CAP Greening Review – Part 2 – Distribution of Measures

An analysis of the distribution of the three 'standard' greening requirements and their potential impact for agricultural businesses in Scotland using Single Application Form returns for 2014.

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LIST OF ABBREVIATIONS

Abbreviation	Description
AFRC	Agriculture, Food, and Rural Communities
BPS	Basic Payment Scheme
CAP	Common Agricultural Policy
COMM	Common Grazing
EFA	Ecological Focus Area
FID	Field Identifier
GIS	Geographical Information System
IACS	Integrated Administration and Control System
LFA	Less Favoured Area
LFASS	Less Favoured Area Support Scheme
LIEM	Land In Environmental Management
NATURA	NATURA 2000 designated site
NVZ	Nitrate Vulnerable Zone
PGRS	Grass Over 5 Years
RGR	Rough Grazing
RP	Rural Priorities
RPID	Rural Payments and Inspections Division
SAC	Special Area of Conservation
SAF	Single Application Form
SAF14	Single Application Form - Returns made in 2014
SFP	Single Farm Payment
SLR	Standard Labour Requirement
SPA	Special Protection Area
SRDP	Scottish Rural Development Plan
SSSI	Site of Special Scientific Interest
TGRS	Grass Under 5 Years
WDG	Open Woodland (Grazed)

Note - the above list contains some IACS crop codes used in the analysis. A full list of crop codes together with a lookup table containing classifications used in the analysis may be found in Appendix 4.2.

THE CAP GREENING REVIEW

This review was commissioned by the Cabinet Secretary for Rural Affairs, Food and Environment as part of the policy development process for the Common Agricultural Policy (CAP) Greening measures to be implemented from 2015. The scope of the review was agreed within government with the review managed by the Natural Heritage Management Team within the Environment and Forestry Directorate and supported by analysts from the Rural and Environment Science and Analytical Services Division. The particular focus of the review was on the use of *equivalence* measures. These are the measures designed and implemented within member states as alternatives or supplements to the standard mandatory measures prescribed in the EU Regulations. The review was conducted by staff of the James Hutton Institute between February and May 2015 with interim results used by policy makers (and stakeholders) in decisions announced by the Minister in June 2015. Given the freedom for member states to revise and update Greening equivalence measures this document is intended to provide a record of the evidence base provided by the Greening Review and to contribute to subsequent phases of policy development and implementation. It reflects the state of play in June 2015 and does not consider later revisions to Greening.

The report of the Greening Review comes in four parts.

Part 1 is an overview of the recent trends in key environmental indicators in Scotland, covering soils, biodiversity, water quality and climate change. In addition to outlining the state and trend of each component of the environment, Part 1 also identifies current and potential future pressures. Where any of these pressures are likely to stem from agricultural practices, they are specifically identified.

Part 2 (this document) is a technical report of the distribution of measures providing definitions of the standard and proposed equivalence measures as they stood when the review was commissioned. The report provides a sectoral and regional analysis of the distribution of businesses whose pattern of land use means they would need to undertake one or more of the three Greening requirements. For these businesses, the report also identifies (as far as possible) if their pattern of land use already meets the criteria contained in the Greening measures. This analysis is based on business returns made through the Single Application Form (SAF) for 2014.

Part 3 is a series of map books that are a product of the analysis contained in the distribution of measures technical report. These define the spatial distribution of the greening requirements. National maps for each of the three standard greening requirements are followed by maps for each of the 14 agricultural regions. In addition, data currently collected allows an assessment of the degree to which the crop diversification requirement is currently being met.

Part 4 is an Expert Review of the three standard Greening measures, and where relevant the (then) proposed draft equivalence measures. This draws on research in five fields of study: agro-ecology; biodiversity and landscape ecology; climate change adaptation and mitigation; soils, and waters and catchments. Questions addressed within the Expert Review include: localised and landscape effects, trade-offs, the consequences of implementation factors not specified in the regulation; context specific factors that should be included in guidance to ensure the measure is effective and opportunities for cooperation between businesses and coordinating types and locations of measures.

Part 1 thus provides the wider context, Part 2 the numbers, types and locations of businesses affected and thus the potential scope for benefits or burdens, Part 3 the spatial distribution of the measures, and Part 4 assessments of the (then) proposed equivalence measures set against the counterfactual of the standard greening measures that would otherwise have been implemented.

SUMMARY

This document contains an analysis of the distribution of the three 'standard' CAP Greening requirements in Scotland. These are:

- Permanent Grassland Requirement
- Crop Diversification Requirement
- Ecological Focus Area Requirement

This analysis is based on all Single Application Form (SAF) returns for 2014 made by 21,649 businesses since it was not known which businesses would apply under the new scheme[1]. For the Crop Diversification Requirement, an assessment of the degree to which this requirement would have been met in 2014 is presented. Results are summarised by Agricultural Region, Farm Type, and Business Size. A sister document containing maps is in Part 3 of this Review. Note the analysis used the rules as they stood in 2015 and these have been subsequently amended.

Key Findings

- The proportion of improved permanent grassland would need to drop by around 29% of its current (2014) area in order for government intervention to be triggered under the Permanent Grassland Requirement. It is highly unlikely this will occur.
- Of the businesses submitting a Single Application Form in 2014, 16,740 (or 77%) are exempt from both the Crop Diversification Requirement and Ecological Focus Area Requirement.
- Of the 4,909 businesses subject to either the Crop Diversification Requirement or the Ecological Focus Area Requirement, 4,744 businesses (97%) are subject to both.
- The Crop Diversification Requirement applies to 23% of businesses and 76% of the arable area. 94% of the arable area subject to the requirement (752,784Ha) falls under the 3 crop rule. North East Scotland has 35% of the arable area subject to the requirement (259,983Ha), Tayside 19% (139,821Ha) and Scottish Borders 12% (93,120Ha). In terms of Farm Type, Mixed Holdings, Specialist Cereals, and General Cropping businesses account for 77% (576,489Ha) of the arable area subject to the requirement.
- For the Crop Diversification Requirement, of the 4,274 businesses subject to the 3-crop rule, 3,030 (71%) already pass the requirement. In terms of arable area, those already passing make up 81% or 571,397 Ha of 705,642 Ha. Of those businesses which fail, the majority fail due to the absence or the limited extent (<5% arable area) of a third crop. A smaller number fail due to the size of the main crop exceeding the 75% arable area threshold.
- For the Ecological Focus Area requirement, 78% of businesses are exempt from the requirement, but 77% of all arable area is included in the requirement. At the national level, 3.83% of arable area or 37,680 Ha (or equivalent) must be declared as an EFA.
- Since nearly all businesses must meet both the Crop Diversification and EFA requirements, it is likely that options that can help deliver both may be favoured (i.e. areas of fallow or nitrogen fixing crops).

[1] In the event, 18,340 businesses received Greening payments in 2015.

INTRODUCTION

This document, Part 2 of the CAP Greening Review, contains a distributional analysis of the requirements of the three 'standard' CAP Greening measures as implemented in Scotland. It is based on business returns made through the Single Application Form (SAF) for 2014 and quantifies both the distribution of the measures across agricultural businesses in Scotland, and where possible, the extent to which the Greening requirements are currently being met. A sister report by a panel of experts drawn from across the James Hutton Institute considers the potential effect of these measures, and of proposed equivalence measures, in respect of a number of research domains including agro-ecology, biodiversity, landscape ecology, climate change adaptation and mitigation, soils and catchments.

1 BACKGROUND

The post-2015 CAP Reforms in Pillar 1 contain a number of changes to the way in which subsidy payments are made. Figure 1 gives an overview of the new shape of the CAP in Scotland. In addition to the move to an area-based payment scheme (known as the Basic Payment Scheme), a significant portion of the budget (approximately 30% of direct payments) will now be paid under the element known as "Greening". It is mandatory for applicants to the Basic Payment Scheme to comply with Greening requirements for which they will receive an additional Greening payment in accordance with the total number of eligible hectares in the relevant basic payment region.

