042 €	3,488 €	3,472 €
Farm type missing	7,761 €	11,612 €	12,326 €	11,825 €	12,963 €	20,664 €	19,479 €	16,455 €	18,638 €	16,414 €	17,167 €

Table 50 shows the average payment by region for the baseline and each scenario. Businesses in Eastern Scotland on average have the largest payment in the baseline and this trend follows on into the scenarios. The average Highlands & Islands business receives more under all of the scenarios while the average North Eastern Scotland and South Western Scotland businesses receive less in the scenarios, although the differences vary.

Table 50: Average business payment by region.

Average Payment	Baseline	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	38,058 €	32,656 €	33,550 €	32,479 €	31,843 €	26,557 €	29,801 €	36,778 €	38,555 €	36,922 €	35,303 €
Angus & Dundee City	41,645 €	37,121 €	37,959 €	36,992 €	34,934 €	26,675 €	27,908 €	41,855 €	42,812 €	41,992 €	39,193 €
Borders	46,811 €	37,155 €	39,583 €	36,559 €	37,276 €	28,582 €	35,674 €	37,600 €	43,231 €	37,777 €	36,573 €
City of Edinburgh	59,843 €	45,712 €	48,098 €	45,908 €	43,565 €	33,899 €	42,344 €	52,352 €	60,081 €	52,524 €	49,160 €
Clackmannanshire & Fife	39,374 €	29,197 €	30,502 €	28,994 €	26,292 €	16,193 €	14,108 €	29,664 €	33,166 €	29,676 €	26,769 €
East & Midlothian	46,185 €	36,687 €	38,494 €	36,408 €	34,694 €	22,098 €	22,229 €	35,841 €	39,887 €	35,916 €	33,213 €
Falkirk	20,017 €	18,757 €	20,035 €	18,650 €	17,296 €	9,591 €	8,273 €	13,969 €	16,079 €	14,026 €	13,290 €
Perth & Kinross and Stirling	29,531 €	29,987 €	29,126 €	30,131 €	30,225 €	33,277 €	37,832 €	41,239 €	38,703 €	41,443 €	40,617 €
West Lothian	26,937 €	21,783 €	23,158 €	21,778 €	20,898 €	13,511 €	13,697 €	18,836 €	20,966 €	18,925 €	18,119 €
Highlands & Islands	9,000 €	13,317 €	11,606 €	13,489 €	14,852 €	22,816 €	21,054 €	14,219 €	10,773 €	14,086 €	15,367 €
Caithness & Sutherland	11,225 €	19,571 €	15,783 €	20,408 €	22,720 €	31,566 €	24,827 €	20,527 €	13,533 €	20,074 €	21,992 €
Inverness & Nairn and Lochaber, Skye & Lochalsh	17,990 €	29,771 €	27,099 €	30,780 €	32,314 €	41,494 €	37,526 €	28,147 €	22,314 €	27,566 €	29,846 €
Orkney Islands	10,281 €	15,258 €	13,094 €	14,735 €	16,657 €	33,178 €	36,978 €	20,038 €	15,154 €	19,931 €	21,852 €
Shetland Islands	17,197 €	12,865 €	13,629 €	12,723 €	12,380 €	8,793 €	8,247 €	4,939 €	5,431 €	5,047 €	5,448 €
Western Isles	4,840 €	4,908 €	4,894 €	5,318 €	6,536 €	10,768 €	10,757 €	5,971 €	6,251 €	6,119 €	6,601 €
North Eastern Scotland	1,336 €	3,273 €	2,758 €	3,152 €	3,669 €	7,992 €	5,505 €	4,426 €	3,663 €	4,537 €	4,893 €
Aberdeen City, Aberdeen & Dundee	30,286 €	22,865 €	23,648 €	22,998 €	20,993 €	13,195 €	10,420 €	17,143 €	18,405 €	17,174 €	16,536 €
South Western Scotland	30,286 €	22,865 €	23,648 €	22,998 €	20,993 €	13,195 €	10,420 €	17,143 €	18,405 €	17,174 €	16,536 €
Dumfries & Galloway	31,131 €	22,288 €	23,527 €	21,975 €	22,013 €	17,251 €	22,353 €	19,507 €	22,229 €	19,631 €	19,699 €
E & North Ayrshire Midlothian	38,295 €	23,423 €	24,679 €	22,935 €	23,696 €	19,287 €	25,510 €	21,588 €	24,738 €	21,716 €	21,810 €
E & W Dunbartonshire & Glasgow City	23,307 €	19,693 €	20,757 €	19,503 €	18,561 €	14,159 €	15,952 €	16,041 €	18,025 €	16,151 €	16,222 €
Inverclyde, East Renfrewshire	25,065 €	21,773 €	22,845 €	21,446 €	21,491 €	24,060 €	41,308 €	26,428 €	29,378 €	26,594 €	26,861 €
North Lanarkshire	16,301 €	16,620 €	15,713 €	16,702 €	14,905 €	8,088 €	5,937 €	8,653 €	8,532 €	8,713 €	8,872 €
South Ayrshire	24,635 €	19,370 €	20,432 €	18,496 €	18,678 €	13,275 €	16,480 €	15,639 €	17,646 €	15,741 €	15,668 €
South Lanarkshire	15,117 €	16,081 €	16,889 €	16,067 €	15,513 €	9,220 €	9,797 €	10,879 €	12,210 €	10,946 €	10,875 €
Regional identifier missing	32,376 €	26,158 €	27,600 €	26,218 €	25,246 €	18,087 €	21,723 €	22,367 €	25,552 €	22,502 €	22,141 €
	24,755 €	22,084 €	23,580 €	22,066 €	21,668 €	15,847 €	21,094 €	17,238 €	19,743 €	17,371 €	17,656 €
	16,099 €	13,085 €	11,045 €	12,804 €	13,283 €	24,164 €	19,248 €	21,529 €	18,256 €	21,439 €	22,130 €

5.8 Average Payment per Hectare

Table 51 shows the average payment per hectare by farm type. The second column (Baseline Current) shows substantial variation in the average payment rates per hectare (between €78 for Other and €372 for Cattle and sheep (Lowland) with an overall average of €148.75). It is important to note that in the current baseline the average payment rates per hectare for Cattle and sheep (Lowland) at €372/ha, Dairy at €359/ha, Cereals at €313/ha and Mixed at €305/ha are all above the highest payment rates in the scenarios analysed for this report (excepting payment for the lowest quality land in LCA-S5). The third column (Baseline New area) shows how these rates are reduced if the new (included) area is used to determine payments rates (a range of per hectare values from €22 to €328 and an average of €108.04). That the range of payments per hectare is narrower in the scenarios is driven partly by payment rates but also by the land quality basis of the scenarios rather than activity in the baseline period.

Table 51: Average payment per ha by farm type

Average Payment per ha	Baseline Current	Baseline New area	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Cattle and sheep (LFA)	90 €	82 €	82 €	111 €	82 €	89 €	108 €	125 €	88 €	111 €	88 €	92 €
Cattle and sheep (Lowland)	372 €	310 €	208 €	232 €	208 €	186 €	108 €	87 €	180 €	217 €	180 €	165 €
Cereals	313 €	265 €	201 €	252 €	201 €	180 €	108 €	77 €	174 €	232 €	174 €	160 €
Dairy	359 €	328 €	208 €	231 €	204 €	188 €	108 €	97 €	134 €	161 €	134 €	130 €
General Cropping	274 €	228 €	188 €	237 €	189 €	172 €	108 €	86 €	184 €	240 €	184 €	168 €
Horticulture	185 €	124 €	146 €	212 €	148 €	141 €	108 €	86 €	130 €	190 €	130 €	124 €
Mixed	305 €	261 €	186 €	228 €	185 €	170 €	108 €	88 €	140 €	180 €	140 €	134 €
Other	78 €	26 €	61 €	79 €	62 €	66 €	108 €	92 €	81 €	106 €	80 €	85 €
Specialist Pigs	259 €	147 €	146 €	188 €	146 €	139 €	108 €	128 €	133 €	172 €	133 €	127 €
Specialist Poultry	132 €	93 €	133 €	151 €	134 €	130 €	108 €	128 €	118 €	152 €	119 €	118 €
Farm type missing	125 €	22 €	100 €	114 €	100 €	98 €	108 €	91 €	117 €	144 €	117 €	114 €
Overall Average	149 €	108 €	108 €	141 €	108 €	108 €	108 €	108 €	108 €	141 €	108 €	108 €

Table 52 shows the average payments per hectare by region. Highlands & Islands receive relatively low average per hectare payments in the baseline and across scenarios, and the North East receives the highest average per hectare payment under the LCA based scenarios, although if the payments are based on LFA status then the highest payment is more likely to be in Eastern Scotland. There are some differences within regions, for example Orkney in the Highlands & Islands as well as Perth and Kinross under the LCA scenarios in Eastern Scotland.

Table 52: Average payment per ha by region

Average Payment per ha	Baseline Current	Baseline New area	LCA-S1 Interim	LCA-S1.sr Interim	LCA-S2 Consult A	LCA-S3 Consult B	LCA-S4 Flat Rate	LCA-S5 Reverse	LFA-S1 Interim	LFA-S1.sr Interim	LFA-S2 Consult A	LFA-S3 Consult B
Eastern Scotland	184 €	155 €	133 €	164 €	132 €	130 €	108 €	121 €	150 €	188 €	150 €	144 €
Angus & Dundee City	202 €	169 €	150 €	194 €	150 €	141 €	108 €	113 €	170 €	218 €	170 €	159 €
Borders	206 €	177 €	140 €	158 €	138 €	141 €	108 €	135 €	142 €	172 €	143 €	138 €
City of Edinburgh	231 €	191 €	146 €	162 €	146 €	139 €	108 €	135 €	167 €	202 €	167 €	157 €
Clackmannanshire & Fife	336 €	263 €	195 €	231 €	193 €	175 €	108 €	94 €	198 €	251 €	198 €	179 €
East & Midlothian	248 €	226 €	179 €	210 €	178 €	170 €	108 €	109 €	175 €	218 €	176 €	162 €
Falkirk	275 €	225 €	211 €	238 €	210 €	195 €	108 €	93 €	157 €	191 €	158 €	150 €
Perth & Kinross and Stirling	115 €	96 €	97 €	129 €	98 €	98 €	108 €	123 €	134 €	171 €	135 €	132 €
West Lothian	239 €	215 €	174 €	203 €	174 €	167 €	108 €	110 €	151 €	184 €	151 €	145 €
Highlands & Islands	59 €	43 €	63 €	88 €	64 €	70 €	108 €	100 €	67 €	82 €	67 €	73 €
Caithness & Sutherland	56 €	38 €	67 €	103 €	70 €	78 €	108 €	85 €	70 €	88 €	69 €	75 €
Inverness & Nairn and Badenoch & Strathspey	79 €	47 €	78 €	114 €	80 €	84 €	108 €	98 €	73 €	94 €	72 €	78 €
Lochaber, Skye & Lochalsh	42 €	33 €	50 €	67 €	48 €	54 €	108 €	120 €	65 €	78 €	65 €	71 €
Orkney Islands	237 €	211 €	158 €	183 €	156 €	152 €	108 €	101 €	61 €	73 €	62 €	67 €
Shetland Islands	54 €	49 €	49 €	57 €	53 €	66 €	108 €	108 €	60 €	72 €	61 €	66 €
Western Isles	29 €	18 €	44 €	54 €	43 €	50 €	108 €	74 €	60 €	72 €	61 €	66 €
North Eastern Scotland	300 €	248 €	187 €	224 €	188 €	172 €	108 €	85 €	140 €	175 €	141 €	135 €
Aberdeen City, Aberdeen & Aberdeenshire	300 €	248 €	187 €	224 €	188 €	172 €	108 €	85 €	140 €	175 €	141 €	135 €
South Western Scotland	233 €	195 €	140 €	156 €	138 €	138 €	108 €	140 €	122 €	148 €	123 €	123 €
Dumfries & Galloway	256 €	215 €	131 €	146 €	128 €	133 €	108 €	143 €	121 €	146 €	122 €	122 €
East & North Ayrshire	208 €	178 €	150 €	171 €	149 €	142 €	108 €	122 €	122 €	148 €	123 €	124 €
East & West Dunbartonshire & Glasgow City	134 €	113 €	98 €	112 €	96 €	97 €	108 €	185 €	119 €	144 €	119 €	121 €
Inverclyde, East Renfrewshire & South Ayrshire	294 €	218 €	222 €	265 €	223 €	199 €	108 €	79 €	116 €	144 €	116 €	119 €
North Lanarkshire	240 €	200 €	158 €	179 €	151 €	152 €	108 €	134 €	127 €	154 €	128 €	128 €
South Ayrshire	233 €	177 €	188 €	213 €	188 €	182 €	108 €	115 €	127 €	154 €	128 €	127 €
South Lanarkshire	233 €	193 €	156 €	175 €	157 €	151 €	108 €	130 €	134 €	162 €	134 €	132 €
Regional identifier missing	200 €	169 €	151 €	170 €	150 €	148 €	108 €	144 €	118 €	142 €	118 €	120 €
Overall Average	84 €	10 €	135 €	156 €	135 €	125 €	108 €	79 €	146 €	182 €	146 €	137 €
Overall Average	149 €	108 €	108 €	141 €	108 €	108 €	108 €	108 €	108 €	141 €	108 €	108 €

6 Mapped Results

6.1 Introduction to Mapped Results

Since the IACS field register provides a spatial representation of each land parcel in the form of digitally-mapped field boundaries (or polygons) for every IACS-registered field in Scotland, it is possible to produce maps of the LCA and LFA payment scenarios, and also to produce maps showing changes in payments relative to the baseline. These complement the tables presented in previous sections by giving a detailed spatial illustration of the distribution and redistribution of support under each of the scenarios. This section outlines the methodology used to generate the maps, and then presents maps showing the distribution of payments in the baseline and the scenarios, and the change in payments between the baseline and the scenarios. Supporting maps which assist the interpretation of the results may be found in the additional maps in Appendix E.

6.2 Methodology of Mapping

The maps present payments per hectare for the baseline, scenarios and changes in payments per hectare at field level. The payments are mapped at field level because this is the lowest level of aggregation available (the level at which the effects of scenarios are calculated – Section 1.2). It also has the advantage of minimising the loss of information inherent in grouping field together into higher levels of organisation (e.g. to business level).

Mapping payments at business level would have been desirable as it would provide a direct comparison with results presented in tables in earlier sections of this report. Such mapping is problematic, however, since fields can be used by more than one business. Where multiple claims occur for the same field, then businesses *overlap*. In this overlap area there are, in effect, two or more business level effects that would need to be mapped. Representing such multiple effects, while possible, is undesirable since it greatly complicates the interpretation of the maps particularly when presenting maps at A4 as required for this report.

The area in which this overlap occurs is not trivial. Figure 15 shows the number of unique business users for every land parcel in IACS according to claims made in 2009. For all land parcels in yellow, only a single user makes a claim whilst for all land parcels in green and blue, more than one user makes a claim. Any unclaimed fields are shaded grey whilst any remaining land outside of the IACS mapped area is shown in white. Any mapping at business level based on land parcels with only a single user would remove a significant area of coverage (1,015,337 ha or 18.69%). Multiple-user issues are discussed in more detail in Appendix A.4.

To allow the generation of change maps (scenario minus baseline) the baseline map needs to be compatible with the per-field mapping of scenarios. This means the baseline payments map also needs to be on a per-field basis. Since the baseline payments are not tied to specific parcels it is necessary to disaggregate the per-business payments across all the fields that make up the business. The simplest disaggregation strategy was used (field payment = total business payment*proportion of the business that the field represents). While simple to implement this “flattened” baseline has some undesirable features (e.g. overestimating payments made to land within a business which had low intensity activity in the reference period and therefore underestimating the change in payment on this land, vice versa for higher intensity land within a business, and an inability to map €1.2million of current payments since the claiming business neither owns, nor rents in, any land) which weaken but do not invalidate the change maps. These issues and their implications for the interpretation of the change maps are discussed in Appendix A.3.

The ability of the maps to retain the fine detail of the mapping generated at the field level is limited by the need to report our findings at A4. The mapping does, however, give an *impression* at the national scale of the current distribution of SFP and the effect of implementing the payment scenarios by comparing the generated scenario payments with the derived baseline. It also gives a picture of what is happening below the level of the NUTS3 regions reported in the tables.

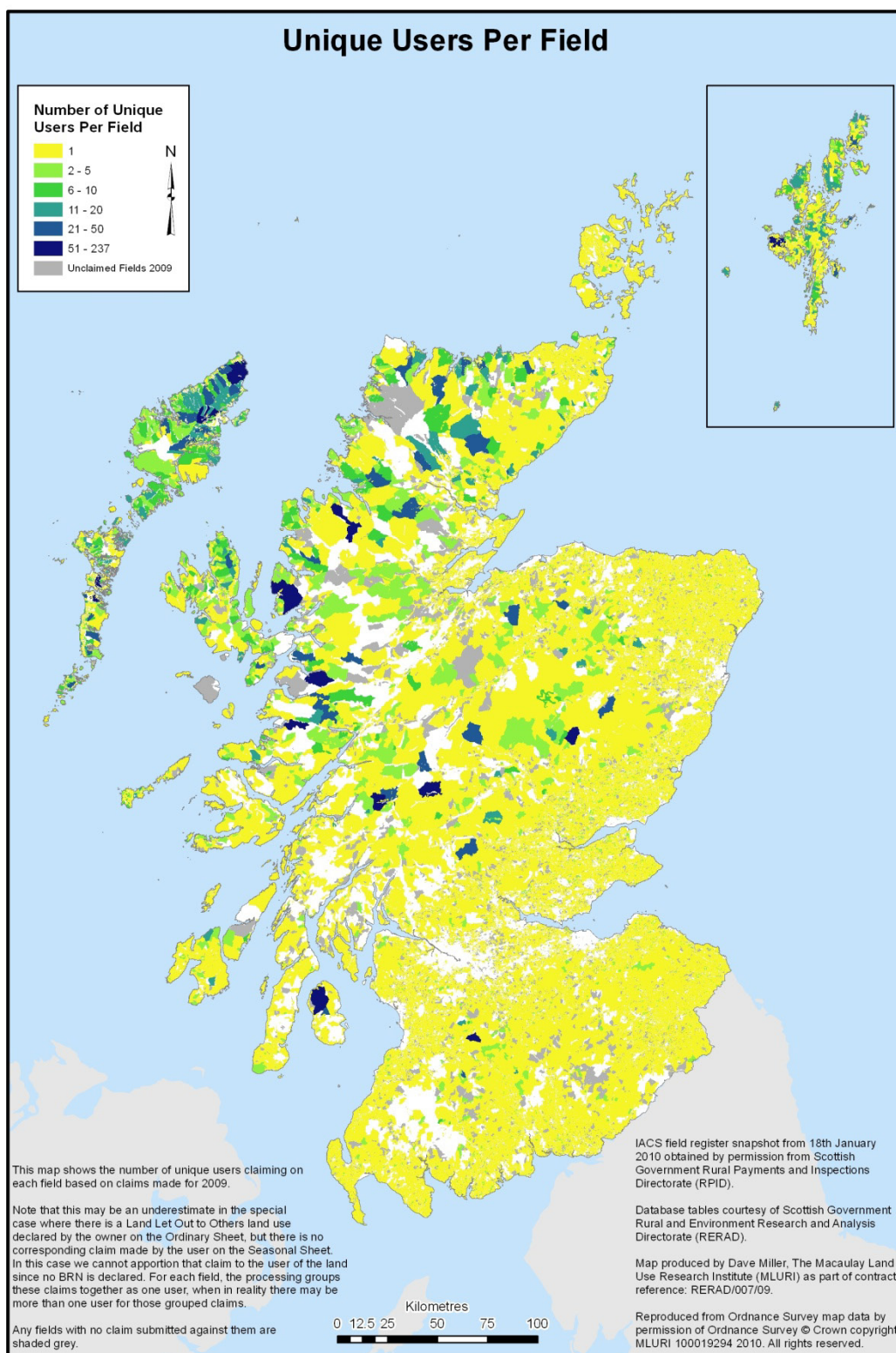


Figure 15: Number of Unique Users per Field

6.3 Map of Current (Baseline) Single Farm Payment

The amount per hectare under the current Single Farm Payment (or Baseline) is derived by distributing business level SFP to the field level. The area for each field is adjusted for ineligible LCA classes and IACS land uses and a payment rate per hectare calculated on all remaining land used or owned by the business.

In the case of multiple claims per polygon, an area-weighted average is applied to generate the payment rate. Figure 16 shows the baseline values in euro per hectare.

The category “Zero current payment or no claim” in black shows those polygons not currently in receipt of SFP, but which may, dependent on land use, qualify under an area-based scheme.

The category “Excluded or unmatched” in grey describes those polygons which are entirely excluded on the basis of ineligible land use.

The general pattern of current payment shows that, on a per hectare basis, more money is concentrated in areas of better quality land (compare with the LCA Map in Figure 2), likely reflecting more intensive use of that land in the reference period for the current scheme, which corresponds with LCA classes 1 to 4.2. There are occasional pockets of darker brown (i.e. higher per hectare payment rates) in areas of poorer quality land (for example in the Highlands). These sometimes refer to land parcels which may be claimed on by multiple claimants (compare with the blue land parcels in Figure 15), or may correspond with businesses which are spread across multiple regions (i.e. a higher SFP for a business based in north east Scotland which also owns a hill farm in the north west) and hence the distributed baseline payment rate reflects the structure of the business, not necessarily that the particular land parcel is actually generating the current SFP. The black areas in the map are those against which no claim is currently being made (and therefore we cannot determine the land use eligibility), or those that belong to a business which is not currently in receipt of single farm payment. These areas are important since, depending on their land use, they may qualify for payment under an area-based scheme – in the modelling work we have assumed the ‘worst budgetary case’ that all of this land qualifies.

Please see the appendix on Baseline Flattening (Appendix A.3) for further discussion on the caveats associated with producing this map.

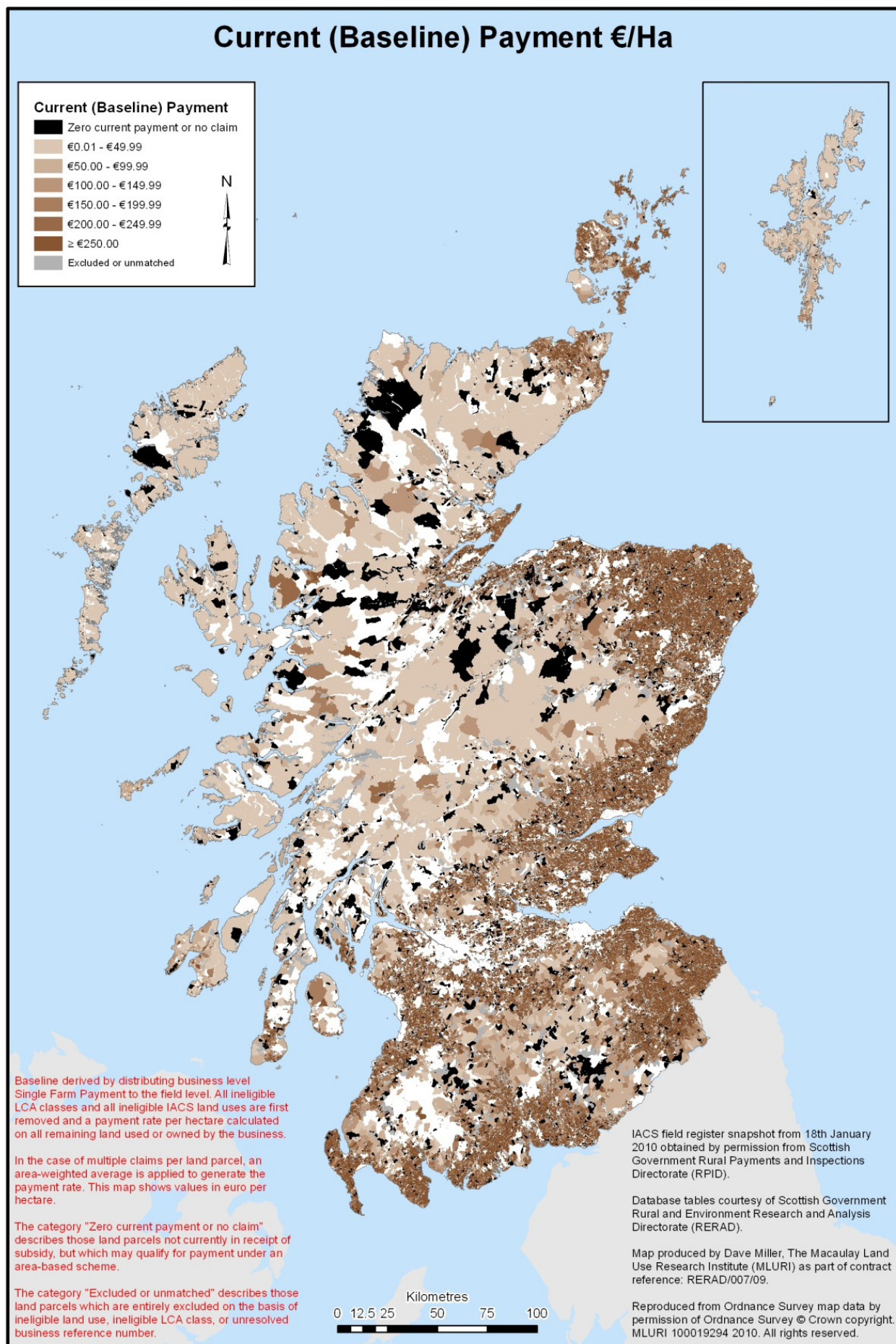


Figure 16: Current (Baseline) Single Farm Payment €/Ha

6.4 Presentation of Scenario Maps

The scenario maps presented in this section all follow a 6-step classification in steps of €50 per hectare in a single colour scheme. This is so that direct comparison may be made between the scenario maps. Since these maps reflect the field-level payments generated by the land parcels as a result of their LCA or LFA mix, the caveats associated with producing the derived baseline do not all apply; however our ability to show the fine detail at this scale remains the same. The lower left corner of each scenario map includes a table with the payment rates in euro per hectare applied to each land class under each scenario. These are colour-coded for ease of reference to the tables in the report.