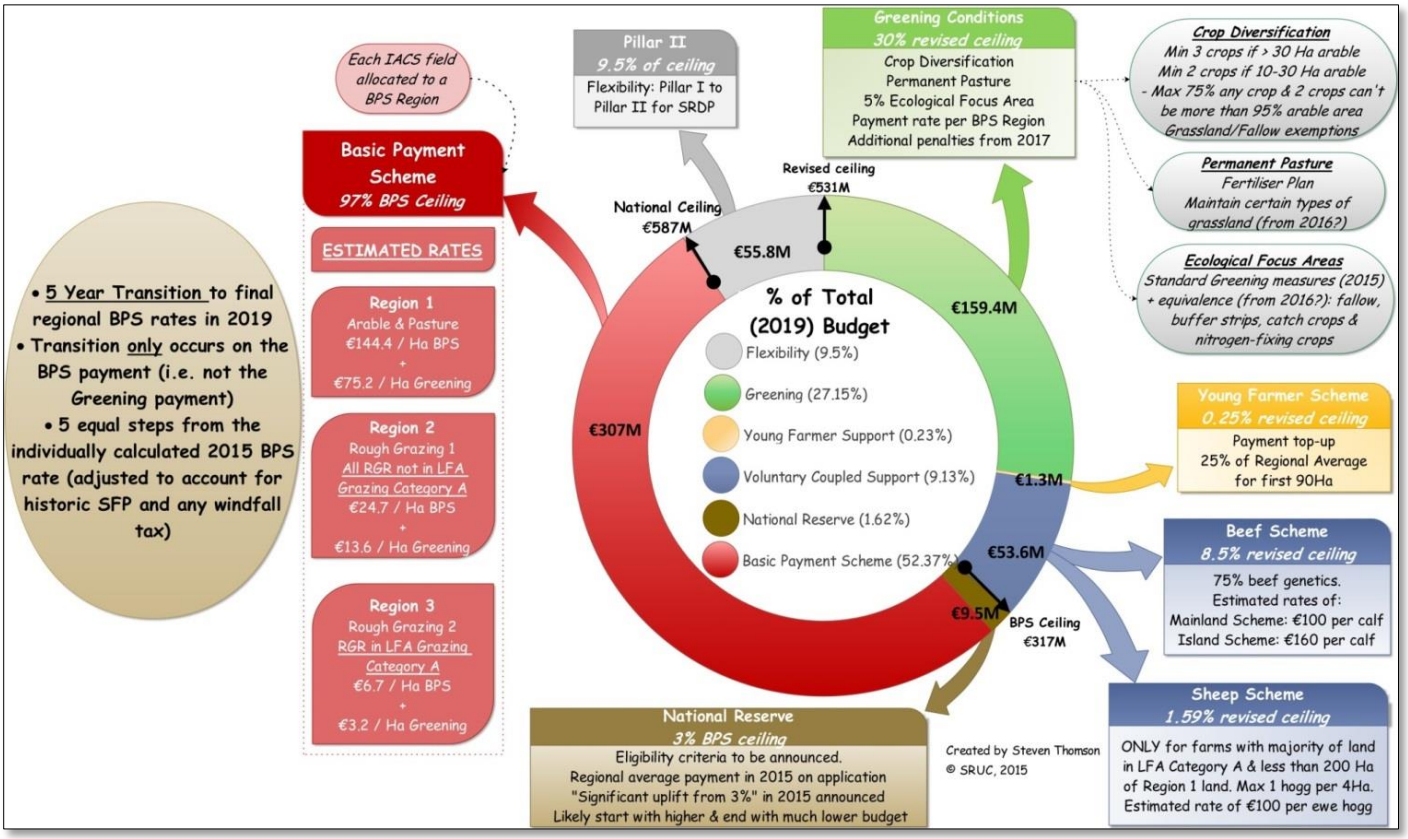

Figure 1: Shape of the new Pillar 1[2]

Under Greening there are three requirements. Businesses may be subject to one or more of the three standard Greening requirements. The three requirements are:

- Permanent Grassland Requirement
- Crop Diversification Requirement
- Ecological Focus Area

[2] Image courtesy of Steven Thomson, Senior Agricultural Economist, SRUC.

From 2016 onwards the Scottish Government proposes to introduce alternative management options for applicants under a national environmental certification scheme known as "Equivalence". This seeks to better reflect the particular challenges facing land managers in Scotland by offering alternative, or additional, practices under two of the three standard Greening requirements. These alternatives apply to the Permanent Grassland Requirement and the Crop Diversification Requirement only.

This part of the Greening Review seeks to establish:

- The degree to which the standard Greening requirements apply to agricultural businesses in Scotland.
- Where possible, the extent to which the standard Greening requirements are currently being met in Scotland.
- Where possible, the numbers and distributions of businesses that could be affected by decisions on any equivalence measures.

1.1 CAP Greening Measures

As noted above there are three 'standard' Greening requirements plus a proposed set of 'equivalence' options (in Scotland from 2016 onwards) which apply at the national or business level. An overview of each of the measures follows as they stood in 2015.

1.1.1 Permanent Grassland Requirement

At the Scotland level, EU regulations require that the ratio of permanent grassland compared to the total agricultural area declared must not decrease by more than 5%. This ratio is to be monitored by Scottish Government. Under Greening, permanent grassland is defined as land that is used to grow grasses or other herbaceous forage (such as clover), either naturally (self-seeded including 'rough grazings') or through cultivation (sown), which has **not** been included in the crop rotation for five years or longer. This means that land reported on the Single Application Form (SAF) as *Rough Grazing* (RGR) and *Grass Over 5 Years* (PGRS) **both** count under the permanent grassland requirement.

In addition to Greening, there are also activity restrictions on certain types of permanent grassland which apply to individual businesses. Any permanent grassland designated as Environmentally Sensitive Grassland (ESG) must not be converted or ploughed. In Scotland these are NATURA[3] designated sites for which existing specific management conditions are already in place. A specific set of NATURA sites has been identified as Environmentally Sensitive Grasslands, which are those sites protected as Special Areas of Conservation because they have a qualifying grassland feature such as upland or wetland habitats, relevant to the CAP regulations. Similarly for permanent grassland in Sites of Special Scientific Interest (SSSIs) any site requirements that may apply to grassland habitats must also be observed under the Permanent Grassland Requirement. Unimproved semi-natural grassland beyond NATURA designated areas are already protected by The Environmental Impact Assessment (Agriculture) (Scotland) Regulations 2006, and land managers wishing to improve this land must first establish whether an Environmental Impact Assessment needs to take place. Thus for substantial areas of semi-natural land and environmentally sensitive grasslands on designated sites there are already more tightly defined existing protections (see sections 2.2 and 3.2). These existing protections combined with a definition of permanent grassland that includes all rough grazings means that potentially a substantial share of unprotected, improved grasslands could be ploughed before the threshold for intervention would be breached.

Figure 2 (taken from page 5 of the Scottish Government Basic Payments Scheme Greening Guidance Booklet[4]) shows the decision rules used to guide land managers in determining their requirements. In essence, unless a business is

[3] NATURA sites in Scotland comprise Special Areas of Conservation (SAC) and Specially Protected Areas (SPA).
[4] http://www.gov.scot/Topics/farmingrural/Agriculture/CAP/CAP2015/Greening/GreeningBooklet

seeking to improve its permanent grassland (e.g. through ploughing) then it is already meeting the conditions of the permanent grassland requirement.

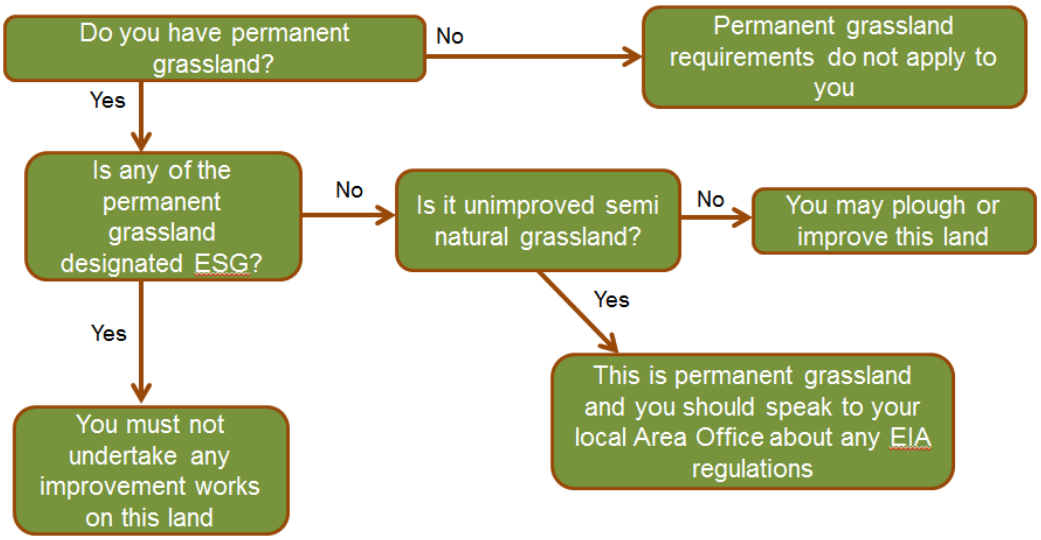

Figure 2: Flowchart for Permanent Grassland Requirement

1.1.2 Crop Diversification Requirement

The crop diversification requirement is intended to enhance biodiversity by requiring a minimum number of arable crops to be grown subject to a number of conditions. Businesses whose land is entirely certified as organic are exempt from this requirement. Businesses partially certified as organic have the option to benefit from the exemption on the organic part of their holding(s) or they may choose not to benefit from the exemption and instead meet the requirement across the whole holding. Otherwise the flowchart in Figure 3, taken from page 7 of the Greening Guidance Booklet[4], applies.

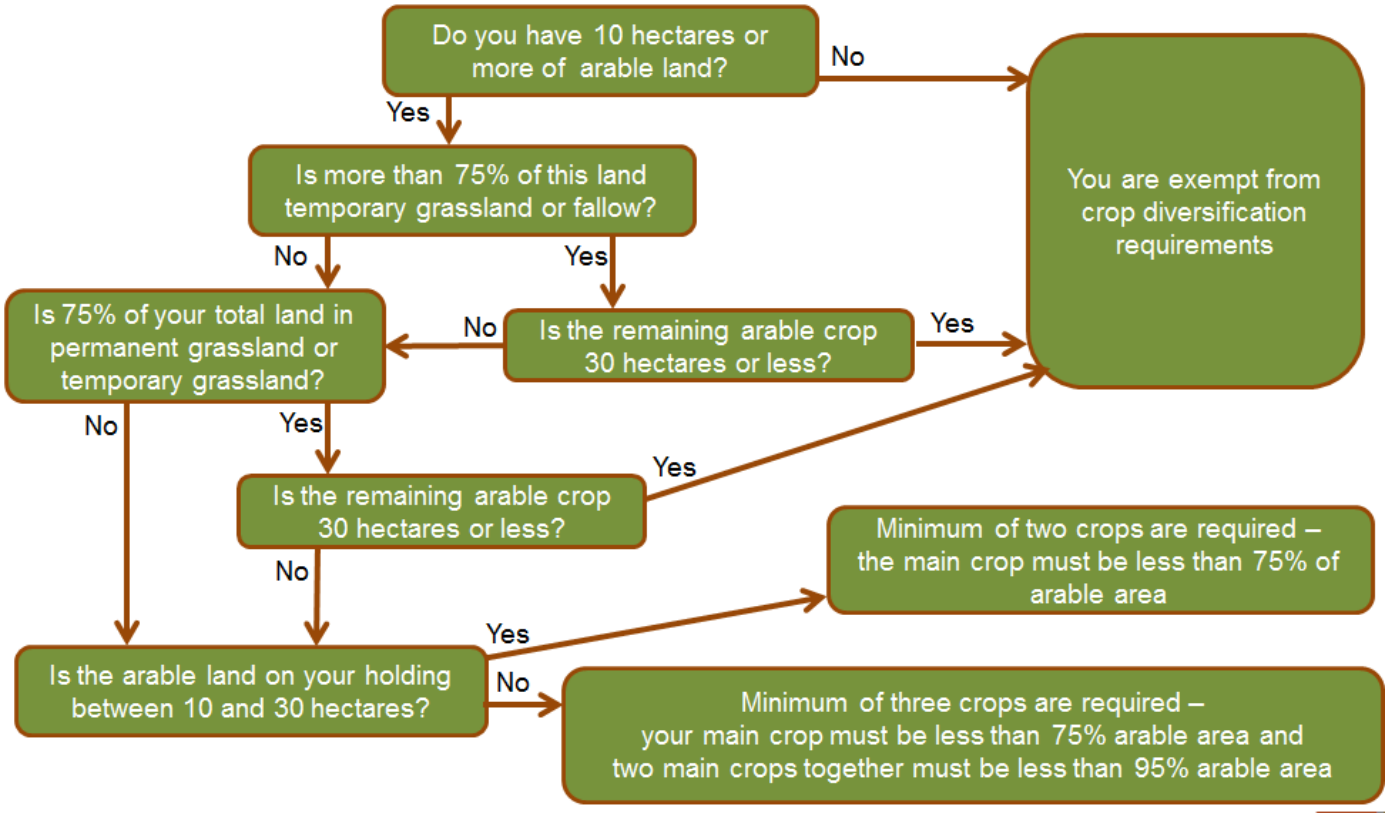

Figure 3: Flowchart for Crop Diversification Requirement

In addition, for the remainder of businesses for which the above chart does not apply,

These businesses meet the following conditions:

a) They have more than 10ha of arable land.
b) Temporary grassland or fallow land makes up more than 75% of the arable land in the business.
c) The rest of the arable land in the business is more than 30ha.

So a separate version of the 3 crop rule applies (referred to in this report as the 3 crop "special" rule).

Where a business meets the above criteria, the 75% restriction on the proportion of the arable area that the main crop makes up is lifted, and on the remaining arable land at least two other crops must be grown. The main crop on this remaining arable land must not cover more than 75% of this land. This leads to the following possibilities per business:

- Exempt from crop diversification requirements.
- 2 crop rule applies (at least two crops must be grown where the main crop must be less than 75% of arable area).
- 3 crop rule applies (at least three crops must be grown where the main crop must be less than 75% of arable area and the two main crops must together make up less than 95% of arable area).
- 3 crop "special" rule applies (at least three crops must be grown but there is no restriction on the proportion that the main crop makes up).

For the purposes of crop diversification, the concept of "crop families" applies where species within the same genus count as a single crop. For three large genera, *Brassicaceae, Solenacea* and *Cucurbitaceae,* crops within the same genus may count as separate crops as long as they are different species. Additionally winter and spring crops count as **separate** crops. Land lying fallow also counts as a separate crop. Finally, permanent crops such as blackberries and nurseries **do not** count for the purposes of crop diversification.

1.1.3 Ecological Focus Area Requirement

The Ecological Focus Area Requirement (EFA) applies at the business level with the main aim of the requirement to improve biodiversity[4]. If a business is subject to this requirement then 5% of the total arable area of the business must be put into one or more of the following five EFA options. These are:

- Fallow land
- Buffer strips
- Field margins
- Catch crop / green cover
- Nitrogen fixing crops (subject to management conditions)

Similar to the crop diversification requirement exemptions exist for wholly organic businesses while for partially organic businesses the part of the business that is not certified organic is subject to the EFA requirements. Otherwise the flowchart in Figure 4, taken from page 12 of the Greening Guidance Booklet[4], applies.

This leads to the following possibilities per business:

- 5% of arable area is subject to the Ecological Focus Area requirement.
- Exempt from the Ecological Focus Area requirement.