6.4.1 Map of Area Payment Rate – LCA-S1 (Interim Report)

Figure 17 shows the calculated payment rate per field under the LCA-S1 (Interim Report) payment rates. The table shows those payment rates in euro per hectare. Notice that in areas of better quality land how the pattern closely resembles that displayed in the baseline map, since the higher payment rates are made on the higher quality land. In comparison, the Highlands are much more uniform in their payment than in the baseline. One important difference is the absence of black in this map (and in all scenario maps) when compared to the baseline map. This is due to the fact the all unclaimed land is considered to be included in the analysis.

6.4.2 Map of Area Payment Rate – LCA-S2 (Consultation A)

Figure 18 shows the calculated payment rate per field under the LCA-S2 (Consultation A) payment rates. The table shows those payment rates in euro per hectare. This is very similar to the LCA-S1 scenario since the payment rates are the same for all but three of the thirteen LCA classes. The difference comes only in Class 5 land where all three divisions of this class are paid the same €102.81 per hectare whilst in LCA-S1 Class 5.1 received €246.84 per hectare whilst Classes 5.2 and 5.3 received €85.44 per hectare. Consequently any differences between LCA-S2 and LCA-S1 reflect the pattern of Class 5 land.

6.4.3 Map of Area Payment Rate – LCA-S3 (Consultation B)

Figure 19 shows the calculated payment rate per field under the LCA-Scenario 3 (Consultation B) payment rates. The table shows those payment rates in euro per hectare. Since the payment rates are more even between classes 1 to 4 and across all divisions of class 5, a more even distribution of darker greens is seen across the map. This has the effect of moving more money ‘upslope’ than scenarios LCA-S1 and LCA-S2 since a greater proportion of the pot of money is allocated to class 5 land.

6.4.4 Map of Area Payment Rate – LCA-S4 (Flat Rate)

Figure 20 shows the calculated payment rate per field under the LCA-Scenario 4 (Flat Rate) payment rates. The table shows the payment rate in euro per hectare. As would be expected, the colour is uniform across the whole country given that each land parcel is allocated the same payment rate.

6.4.5 Map of Area Payment Rate – LCA-S5 (Reverse)

Figure 21 shows the calculated payment rate per field under the LCA-Scenario 5 (Reverse) payment rates. The table shows those payment rates in euro per hectare. This scenario produces a radically different pattern across the

country due to the higher payments for land classes 5 and 6. The effect is to highlight areas of 6.1 and 6.2 land since these classes attract the highest payment rates, reversing the patterns seen in previous mapping.

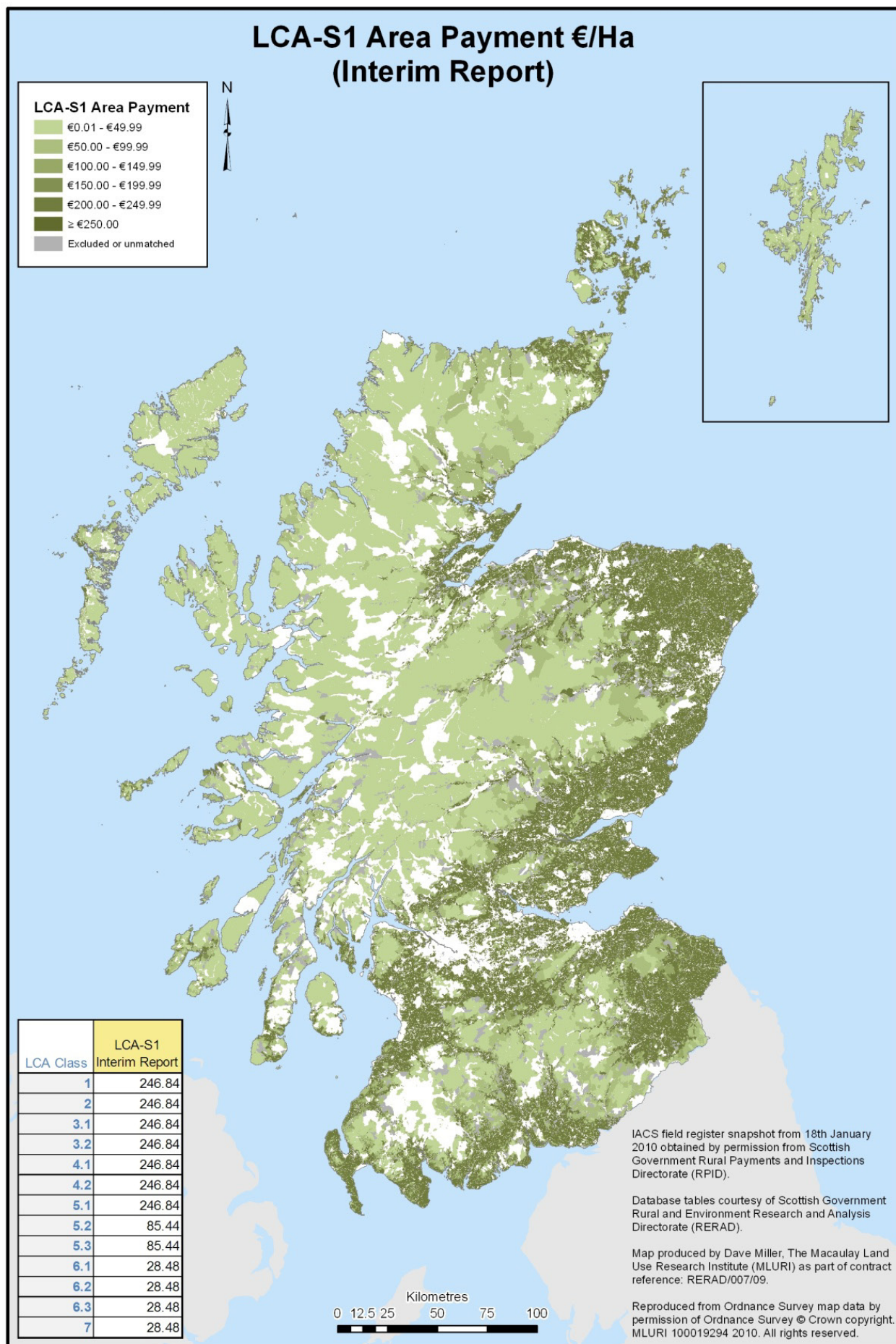


Figure 17: LCA-S1 Area Payment €/Ha (Interim Report)

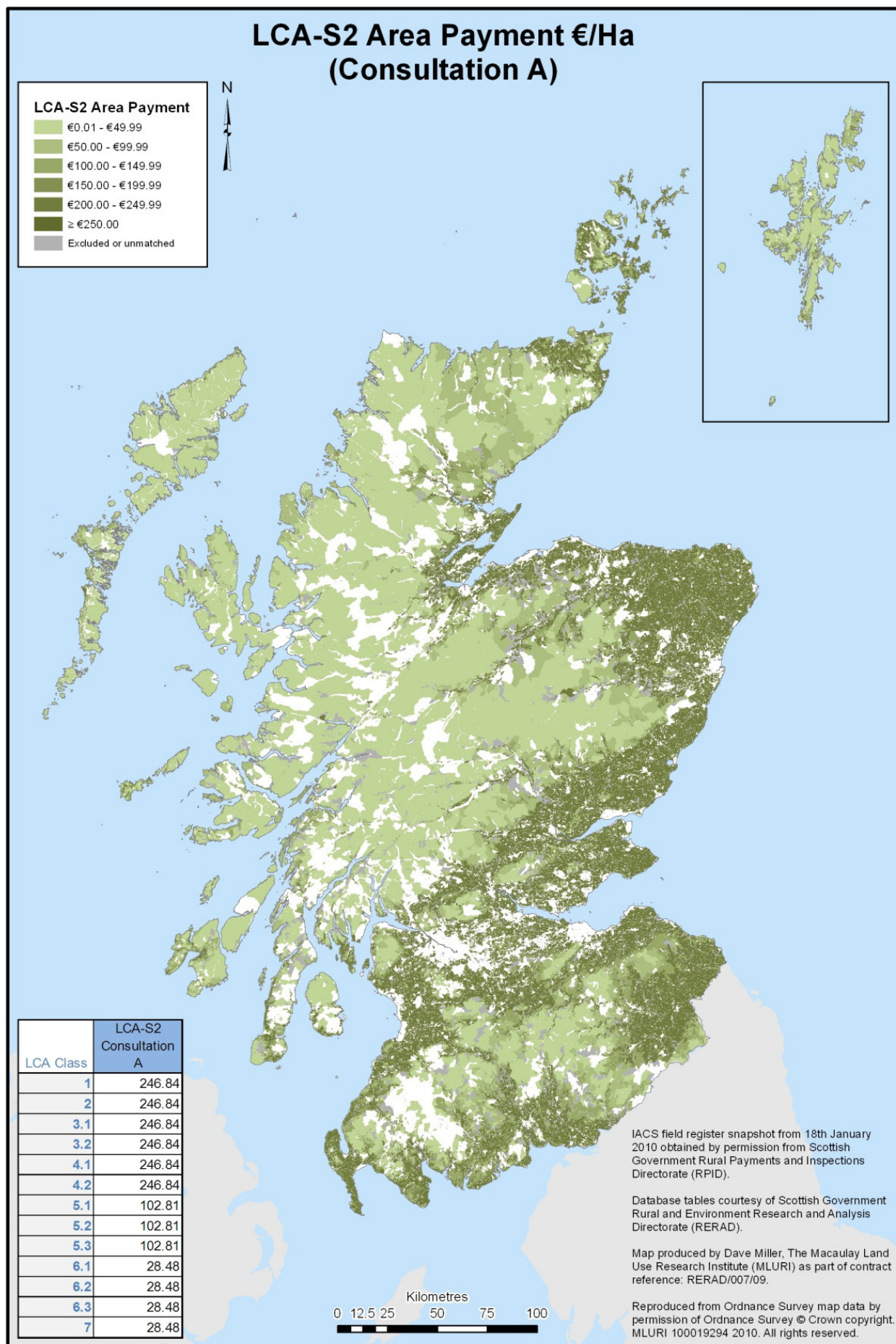


Figure 18: LCA-S2 Area Payment €/Ha (Consultation A)

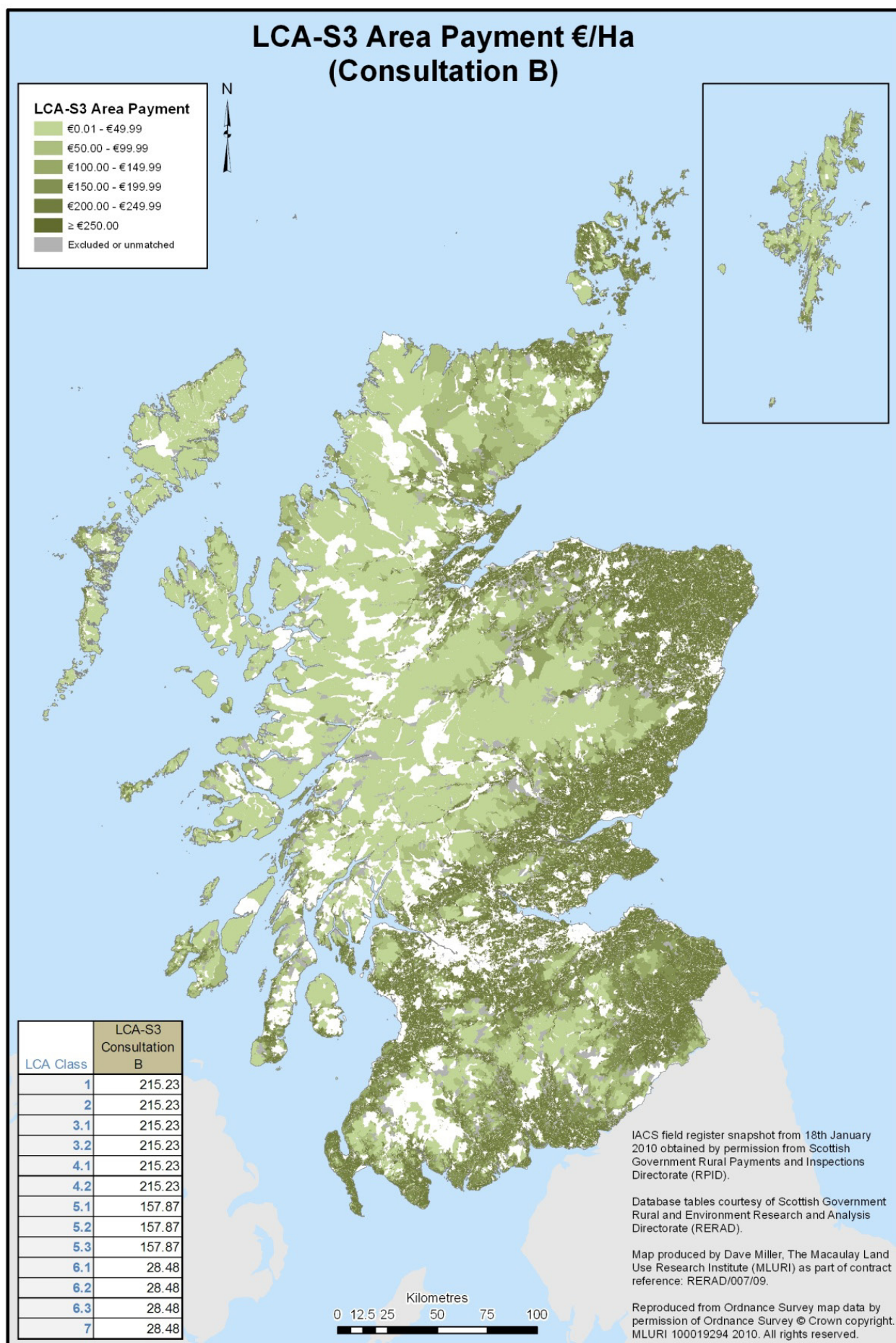


Figure 19: LCA-S3 Area Payment €/Ha (Consultation B)

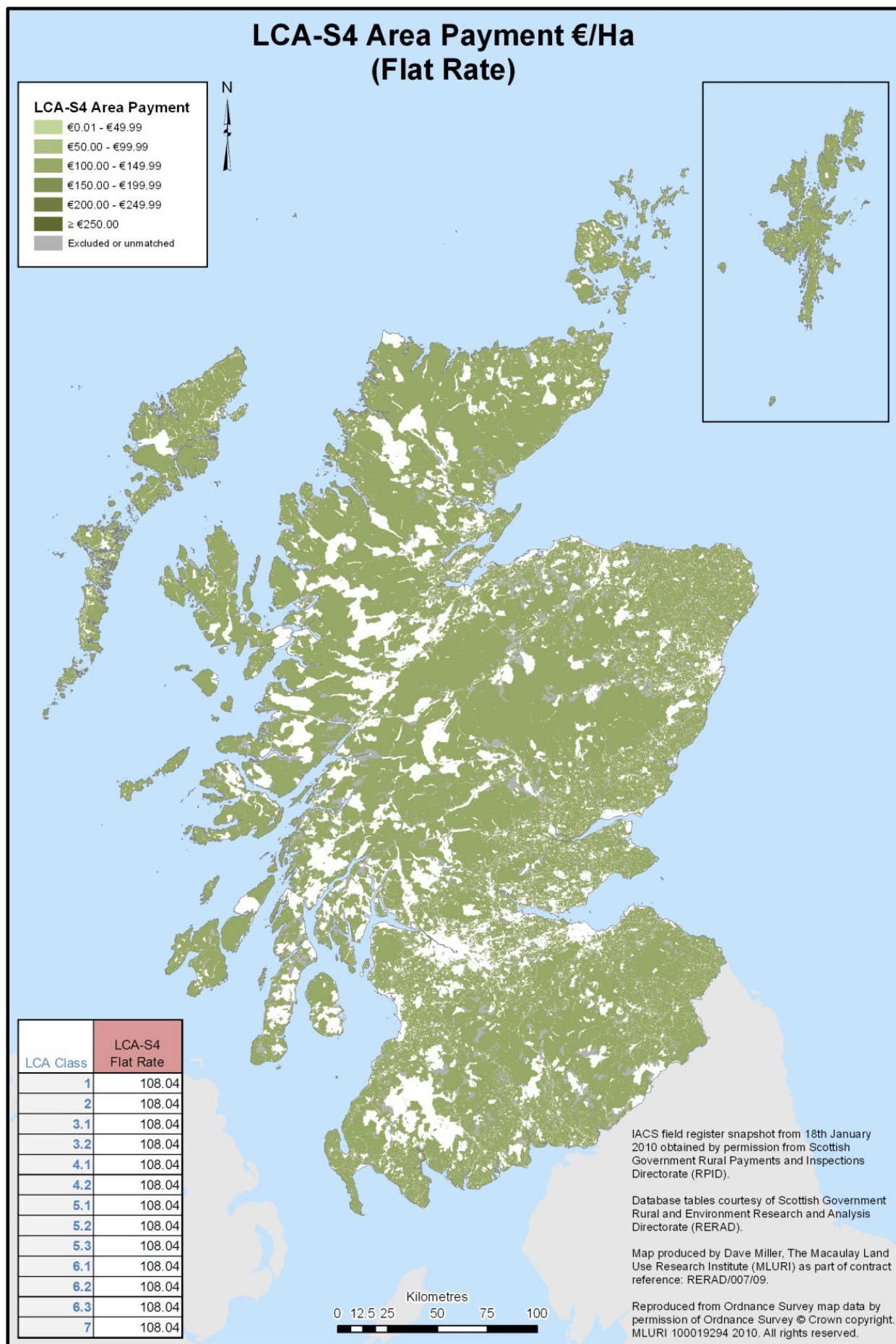


Figure 20: LCA-S4 Area Payment €/Ha (Flat Rate)

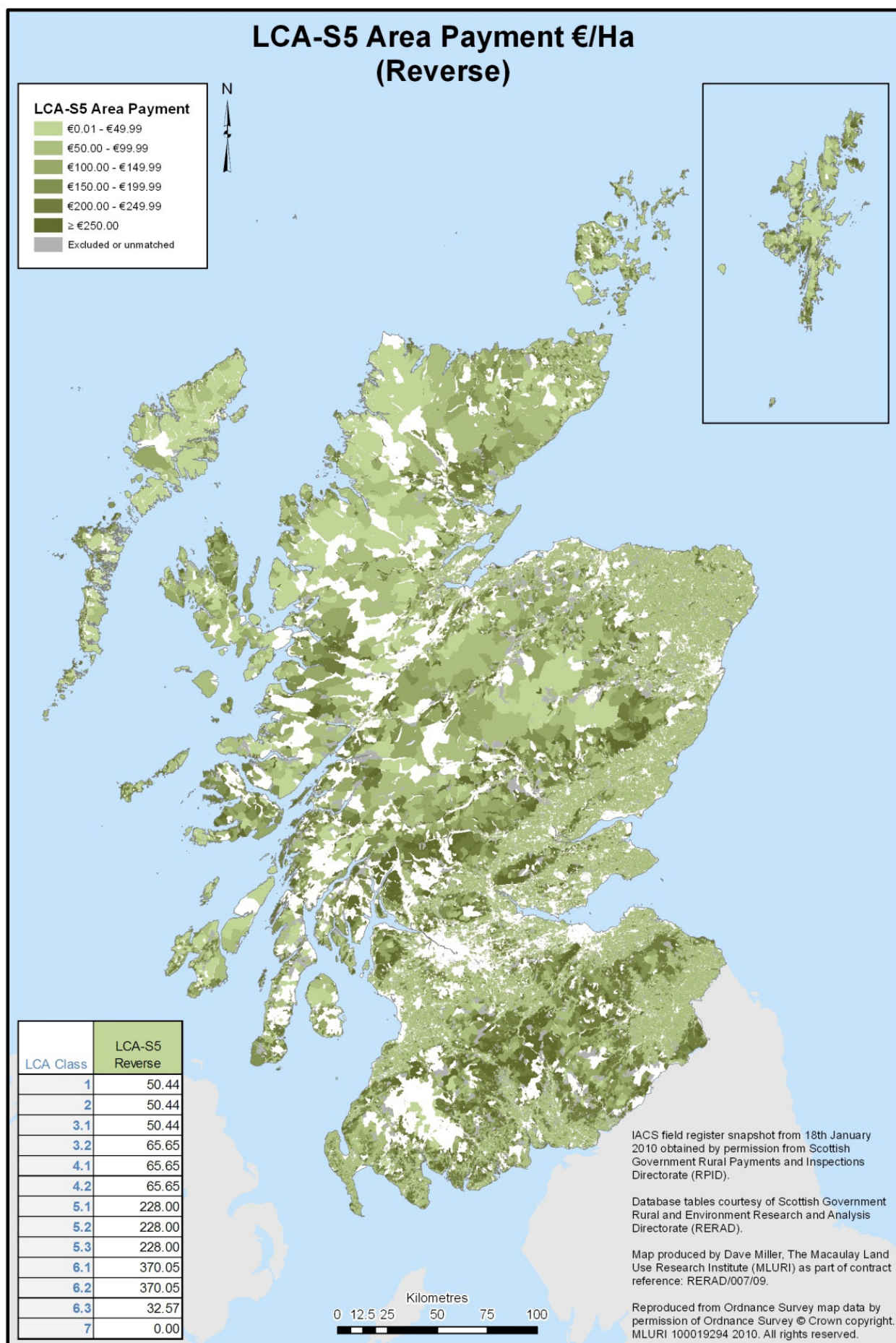


Figure 21: LCA-S5 Area Payment €/Ha (Reverse)

6.4.6 Map of Area Payment Rate – LFA-S1 (Interim Report)

Figure 22 shows the calculated payment rate (euro per hectare) per field under the LFA-S1 (Interim Report) payment rates. The much simpler basis of the LFA map in comparison to the LCA map yields a markedly different pattern of payment rates. Since there are only four classes (based on fragility) and four payment rates the effect is simply a recode of the LFA map seen in Figure 4 since very few fields cross the fragility boundaries and hence there is very little mixing of payment rates within field boundaries.

6.4.7 Map of Area Payment Rate – LFA-S2 (Consultation A)

Figure 23 shows the calculated payment rate per field under the LFA-S2 (Consultation A) payment rates. Since the payment rates in each of the four categories are virtually identical to those in LFA-S1, the map is identical since the payment rates per land parcel never cross the €50 per hectare class boundaries which are represented and also because there is very little mixing of payment rates within field boundaries.

6.4.8 Map of Area Payment Rate – LFA-S3 (Consultation B)

Figure 24 shows the calculated payment rate per field under the LFA-S3 (Consultation B) payment rates. The table shows those payment rates in euro per hectare. Although the payment rates under each of the four categories change more between LFA-S2 and LFA-S3 than between LFA-S1 and LFA-S2, again the map is the same since the payment rates per land parcel never cross the €50 per hectare class boundaries which are represented and since there is very little mixing of payment rates within a field boundary.