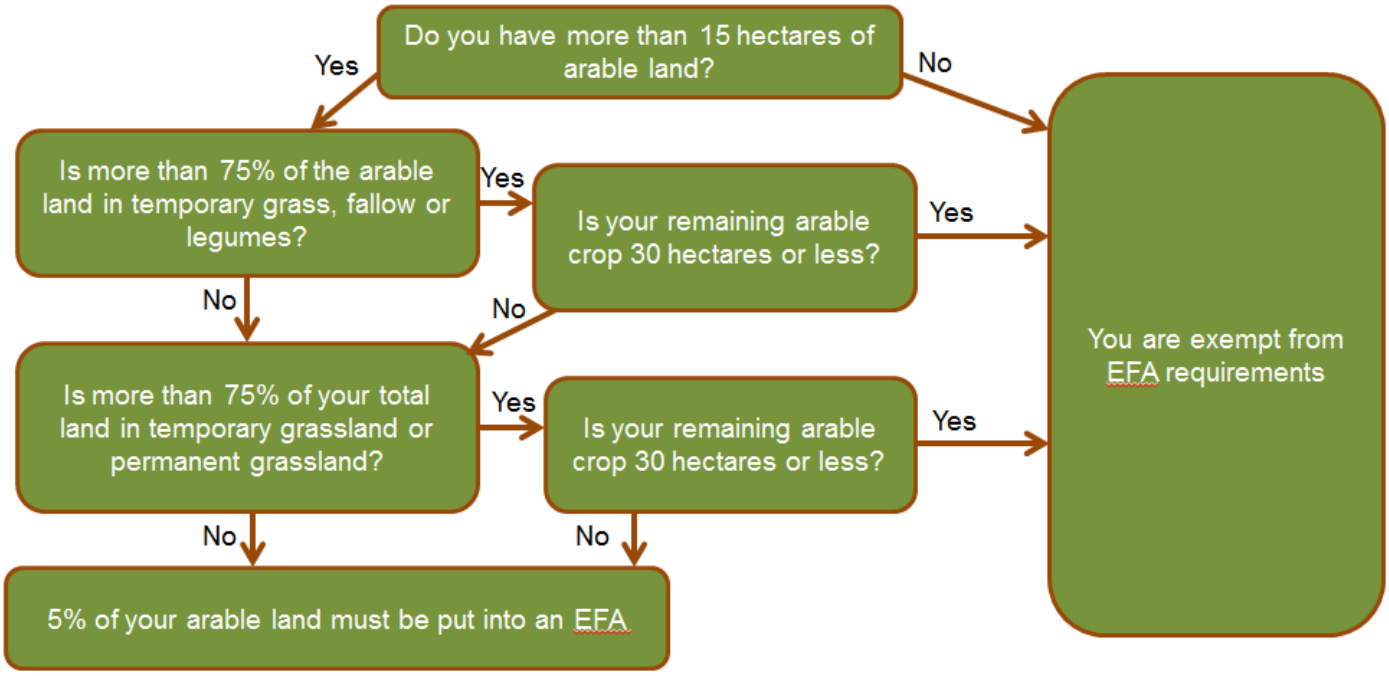

Figure 4: Flowchart for Ecological Focus Area Requirement

1.1.4 Equivalence – Overview

Since the standard greening measures, such as crop diversification, could in some cases introduce potentially adverse impacts for farmland birds and other wildlife (e.g. incentivising an increase in the area of winter sown crops to meet obligations under the three crop rule in some cases), the Scottish Government proposed to introduce a national certification scheme from 2016, known as **equivalence**. This consists of alternative measures which may be invoked in place of (in the case of the crop diversification requirement), or in addition to (in the case of the permanent grassland requirement), the standard greening measures. These elements were in draft when the initial Greening Review analysis was conducted. Details of the options that were being considered are given below based on internal proposal texts available in February 2015.

1.1.5 Equivalence – Permanent Grassland Fertiliser Regime

The following gives details of the 2015 thinking on an equivalent scheme for the Permanent Grassland Requirement. This option is ***in addition*** to the standard Permanent Grassland Requirement.

a) Overview of requirement

In addition to the standard permanent grassland requirement, an equivalent practice of a fertiliser regime will be required.

The equivalent practice will apply to all permanent grassland to which organic and/or inorganic fertiliser is applied, excluding permanent grassland that is defined as rough grazing.

The equivalent practice will have the following requirements:

- having a soil analysis carried out in the previous five years,
- using the results of the soil analysis to produce and implement a basic nutrient management plan,
- keeping records of all fertiliser applications.

b) Intended outcomes for the environment and climate

This equivalent practice is intended to provide additional climate benefit by reducing emissions of nitrous oxide, another greenhouse gas, from the inefficient use of organic and inorganic fertiliser. This is important in Scotland as these nitrous oxide emissions represent the largest source of avoidable greenhouse gas emissions from agricultural activity. Improving fertiliser management through the fertiliser regime requirement will help to reduce these emissions.

In addition, diffuse water pollution is one of Scotland's biggest pollution pressures and nitrate pollution caused by inefficient fertiliser application to farmland is a major contributor. Inefficient fertiliser management can also have an impact on air quality through increasing emissions of ammonia, a major air pollutant. The fertiliser regime requirement will contribute to delivering environmental quality gains in both these areas.

1.1.6 Equivalence – Crop Diversification

The following gives details of the 2015 thinking on an equivalent scheme for the Crop Diversification Requirement. In this case two options are available which may be taken up ***instead of*** the standard Crop Diversification Requirement these are – **Winter Soil Cover** or **Catch Crops**.

a) Overview of requirement:

Farmers who are not exempt under Article 44 will be required to observe at least one of the following requirements:

- the standard Crop Diversification requirement.
- an equivalent Winter Soil Cover requirement.
- an equivalent Catch Crops requirement.

b) Intended outcomes for the environment and climate:

The standard crop diversification requirement will deliver a very limited environmental benefit in Scotland because large areas of monoculture cropping are uncommon. The requirement may lead to perverse environmental outcomes on farms required to grow a smaller area of spring barley, the dominant crop in Scotland. Under the standard Crop Diversification requirement, these farms may be incentivised to increase the area of winter-sown crops, with potential adverse impacts for farmland birds and other wildlife.

The Scheme offers farmers who are not already exempt under Article 44 the option of complying either with the standard Crop Diversification requirement or with one of two alternative practices: Winter Soil Cover or Catch Crops. These equivalent requirements will benefit soils by reducing erosion and increasing soil organic matter through the ploughing in of cover or catch crop residues. The requirements will benefit water quality by reducing diffuse pollution from sediment and fertiliser run off. Catch crops also have the potential to benefit a range of bird species. For example, forage brassicas can provide food and cover for seed-eating birds, while undersown grass leys can increase the availability of insect food for Grey Partridge chicks by allowing insects to complete their life-cycle in the soil.

If permissible, stubble from cereal crops should count as a form of Winter Soil Cover, in recognition of the benefit to farmland birds and other wildlife, through provision of winter food and shelter.

c) Further detail on the equivalent practices:

Winter Soil Cover

Farmers are required to ensure that at least 25% of their eligible arable area has one or more of the following types of soil cover between 1 October and 14 February:

- Undersown grass leys
- Other winter green cover, including alfalfa, buckwheat, clover, fenugreek, fodder radish, forage pea, forage rye, mustard, phacelia, trefoil, winter field bean, winter tares (vetches), Italian ryegrass, Westerwold ryegrass
- Wild bird cover crops
- Winter stubbles **[if permissible under rules for equivalence]** that have not been sprayed with herbicide after harvest
- Any mixture of the above.

The cover crops must not be harvested between 1 October and 14 February.

Catch crops

Farmers are required to ensure that at least 25% of their eligible arable area has one or more of the following types of catch crops between 1 October and 14 February:

- Stubble turnips
- Typhon
- Maincrop turnips
- Swedes
- Fodder beet
- Forage rape
- Kale
- Forage rape/kale hybrids
- Any mixture of the above.

The catch crops must not be harvested between 1 October and 14 February.

Possibility to combine Winter Soil Cover and Catch Crops

Farmers may meet the 25% requirement through a combination of Winter Soil Cover and Catch Crops. This is justified because:

- in practical terms, the distinction between cover crops and catch crops is blurred e.g. fodder radish may be considered as a cover crop or as a catch crop.
- cover crops and catch crops deliver a similar environmental benefit. An equivalent of greater benefit to the Crop Diversification requirement could therefore be achieved though only winter cover, only catch crops or a combination of the two.

Note on basis for 25% requirement

Under the standard Crop Diversification requirement, it is permitted for farmers to have 75% of their arable land under a single crop i.e. the greening requirement applies on 25% of their arable land. Scottish Government therefore assume that in order to be equivalent to the standard requirement, the equivalent winter cover and catch crop practices should apply on 25% of eligible arable land.

2 METHODOLOGY

This section is a brief summary of the main processing and data integration steps that needed to be undertaken to support the analysis. Results are presented in section 3.

2.1 Data sources

Integrated Administration and Control System (IACS) returns made through the Single Application Form (SAF) for 2014 form the basis of the land use data which supports this review. This consists of a total of 21,649 entities comprising businesses currently in receipt of Single Farm Payment (SFP), those in receipt of Pillar 2 subsidy only (e.g. Scottish Rural Development Plan (SRDP) or Less Favoured Area Support Scheme (LFASS) among other schemes), and those in receipt of both. The SAF14 dataset takes into account seasonal rentals between businesses in 2014.

In addition, a number of other spatial and non-spatial data sources were used through the course of the analysis including: IACS field boundaries; the revised Nitrate Vulnerable Zone (NVZ) boundaries implemented from February 2015; Specially Protected Areas (SPAs) and Special Areas of Conservation (SACs) which together make up the NATURA designated sites in Scotland; Sites of Special Scientific Interest (SSSIs); Basic Payment Scheme field regionalisations (a prototype dataset), and data on organic farming related Rural Priorities measures.

The following sections give a brief overview of processing tasks for each of the requirements.

2.2 Permanent Grassland Requirement

In order to quantify the Permanent Grassland Requirement, it was first necessary to identify the IACS crop codes that make up permanent grassland. Table 1 shows which IACS crop codes were included along with their description and assignment to either improved or unimproved grassland.

Table 1: IACS Crop Codes associated with Permanent Grassland

IACS Crop Code	Crop Code Description	Improved vs Unimproved
COMM	Common Grazing	Unimproved
LIEM	Land in Environmental Management	Unimproved[5]
PGRS	Grass Over 5 Years	Improved
RGR	Rough Grazing	Unimproved
WDG	Open Woodland (Grazed)	Unimproved

Due to the existing protections provided for permanent grassland in NATURA sites it was desirable to identify those fields which overlapped NATURA areas. In Scotland NATURA sites comprise Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). Spatial data layers for both of these designations were acquired through the SNHi spatial data portal[6] and combined to form a single layer which was intersected with the IACS field boundaries. To determine whether a field was inside or outside a NATURA designated area, the overlap threshold was set at 90% - i.e. those fields with ≥ 90% overlap were considered to be inside a NATURA designated area. Any permanent grassland within those fields was identified as NATURA or Non-NATURA accordingly. The combination of SAF crop codes and field assignment generated the following four categories:

- Improved Permanent Grassland
- Improved Permanent Grassland within NATURA
- Unimproved Permanent Grassland
- Unimproved Permanent Grassland within NATURA

[5] LIEM was allocated to unimproved permanent grassland following advice from policy colleagues. This differs from advice contained in the Greening Booklet where LIEM should be counted as Arable. The total declared area of this category in SAF14 is small at 4,588 Ha.

[6] http://gateway.snh.gov.uk/natural-spaces/index.jsp

Of a total of 440,760 fields with a SAF claim in the 2014 dataset, 5,679 fields were considered to be part of a NATURA designated site.

The calculation of permanent grassland within Sites of Special Scientific Interest (SSSIs) was carried out in a similar manner with the most recent spatial data layer describing these provided by SNHi[6] and overlaid (intersected) with the IACS field snapshot. To determine whether or not a field was inside or outside a SSSI, the overlap threshold was set at 90% - i.e. those fields with ≥ 90% overlap were considered to be inside a SSSI.

The permanent grassland areas for each of the four categories were then calculated for each business. This yields business level aggregations of permanent grassland areas of different types and these have been summarised by Agricultural Region, by Farm Type, and by Business Size in subsequent sections (see section 3.2).

Using this data it is also possible to map the four permanent grassland categories outlined above. In this case the dominant category has been calculated per field and this has been represented as a national map see Section 3.2 and a series of regional maps – one for each Agricultural Region (in Part 3 of the Greening Review).

2.3 Crop Diversification Requirement

For the Crop Diversification Requirement it was first necessary to classify the arable IACS crop codes into the following three categories through the use of a lookup table developed with colleagues in RPID:

- Arable – Temporary Grassland
- Arable – Fallow
- Arable – Other

Arable areas were then summarised for each business. A series of area and proportion calculations then took place in order to assign each business to one of the following categories according to the flowchart shown previously in Figure 3.

- 2 crop rule applies
- 3 crop rule applies
- 3 crop 'special' rule applies[7]
- Exempt from crop diversification rule

These results were summarised by Agricultural Region, Farm Type, and Business Size as shown in the results section 3.3. As with the permanent grassland requirement, it is also possible to map the crop diversification requirement. In this case the dominant category was calculated per field and this has been presented as a national map (see Section 3.3) and as a series of regional maps – one for each Agricultural Region (in Part 3 of the Greening Review).

2.4 Crop Diversification Assessment

For the Crop Diversification Requirement it is possible, using data collected in 2014 SAF, to assess whether or not the crop diversification rule is currently being met. To support this, each IACS arable crop code was assigned to a crop family on the basis of the lookup table given in Annex D of the Greening Booklet[4]. Where a crop family was not explicitly listed each crop counted as its own crop family. Results are presented by Agricultural Region, Farm Type and Business Size in section 3.4.

Since those businesses which are certified as organic are exempt from the requirement, and those with a part of their business as organic have the option to benefit from the exemption or to meet the Greening requirement across all of their arable land, it was necessary to include an organic identifier in the calculation framework. In the absence

[7] Where temporary grassland or fallow may be counted as the main crop with no restriction on the proportion that that crop may make up and two other crops must be sown.

of a list of certified businesses within the time frame of the Review), in order to determine whether a business had organic land recourse was made to claims made under the Rural Priorities options for conversion to, or maintenance of, organic farming. Where a field contains a claim made under any of the eight relevant options, the field was flagged as organic. This allowed for businesses which are either wholly organic or partially organic to be detected, at least according to those who made claims under Rural Priorities options. The results of the organic business detection are presented in section 3.7. It should be noted that the management requirements of Rural Priorities measures under the agri schemes differ from those of Greening and so this analysis is only indicative.

The extent to which the Crop Diversification Requirement is currently being met can also be mapped. In this case the dominant category was calculated per field and this has been presented as a national map (see Section 3.4) and as a series of regional maps – one for each Agricultural Region (in Part 3 of the Greening Review).

2.5 Ecological Focus Area Requirement

For the Ecological Focus Area requirement, the SAF land use data for 2014 was used to quantify the number, and area, of businesses subject to the requirement. Areas and proportions of arable and permanent grassland were calculated for each business using the flowchart shown in Figure 4 (above). This generated for each business a flag which indicated whether the business was exempt from the EFA requirement or whether the business was required to allocate 5% of its arable land (or equivalent area dependent on options chosen) into an EFA. Results are presented in section 3.5 as a summary and by Agricultural Region, with further breakdowns for only those businesses to which the EFA requirement applies by Agricultural Region, Farm Type and Business Size.

It is also possible to map those businesses which are subject to the EFA requirement. The dominant class per field was calculated (e.g. in the case of a field used by multiple businesses, the requirement of the business using the largest share of the field was assigned to the field). This has been presented as a national map (see Section 3.5) and as a series of regional maps – one for each Agricultural Region (in Part 3 of the Greening Review).

2.6 Ecological Focus Area Assessment

While some of the data required to assess whether the Ecological Focus Area requirement is currently being met is collected (e.g. fallow land), existing data does not support a full analysis of all of the ways in which the EFA requirement may be fulfilled (e.g. field margins, buffer strips, and catch crops). While some of this data may be derived through analysis of certain Rural Priorities measures, it was not feasible within the resources of the Greening Review and would not have been comprehensive in any case. As a result the extent to which the EFA requirement is currently being met has not been assessed.

2.7 Permanent Grassland Equivalence

As described above, an equivalence scheme for the permanent grassland requirement was being considered for introduction in Scotland from 2016. In conjunction with SG policy and analysis staff and RPID a series of analyses were undertaken which sought to quantify both the area, and number of fields, on which the soil sampling element of the equivalence scheme would occur, dependent on implementation decisions which at the time of analysis were yet to be taken. In order to support these analyses the following data integrations took place:

2.7.1 Assigning a Basic Payment Scheme region to fields

One option explored was applying the requirement for soil testing only to improved grassland in Basic Payment Scheme (BPS) Region 1. BPS Region 1 contains fields in which 40% or more of the claimed area is either arable, temporary grassland or permanent grassland. Data identifying such fields was drawn from a prototype BPS regionalisation that had previously been undertaken by the project team in support of RPID. This allowed Region 1 improved permanent grassland which is not in a Natura/SSSI site to be identified. For the purposes of this analysis this grassland is referred to as ‘eligible’ grassland.