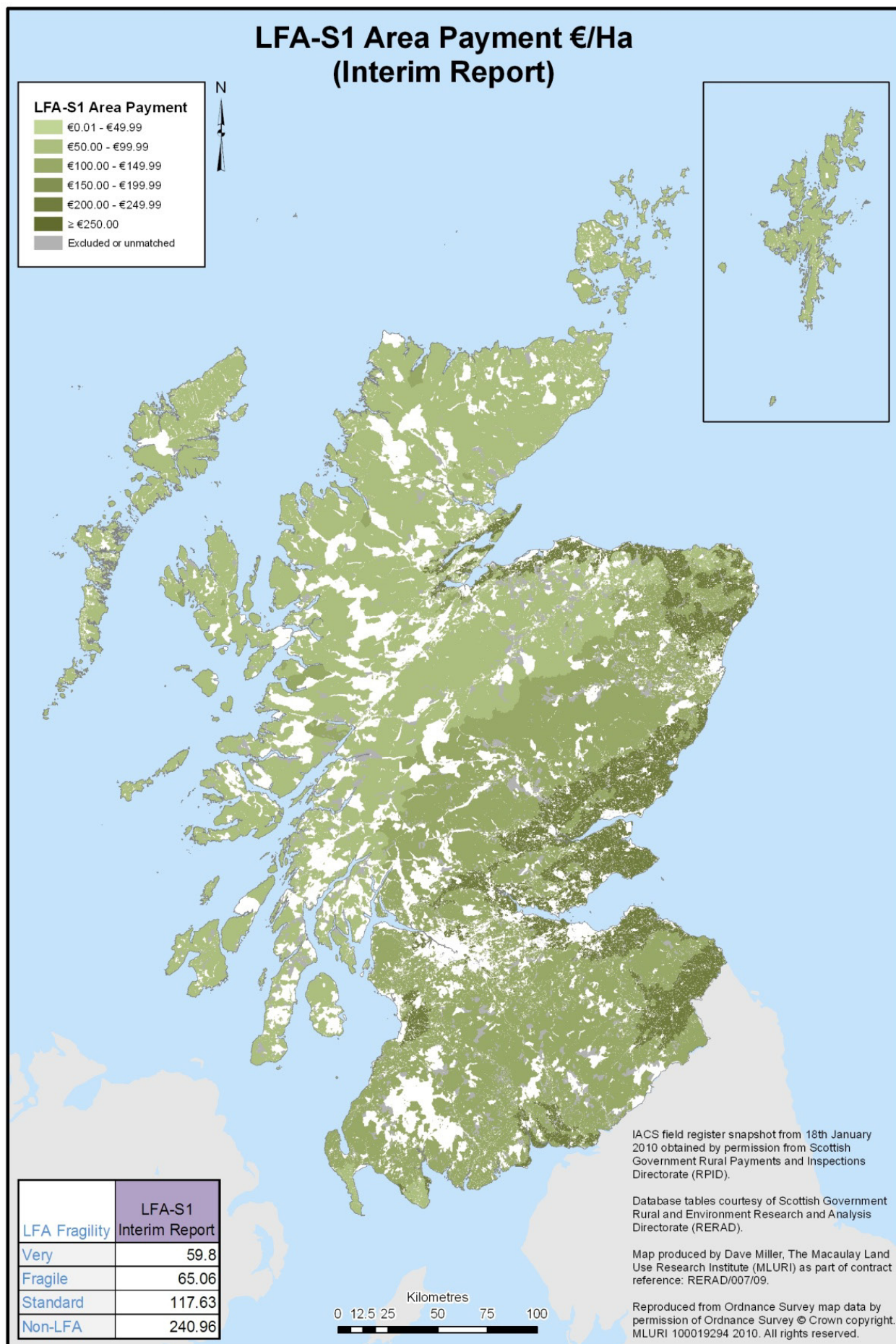


Figure 22: LFA-S1 Area Payment €/Ha (Interim Report)

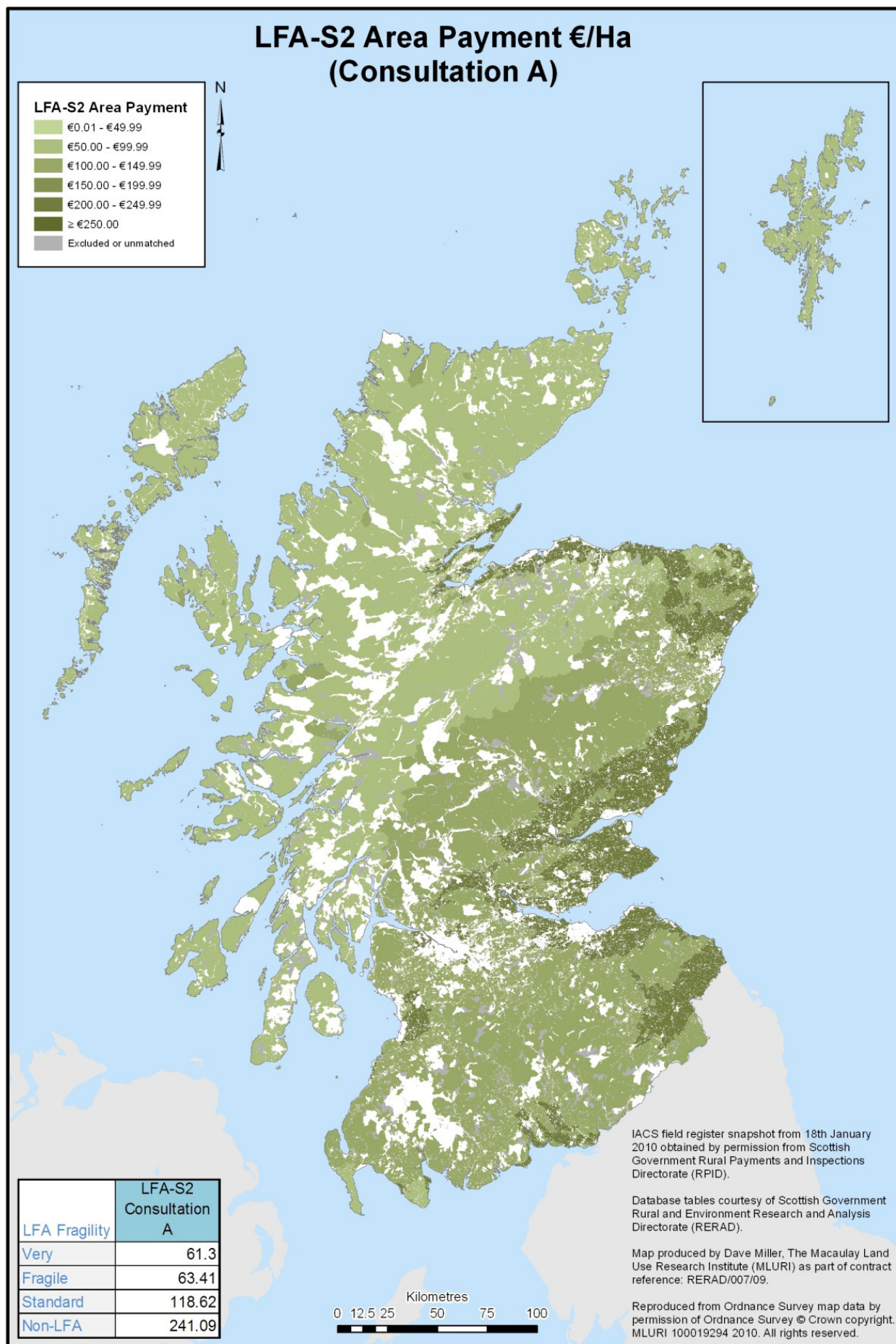


Figure 23: LFA-S2 Area Payment €/Ha (Consultation A)

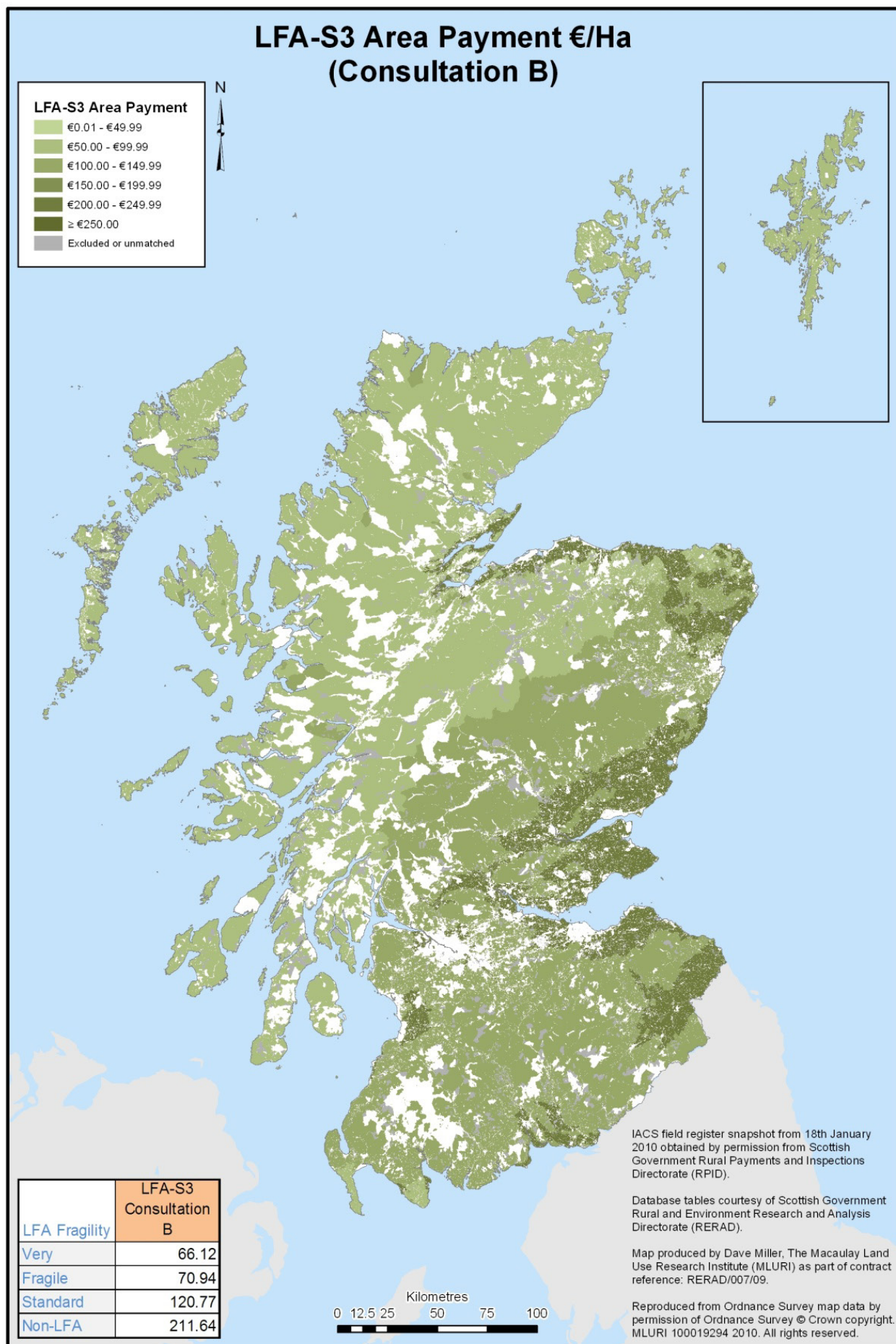


Figure 24: LFA-S3 Area Payment €/Ha (Consultation B)

6.5 Presentation of Change Maps

All the maps presented in this section show the changes in payment rates per hectare between the baseline and scenarios. The maps use a 13-step classification scheme: with a central zero change class ranging from plus to minus €2, six increasing classes and six decreasing classes using €50 per hectare increments. Green values represent a positive change in payments per hectare relative to the baseline, whilst red values indicate a negative change in payment rates per hectare. These represent the calculated per hectare change for each land parcel with respect to the derived baseline. As highlighted previously in this report, caution should be observed when interpreting the change maps since the underlying assumptions which apply to the generation of the baseline map also apply here. The caveats associated with producing the derived baseline and their effect on the maps showing changes in payment rates per hectare are explored in Appendix A.3.

6.5.1 Map of Change in Payment Rate – LCA-S1 (Interim Report)

Figure 25 shows the change in the calculated payment rate per hectare under the LCA-S1 (Interim Report) with reference to the derived baseline. The pattern gives a much more detailed picture of change below the level of the NUTS2 and NUTS3 regions reported in the tables. Table 20 showed the change in payment by region (both NUTS2 and NUTS3) for all scenarios. It showed a redistribution of payments in favour of the Highlands & Islands while North Eastern Scotland, Eastern Scotland and South Western Scotland all showed reductions. This is borne out in the general pattern displayed in the map. In fact for LCA-S1, each of the NUTS3 regions within the Highlands & Islands showed a net increase with the exception of the Orkney Islands. However, as can be seen in the map, the pattern is by no means uniform. In general terms the predominance of reds in the east, the north east and the south west mirror the results from the tables; however there are several land parcels in the Highlands which show a large reduction in their per hectare payment rates. These correspond with those land parcels with a high payment rate in the derived baseline, but which lie on poorer grade land which attracts a lower payment rate under LCA-S1.

6.5.2 Map of Change in Payment Rate – LCA-S2 (Consultation A)

Figure 26 shows the change in the calculated payment rate per field under the LCA-S2 (Consultation A) relative to the derived baseline. Since the payment rates in LCA-S1 and LCA-S2 differ only in their rates of payment to class 5 land while rates of payment to all other land classes remain the same, the pattern of change in payment is largely the same as for LCA-S1. The differences lie only in areas of class 5 land which comprise approximately 17.5% of the total Included area and tend to be focused in the straths and on hill land used for grass production.

6.5.3 Map of Change in Payment Rate – LCA-S3 (Consultation B)

Figure 27 shows the change in the calculated payment rate per field under the LCA-S3 (Consultation B) when compared to the derived baseline. The map shows that whilst the pattern of distribution remains broadly the same as for LCA-S1 and LCA-S2, it is the *intensity* of the changes which differs in that the reductions in the north east and south west are that much greater whilst in the Highlands & Islands the increases are more pronounced.

6.5.4 Map of Change in Payment Rate – LCA-S4 (Flat Rate)

Figure 28 shows the change in the calculated payment rate per field under the LCA-S4 (Flat Rate) relative to the derived baseline. The difference between the flat rate (LCA-S4) and the previous three LCA scenarios is readily apparent. While LCA-S3 can be characterised by an increase in intensity of the same pattern of increases and reductions when compared with LCA-S1 and LCA-S2, LCA-S4 shows a marked increase in the numbers of land parcels

which appear at both ends of the spectrum (that is intense greens and intense reds) showing large differences (both positive and negative) in the per hectare payment rates when compared to the baseline. Overall this has the effect of moving more of the money ‘upslope’ towards the upland areas and away from more intensively managed land. In fact the pattern of change in the higher quality land is much more uniform than in any of the previous three LCA scenarios in that there are a greater number of land parcels which show a reduction. This is corroborated by Table 31 which shows a marked increase in the number of businesses whose payment decreases under LCA-S4 in the east, north east, and south west when compared to LCA-S1, LCA-S2 and LCA-S3.

6.5.5 Map of Change in Payment Rate – LCA-S5 (Reverse)

Figure 29 shows the change in the calculated payment rate per field under the LCA-S5 (Reverse) when compared to the derived baseline. This scenario sees higher payments to the poorer quality land with the exclusion of the most marginal land (land class 7). Since the baseline payments currently favour the higher quality land, the changes in this scenario are the most pronounced of any of the LCA-based scenarios. While the reductions remain in the same areas as for the other LCA scenarios, the highest increases tend to occur more predominantly in the Southern Uplands rather than in the Highlands as with the flat rate LCA-S4 scenario. This occurs since more of the grade 7 land is in the Highlands while the poorest quality land in the south tends to be in the LCA class 6 category with only very small areas of class 7 (see Figure 2).

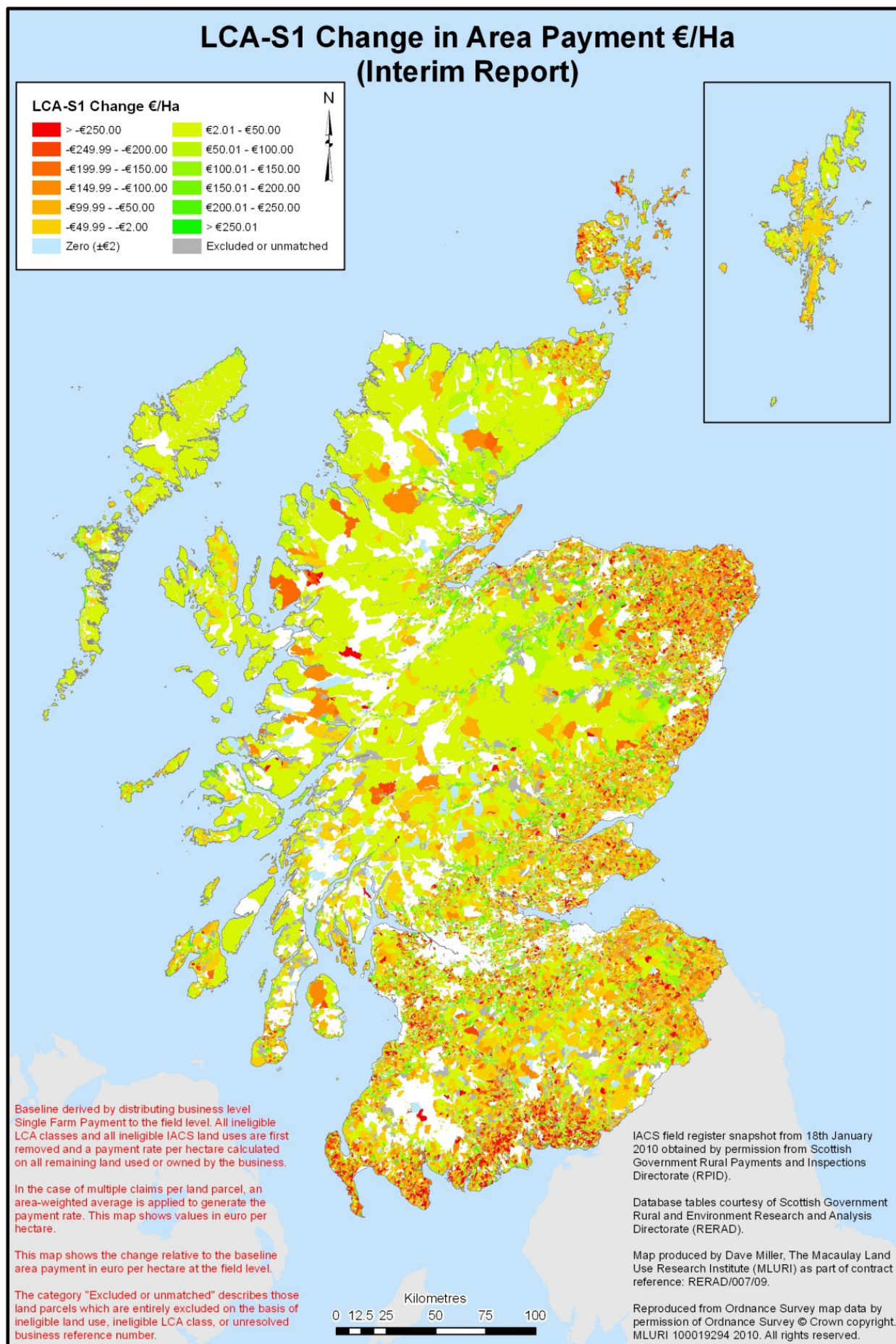


Figure 25: LCA-S1 Change in Payment €/Ha (Interim Report)

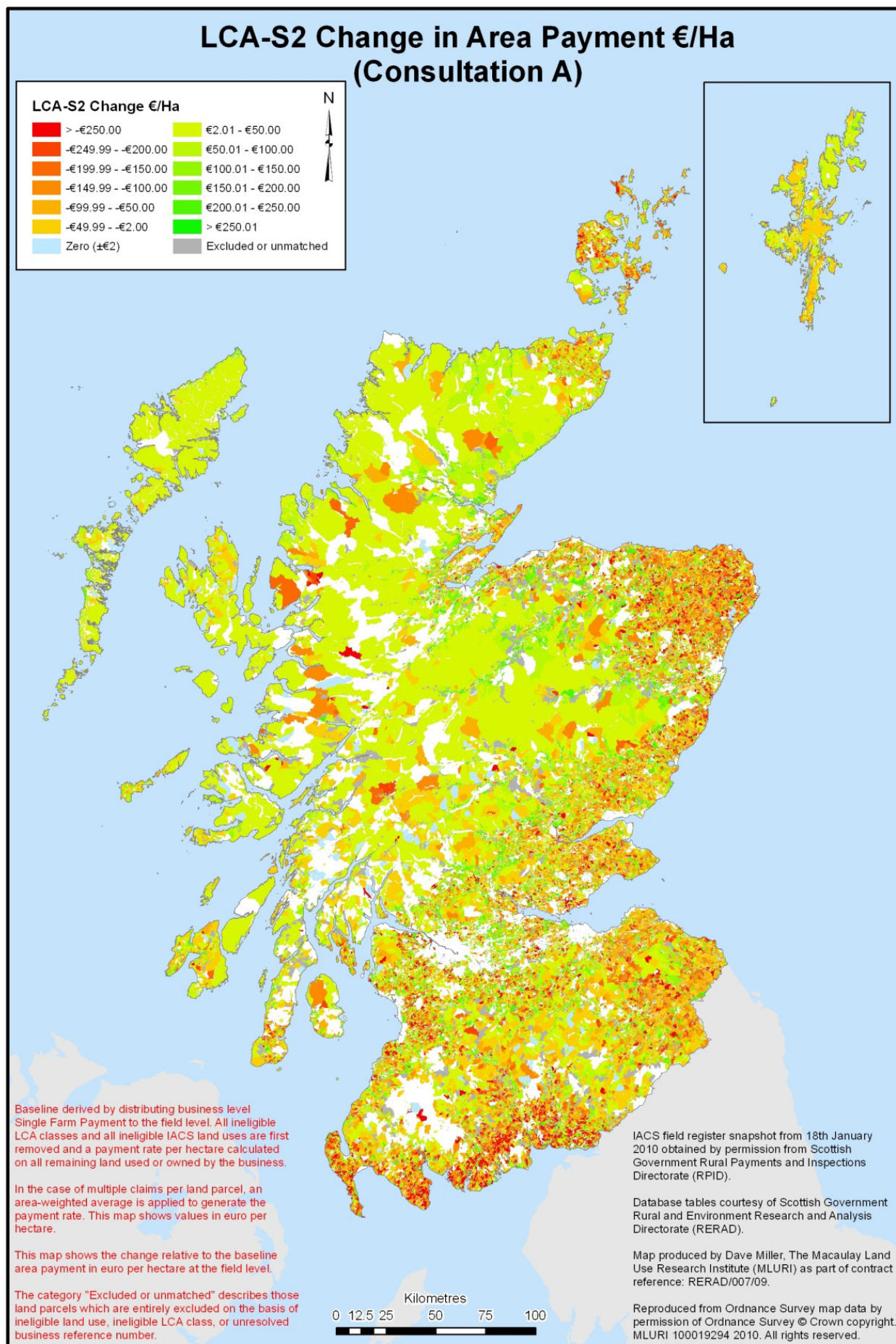


Figure 26: LCA-S2 Change in Payment €/Ha (Consultation A)

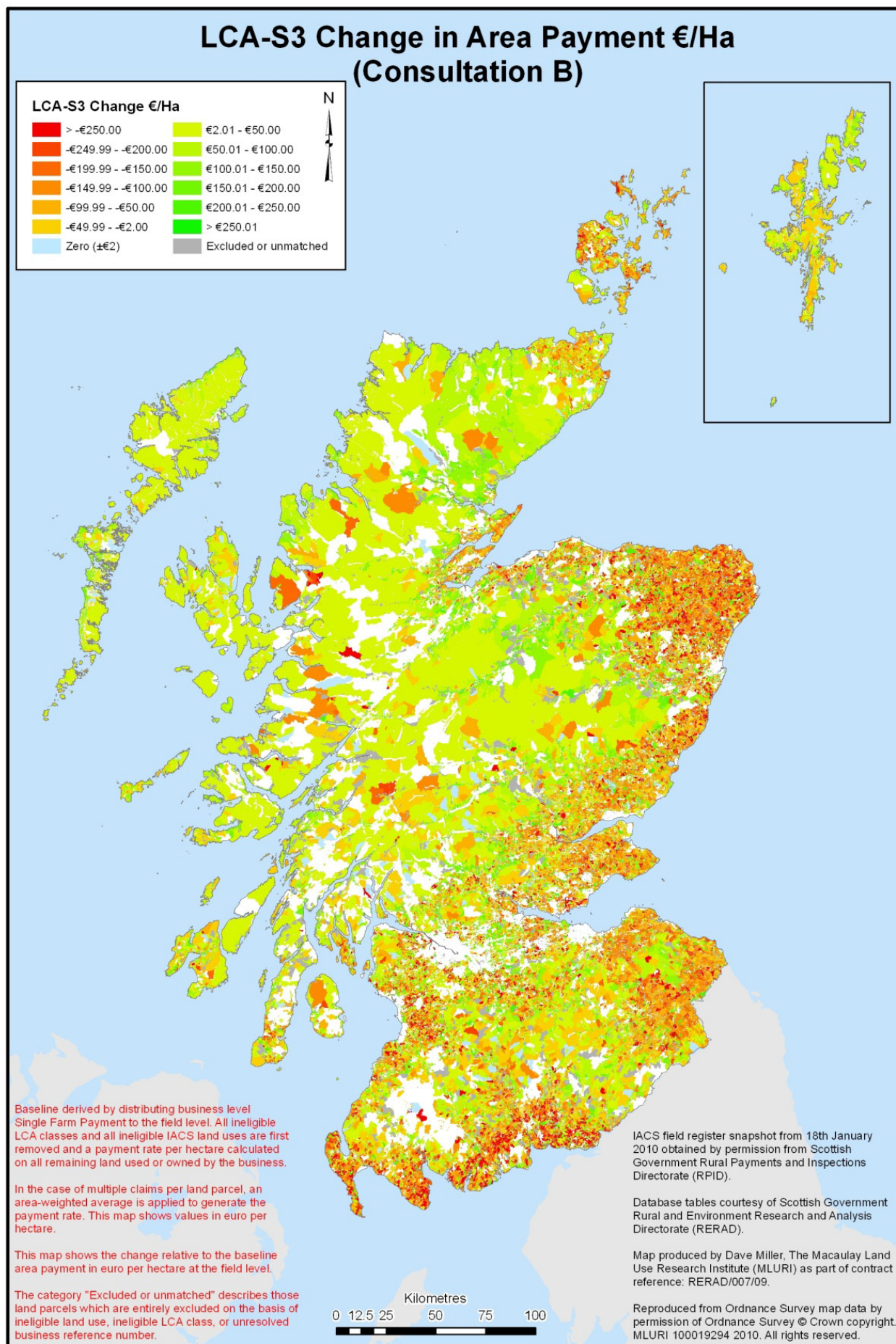


Figure 27: LCA-S3 Change in Payment €/Ha (Consultation B)