2.7.2 Nitrate Vulnerable Zone (NVZ) inclusion

Grasslands within Nitrate Vulnerable Zones (NVZs) are already subject to similar measures to those proposed under permanent grassland equivalence. This analysis sought to quantify how much of the 'eligible' grassland which may be subject to the equivalence measure is already within these zones. To support this, the revised boundaries for NVZ areas were incorporated into the analysis framework. Where a field had ≥90% overlap with an NVZ zone then the field was flagged as being within the NVZ boundary and all claims within it were assigned as NVZ claims. Results are presented by Agricultural Region, Farm Type and Business Size in section 3.6.

2.7.3 Grazing Category Analysis

Consideration was also given to developing eligibility criteria based on intensity of land use using stocking densities. In order to deliver this the LFASS grazing categories that formed part of the BPS Regionalisation work were also incorporated into the analysis framework. Areas were summarised by Agricultural Region and are presented in section 3.6.7.

2.7.4 20-20 Analysis

Finally, part of the analysis sought to test area and percentage thresholds that 'eligible' grassland made up for each business. It was considered that where 'eligible' grassland made up less than 20 hectares, and that where 'eligible' grassland made up less than 20% of the eligible claimed area of the business, that these businesses may be excluded from the equivalence requirement. Results of this analysis are presented in section 3.6.8.

3 RESULTS

The results section first presents an analysis of the mix of Greening requirements as they apply to businesses including a calculation of the number and area of business that are entirely exempt from all Greening requirements. Analysis of the distributions of the three 'standard' Greening requirements (Permanent Grassland, Crop Diversification and Ecological Focus Areas) are then reported including an assessment of the degree to which businesses met the conditions of the Crop Diversification Requirement in 2014. Following this a series of analyses conducted in support of the development of an 'equivalence' scheme for the Permanent Grassland requirement is presented. Finally a short note on the identification and inclusion of organic businesses is discussed. Section 4.1 in the Appendices to this report provides a characterisation of the SAF 14 business population that can be used as background for interpreting the results presented below

3.1 Mix of Greening Requirements

3.1.1 Businesses entirely exempt from Greening

Calculations suggest that only a very small minority of businesses are exempt from all three greening requirements. Out of the 18,191 businesses in the dataset in receipt of SFP in 2014 only 237 businesses (1.3%) are exempt from all three requirements covering a total area of 4,040 Ha. These totals only include those businesses with no permanent grassland and less than 10 Ha of arable area (the lower of the EFA and Crop Diversification thresholds).

3.1.2 Mix of Crop Diversification and EFA requirements

Considering only the Crop Diversification requirement and EFA requirements, Table 2 shows the mix of Greening requirements. Values are presented as counts of businesses and are split between those currently in receipt of Single Farm Payment in 2014 (Current SFPS) and those which do not currently hold any entitlement (Other). The breakdown shows that 13,490 of a total of 18,191 current SFPS businesses (74%) are exempt from both measures (see highlighted cells). If other businesses are also taken into account 16,740 of a total of 21,649 (77%) are exempt from both measures. The table highlights that, where Greening applies, it is most commonly as the three-crop rule plus ecological focus area, with the other combinations making up a small number of cases. Figure 5 shows the same data in chart form.

Table 2: Mix of Crop Diversification and EFA Requirements – Count of Businesses

Mix of Crop Diversification and EFA Requirements	Count of Businesses		
	Current SFPS	Other	All
EFA applies	**4,604**	**174**	**4,778**
2 crop rule applies	285	44	329
3 crop rule applies	4,145	119	4,264
Count TGRS/Fallow as main crop plus 2 other crops	151		151
Exempt from Crop Diversification	23	11	34
EFA Exempt	**13,587**	**3,284**	**16,871**
2 crop rule applies	89	32	121
3 crop rule applies	8	2	10
Exempt from Crop Diversification	13,490	3,250	16,740
Grand Total	**18,191**	**3,458**	**21,649**

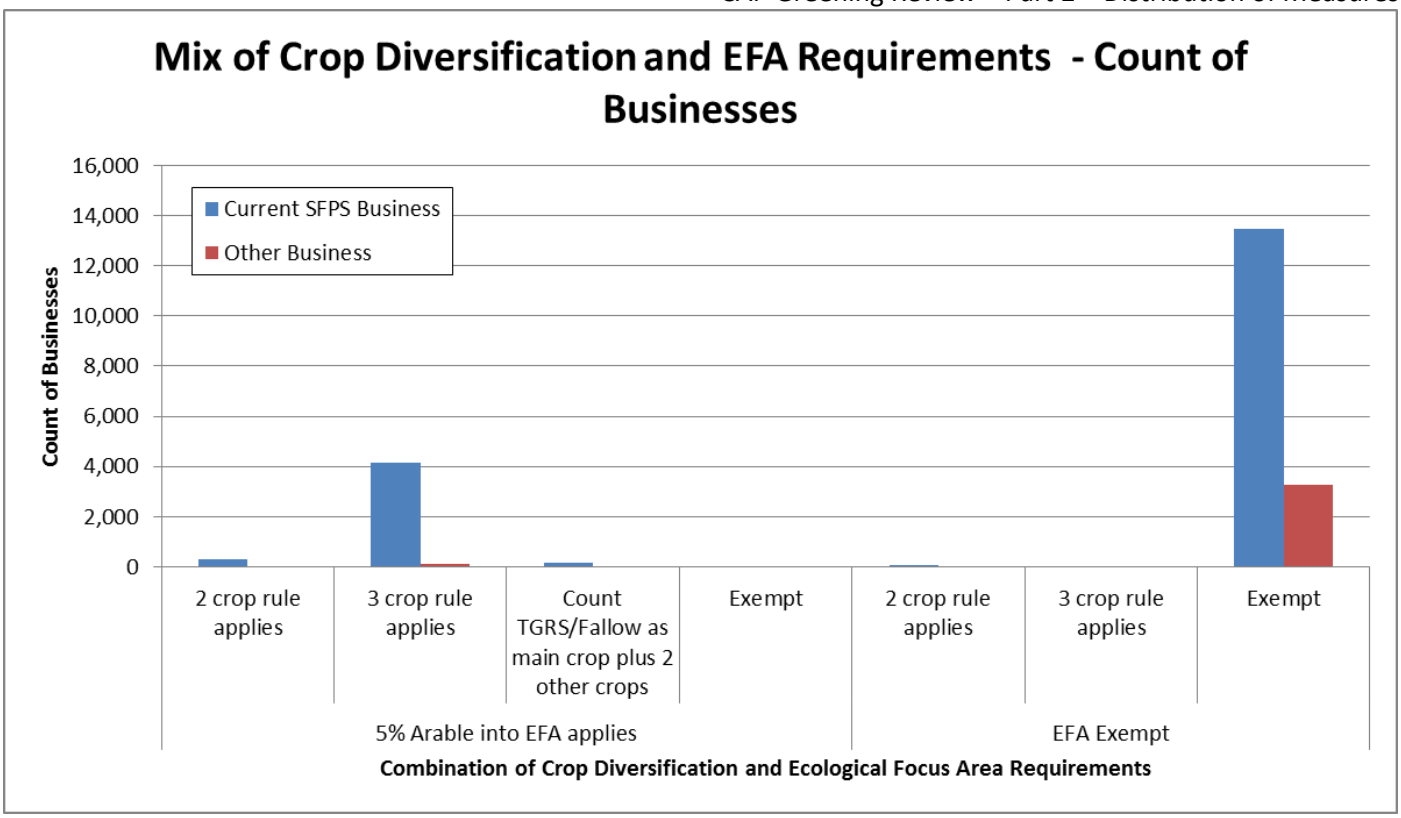

Figure 5: Mix of Greening Requirements – Count of Businesses

The same analysis can be conducted using areas eligible (and potentially eligible) for SFPS. Table 3 shows the breakdown of total eligible area in hectares for each category. This shows that, in area terms 3,441,219 Ha from a total of 4,796,160 Ha (or 72%) of the area is exempt from both the crop diversification and EFA requirements. EFA plus three-crop diversification is the dominant mode in area terms (more than 1.2M Ha) though EFA with TGRS as the main crop with two other crops also makes up more than 100K Ha. Figure 6 shows the same data in chart form.

Table 3: Mix of Crop Diversification and EFA Requirements – Eligible Area (Ha)

Mix of Crop Diversification and EFA Requirements	Eligible Area (Ha)		
EFA applies	**1,334,761**	**16,764**	**1,351,525**
2 crop rule applies	8,942	1,276	10,218
3 crop rule applies	1,209,888	13,740	1,223,628
Count TGRS/Fallow as main crop plus 2 other crops	103,183		103,183
Exempt from Crop Diversification	12,748	1,747	14,495
EFA Exempt	**3,030,126**	**414,509**	**3,444,635**
2 crop rule applies	1,858	579	2,437
3 crop rule applies	856	123	979
Exempt from Crop Diversification	3,027,412	413,807	3,441,219
Grand Total	**4,364,887**	**431,273**	**4,796,160**

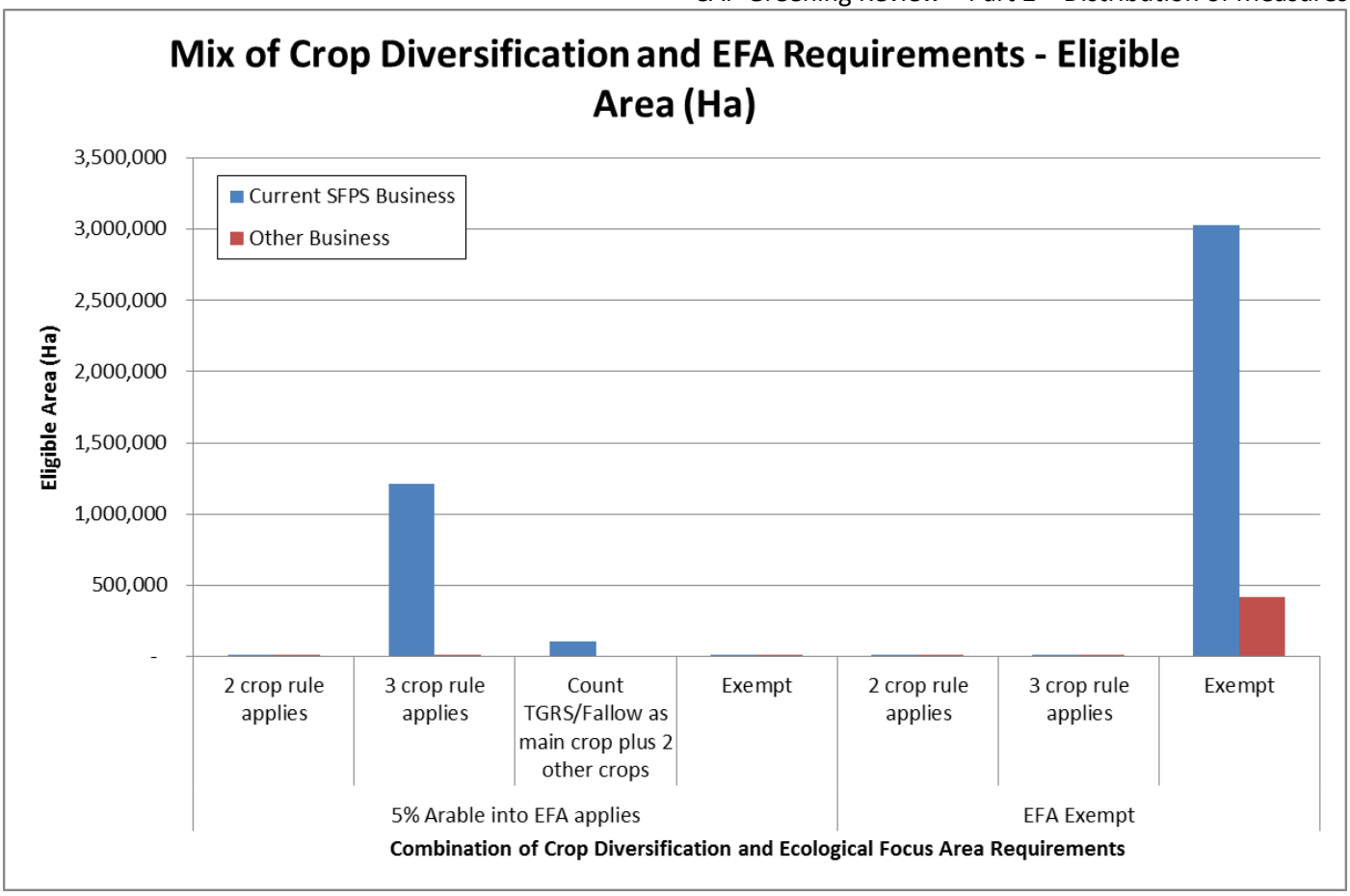

Figure 6: Mix of Crop Diversification and EFA Requirements – Eligible Area (Ha)

3.2 Permanent Grassland Requirement

This section presents the results of the analysis of the Permanent Grassland Requirement. Results for all improved and unimproved permanent grassland are presented first by Agricultural Region, then by Farm Type, and finally by Business Size. Following this a deeper analysis of the areas of improved permanent grassland only is presented.

Areas of permanent grassland are classified into four categories and are mapped in Figure 7. These reflect distinctions made under the Permanent Grassland Requirement flowchart in the Greening Guidance Booklet also shown in Figure 2.

- Improved Grassland describes PGRS[8] not in a NATURA site.
- Improved Grassland within NATURA describes PGRS[8] within a NATURA site.
- Unimproved Grassland describes RGR[9] (and similar[10]) land uses not in a NATURA site.
- Unimproved Grassland within NATURA describes RGR[9] (and similar) land uses within a NATURA site.

Colours in the charts in this section match colours used for the corresponding categories in the maps of the Permanent Grassland Requirement which may be found in Part 3 of the CAP Greening Review.

[8] PGRS is the crop code for "Grass Over 5 Years".
[9] RGR is the crop code for "Rough Grazing". Note that some other crop codes were also allocated to the Rough Grazing land type.
[10] See Table 1 for crop codes associated with Improved and Unimproved Grassland in the analysis.