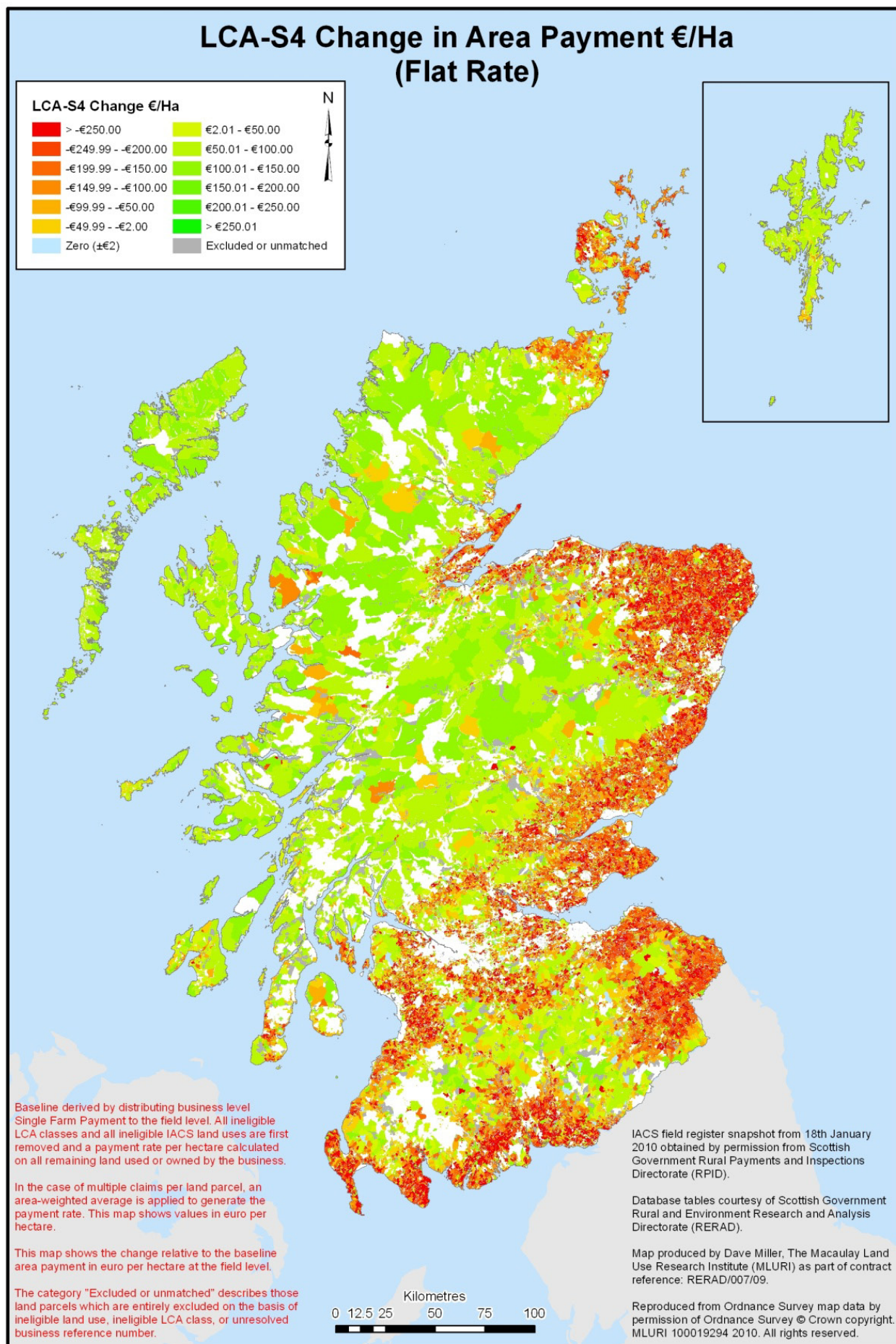


Figure 28: LCA-S4 Change in Payment €/Ha (Flat Rate)

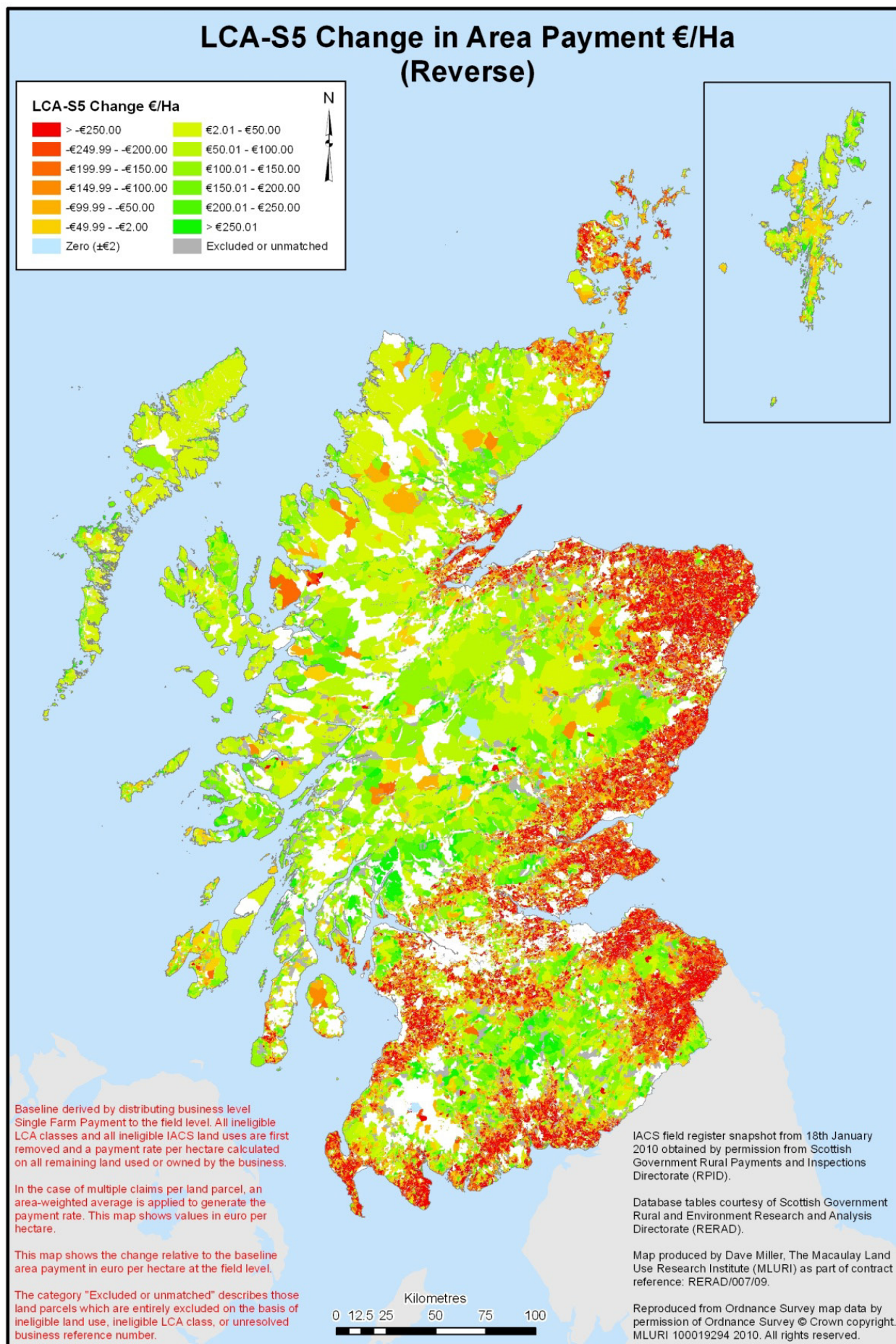


Figure 29: LCA-S5 Change in Payment €/Ha (Reverse)

6.5.6 Map of Change in Payment Rate – LFA-S1 (Interim Report)

Figure 30 shows the change in the calculated payment rate per field under the LFA-S1 (Interim Report) relative to the derived baseline. A broadly similar pattern emerges to the LCA-based scenarios with upland areas tending to see increases whilst lowland areas show reductions. The same pattern of some businesses in the Highlands seeing large reductions also exists here. One important difference between the LFA scenarios and the LCA scenarios is that there is more ‘uniformity’ of increase or reduction in certain areas. For example in the north east, we see more clustering of severe reductions in some localities due to the simpler nature of the regions on which all LFA-scenarios are based.

6.5.7 Map of Change in Payment Rate – LFA-S2 (Consultation A)

Figure 31 shows the change in the calculated payment rate per field under the LFA-S2 (Consultation A) when compared to the derived baseline. As would be expected given the similarity of payment rates between LFA-S1 and LFA-S2, there is little discernable difference between the first two LFA scenarios, with only a very small number of land parcels seeing a change in category, and those that do change only move by one step in the classification.

6.5.8 Map of Change in Payment Rate – LFA-S3 (Consultation B)

Figure 32 shows the change in the calculated payment rate per field under the LFA-S3 (Consultation B) relative to the derived baseline. In all scenarios analysed, the Highlands & Islands region sees a net gain whilst the Orkney Islands see net reductions. Again, the pattern in general terms is more uniform than in the LCA scenarios due to the simpler basis of the LFA map in comparison to the LFA map.

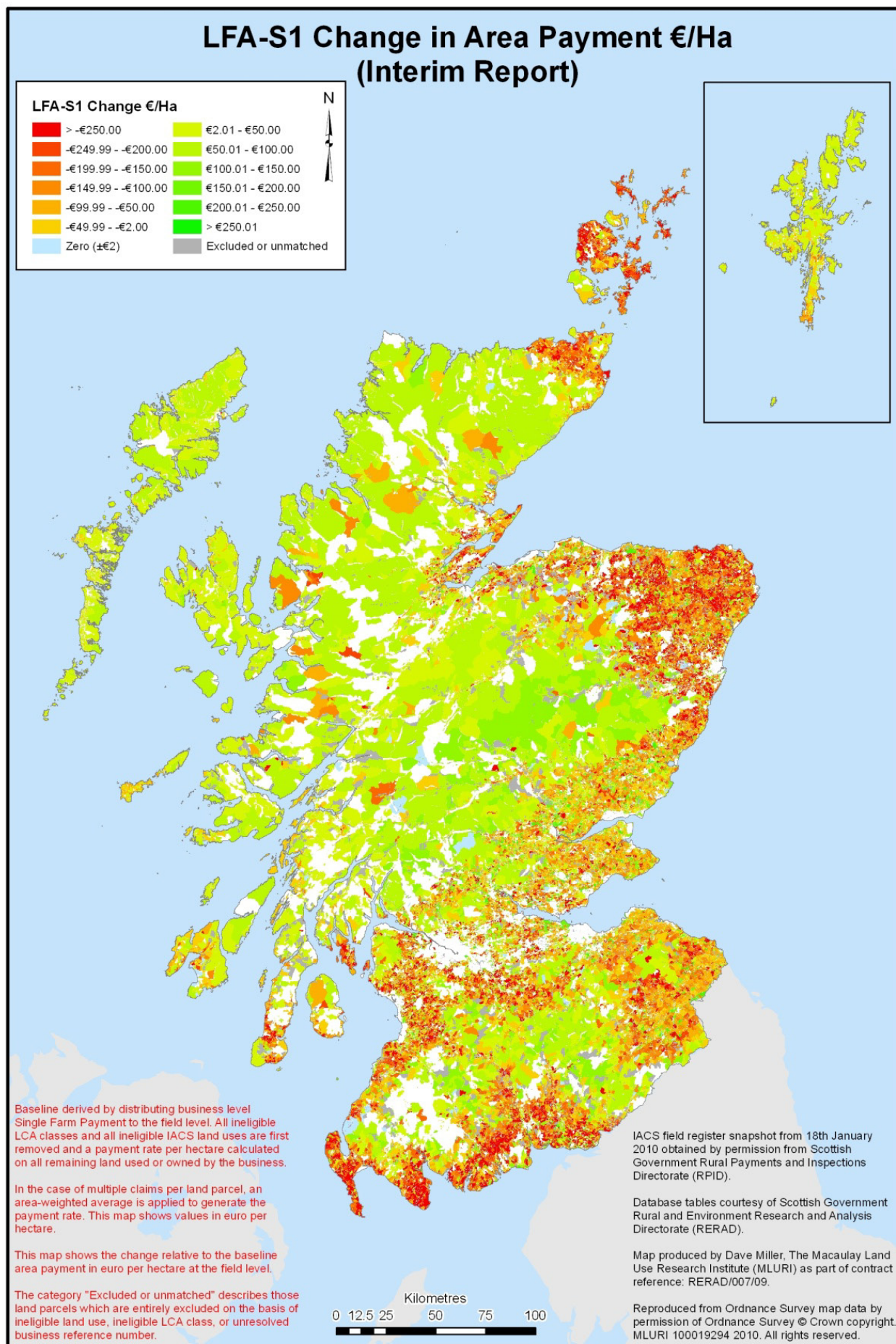


Figure 30: LFA-S1 Change in Payment €/Ha (Interim Report)

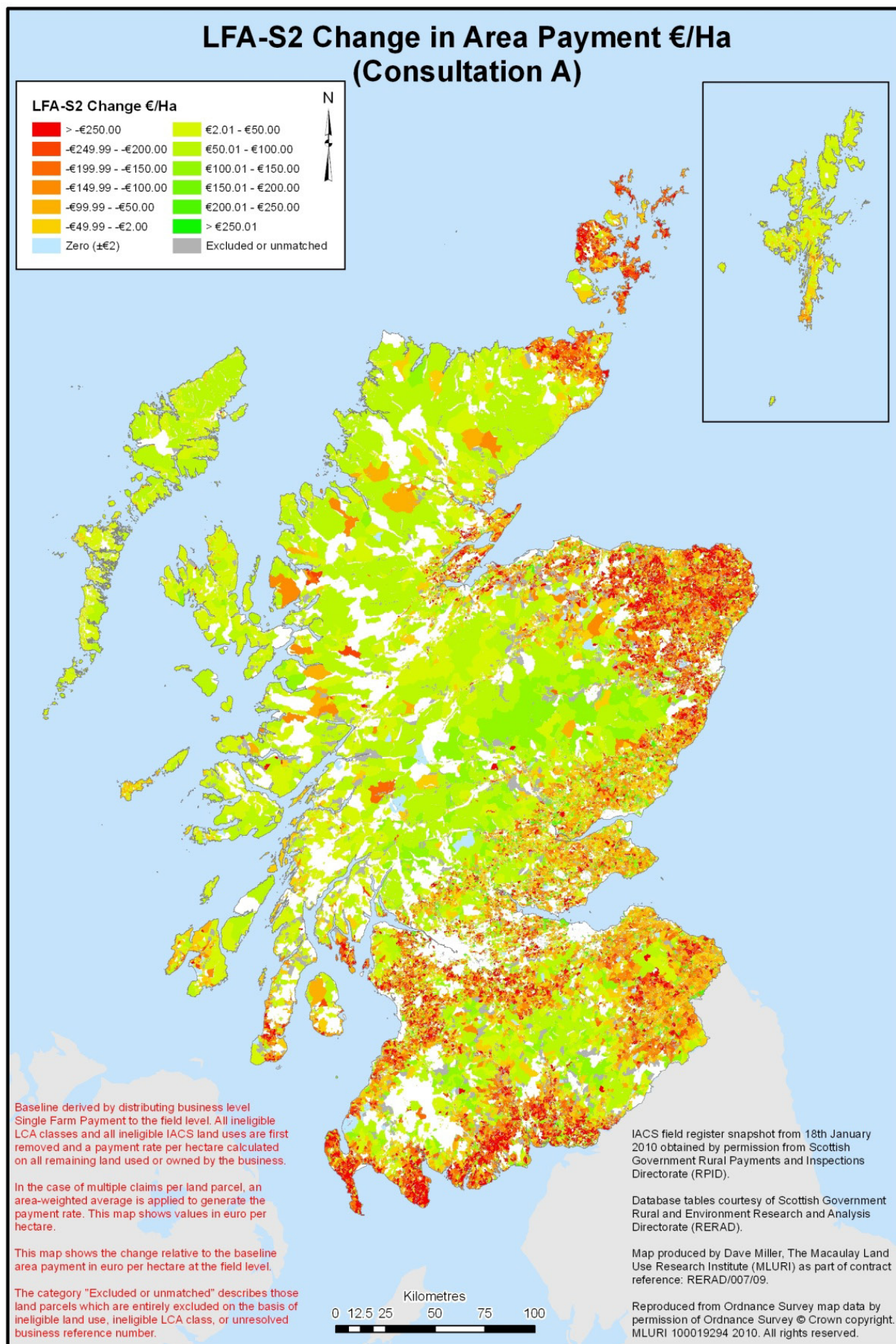


Figure 31: LFA-S2 Change in Payment €/Ha (Consultation A)

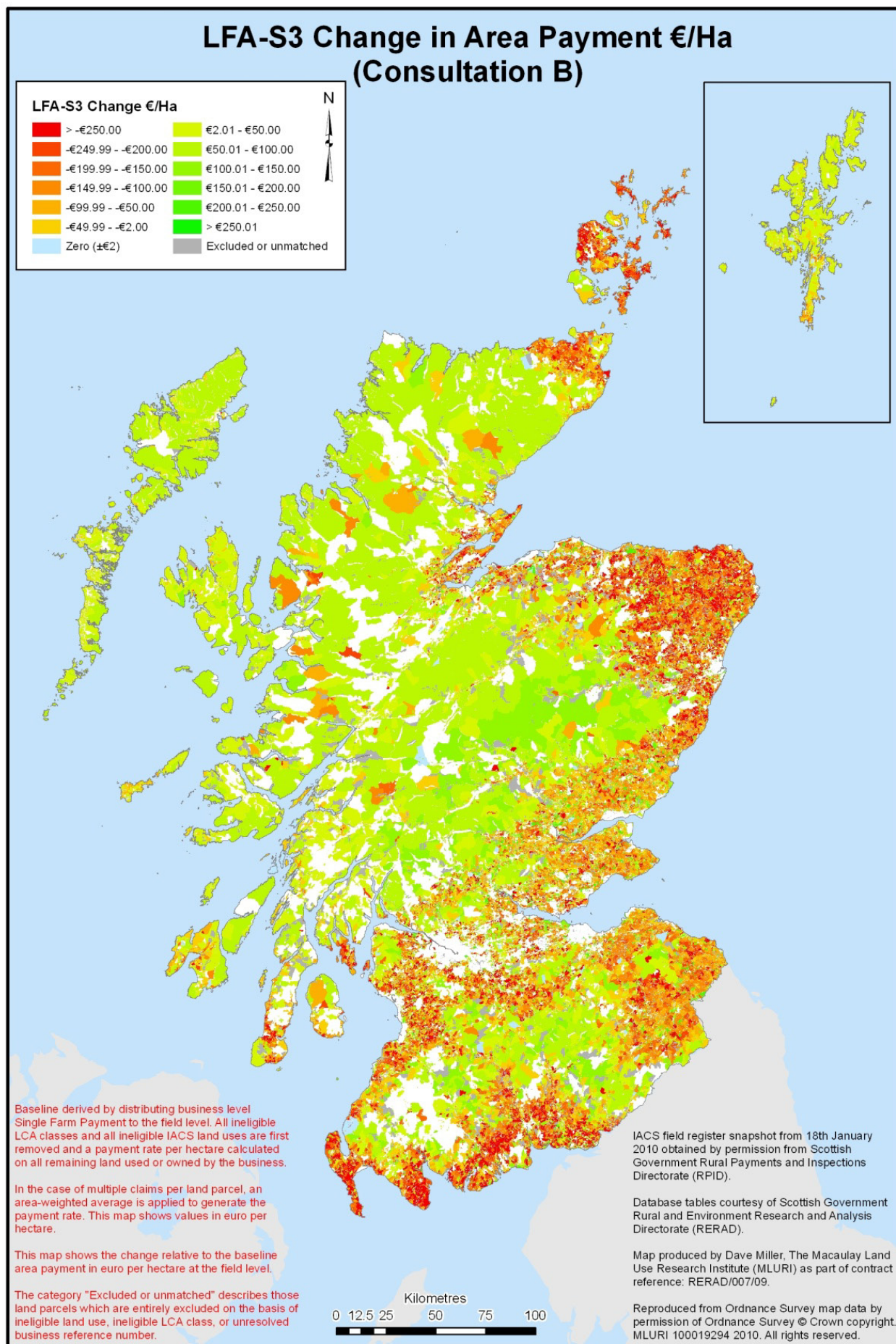


Figure 32: LFA-S3 Change in Payment €/Ha (Consultation B)

6.6 Summary of Mapped Results

The mapping of the current single farm payment, the LCA and LFA scenarios, and the change in payment per hectare between current SFP and scenarios presented in this section give a picture of the current spread of single farm payment across Scotland, the spread of payment proposed under each of the scenarios, and the field level change in payment rate between the baseline and the each of the scenarios. Whilst this is shown at the field level, and is therefore different from the business level analysis shown in the tables in Section 5, the pattern of disruption does mirror that shown in the tables and also gives a picture of what is happening below the level of the NUTS3 regions.

The three scenarios LCA-S1 to LCA-S3 have broadly similar patterns in the redistribution of payments, while the degree of redistribution is most pronounced in the flat rate (LCA-S4) and reverse (LCA-S5) scenarios. The three LFA scenarios show a virtually identical pattern in distribution of payments due to the more uniform nature of the payment rates and also due to the much simpler nature of the regions on which they are based. In all scenarios the effect at the national level is the same – that is subsidy moves away from the higher grade, more productive, land towards areas of lower grade, less productive land. Only the degree of change differs between scenarios.

Further maps and information which support the interpretation of the baseline, scenario, and change maps shown in this section may be found in Appendix E. These include further detail on claimed versus unclaimed fields, the unique users per field issue, areas of common grazing, seasonal rentals, land use eligibility, and the proportion of polygons on which a claim is made.

7 Key Findings

Given the role of the research team in supporting the Inquiry Team no conclusions or recommendations were sought. It is perhaps helpful to highlight key findings seen as significant in discussion with the Inquiry Team, REAS and SG colleagues.

7.1 Existing and New Claims

The research estimates that out of 5,403,448 ha with SAF claims in 2009, 4,354,660 ha of land are currently used to activate SFPS entitlements. Of the currently claimed SAF area it is estimated that 4,972,035 ha would be included in an area based scheme. A further (maximum) new area of 1,002,494 ha could also be included in the scheme to give a total (maximum) area for payment of 5,974,530 ha. The new area would receive 17-22% of current budget depending on the scenario (see Section 5.2, Table 14). The effect of the new claims is that average payments per ha fall from €149 to €108 (see Section 5.8, Table 51 and Table 52).

7.2 Overall Redistribution

In all the scenarios for area payments that were analysed there are significant redistributions of support across regions and farm types. Redistribution is defined in the report as the sum of the increases and decreases in payment for all businesses. The redistributive impacts are largest for scenarios that pay higher rates of support on land with lower agricultural potential relative to the baseline (e.g. LCA-S5), but remains substantial even where the highest payments are made to the best quality land (Interim, Consultations A and B^{xx}). The groupings of land classes and differences in support rates per hectare change the relative magnitudes of redistribution but much less than the decision to replace the current historic model for Pillar 1 payments with an area based one.

7.3 Redistribution within Regions and Farm Types

There are substantial redistributions within farm types and regions for all the scenarios assessed (see Section 5.2). The nature of this redistribution is from those with currently larger entitlements (likely reflecting more intensive use of land) to those with smaller or no entitlements. For example under LCA-S1, the Cattle and sheep (LFA) farm type sees a small net gain of €0.9 million, but within this farm type the total amount moving from businesses experiencing a decrease amounts to €69.8 million and the total going to businesses experiencing an increase amounts to €63.9 million for current claimants and a further €6.8 million for those receiving no payment in the baseline.

At the regional level, similar patterns are observed. For example, for Scenario LCA-S1, businesses in Perth and Kinross see a net change of €0.9 million. The total amount moving from businesses experiencing a decrease amounts to €13.7 million. This is balanced by the total going to businesses experiencing an increase amounting to €10.1 million for current claimants and a further €4.4 million for those receiving no payment in the baseline.

^{xx} Note that while the structure and intent of the Interim and Consultation scenarios has been maintained the specific payment rates have changed as a result of incorporating within the analysis the additional areas likely to be included in a new scheme.

7.4 Redistribution across Regions and Farm Types

In all but one case (Scenario LFA-S1.sr for Eastern Scotland) there is a consistent reduction in SFP for Eastern Scotland, Southwest Scotland and North Eastern Scotland (see Table 20 in Section 5.2) and increases for Highlands and Islands. However, care needs to be taken when commenting on regional effects. While Highlands and Islands region sees increases in SFP in all scenarios, at NUTS3 level the Orkney Islands see a net reduction in total payments. There are significant contrasts between regions, for example in LCA-S1 the region that sees the largest net increases is Caithness and Sutherland (£25.1 million) with the greatest net reduction in Dumfries and Galloway (£39.3 million).

For analysis by farm types^{xxi} it is apparent that for all scenarios tested some farm types see net reductions in SFP (see Table 15). This includes Cattle and sheep (Lowland), Cereals, Dairy, General Cropping, and Mixed. Farm types with consistent increases include Cattle and sheep (LFA) and Other (mainly Specialist Grass and Forage), except where stocking rate eligibility criteria are applied (LCA-S1.sr and LFA-S1.sr).

7.5 Changes in Distribution of Payments

With all the scenarios for area payments, there are more businesses that see their total payments increase compared to those that sees reductions. For example, for Scenario LCA-S1, of the separate businesses that can be identified in the analysis 61% experience an increase in support and 39% a decline in support. Given the fixed budget, however, the average magnitude of increases is smaller than the reductions.

7.6 Stocking Rate Effects

Adding an eligibility criterion that limits claimed areas to those with a stocking rate of 0.12 livestock units per ha (~1 sheep per ha) removes ~1.39 million ha. This is equivalent to some €62.8 million or 10% of the overall budget for LCA-S1.sr and €110.6 million or 17% for LFA-S1.sr. This allows payments for eligible land to be scaled up by that amount. This scaling up reduces redistribution, marginally in the case of the LCA-S1.sr but substantially in the case of the LFA-S1.sr.

7.7 Caveats to the Analysis

Within the limits of the data and time available it was possible to carry out a thorough analysis that brings out key issues for decision makers. However, given the significance of the policy discussion being informed by this analysis it is important that the limitations of the analysis are understood so that interpretations of the analysis are soundly based and all uncertainties in the results understood. Specific limitations are recognised in the text and summarised at the end of the report (Appendix F). None of the limitations are, however, so severe that they undermine the headline results from the analysis. Some possible improvements to the analysis became apparent as the analysis was carried out; however, these were beyond the scope of the project. These have been noted as technical recommendations for future analysis.

^{xxi} As defined in the June Agricultural Census.

Technical Appendices

The technical appendices annexed to this report exist to supplement the descriptions of methodology and results outlined in the main body of the report. They include further details on IACS land classes, baseline derivation, issues relating to the Land Let Out to Others (LLO) category in the IACS forms, regional analyses, stocking rate criteria, classification tables, additional maps, summary of interpretational issues, and finally a summary of the GIS implementation issues which must be addressed prior to the implementation of any area-based scheme.

Appendix A Supplementary Information Relating to Data

Appendix A.1 Included Land Uses

The following land uses are included in the scenario area payment calculations:

- ARABLE SILAGE FOR STOCK FEED
- AROMATIC, MEDICAL AND CULINARY PLANTS
- ARTICHOKES
- ASPARAGUS
- BEANS FOR HUMAN CONSUMPTION
- BILBERRIES (AND OTHER FRUITS OF THE GENUS VACCINIUM)
- BLACKBERRIES
- BLACKCURRANTS
- BRUSSEL SPROUTS
- BULBS/FLOWERS
- CABBAGES
- CALABRESE
- CANARY SEED
- CARROTS
- CAULIFLOWER
- COMMON GRAZING
- FALLOW
- FIBRE FLAX
- FIELD BEANS
- FLOWER BULBS AND CUT FLOWERS
- FODDER BEET
- GOOSEBERRIES
- GRASS OVER 5 YEARS
- GRASS UNDER 5 YEARS
- GREEN COVER MIXTURE
- HEMP
- KALE AND CABBAGES FOR STOCKFEED
- LAND PREVIOUSLY STRUCTURAL SET-ASIDE
- LEEKS
- LETTUCE
- LFASS INELIGIBLE ENVIRONMENTAL MANAGEMENT
- LINSEED
- LOGANBERRIES
- MAIZE
- MILLET
- MIXED CEREALS
- OPEN WOODLAND(GRAZED)
- OTHER CROPS FOR STOCK FEED
- OTHER SOFT FRUIT
- OTHER VEGETABLES
- PEAS FOR HUMAN CONSUMPTION
- PROTEIN PEAS
- RAPE FOR STOCK FEED
- RASPBERRIES
- REDCURRANTS
- REED CANARY GRASS ENERGY
- RHUBARB
- ROUGH GRAZING
- RYE
- SEED POTATOES
- SFPS BEING CLAIMED ON AGRI-ENVIRONMENTAL OPTIONS
- SHARED GRAZING
- SHOPPING TURNIPS/SWEDES
- SHOPPING TURNIPS/SWEDES ENERGY
- SHORT ROTATION COPPICE
- SHORT ROTATION COPPICE ENERGY
- SOFT FRUIT
- SPRING BARLEY
- SPRING BARLEY ENERGY
- SPRING OATS
- SPRING OILSEED RAPE
- SPRING OILSEED RAPE ENERGY
- SPRING WHEAT
- STRAWBERRIES
- SWEET LUPINS
- SWEETCORN
- TOP FRUIT
- TRITICALE
- TURNIPS/SWEDES FOR STOCK FEED
- WARE POTATOES
- WARE POTATOES ENERGY
- WHOLE CROP CEREALS
- WILD BIRD SEED
- WINTER BARLEY
- WINTER OATS
- WINTER OILSEED RAPE
- WINTER OILSEED RAPE ENERGY
- WINTER WHEAT

Appendix A.2 Excluded Land Uses

The following land uses are excluded from the scenario area payment calculations:

- HAZELNUTS
- NON-FOOD SETASIDE - BARLEY FOR INDUSTRIAL USE
- NON-FOOD SETASIDE - FOREST TREES SHORT CYCLE
- NON-FOOD SETASIDE - HIGH ERUCIC ACID RAPESEED
- NON-FOOD SETASIDE - OILSEED RAPE FOR INDUSTRIAL USE
- NON-FOOD SETASIDE - TREES SHRUBS AND BUSHES
- NON-FOOD SETASIDE - WHEAT FOR INDUSTRIAL USE
- NORMAL SETASIDE - 5 YEAR UNDER FWS
- NORMAL SETASIDE - 5 YEAR UNDER WGS
- NORMAL SETASIDE - BARE FALLOW
- NORMAL SETASIDE - GREEN COVER MIXTURE
- NORMAL SETASIDE - MUSTARD
- NORMAL SETASIDE - NAT REGEN (AFTER CEREALS)
- NORMAL SETASIDE - NAT REGEN (AFTER OTHER CROPS)
- NORMAL SETASIDE - NEXT TO WATERCOURSES, HEDGES, WOODS, DYKES AND SSSIs
- NORMAL SETASIDE - ORGANIC LEGUMES
- NORMAL SETASIDE - OWN MANAGEMENT PLAN
- NORMAL SETASIDE - PHACELIA
- NORMAL SETASIDE - SOWN GRASS COVER
- NORMAL SETASIDE - WILD BIRD COVER
- NURSERY - FRUIT STOCK
- NURSERY - ORNAMENTAL TREES
- NURSERY - SHRUBS
- OTHER LAND
- OTHER NURSERY STOCKS
- PISTACHIOS
- PONDS, RIVERS, STREAMS OR LOCHS
- POSITIVE ENVIRONMENTAL MANAGEMENT
- ROADS, YARDS OR BUILDINGS
- SCREE OR SCRUB
- SETASIDE AGRICULTURAL PRODUCTION - ARABLE
- SETASIDE AGRICULTURAL PRODUCTION - FORAGE
- STRUCTURAL SETASIDE - EX 5 YEAR STILL IN FWS
- STRUCTURAL SETASIDE - WGS, FWPS OR SFGS
- TREES SHRUBS & BUSHES
- TURF PRODUCTION
- UNCLAIMED LAND
- WOODLAND AND FORESTRY
- WOODLAND/FORESTRY WITH UNIQUE FIELD IDENTIFIER

Appendix A.3 Baseline Flattening

There is no explicit link between SFPS entitlements held by a business and specific land parcels (other than the need to have enough land available to activate the entitlements). This means that to create a per-field map of baseline payments the entitlements need to be allocated across all the included land parcels that make up the business. This disaggregation process is referred to here as flattening the baseline. This process is necessary to allow the generation of change maps since businesses overlap in their use of land parcels (as discussed in Section 6.2).

Any process of flattening will have to make assumptions on how the entitlements are best distributed across the land parcels. Within this analysis a simple approach was agreed with REAS colleagues and used since it was not possible to be certain that more complex processes would yield superior results. Flattening the baseline was implemented as follows:

- A single rate (€ per ha) for all land parcels in a business was set by dividing the total value of entitlement by the area of included (or unclaimed) land parcels.

While creating a flat rate for the per-field baseline is technically simple, such a baseline is potentially misleading when used for comparative purposes, particularly when used with the scenario mapping to generate maps of change. Figure 33 provides a graphical representation of the process of flattening described above as applied to a hypothetical 1000ha business made up of 100ha of LCA3.1 land and 900ha of LCA6.3 land. In this case the

entitlements based on the 2000 to 2002 business activities across all the land are “pooled” (the central €1000 pot) and then flattened to give a rate of €1 per ha. This results in the distribution of €100 to the LCA3.1 land and €900 to the LCA6.3. While uncertain it is highly likely that the activities that generated the entitlements were not so distributed. It is more likely (but unquantifiable within the scope of the project) that the 100ha of LCA3.1 land generated the majority of the entitlements, as LCA3.1 land can support more intensive production than LCA6.3. In reality, interdependencies between the two land classes mean that it is difficult to be certain where the entitlement would be best identified.

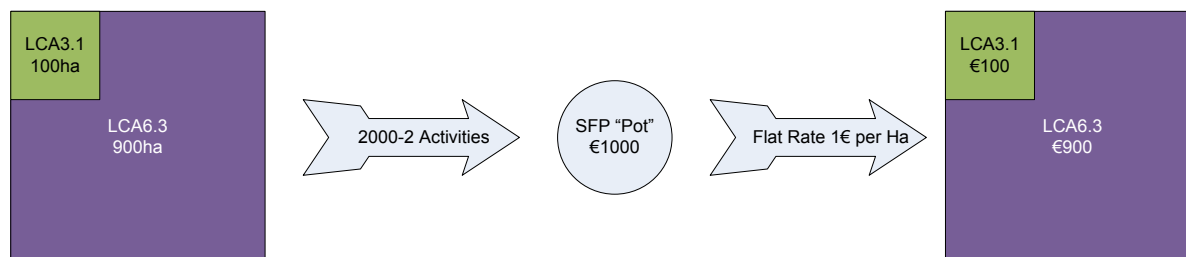


Figure 33: Deriving the baseline Payments per ha.

This is not an academic concern, but has potentially serious implications for the reliability of the baseline and the derived change maps. A flat rate derived at business level and applied to all LCA classes has the net effect of reallocating entitlement (more probably) generated by activity on high quality land (e.g. the LCA 3.1 land in Figure 33) to areas of poor quality land (the LCA 6.3 land in Figure 33). This artificially inflates the rates of payment per Ha for the relatively poorer quality land in all businesses. In effect a form of flattening is being built into deriving the baseline. This means that the change maps tend to underestimate the degree of redistribution.

In general, business-level comparisons are more definitive since changes in entitlement can be precisely quantified. Most analyses in this report (i.e. the tables) are of this type; however, for completeness, field-level comparisons (i.e. the maps) have also been included. Great care is needed in using, interpreting or drawing conclusions from the field-level baseline or change data.

Appendix A.4 Unique Users per Field

Figure 15 showed the number of unique users per land parcel based on claims made in 2009. It highlights the issue where one land parcel may have more than one user claiming against it. This demonstrates why it was not possible to produce a business-level map based on usership since many businesses may have an interest in any one land parcel. This section provides more detail on the data involving multiple users of fields.

Table 53 shows that 18.69% of the total claimed area is made up of fields with multiple claims and multiple users. This does not pose a problem for the business-level tabular analysis where it is possible to allocate each claimant a proportional share of the field area; however for the mapping of payments a proportional share is not sufficient since it has no geographical basis. Claims are not spatially explicit below the field level so we are unable to represent a business' share of a field on a map where multiple claims exist for that field. This means that we cannot perform a business 'dissolve'^{xxii} on the polygons to produce a true mapped output of business level payments.

^{xxii} GIS term used to describe the operation where multiple fields with the same user are merged together to create a single polygon, and a single record per business in the data table.

Table 53: Summary from Usership Analysis

Number of Fields	434,222
Area of Fields (ha)	6,307,993
Number of Claims	484,765
Area of Claims (ha)	5,431,119
Number of Fields with claim	383,423
Number of Fields with multiple claims	76,729
Area of Fields with multiple claims (ha)	2,621,744
Claimed Area of Fields with multiple claims (ha)	2,442,929
Number of Fields with multiple claims and multiple users	8,371
Area of Fields with multiple claims and multiple users (ha)	1,176,150
Claimed Area of Fields with multiple claims and multiple users (ha)	1,015,337
Number of Fields with multiple claims and multiple users as a % of all claims	1.73
Claimed Area of Fields with multiple claims and multiple users as a % of total claimed area	18.69

In most cases the presence of these ‘multi-user polygons’ is likely to indicate areas of crofting and common grazing. See Appendix E.2 for a map of common grazing.

The favoured solution to this problem, and the one followed within our analysis, is to distribute the total business baseline payments evenly across all included claim areas for each business (i.e. flatten the baseline – see Appendix A.3). For fields with multiple business users an area-weighted-average is applied to each of the business area payments in order to calculate a single area payment per field. With this approach a complete coverage is achieved and all land that is earning money is retained within the analysis.

Appendix A.5 Land Let Out to Others

Prior to 2009 the owner of a field recorded the code LLO (land let out to others) on the IACS(3) sheet to indicate that they were letting out land; however, from 2009 land owners were required to record a composite code that included the land-use code too. For example, land rented out for rough grazing would be coded LLO-RGR. This meant that from 2009 onwards it is possible to identify which land was being rented out and what that land was used for.

Our analyses also required us to account for the area that was seasonally rented in. The SAF provides this since land that is seasonally rented is recorded on the IACS(4) (seasonal land) form.

So, in summary, we can work out the area farmed by a business as follows:

$$\text{Farmed Area} = \text{IACS(3) non-LLO area} + \text{IACS(4) area}$$

The nature of the data allowed us to perform this calculation at field level and aggregate up to holding or business. It was also possible to differentiate the results by land use.

Some field claims made on the SAF were specified using an old Field ID. These old Field IDs are incompatible with the new Field IDs used in the IACS GIS (2010) polygon dataset so we performed a spatial analysis to build a lookup table that would allow us to convert the old Field IDs. By implementing this lookup table the quality of the data used in the final analysis benefited from an improved match between the claim data and the GIS polygons.

Every effort was made to match all claim data to the IACS GIS field polygon dataset; however a small number of claims (made up of 706 ha of seasonal claims, 4,881 ha of owner user claims and 311 ha of shared/commons claims) were not matched to the GIS.

Table 54 shows the seasonal rental land-use areas following the data adjustments detailed in Section 3.1 Data Collation - IACS Data Quality Checks.

Table 54: Land use breakdowns (after data adjustments)

<i>Land Use</i>	<i>Area (Ha)</i>
Rough Grazing	455,280
Permanent Grassland	147,714
Temporary Grassland	38,529
Spring Barley	11,816
Seed Potatoes	4,944
Ware Potatoes	4,872
LFASS Ineligible Environmental	3,351
Winter Wheat	2,041
Peas for Human Consumption	1,563
Open Woodland Grazed	1,507
Other Codes	10,232
	681,849

Appendix B Regional Analysis – Claims, Rentals and Ownership

Appendix B.1 Regional Analysis of Claim Data

It is known that in the Baseline there might be businesses located in one region that activate some or all of their entitlements using land in another region. The Inquiry Team would like to measure and map this but it is not possible to do so since, as discussed earlier in this report, there is no direct linkage between entitlements and fields. Instead we can analyse the IACS claims made on the land parcels, together with location details of the businesses making those claims, and use these as an indicator of possible cross-region entitlement activation.

Table 55 shows the claim data in a tabular format. The NUTS2 regions down the side show the location of the user's main farm. The NUTS2 regions along the top show the location of the holding that owns the field (n.b. the owning holding is not necessarily a main farm and therefore can be a sub-holding). Partial usage of fields is included in these tables since we can allocate each share to a different cell in the table. Green colours highlight the larger values. The table shows that the users of land are located in the same region as the owners in most cases (94% of cases when Regional Identifier Missing is discounted).

Table 55: Claim data by owner NUTS2 region (columns) and user NUTS2 region (rows)

Claim Data (ha)	Eastern Scotland	Highlands & Islands	North Eastern Scotland	South Western Scotland	Regional Identifier Missing	Grand Total
Eastern Scotland	1,279,329	91,883	5,439	30,411	13,697	1,420,759
Highlands & Islands	9,065	2,324,643	37,742	1,685	39,030	2,412,166
North Eastern Scotland	5,361	51,808	489,692	1,312	2,989	551,162
South Western Scotland	20,709	36,944	1,575	833,503	4,810	897,541
Regional Identifier Missing	30,614	81,568	29,365	11,212	2,629	155,388
Grand Total	1,345,078	2,586,847	563,813	878,124	63,156	5,437,017

Table 56 gives more detail by breaking down the user data to NUTS3.

Table 56: Claim data by owner NUTS2 region (columns) and user NUTS3 region (rows)

Claim Data (ha)	Eastern Scotland	Highlands & Islands	North Eastern Scotland	South Western Scotland	Regional Identifier Missing	Grand Total
Eastern Scotland	1,279,329	91,883	5,439	30,411	13,697	1,420,759
Angus & Dundee City	169,611	4,015	1,286	297	3,660	178,869
Borders	362,875	21,916	2,200	22,865	3,784	413,639
City of Edinburgh	12,527	495	0	22	460	13,505
Clackmannanshire & Fife	98,668	12,866	150	679	896	113,259
East & Midlothian	86,116	6,826	103	483	1,012	94,539
Falkirk	15,817	513	46	441	7	16,824
Perth & Kinross and Stirling	510,618	44,800	1,495	1,693	3,860	562,465
West Lothian	23,097	452	160	3,931	18	27,659
Highlands & Islands	9,065	2,324,643	37,742	1,685	39,030	2,412,166
Caithness & Sutherland and Ros	818	721,308	4,934	0	29,079	756,140
Inverness & Nairn and Moray, B	82	383,783	1,571	0	2,607	388,043
Lochaber, Skye & Lochalsh and	8,098	832,981	30,542	1,685	5,088	878,395
Orkney Islands	63	84,656	565	0	357	85,641
Shetland Islands	4	122,832	130	0	1,317	124,283
Western Isles	0	179,082	0	0	583	179,665
North Eastern Scotland	5,361	51,808	489,692	1,312	2,989	551,162
Aberdeen City, Aberdeenshire &	5,361	51,808	489,692	1,312	2,989	551,162
South Western Scotland	20,709	36,944	1,575	833,503	4,810	897,541
Dumfries & Galloway	11,600	20,011	1,148	436,155	2,569	471,483
E & North Ayrshire Mainland	1,629	5,277	280	111,117	866	119,169
E & W Dunbartonshire & Helensb	431	3,632	60	40,626	170	44,920
Glasgow City	0	40	0	1,097	0	1,137
Inverclyde, East Renfrewshire	286	1,168	0	34,394	96	35,944
North Lanarkshire	648	1,080	0	17,508	85	19,322
South Ayrshire	4,803	2,240	58	79,698	852	87,651
South Lanarkshire	1,312	3,495	30	112,906	171	117,914
Regional Identifier Missing	30,614	81,568	29,365	11,212	2,629	155,388
Grand Total	1,345,078	2,586,847	563,813	878,124	63,156	5,437,017

This table shows that the NUTS3 regions that are using the most land located in another NUTS2 region are Aberdeen City, Aberdeenshire & NE Moray (51,808 ha of Highlands & Islands); Perth & Kinross (44,800 ha of Highlands & Islands); and Lochaber, Skye & Lochalsh (30,542 ha of North East Scotland); however as a percentage these figures are below 10% of the total used land in these regions.

Appendix B.2 Regional Analysis of Seasonal Rentals

The next regional cross tabulation (Table 57) was produced to give an understanding of which NUTS2 regions land is being rented from and to. Note that this table shows the owner's region along the top and the renter's (i.e. user's) region down the side. As before, each renter's region is that of the renter's main farm and the owner's region is that of the holding that owns the field (n.b. the owning holding is not necessarily a main farm and therefore can be a sub-holding). Green colours highlight the larger values in the table (in general seasonal rental is within a region but note the areas of Highlands and Islands rented by businesses elsewhere).

Table 57: Seasonal rentals by owner NUTS2 region (columns) and renter NUTS2 region (rows)

Seasonal Rentals (ha)	Eastern Scotland	Highlands & Islands	North Eastern Scotland	South Western Scotland	Regional Identifier Missing	Grand Total
Eastern Scotland	83,046	47,520	4,799	3,084	3,582	142,031
Highlands & Islands	2,681	220,143	4,402	1,076	4,312	232,613
North Eastern Scotland	3,106	34,596	48,895	286	1,632	88,515
South Western Scotland	10,222	33,203	840	88,521	2,783	135,570
Regional Identifier Missing	19,392	45,290	11,132	4,931	2,375	83,120
Grand Total	118,447	380,751	70,068	97,898	14,684	681,849

The data shows that of the 380,751 ha of Highlands & Islands land that is rented out, only 220,143 ha (58%) is known to be rented to a business with a main farm in the Highlands & Islands region with 47,520 ha (12%) being rented to Eastern Scotland businesses, 34,596 ha (9%) to North Eastern Scotland businesses; 33,203 ha (9%) to South Western Scotland businesses; and a further 45,290 ha (12%) to businesses with Regional Identifier Missing. By comparison, 70% of Eastern Scotland, 70% of North Eastern Scotland and 90% of South Western Scotland rentals are to businesses in the same region.

Table 58 shows the seasonal rentals at NUTS3 level (that is land that belongs to one business which is rented to another business for all or part of the year) which shows in more detail the location of the businesses that are renting land.

Table 58: Seasonal rentals by owner NUTS2 region (columns) and renter NUTS3 region (rows)

Seasonal Rentals (ha)	Eastern Scotland	Highlands & Islands	North Eastern Scotland	South Western Scotland	Regional Identifier Missing	Grand Total
Eastern Scotland	83,046	47,520	4,799	3,084	3,582	142,031
Angus & Dundee City	16,279	2,942	731	124	631	20,707
Borders	15,049	20,396	2,200	883	319	38,847
City of Edinburgh	670	495	0	0	460	1,625
Clackmannanshire & Fife	10,449	6,268	118	598	729	18,163
East & Midlothian	5,068	3,587	68	219	33	8,974
Falkirk	1,776	268	46	159	0	2,249
Perth & Kinross and Stirling	31,415	13,112	1,476	516	1,404	47,923
West Lothian	2,340	452	160	584	6	3,543
Highlands & Islands	2,681	220,143	4,402	1,076	4,312	232,613
Caithness & Sutherland and Ros	555	70,009	55	0	1,032	71,650
Inverness & Nairn and Moray, B	82	52,025	982	0	2,115	55,204
Lochaber, Skye & Lochalsh and	1,982	74,190	2,830	1,076	854	80,931
Orkney Islands	63	13,520	535	0	219	14,337
Shetland Islands	0	4,353	0	0	30	4,383
Western Isles	0	6,046	0	0	62	6,108
North Eastern Scotland	3,106	34,596	48,895	286	1,632	88,515
Aberdeen City, Aberdeenshire &	3,106	34,596	48,895	286	1,632	88,515
South Western Scotland	10,222	33,203	840	88,521	2,783	135,570
Dumfries & Galloway	4,099	18,720	585	42,895	1,201	67,499
E & North Ayrshire Mainland	1,629	3,580	108	16,581	801	22,699
E & W Dunbartonshire & Helensb	247	3,632	60	5,312	162	9,414
Glasgow City	0	40	0	110	0	150
Inverclyde, East Renfrewshire	260	643	0	5,469	60	6,432
North Lanarkshire	261	972	0	3,214	85	4,532
South Ayrshire	2,755	2,154	58	6,113	347	11,428
South Lanarkshire	971	3,461	30	8,827	127	13,415
Regional Identifier Missing	19,392	45,290	11,132	4,931	2,375	83,120
Grand Total	118,447	380,751	70,068	97,898	14,684	681,849

The NUTS3 regions Lochaber (80,931 ha), Caithness (71,650 ha) and Dumfries & Galloway (67,499 ha) do the most renting in of land overall; however most of this land is rented from within the same NUTS2 region. The major cross-regional rentals are Aberdeen City & Aberdeenshire rentals of 34,596 ha from Highlands & Islands; Borders rentals of 20,396 ha from Highlands & Islands; and Dumfries & Galloway rentals of 18,720 ha from Highlands & Islands. Note that it was not possible to classify the renter for 83,120 ha (12% of the total) of seasonal rentals so these figures could be higher.

It is possible that some seasonal rentals occur in order to activate entitlement but the data does prove if or where this is happening; however it does allow for the quantification of how significant the cross-regional renting of agricultural land is in Scotland. Of the total 681,849 ha of seasonal rentals: 440,605 ha (65%) occur within the same NUTS2 region; 145,814 ha (21%) cross regional boundaries; and for the remaining 95,429 ha (14%) the renter or owners region is missing.

Appendix B.3 Regional Analysis of Ownership Data

The preceding tables give a regional analysis of claim data; however the issue of activating entitlement on land located in a region different from the main business can be analysed in another way. The ownership map shown in Figure 34 shows the field polygons classified by the NUTS 3 region of the owning business' main farm.

By devising a colour scheme using the region of the owning business' main farm it means that the classification shows where payments are going and the geographical position on the map shows where the subsidy is potentially being activated.

The map shows a total of 434,222 field polygons, of which 23,758 (5.47%) are shown in grey. For the grey polygons it was not possible to determine the NUTS 3 region for the main farm code of the field's owner. There are three main reasons for this:

- There is no data for fields that exist in the 2010 field polygons dataset – these might be newly created or modified polygons. This occurs in 1,091 cases.
- The main farm code for the field is not known. This occurs in 21,826 cases.
- The parish code segment of the main farm code is a 900 number (e.g. 904/0057). This occurs in 841 cases. These codes refer to land that is owned by a business registered outside Scotland.

Since multiple users per field cannot be mapped (see Section 6.2) the same map cannot be prepared for *users* of land in the same way. i.e. It is only possible generate the map for *owners* of land as presented in Figure 34.

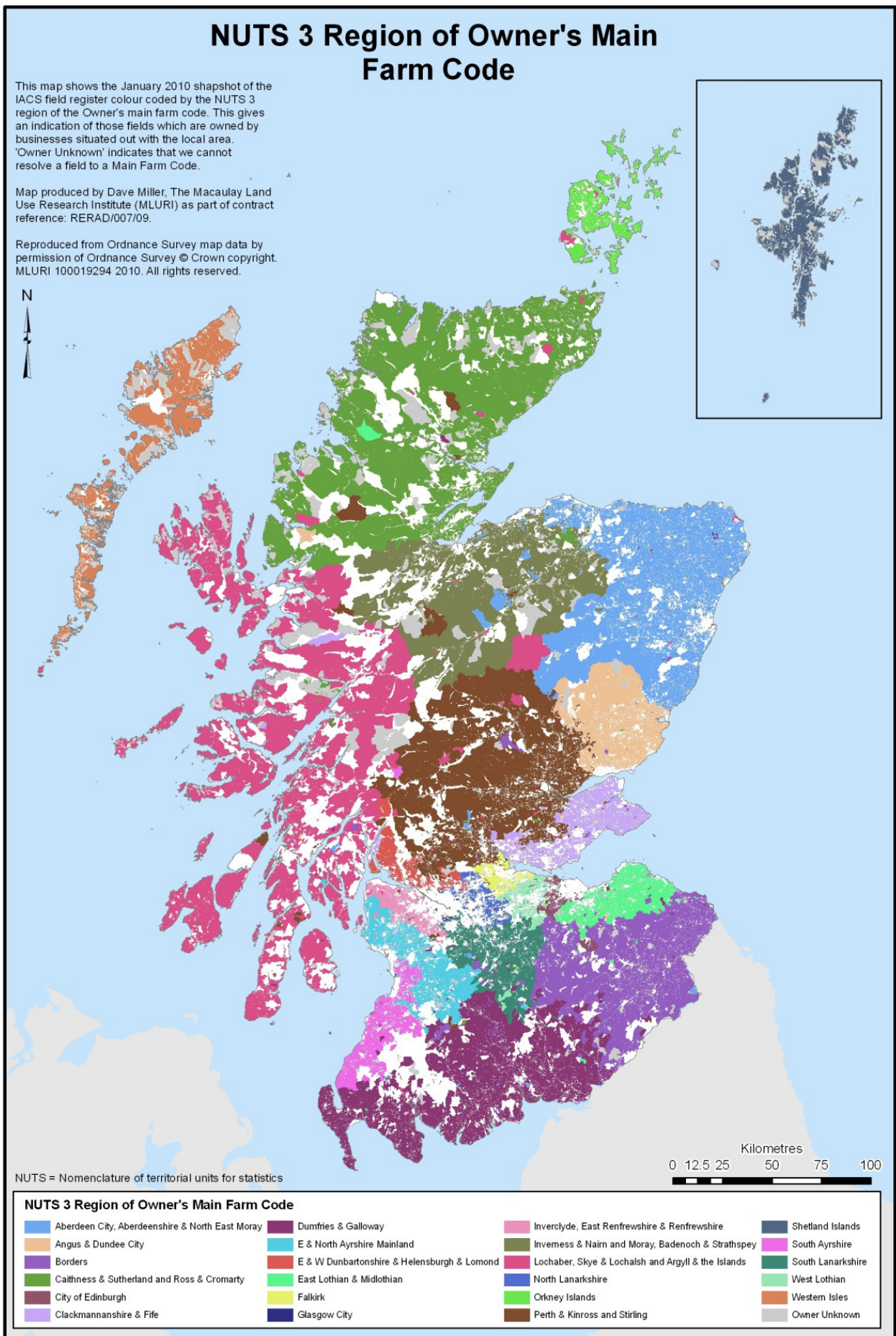


Figure 34: Region of owner's main farm code

Appendix C Classification Tables to Assist Interpretation of Results

Appendix C.1 Classification of Included Areas

Table 59 shows the total (included land) area by LCA class. This is the total area that is known (or assumed) to have an included land use. The area shown in this table has not had a stocking rate eligibility criterion applied to it.

Table 59: Total included area by LCA class

Total Area (ha)	All Included Land
LCA 1	4,196
LCA 2	106,836
LCA 3.1	333,509
LCA 3.2	700,083
LCA 4.1	301,705
LCA 4.2	374,586
LCA 5.1	112,504
LCA 5.2	429,939
LCA 5.3	502,945
LCA 6.1	124,219
LCA 6.2	467,116
LCA 6.3	2,318,445
LCA 7	198,447
Grand Total	5,974,530

Table 60 shows the total (included land) area by LFA class.

Table 60: Total included area by LFA class

Total Area (ha)	All Included Land
Non-LFA	838,866
LFA - Standard	2,157,075
LFA - Fragile	2,136,439
LFA - Very Fragile	842,151
Grand Total	5,974,530

Table 61 shows the total (included land) area breakdown by farm type. This report deals only with the robust farm type but in order to give some context to this broad classification the table also shows the breakdown for the more detailed main farm type.

Table 61: Total included area by robust and main farm types

Total Area (ha)	All Included Land
Cattle and sheep (LFA)	3,142,757
Cattle and sheep (DA)	37,737
Mixed Cattle and Sheep (SDA)	1,022,311
Specialist Beef (SDA)	946,679
Specialist Sheep (SDA)	1,136,030
Cattle and sheep (Lowland)	67,719
Cattle and sheep (Lowland)	67,719
Cereals	364,625
Cereals	364,625
Dairy	195,861
Dairy (LFA)	143,045
Dairy (Lowland)	52,816
General Cropping	355,914
General Cropping	355,914
Horticulture	10,256
Other Horticulture	4,349
Specialist Fruit	577
Specialist Glass	5,330
Mixed	342,936
Cropping and Dairy	13,581
Cropping and Mixed Livestock	4,672
Cropping, Cattle and Sheep	296,076
Cropping, Pigs and Poultry	9,688
Mixed Livestock	18,919
Other	589,729
Non-classifiable - Fallow	658
Non-classifiable - Other	18,171
Special Set-aside	3,302
Specialist Grass and Forage	566,796
Specialist Horses	801
Specialist Pigs	3,659
Specialist Pigs	3,659
Specialist Poultry	16,187
Specialist Poultry	16,187
Farm type missing	884,886
Grand Total	5,974,530

The table shows that most businesses with a Mixed robust farm type (86%) have a main farm type of Cropping, Cattle and Sheep. The Other robust farm type is predominantly (96%) Specialist Grass and Forage.

Table 62 shows the total (included land) area by region.

Table 62: Total included area by region

Total Area (ha)	All Included Land
Eastern Scotland	1,432,785
Angus & Dundee City	185,913
Borders	404,231
City of Edinburgh	15,375
Clackmannanshire & Fife	116,309
East & Midlothian	91,633
Falkirk	17,400
Perth & Kinross and Stirl	575,664
West Lothian	26,262
Highlands & Islands	2,641,471
Caithness & Sutherland an	879,733
Inverness & Nairn and Mor	426,690
Lochaber, Skye & Lochalsh	886,252
Orkney Islands	87,980
Shetland Islands	131,661
Western Isles	229,154
North Eastern Scotland	535,065
Aberdeen City, Aberdeensh	535,065
South Western Scotland	903,561
Dumfries & Galloway	471,292
E & North Ayrshire Mainla	119,521
E & W Dunbartonshire & He	44,093
Glasgow City	599
Inverclyde, East Renfrews	36,371
North Lanarkshire	20,312
South Ayrshire	87,723
South Lanarkshire	123,650
Regional identifier missing	461,648
Grand Total	5,974,530

Appendix D Stocking Rate

Appendix D.1 Stocking Rate Coefficients - Sensitivity Testing

A simple test was conducted in order to illustrate how varying the weightings used in the stocking rate calculations (see Section 3.6) affects the excluded area. Table 63 shows how varying the weighting for sheep (excluding lambs) affected the excluded area while assuming a minimum stocking density of 0.12 LSU/Ha and a fixed weighting for cattle (excluding calves) of 1.0 LSU. It shows that by reducing the sheep weighting from 0.12 to 0.06 results in a further 337,769 hectares of land being excluded.

Table 63: Effect of sheep weighting on excluded area

Sheep Weighting (LSU)	Excluded Area (ha)
0.06	1,731,452
0.07	1,658,229
0.08	1,591,818
0.09	1,533,339
0.10	1,480,695
0.11	1,434,555
0.12	1,393,683
0.13	1,356,505
0.14	1,323,549
0.15	1,294,448

Similarly, by fixing the sheep (excluding lambs) weighting at 0.12 LSU and varying the cattle (excluding calves) weighting between 0.6 and 1.0 LSU the results shown in Table 64 are generated. The table shows that reducing the cattle weighting from 1.0 to 0.6 LSU results in a further 84,243 hectares of land being excluded.

Table 64: Effect of cattle weighting on excluded area

Cattle Weighting (LSU)	Excluded Area (ha)
0.60	1,477,926
0.65	1,465,828
0.70	1,454,342
0.75	1,443,263
0.80	1,432,700
0.85	1,422,485
0.90	1,412,559
0.95	1,402,917
1.00	1,393,683

The weightings selected for both tables reflect realistic upper and lower boundaries. Figure 35 plots the results from Table 63 and Table 64 and shows that the area excluded is much more sensitive to changes in the weighting applied to sheep than to cattle.

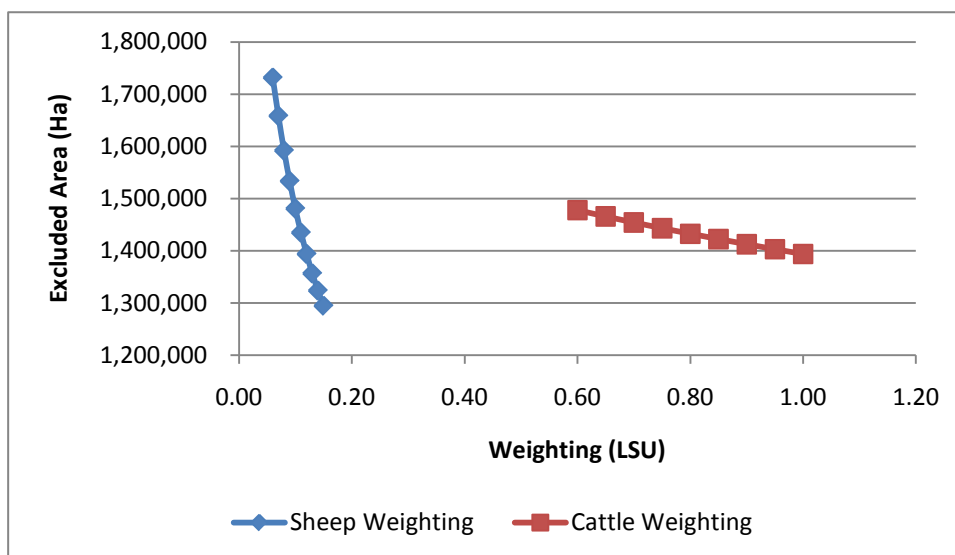


Figure 35: Effect of weighting on excluded area

Table 65 shows how fixing the sheep and cattle weightings at 0.12 and 1.0 respectively while varying the minimum stocking rate threshold affects the area excluded.

Table 65: Effect of stocking rate threshold on excluded area

Stocking Rate Threshold (LSU/ha)	Excluded Area (ha)
0.01	552,049
0.02	662,052
0.04	859,580
0.06	1,024,874
0.08	1,163,532
0.10	1,283,484
0.12	1,393,683
0.14	1,496,956
0.16	1,591,347
0.18	1,676,684
0.20	1,755,671
0.22	1,828,421
0.25	1,925,024
0.30	2,062,176
0.35	2,177,598
0.40	2,276,648
0.45	2,362,690
0.50	2,438,389

For example if a higher minimum stocking rate threshold of 0.20 livestock units per hectare is applied, then this would result in 1,755,671 ha of land being excluded. Figure 36 illustrates this data.

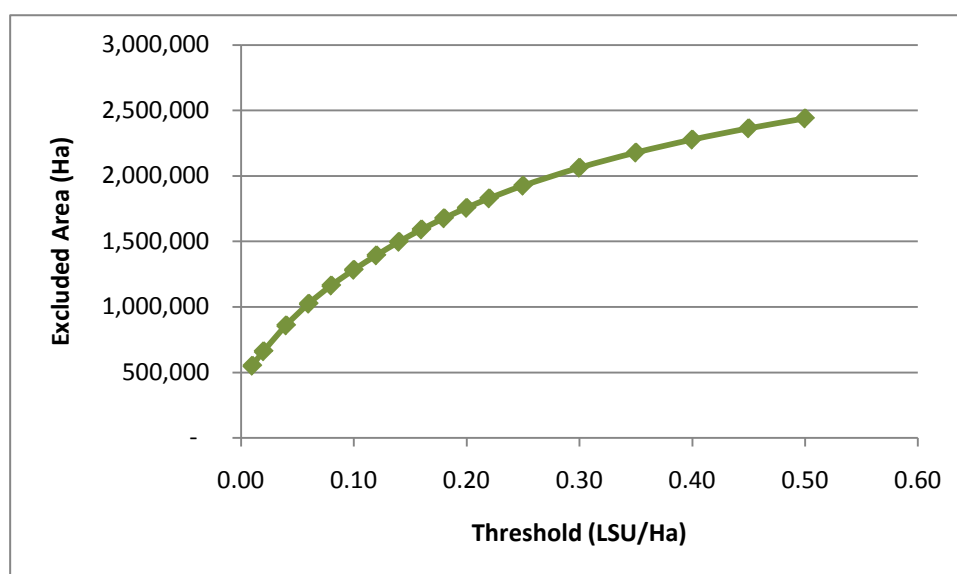


Figure 36: Effect of stocking rate threshold on excluded area

The chart shows that any stocking rate threshold, even as low as 0.01 LSU/ha, would exclude at least half a million hectares of land and that a rate of 0.6 would exclude over a million hectares.

This investigation kept the calculation as simple as possible but a more sophisticated calculation could be carried out using alternative combinations of grazing livestock categories, perhaps making use of more detailed classifications available through the June Agricultural Census.

Appendix D.2 Breakdown of Stocking Rate Exclusions

Table 66 gives a regional breakdown of land excluded by stocking rate eligibility criteria which shows that the Highlands and Islands region accounts for 72% of excluded land and Eastern Scotland a further 17%.

Table 66: Regional breakdown of area excluded for failing to meet minimum stocking rate

Land Excluded by Stocking Rate Eligibility Criteria	Excluded Area (ha)
Eastern Scotland	240,550
Angus & Dundee City	38,335
Borders	20,938
City of Edinburgh	791
Clackmannanshire & Fife	13,862
East & Midlothian	9,646
Falkirk	926
Perth & Kinross and Stirling	153,775
West Lothian	2,277
Highlands & Islands	1,000,976
Caithness & Sutherland and Ross & Cromarty	417,525
Inverness & Nairn and Moray, Badenoch & Strathspey	162,078
Lochaber, Skye & Lochalsh and Argyll & the Islands	324,376
Orkney Islands	7,502
Shetland Islands	17,487
Western Isles	72,008
North Eastern Scotland	73,533
Aberdeen City, Aberdeenshire & North East Moray	73,533
South Western Scotland	51,882
Dumfries & Galloway	24,150
E & North Ayrshire Mainland	8,557
E & W Dunbartonshire & Helensburgh & Lomond	3,614
Glasgow City	125
Inverclyde, East Renfrewshire & Renfrewshire	2,500
North Lanarkshire	1,462
South Ayrshire	4,982
South Lanarkshire	6,491
Regional identifier missing	26,742
Grand Total	1,393,683

Table 67 shows the farm type breakdown of land excluded by stocking rate eligibility criteria. The Cattle and sheep (LFA) farm type makes up the majority (60%) of the excluded area with the Other farm type (i.e. predominantly Specialist Grass and Forage) next (23%). The low amount of area excluded for Cattle and sheep (Lowland) indicates higher stocking rates for this type of business.

Table 67: Farm type breakdown of area excluded for failing to meet minimum stocking rate criteria

Land Excluded by Stocking Rate Eligibility Criteria	Excluded Area (ha)
Cattle and sheep (LFA)	832,544
Cattle and sheep (Lowland)	1,314
Cereals	84,149
Dairy	239
General Cropping	68,118
Horticulture	3,698
Mixed	40,426
Other	319,087
Specialist Pigs	914
Specialist Poultry	5,126
Farm type missing	38,066
Grand Total	1,393,683

A significant amount of the excluded area is for Cereals (6%), General Cropping (5%) and Mixed (3%). These businesses must have some areas in grass that carry little or no stock.

In the calculation of excluded land it is assumed that the poorest land is excluded first, in order that the remaining land is of better quality and would thus generally attract a higher payment rate. This results in the breakdowns by LCA and LFA shown in Table 68 and Table 69.

Table 68: LCA breakdown of area excluded for failing to meet minimum stocking rate

Land Excluded by Stocking Rate Eligibility Criteria	Excluded Area (ha)
LCA 1	27
LCA 2	863
LCA 3.1	6,956
LCA 3.2	31,579
LCA 4.1	14,851
LCA 4.2	20,260
LCA 5.1	5,121
LCA 5.2	29,109
LCA 5.3	71,041
LCA 6.1	10,556
LCA 6.2	84,100
LCA 6.3	987,358
LCA 7	131,863
Grand Total	1,393,683

Table 69: LFA breakdown of area excluded for failing to meet minimum stocking rate

Land Excluded by Stocking Rate Eligibility Criteria	Excluded Area (ha)
Non-LFA	31,071
LFA - Standard	294,571
LFA - Fragile	869,516
LFA - Very Fragile	198,525
Grand Total	1,393,683

Of the total grazing area of 4,161,738 ha, the area that is excluded by stocking rate eligibility is 1,393,683 ha leaving an eligible grazing area of 2,758,051 ha.

From a total of 28,655 businesses, 15,853 have livestock (i.e. cattle and/or sheep comprising a total of 1,674,704 livestock units) and 12,802 do not.

Although 15,853 businesses have livestock there are only 15,537 (98%) which were identified as using a grazing area. Table 70 details the total grazing area, the total livestock units and the stocking rate by region.

Table 70: Stocking rate by region

Business, Grazing Area & Stocking Rate by Region	Number of Businesses	Number of Livestock Businesses	Total Grazing Area (ha)	Total Livestock Units	Stocking Rate (LSU/ha)
Eastern Scotland	5,829	2,805	976,168	415,555	0.43
Angus & Dundee City	753	318	108,267	41,133	0.38
Borders	1,528	821	282,367	155,403	0.55
City of Edinburgh	49	17	8,148	3,712	0.46
Clackmannanshire & Fife	776	359	55,640	47,248	0.85
East & Midlothian	448	174	50,629	27,097	0.54
Falkirk	196	116	11,391	10,909	0.96
Perth & Kinross and Stirl	1,869	878	440,649	114,370	0.26
West Lothian	210	122	19,078	15,684	0.82
Highlands & Islands	12,508	6,980	2,080,090	341,521	0.16
Caithness & Sutherland an	3,011	1,610	665,347	83,016	0.12
Inverness & Nairn and Mor	1,111	536	324,021	53,170	0.16
Lochaber, Skye & Lochalsh	2,886	1,605	736,532	101,484	0.14
Orkney Islands	1,081	663	78,959	65,583	0.83
Shetland Islands	1,321	933	123,139	22,448	0.18
Western Isles	3,098	1,633	152,092	15,819	0.10
North Eastern Scotland	4,381	2,197	311,312	277,210	0.89
Aberdeen City, Aberdeensh	4,381	2,197	311,312	277,210	0.89
South Western Scotland	5,659	3,536	758,430	637,556	0.84
Dumfries & Galloway	2,640	1,688	387,360	345,360	0.89
E & North Ayrshire Mainla	912	575	105,221	92,762	0.88
E & W Dunbartonshire & He	198	117	39,973	16,619	0.42
Glasgow City	8	4	596	530	0.89
Inverclyde, East Renfrews	296	180	32,621	24,820	0.76
North Lanarkshire	238	120	15,471	13,695	0.89
South Ayrshire	524	325	73,490	65,671	0.89
South Lanarkshire	843	527	103,698	78,099	0.75
Regional identifier missing	278	19	35,738	2,862	0.08
Overall Average / Grand Total	28,655	15,537	4,161,738	1,674,704	0.40

The headline stocking rate for Scotland is 0.40 LSU/ha using the aforementioned scheme for the calculation of livestock units.

At NUTS2, the highest average stocking rate occurs in North Eastern Scotland (0.89 LSU/ha) and the lowest in Highlands & Islands (0.16 LSU/ha). At NUTS3 the highest stocking rate (0.96 LSU/ha) occurs in Falkirk and the lowest in Western Isles (0.10 LSU/ha).

Appendix D.3 Other livestock types

The livestock categories within the JAC could potentially allow other types of livestock (e.g. goats or farmed deer) to be included in the stocking rate calculation. For example, assuming that all farmed deer are mature hinds at 0.3LU then a further 20,758 ha of grazing land would become eligible for payment.

Appendix D.4 Applying stocking rate threshold to scenarios

A minimum stocking rate eligibility criterion of 0.12 LSU/ha along with a cattle (excluding calves) weighting of 1.0 LSU and a sheep (excluding lambs) weighting of 0.12 LSU was applied to the scenarios LCA-S1 and LFA-S1. This was achieved by the following process:

1. For each business:
 - a. Calculate the livestock units
 - b. Calculate the maximum allowed grazing area for the business from the LSU / stocking rate threshold
 - c. Calculate the new adjusted grazing area and the excluded area
 - d. Distribute the exclusions across the LCA and LFA classes for that business
 - e. Calculate the new (reduced) area payment using the original payment scenario
2. Sum the new (reduced) business area payments to national level
3. Calculate the national level ratio of the total non-exclusion area payment to the total (reduced) exclusion area payment
4. For each business:
 - a. Calculate the new stocking rate area payment using the original payment scenario scaled up by the national level ratio
5. Sum the new business level stocking rate area payment and check it matches the original area payment budget

The process above was applied to LCA-S1 and LFA-S1 to produce the scenarios LCA-S1.sr and LFA-S1.sr respectively. The scenario LCA-S1.sr frees up €62.8 million (10% of the total budget) and LFA-S1.sr frees up €110.6 million (17%).

The process detailed above increases the payment rates by a fixed proportion so that the ratios between the payment steps remain the same in non-SR and SR scenarios. This ensures that the full budget is spent while also applying the stocking rate restriction.

Stocking rate eligibility criterion is a significant factor for an area-based payment scheme; however the accurate calculation of stocking rates is constrained by factors including the following:

- The pre-crosschecked IACS(4) (seasonal sheet) data can be unreliable for the calculation of grazing area although the data has been corrected for this (see Section 3.1 - Data Collation - IACS Data Quality Checks).
- JAC, from which the livestock numbers are derived, contains imputed data for non-returns.
- Livestock numbers fluctuate throughout the year so the JAC livestock figures may not necessarily be representative
- Livestock movement between businesses could distort the results

Appendix D.5 Classification of Businesses

Table 71 shows the number of businesses by region (NUTS 3 nested within NUTS2) versus robust farm type. It shows that there are 11,308 Cattle & Sheep (LFA) farms and that more than half of these (6,914) occur in Highlands & Islands.

Table 71: Number of businesses by region and farm type

Number of Businesses	Cat & Shp (LFA)	Cat & Shp (Lowland)	Cereals	Dairy	General Cropping	Horti-culture	Mixed	Other	Specialist Pigs	Specialist Poultry	Farm type missing	Grand Total
Eastern Scotland	1,264	398	946	113	1,012	59	457	909	16	115	540	5,829
Angus & Dundee City	52	30	82	5	358	11	67	84	1	9	54	753
Borders	507	73	256	16	99	10	114	238	5	42	168	1,528
City of Edinburgh	6	2	26	1	2	1	2	3	1	1	4	49
Clackmannanshire & Fife	52	80	174	26	172	8	78	124	2	12	48	776
East & Midlothian	48	34	153	6	77	5	38	50	2	4	31	448
Falkirk	86	10	32	13	2	0	5	32	0	5	11	196
Perth & Kinross and Stirl	447	146	187	30	300	21	144	342	4	38	210	1,869
West Lothian	66	23	36	16	2	3	9	36	1	4	14	210
Highlands & Islands	6,914	57	362	136	238	194	432	2,917	31	210	1,017	12,508
Caithness & Sutherland an	1,446	23	158	16	70	45	159	734	7	62	291	3,011
Inverness & Nairn and Mor	453	34	88	10	40	20	51	264	3	24	124	1,111
Lochaber, Skye & Lochalsh	1,625	0	7	74	20	53	41	678	9	54	325	2,886
Orkney Islands	612	0	79	25	26	10	49	225	5	22	28	1,081
Shetland Islands	987	0	1	5	10	14	33	194	1	15	61	1,321
Western Isles	1,791	0	29	6	72	52	99	822	6	33	188	3,098
North Eastern Scotland	777	377	920	47	322	35	682	831	17	109	264	4,381
Aberdeen City, Aberdeensh	777	377	920	47	322	35	682	831	17	109	264	4,381
South Western Scotland	2,353	224	204	918	76	29	188	1,101	10	117	439	5,659
Dumfries & Galloway	1,123	115	91	403	37	10	98	459	7	60	237	2,640
E & North Ayrshire Mainla	360	32	18	198	7	4	20	197	0	24	52	912
E & W Dunbartonshire & He	89	8	7	22	5	0	7	39	0	3	18	198
Glasgow City	2	1	0	2	0	0	0	3	0	0	0	8
Inverclyde, East Renfrews	131	7	17	39	6	0	2	77	1	6	10	296
North Lanarkshire	107	10	6	22	0	3	2	70	1	4	13	238
South Ayrshire	161	41	30	97	15	9	29	96	0	7	39	524
South Lanarkshire	380	10	35	135	6	3	30	160	1	13	70	843
Regional identifier missing	0	0	0	0	0	0	0	0	0	0	278	278
Grand Total	11,308	1,056	2,432	1,214	1,648	317	1,759	5,758	74	551	2,538	28,655

Table 72 shows the LCA breakdown by region for the average business. The final column shows the average business size with the largest occurring in Inverness & Nairn (384 ha) and the smallest average in the Western Isles (74 ha). The average business size for Scotland is 195 ha.

Table 72: Average business area by region and LCA class; also showing average total area per business

Average Business Area (ha)	LCA 1	LCA 2	LCA 3.1	LCA 3.2	LCA 4.1	LCA 4.2	LCA 5.1	LCA 5.2	LCA 5.3	LCA 6.1	LCA 6.2	LCA 6.3	LCA 7	Grand Total
Eastern Scotland	0.52	11.33	32.96	28.00	13.04	15.04	6.09	23.28	17.01	6.94	23.60	60.99	7.01	246
Angus & Dundee City	1.35	20.30	55.33	31.59	10.43	6.43	4.53	23.03	7.07	4.76	27.14	35.19	19.76	247
Borders	0.26	9.60	31.03	22.39	17.35	26.84	11.73	36.84	26.16	13.29	15.01	53.07	0.97	265
City of Edinburgh	3.10	56.33	37.14	15.97	12.35	28.87	3.70	24.96	17.04	20.91	37.18	55.33	0.88	314
Clackmannanshire & Fife	0.00	12.89	43.37	40.66	7.64	4.14	2.69	6.46	4.18	1.46	10.16	15.06	1.18	150
East & Midlothian	3.21	22.14	53.98	20.00	15.12	11.56	6.17	16.21	18.85	7.42	6.17	22.62	1.09	205
Falkirk	0.00	3.05	14.84	25.40	3.21	22.26	2.26	6.12	6.50	0.34	1.08	3.39	0.31	89
Perth & Kinross and Stirl	0.00	5.79	19.01	30.00	14.29	12.25	4.32	24.30	19.78	5.79	42.88	117.34	12.25	308
West Lothian	0.00	9.48	23.63	13.79	4.86	22.58	2.91	9.20	14.59	0.94	6.36	16.26	0.46	125
Highlands & Islands	0.00	0.65	1.39	4.19	6.30	9.05	2.93	12.47	21.75	4.05	15.31	123.75	9.33	211
Caithness & Sutherland an	0.00	1.56	4.08	9.18	9.71	9.82	1.45	9.05	51.20	1.39	5.88	181.05	7.79	292
Inverness & Nairn and Mor	0.00	3.03	3.65	19.22	18.06	24.12	0.95	38.00	27.98	0.94	33.20	161.51	53.38	384
Lochaber, Skye & Lochalsh	0.00	0.01	0.35	1.18	5.01	6.45	7.80	16.91	17.67	13.95	41.23	185.68	10.84	307
Orkney Islands	0.00	0.00	0.00	0.03	12.27	29.34	2.78	9.98	4.91	0.06	2.24	19.50	0.29	81
Shetland Islands	0.00	0.00	0.01	0.03	0.05	3.10	0.04	16.75	7.18	0.28	7.92	62.92	1.39	100
Western Isles	0.00	0.00	0.00	0.00	0.55	0.78	1.84	1.53	6.79	1.54	1.64	59.13	0.17	74
North Eastern Scotland	0.00	2.10	9.22	55.94	7.11	10.78	0.52	7.36	4.59	0.25	4.12	16.61	3.53	122
Aberdeen City, Aberdeensh	0.00	2.10	9.22	55.94	7.11	10.78	0.52	7.36	4.59	0.25	4.12	16.61	3.53	122
South Western Scotland	0.00	0.55	5.23	21.66	18.67	20.46	6.13	16.49	16.30	5.00	17.13	31.01	1.05	160
Dumfries & Galloway	0.00	0.39	5.02	22.61	15.83	20.62	8.49	22.89	19.43	5.35	17.67	38.61	1.63	179
E & North Ayrshire Mainla	0.00	0.17	3.81	15.89	19.92	25.50	3.37	7.14	9.86	2.65	13.98	28.50	0.26	131
E & W Dunbartonshire & He	0.00	0.00	2.80	24.37	11.70	18.76	5.68	11.03	17.19	24.75	51.33	51.66	3.42	223
Glasgow City	0.00	0.00	9.87	44.26	1.81	9.18	0.00	2.10	2.65	0.00	1.68	3.32	0.00	75
Inverclyde, East Renfrews	0.00	0.00	3.54	13.43	22.24	17.31	9.26	11.31	15.17	1.75	9.17	19.52	0.18	123
North Lanarkshire	0.00	0.39	3.77	17.94	7.52	25.47	2.41	6.94	12.24	1.35	1.76	5.22	0.32	85
South Ayrshire	0.00	2.54	10.29	33.56	19.07	21.75	3.11	16.55	12.73	5.20	16.36	25.39	0.86	167
South Lanarkshire	0.00	0.59	5.80	20.64	29.69	13.88	3.69	12.49	17.11	3.90	18.56	20.15	0.19	147
Regional identifier missing	0.00	1.26	5.43	8.55	3.50	3.44	4.05	9.77	7.61	1.12	23.29	122.15	33.50	224
Overall Average	0.11	3.03	9.80	20.44	10.21	12.73	3.85	14.65	16.95	4.22	15.72	76.27	6.57	195

Table 72 also highlights how businesses in different regions are made up of differing LCA classes with businesses in Eastern Scotland having on average larger proportions of LCA 1 – 3.1 area and Highlands & Islands businesses on average including more LCA 6.3 area.

Table 73 shows the LCA breakdown by farm type for the average business. Here we see that the largest average business size occurs in businesses with a farm type of Cattle & Sheep (LFA) (278 ha) and the smallest businesses have a farm type of Horticulture (32 ha) or Specialist Poultry (29 ha).

Table 73: Average business area by farm type and LCA class; also showing average total business area

Average Business Area (ha)	LCA 1	LCA 2	LCA 3.1	LCA 3.2	LCA 4.1	LCA 4.2	LCA 5.1	LCA 5.2	LCA 5.3	LCA 6.1	LCA 6.2	LCA 6.3	LCA 7	Grand Total
Cattle & sheep (LFA)	0.00	0.15	1.31	10.86	14.36	19.66	7.13	26.28	30.65	8.04	27.55	123.06	8.89	278
Cattle & sheep (Lowland)	0.07	1.97	9.78	29.34	4.39	5.49	0.69	1.84	2.06	0.46	2.73	4.79	0.53	64
Cereals	0.35	10.93	34.63	53.04	7.23	8.51	1.30	4.46	4.51	0.86	3.97	19.30	0.85	150
Dairy	0.00	1.53	14.10	49.46	28.62	28.35	6.57	9.31	7.21	1.85	4.39	9.33	0.61	161
General Cropping	1.06	25.59	61.58	47.20	8.50	7.66	1.75	11.51	7.36	2.60	9.03	26.18	5.95	216
Horticulture	0.00	2.56	5.18	4.26	1.86	1.97	0.33	2.46	2.60	0.30	0.57	9.92	0.34	32
Mixed	0.08	4.47	21.39	71.33	18.45	17.35	2.36	10.91	7.56	2.19	6.32	29.89	2.65	195
Other	0.01	0.22	0.95	3.77	2.61	3.58	0.90	4.70	8.05	1.24	8.71	59.60	8.06	102
Specialist Pigs	0.01	0.92	3.58	11.68	4.76	2.86	0.93	2.32	4.75	2.47	4.73	10.34	0.12	49
Specialist Poultry	0.00	0.71	1.13	3.95	3.16	3.57	0.39	2.00	2.49	1.48	2.91	7.58	0.02	29
Farm type missing	0.03	0.76	2.89	5.32	3.62	5.92	2.05	12.38	16.88	3.48	16.89	111.79	9.23	191
Overall Average	0.11	3.03	9.80	20.44	10.21	12.73	3.85	14.65	16.95	4.22	15.72	76.27	6.57	195

Note: 96% of the Other farm type (by area) is Specialist Grass and Forage.

It can also be seen that on average larger areas of LCA 1 and LCA 2 are present in farm types Cereals and General Cropping with LCA 6.3 making up the largest proportion of Cattle & Sheep (LFA). Again, the Scotland average business area is shown to be 195 ha.

Table 74 shows the LFA classification by region. We see that Eastern Scotland, North Eastern Scotland and South Western Scotland are predominantly LFA - Standard while Highlands & Islands is predominantly LFA - Fragile. Eastern Scotland also has a large area of Non-LFA and Highlands & Islands has a large area of LFA - Very Fragile. The grand totals by region match those shown in Table 72 with the average Scotland business area again shown to be 195 ha.

Table 74: Average business area by region and LFA class; also showing average total business area by region

Average Business Area (ha)	Non-LFA	LFA-Stnd	LFA-Frag	LFA-Very	Grand Total
Eastern Scotland	70.59	159.30	15.02	0.89	246
Angus & Dundee City	106.37	134.72	5.75	0.06	247
Borders	58.39	192.51	13.09	0.56	265
City of Edinburgh	129.53	174.13	10.11	0.00	314
Clackmannanshire & Fife	105.19	26.84	17.45	0.40	150
East & Midlothian	102.02	87.30	15.10	0.12	205
Falkirk	29.74	56.42	2.01	0.61	89
Perth & Kinross and Stirl	51.05	232.67	22.25	2.04	308
West Lothian	34.37	88.54	2.14	0.01	125
Highlands & Islands	3.03	5.22	140.65	62.19	211
Caithness & Sutherland an	6.69	6.51	278.96	0.01	292
Inverness & Nairn and Mor	15.16	9.38	359.47	0.04	384
Lochaber, Skye & Lochalsh	0.30	11.79	178.26	116.28	307
Orkney Islands	0.03	0.77	4.33	76.27	81
Shetland Islands	0.00	0.15	0.43	99.09	100
Western Isles	0.00	0.04	0.05	73.88	74
North Eastern Scotland	32.48	66.27	23.25	0.13	122
Aberdeen City, Aberdeensh	32.48	66.27	23.25	0.13	122
South Western Scotland	10.47	138.53	9.73	0.94	160
Dumfries & Galloway	11.83	150.30	14.84	1.55	179
E & North Ayrshire Mainla	7.62	117.52	5.22	0.69	131
E & W Dunbartonshire & He	9.75	194.57	17.55	0.82	223
Glasgow City	0.92	68.88	5.06	0.00	75
Inverclyde, East Renfrews	11.33	107.54	3.87	0.14	123
North Lanarkshire	8.77	72.05	3.82	0.71	85
South Ayrshire	23.52	139.61	4.02	0.26	167
South Lanarkshire	1.65	140.87	4.07	0.09	147
Regional identifier missing	13.51	88.22	115.17	6.76	224
Overall Average	22.85	73.03	71.04	27.60	195

Table 75 shows the LFA classification by farm type. It shows that Cattle & Sheep (LFA) businesses are predominantly LFA - Standard and LFA - Fragile; Dairy and Mixed farm businesses are predominantly LFA - Standard; and that Cattle & sheep (Lowland), Cereals and General Cropping businesses are predominantly Non-LFA. The grand totals by region match those shown in Table 73 with the average Scotland business area again shown to be 195 ha.

Table 75: Average business area by farm type and LFA class; also showing total business area by farm type

Average Business Area (ha)	Non-LFA	LFA-Stnd	LFA-Frag	LFA-Very	Grand Total
Cattle & sheep (LFA)	1.83	118.81	105.19	52.06	278
Cattle & sheep (Lowland)	35.70	20.42	7.27	0.73	64
Cereals	81.39	37.99	28.50	2.02	150
Dairy	33.51	99.16	17.43	10.51	161
General Cropping	126.77	63.98	24.12	1.09	216
Horticulture	10.56	5.22	11.52	5.05	32
Mixed	59.29	78.96	50.42	6.29	195
Other	3.05	21.33	65.73	12.31	102
Specialist Pigs	14.74	14.76	16.46	3.49	49
Specialist Poultry	3.55	18.12	4.64	3.06	29
Farm type missing	8.07	53.12	92.07	38.00	191
Overall Average	22.85	73.03	71.04	27.60	195

Note: 96% of the Other farm type (by area) is Specialist Grass and Forage.

Appendix E Additional Maps

This appendix contains further maps and information which support the interpretation of the baseline, scenario, and change maps shown in Section 6.

Appendix E.1 Claimed vs. Unclaimed Fields

Figure 37 shows the land parcels against which a claim (included or excluded) was submitted in 2009 together with those that were not subject to a claim. The area of unclaimed fields shows potential areas which may become eligible for payment under an area-based scheme dependent on land use. The intention of this map is to give a clearer picture of those fields shaded grey in the Unique Users per Field map in Figure 15.

Appendix E.2 Common Grazing

Figure 38 shows all polygons which have a dominant land use (i.e. the largest area in any multi-claim polygon) declared as Common Grazing. When compared with Figure 15: Number of Unique Users per Field, the match between those multi-user polygons and the common grazing land can be seen.

Appendix E.3 Seasonal Rentals

Figure 39 shows all polygons against which at least one seasonal rental is made with the exclusion of any polygon whose dominant land use (i.e. the largest area in any multi-claim polygon) is declared as Common Grazing. It should be noted that not all of the area will be seasonally rented (since polygons may be subject to multiple claims), but rather a proportion of each polygon shown will be seasonally rented.

Appendix E.4 IACS Land Use Eligibility

Figure 40 shows all polygons classified according to whether any polygon has an IACS declared land use(s) which is considered to be Included or Excluded, or whether there is any unclaimed area within the polygon. Since there may be a mix of all three of these categories, each combination is represented. The green polygons in this map show areas for which we have no current land use (according to the 2009 claims). These are considered as new areas which may become eligible for an area-based payment dependent on the land use within them. The red polygons are any field which has been entirely excluded on the basis of the IACS declared land use (these also appear as grey areas on the scenario maps). Light blue areas indicate polygons for which the entire area of the polygon is eligible for payment.

Appendix E.5 IACS Land Use Eligibility (Excluded Only)

Figure 41 shows only those polygons which are entirely excluded on the basis of their IACS declared land use. These are polygons which are removed before implementing the scenario analyses. (These also appear as grey on the scenario maps).

Appendix E.6 Proportion of Polygon which is an Included Land Use

Figure 42 shows the proportion of each polygon which is considered to be an included land use. Any unclaimed polygons are shown this time in yellow. This gives an indication of how much of each polygon could become eligible (according to current claim data) for payment under an area-based scheme. It shows that not all of the field area of each polygon is currently claimed, and that the proportion of included land uses is below 50% for much of the Western Isles.

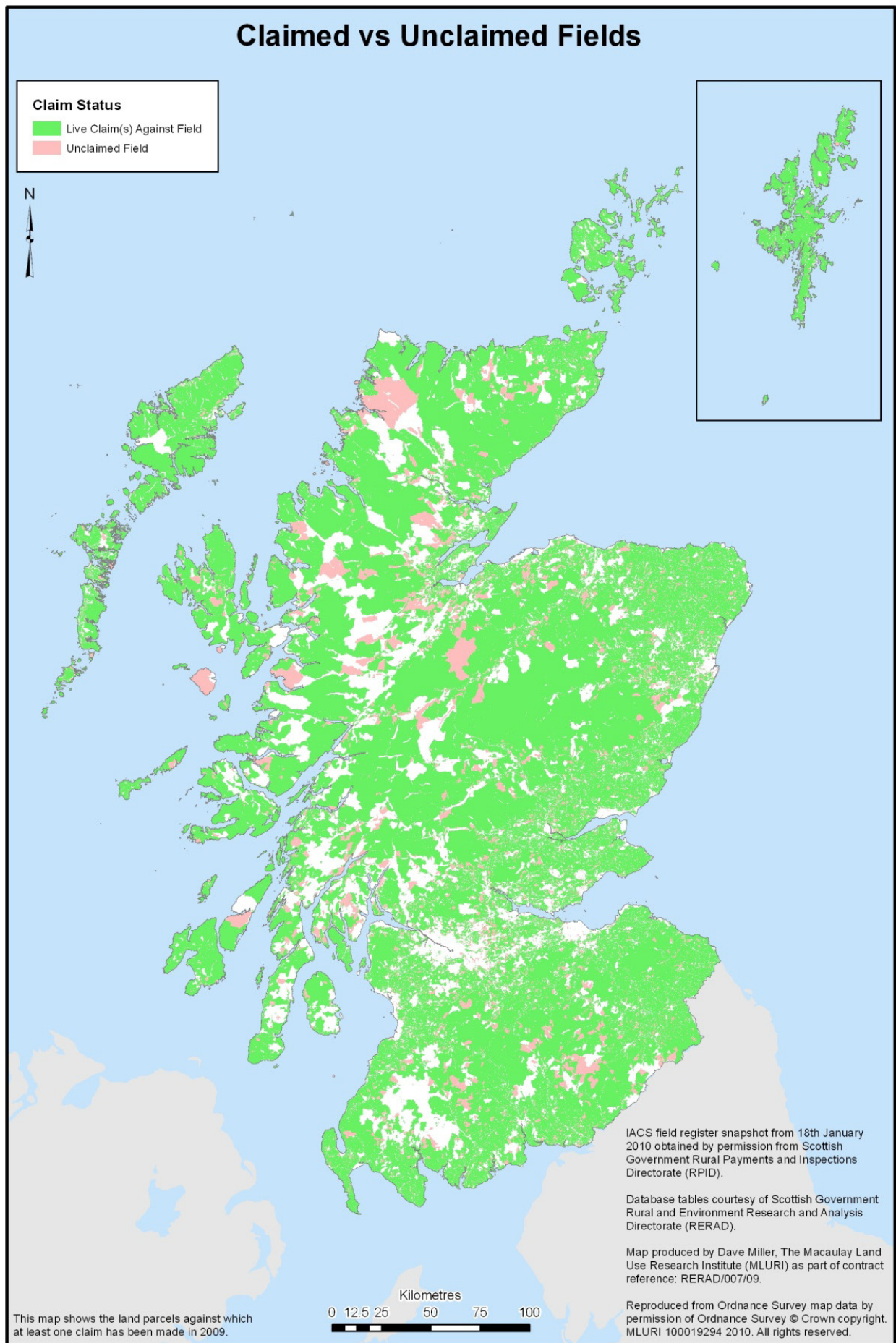


Figure 37: Claimed and Unclaimed Fields

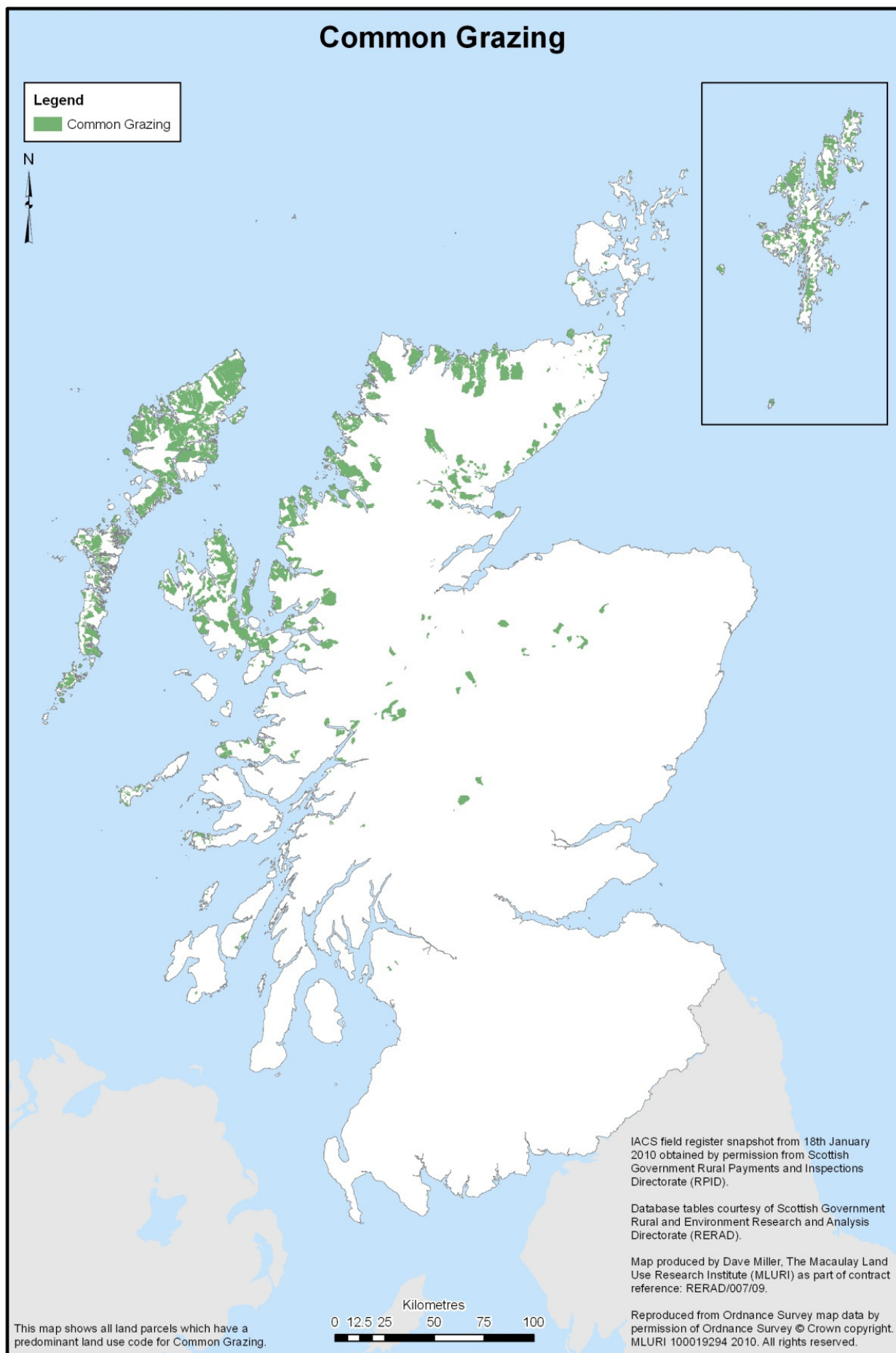


Figure 38: Common Grazing

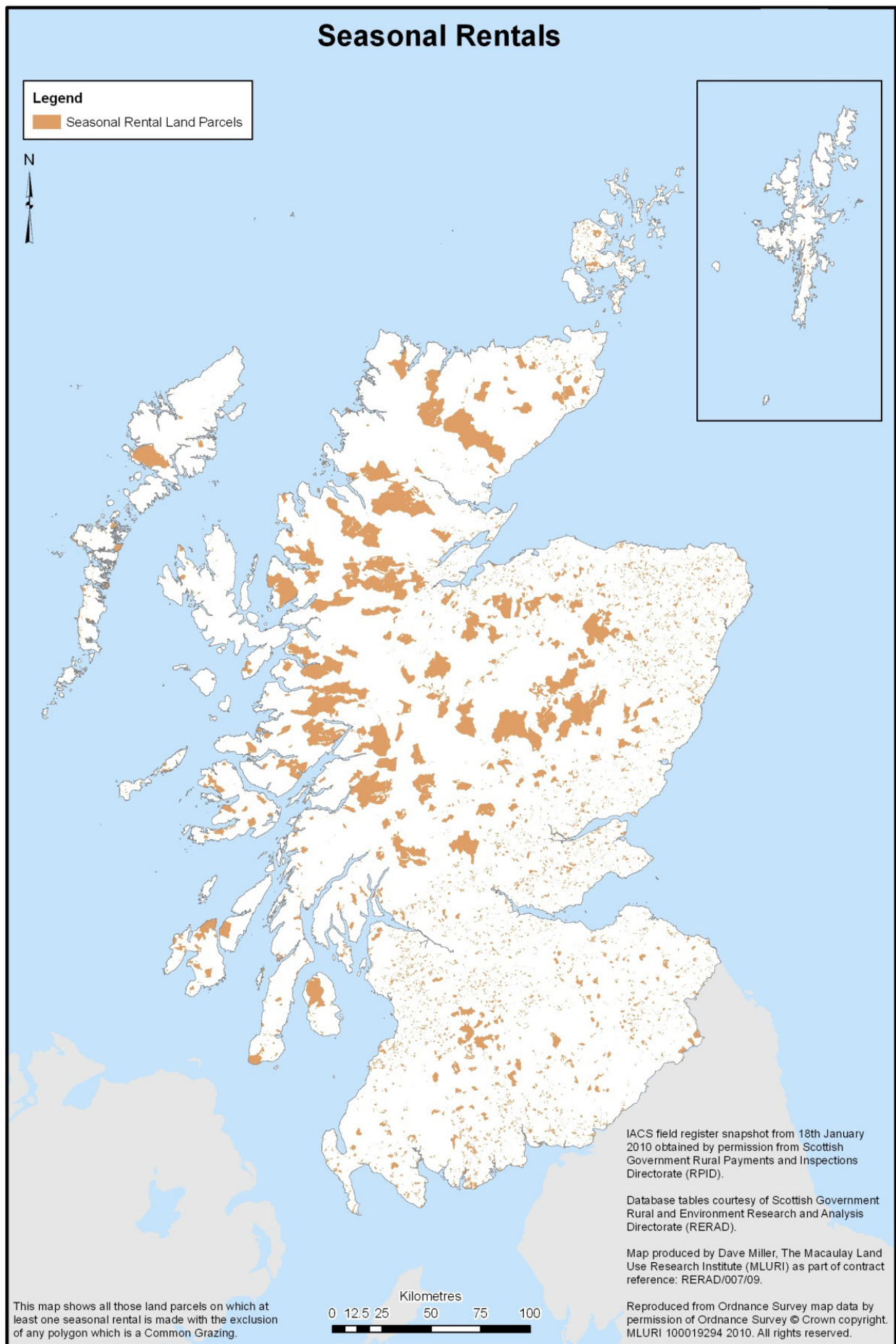


Figure 39: Seasonal Rentals

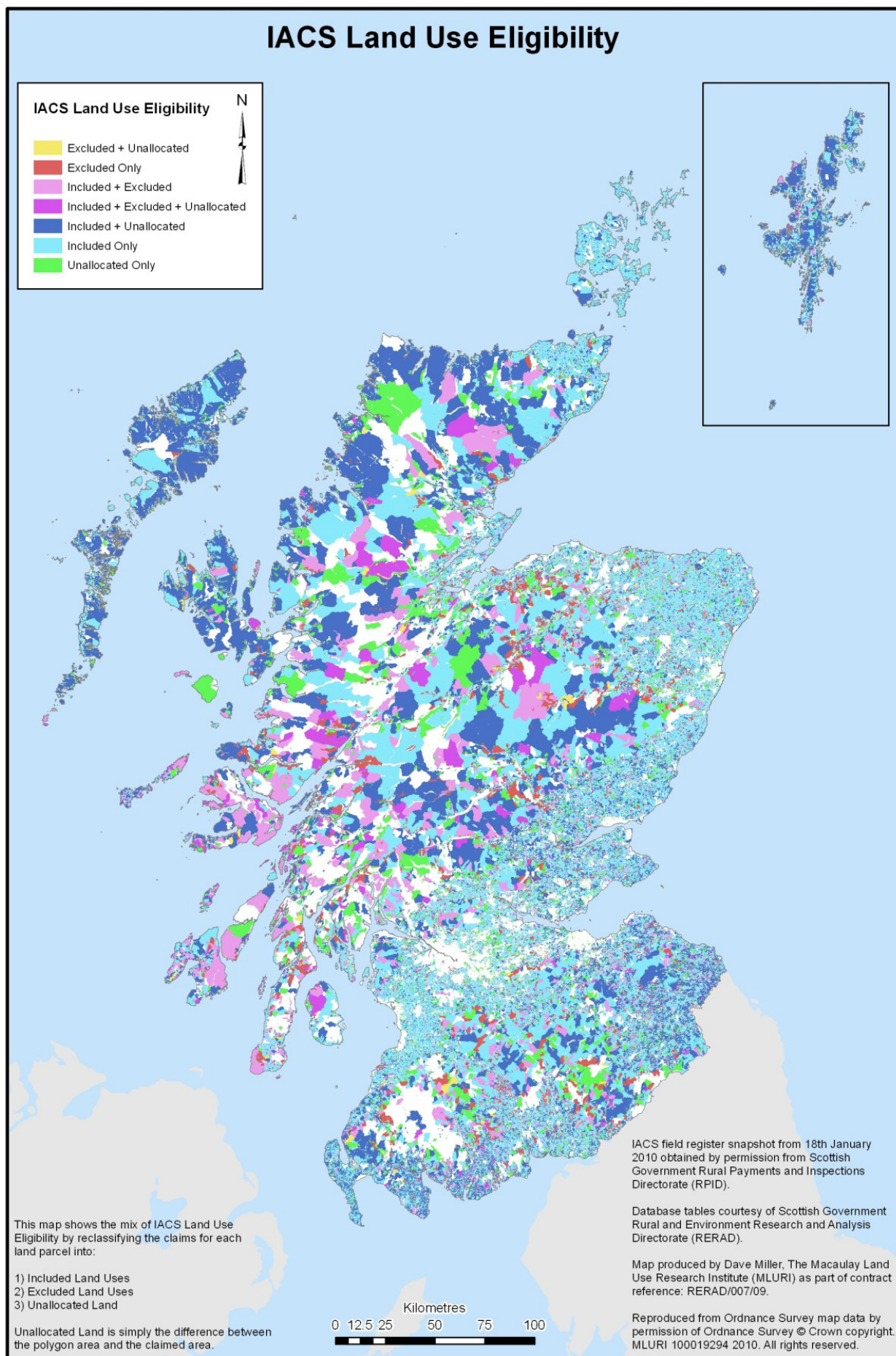


Figure 40: Included, Excluded and Unclaimed Land

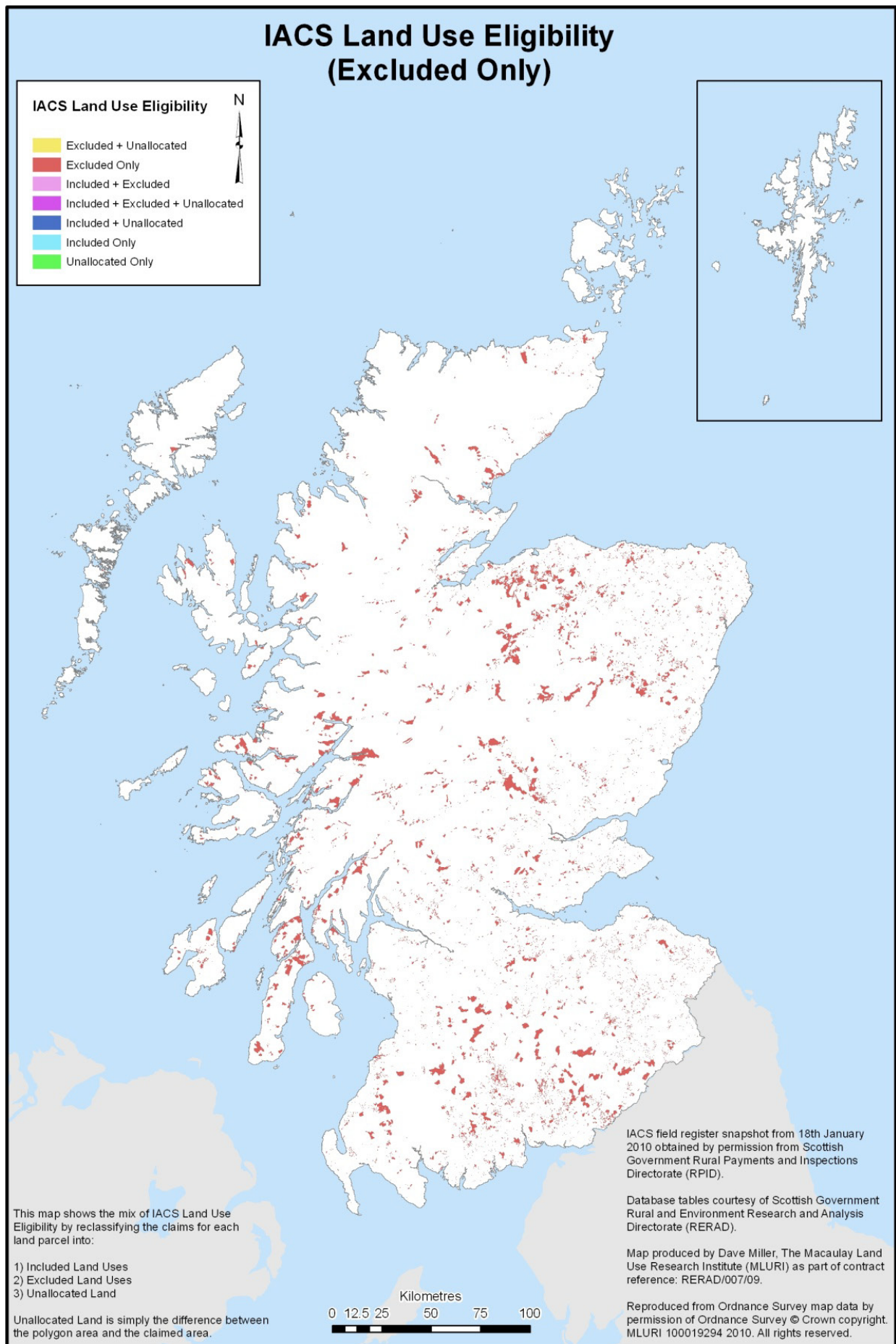


Figure 41: Excluded Land (IACS Land Use)

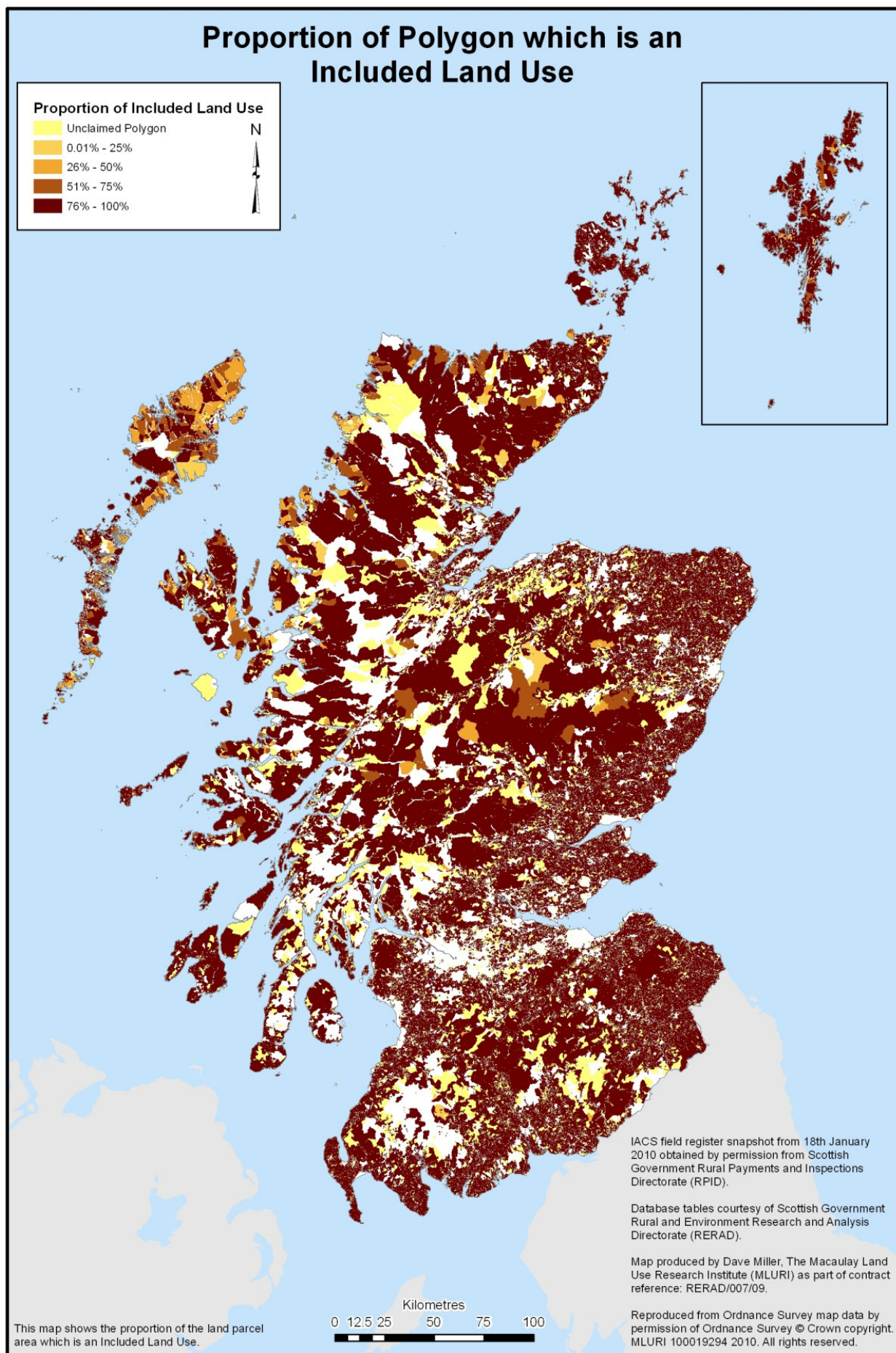


Figure 42: Proportion of Land Parcel with Included Land Use

Appendix F Summary of Issues Related to the Interpretation of Results

The analysis is strongest in assessing the consequences for existing entitlement holders. It is weaker in assessing, at a business level, the payments for areas of land that would become eligible but currently do not make a claim. It is important that any interpretation of the results takes account of these and other limitations. None of the limitations are, however, so severe that they undermine the overall credibility of the analysis in terms of the headline results.

The following caveats apply to the analysis performed herein:

Appendix F.1 Issues

- Data is collected and processed at different resolutions (i.e. sub-field, field, holding, main farm or business level). Results are generally reported at business level by aggregating the data; however the aggregation process is not perfect for the following reasons:
 - Detailed sub-field (e.g. LCA analysis) data cannot be accurately reconciled with field-level land use data where there are multiple land uses within a field. This is because the precise location of each land use within the field cannot be determined. In these cases a worst case (for payment) strategy has been applied by assuming that included land uses occur on the best LCA land.
 - The geo-referencing point for a holding is usually the farm building and fields are not guaranteed to be geographically adjacent to the holding that owns them. In addition, geographical features can cross regional boundaries so it may be the case that some fields are actually located in a different region to the holding that they belong to.
 - When a business owns multiple holdings, one of them is designated as the main farm. A main farm can be geographically distant to any of its sub-holdings since there is no requirement for them to be contiguous or even within the same region. This means that payment for a field in one region may actually be made to a business with a main farm located in another region.
- Region data is incomplete for 8% of the included area since in these cases it was not possible to make the link between a claim and the main farm code for the business making the claim or it was not possible to determine the region for the main farm (e.g. for businesses located outwith Scotland).
- It was not possible to resolve a business reference number for 399,471 ha of land that has been designated as 'included'. This is a mixture of known holdings where the business owning the holding is not known (241,316 ha) and JAC claimed areas that are not covered by an IACS claim at present but for which are expected to submit a claim in future if they became eligible in a new scheme (158,156 ha). These areas are accounted for in the scenario payment calculations but they are not attributed to a business and so are excluded from some results, e.g. the numbers of businesses seeing a change in payment.
- Unmapped Area - since there is no land parcel mapping for this area the option of determining the LCA mix by GIS overlay is not available (without a more detailed investigation). What is known is the mix of LCA classes that are outwith the IACS mapped area. Therefore the assumption made is that the LCA mix for the Included JAC area is estimated from this remaining LCA area using the same worst case (for payment) approach detailed above. This has the consequence of including the LCA classes with the greatest land use capability (i.e. the land most likely to be being used for agriculture). While this is a necessary assumption for budgeting purposes it is weakened by the fact that the mix of land uses present within the Included JAC land is dominated by rough grazing. Since this is unlikely to be found on the best quality land it is likely that the LCA mix assumed for the Included JAC contains too large a proportion of the more capable LCA classes. Another consequence of the inclusion of unmapped areas is an increase in the size of the Missing Data categories for Region and Farm Type analyses. Further investigation of the unmapped area would require modifications to the analytical framework and is beyond the scope of the project.
- Farm type data comes from June Agricultural Census. Since there is a direct one-to-one relation between business and main farm code, the join between IACS and JAC is made for main farm codes. Since the

analysis uses main farm code as a surrogate for the business, the farm type of the MFC is applied to the business. Getting this meta-data from JAC has the following consequences:

- Where the MFC does not exist in JAC the data is classified as farm type missing.
- Non-MFC holdings (i.e. sub-holdings) are *not* taken into account when preparing the farm type classification but fields belonging to those sub-holdings *are* accounted for in the field-level analysis.

Appendix F.2 Minor Issues

- There is a difference between the business level baseline payment (€648 million) and the field level baseline payment (€647 million). This is an artefact of the baseline flattening process where it is impossible to calculate a payment rate for businesses in receipt of a payment but who have been identified as having zero included land use area.
- There is a slight mismatch between the total baseline payment budget (€648 million) and the scenario payment budgets (€645 million) due to areas that were expected to attract payment occurring in LCA 888/999/9500 coded land.
- There is a small difference between IACS polygon area and LCA area due to mapping scales – any IACS claim areas that fall outside of the LCA areas have been omitted from the analysis.
- The field data used in the analysis is the pre-crosschecked field claim data. However before it could be used a number of quality control steps were performed including: correction of over claims; mismatches in LLO claims; missing LLO claims; etc. See Section 3.1 Data Collation - IACS Data Quality Checks.

Appendix G Summary of GIS Implementation Issues

IACS was designed to validate individual business claims. It was not designed to be used in conjunction with LCA or LFA as the basis for the calculation of area payments. As might be expected, the implementation of an area-based payment scheme would require the consideration of several technical issues related to the spatial representation of field data, for example:

- The digitising of field boundaries would need to be validated to avoid overlaps or gaps between field polygons (Scottish Government are currently working to resolve these issues).
- Checks would need to be made to ensure that all claims match an active field and that there is no duplication of claims for the same field.

In circumstances where there are a number of claims per field, there is no way of knowing where within the field those claims are being made. As a result, it is not possible to accurately apportion LCA or LFA classes to claims in mixed land use polygons. In these circumstances a strategy would be needed for apportionment. For example the eligible land could be allocated to the best LCA land first (see Section 3.5).

- LCA is mapped at two scales (1:50,000 for most of the more intensively managed land and 1:250,000 scale for the remaining areas). This results in differing levels of accuracy between these areas.
- The mapping scale of LCA differs from the mapping scale used for the IACS field polygons (approx 1:2500 to 1:5000 in the better mapped areas). This difference in scale can mean some fields adjacent to urban areas are coded as built-up in the LCA and are not given an LCA agriculture class (Figure 43). In future this could be improved upon by altering the boundary of the LCA built-up area.

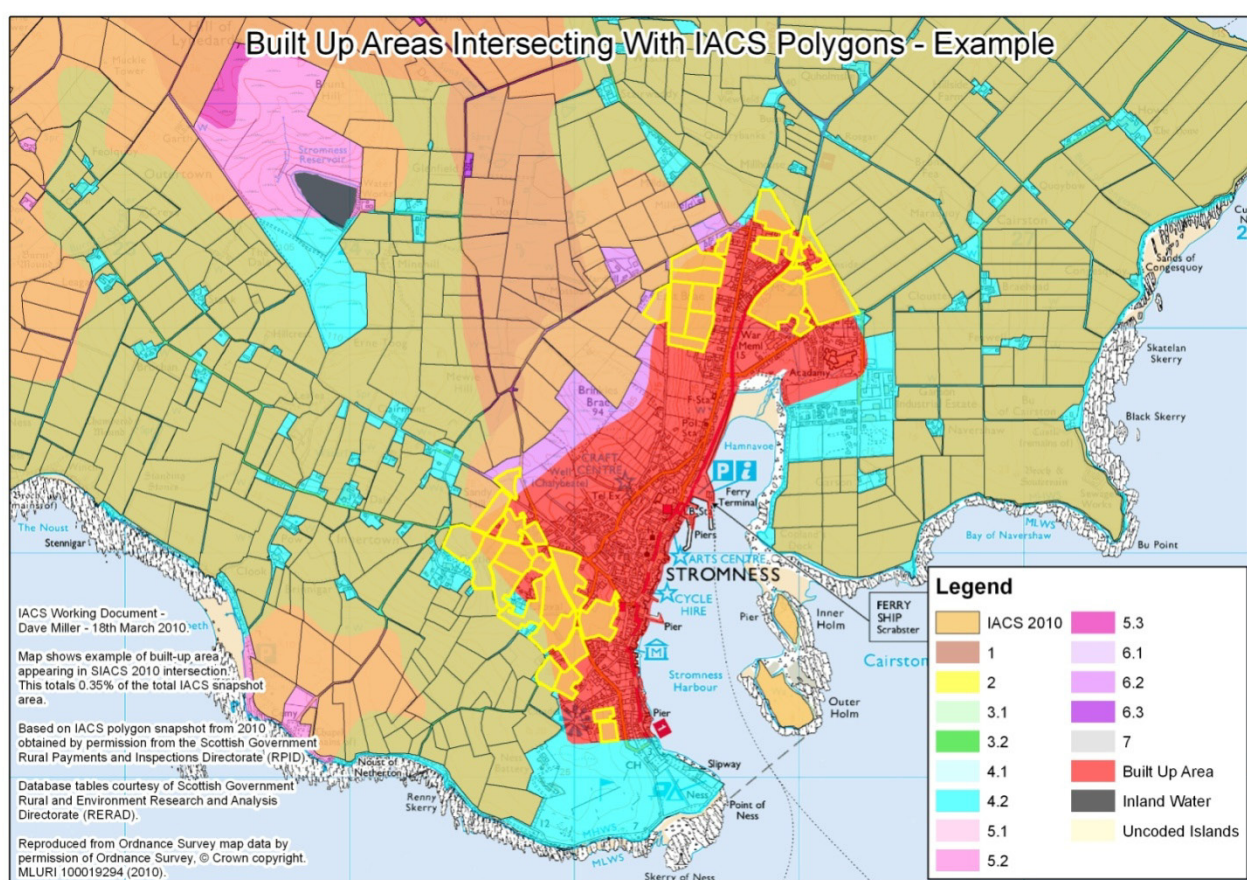


Figure 43: Built-up example

- Some large estate polygons exist in IACS that contain lochs which have not been excluded. LCA classifies these areas as inland water (Figure 44) but they should be excluded in the IACS field dataset before implementing an area-payment scheme.

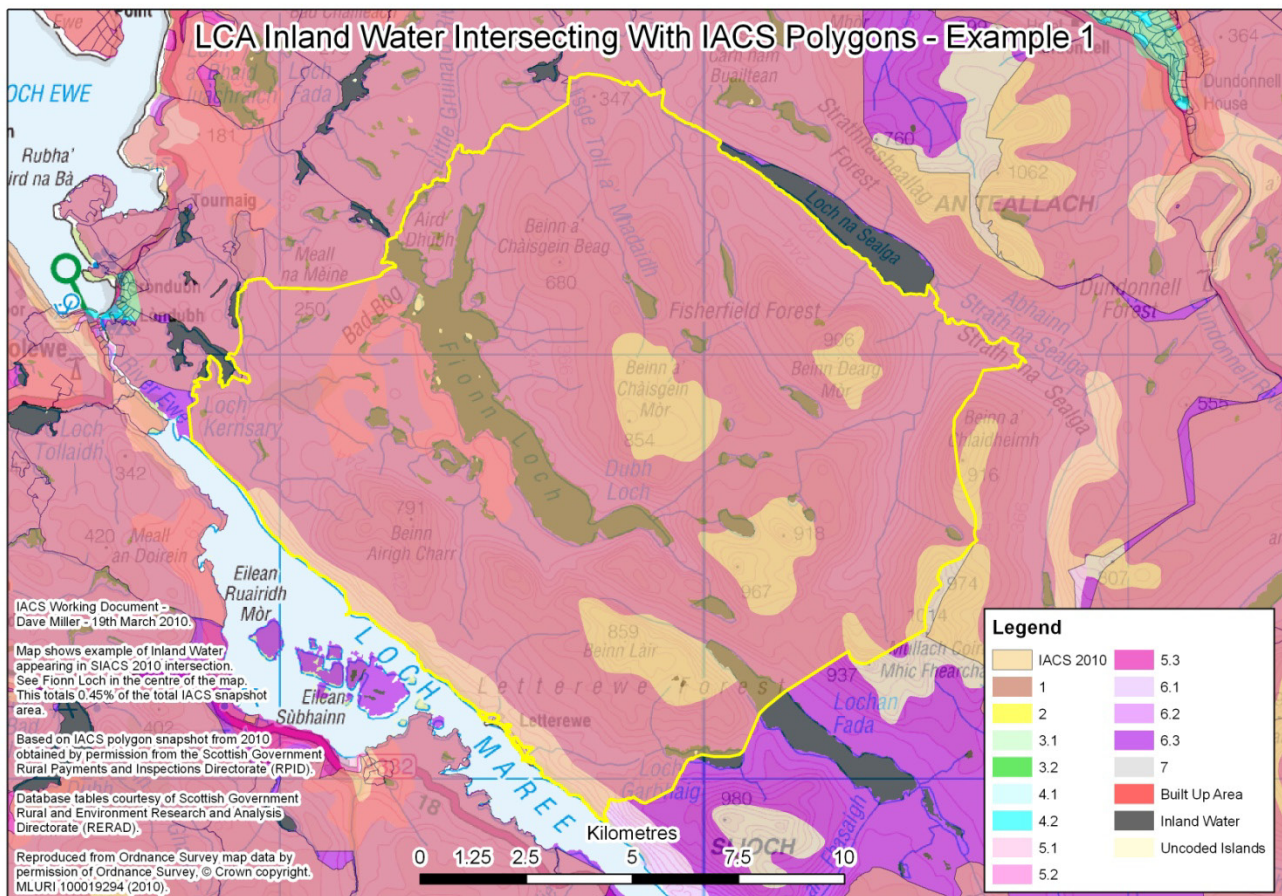


Figure 44: Inland water examples

- A number of small islands (0.02% of total area) are coded as Uncoded islands in LCA, which means no LCA payment rate can be assigned to these areas. This may be a moot point since it is unlikely that these areas will be farmed.
- In some cases, such as the example in Figure 45, the IACS polygons do not match the coastline. The area outlined in blue forms part of the polygon outlined in yellow and cuts across two sea lochs on the west coast. The implementation of an area payment scheme would require that all spatial datasets implement a common coastline as the lower limit of claimable agricultural land. This coastline should be based on the Ordnance Survey Mean High Water Mark.

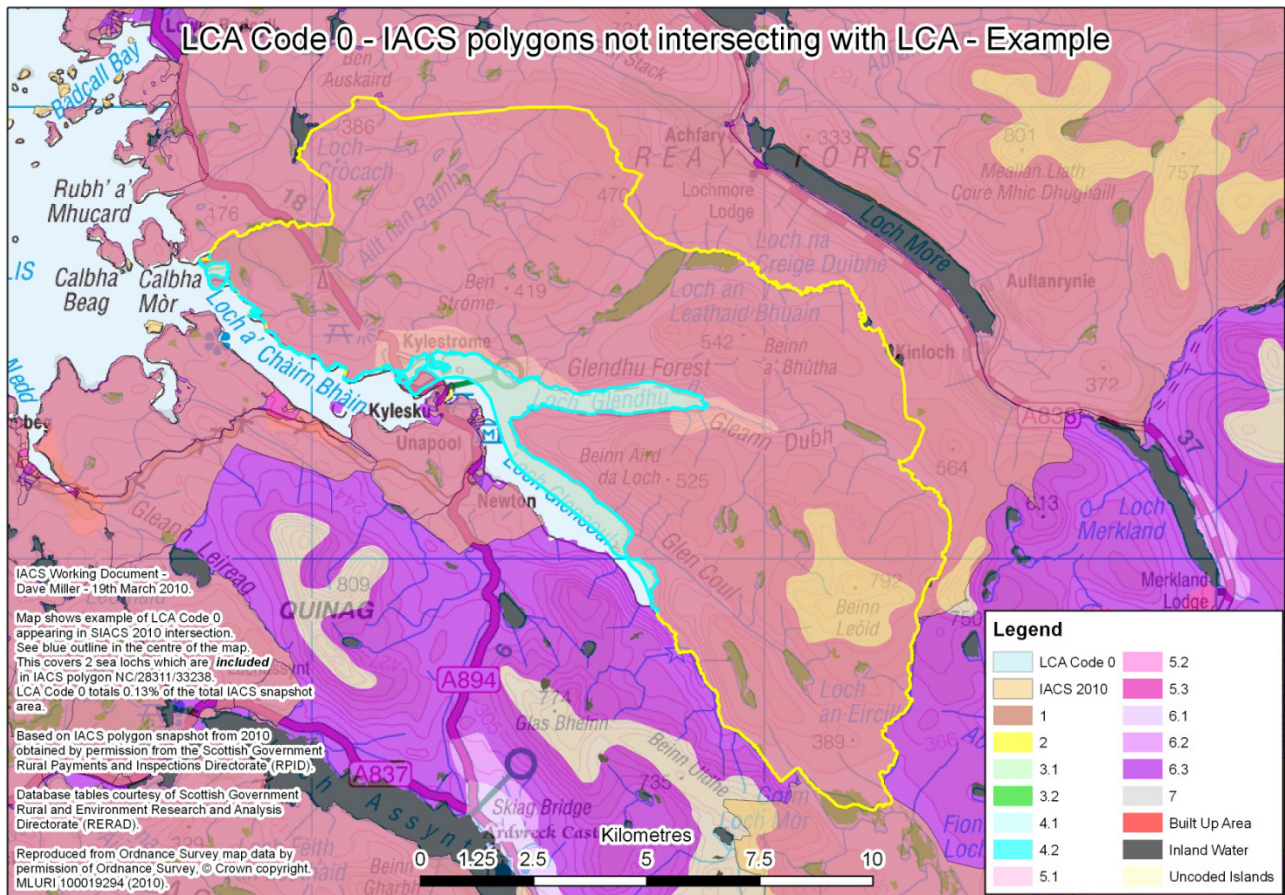


Figure 45: Example showing IACS polygons that do not intersect with LCA