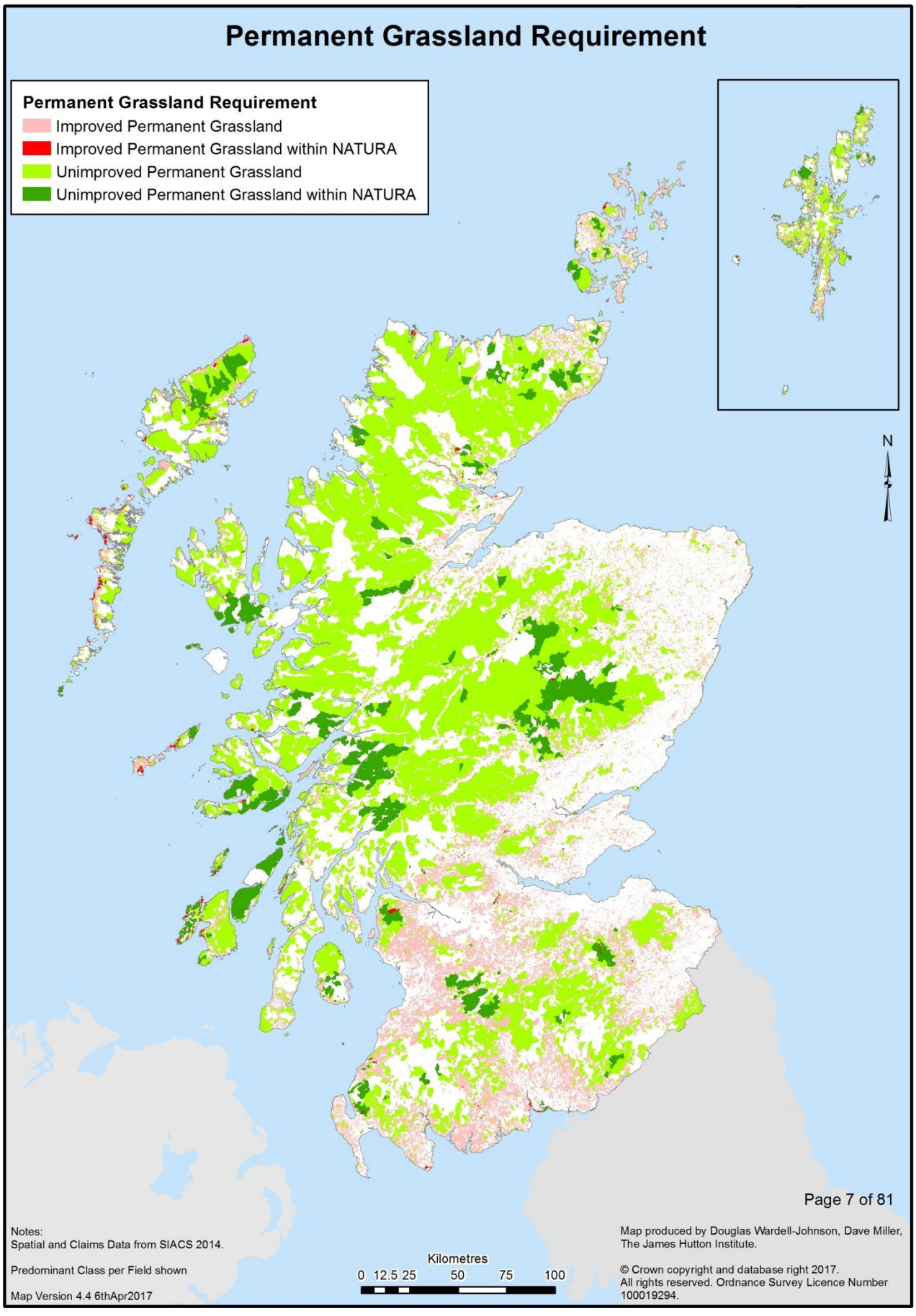

Figure 7: Example of National Permanent Grassland Map

3.2.1 Permanent Grassland Requirement – Overall Areas By Agricultural Region

Figure 8 and Table 4 show the breakdown of areas of permanent grassland in terms of hectares per Agricultural Region. Figure 9 shows the same data but only for the improved permanent grassland. Although Highland region apparently dominates this is simply an outcome of size of the region. Unimproved Grassland dominates Highland whereas the region with the largest area of improved grassland is Dumfries and Galloway.

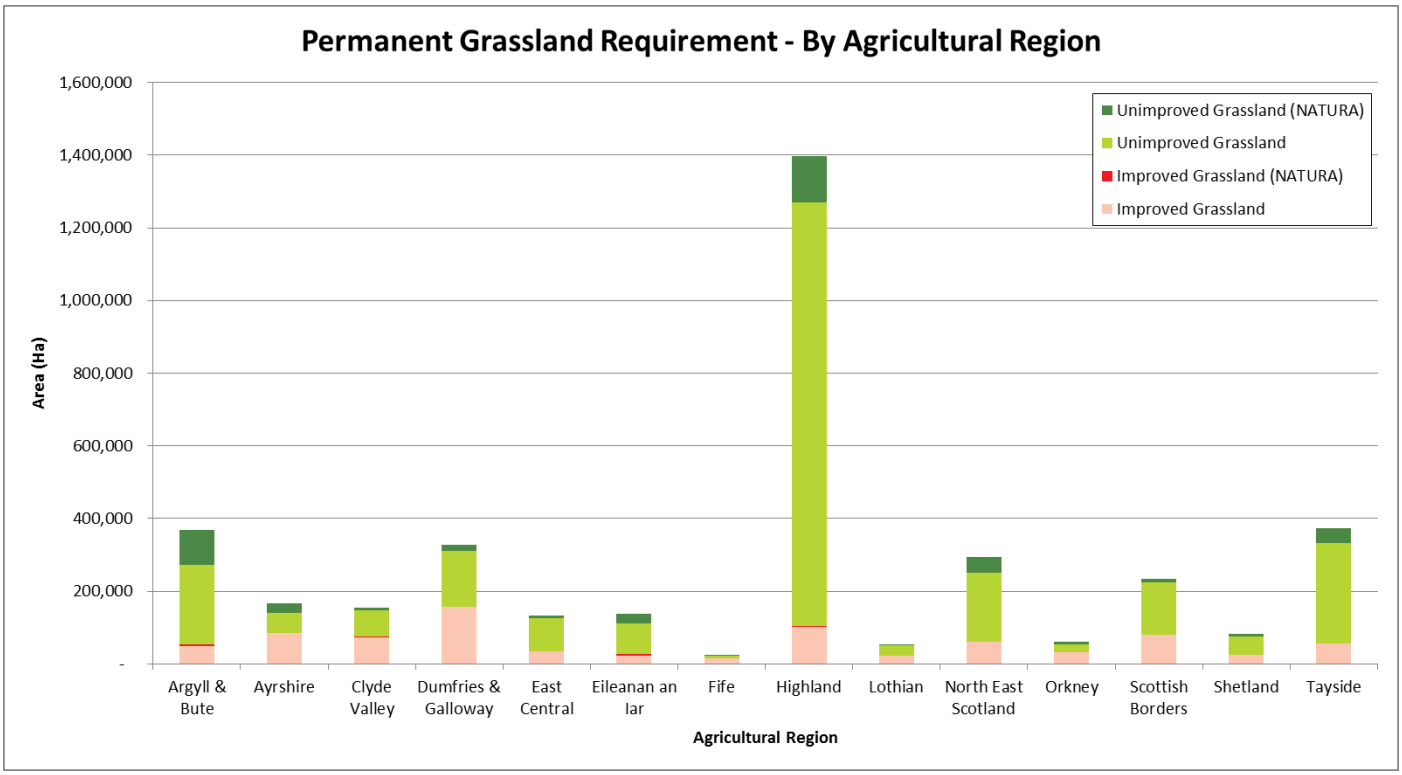

Figure 8: Permanent Grassland Requirement – By Agricultural Region (Ha)

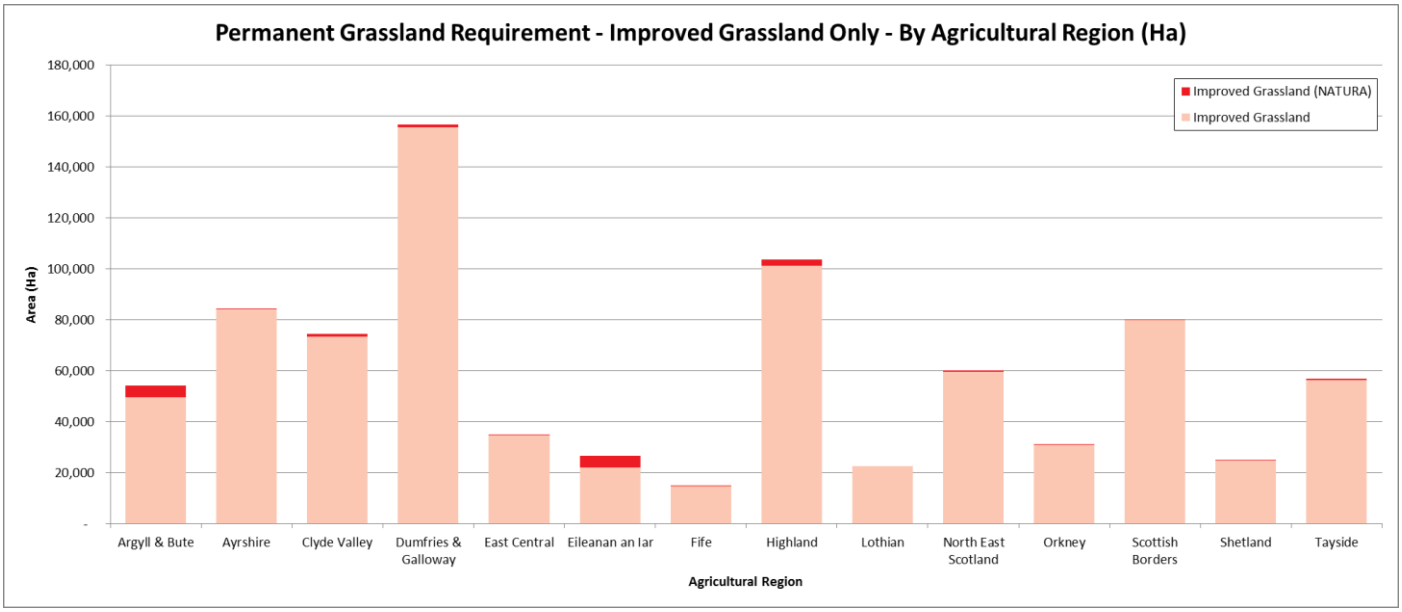

Figure 9: Permanent Grassland Requirement – Improved Grassland Only – By Agricultural Region (Ha)

Table 4: Permanent Grassland Requirement – By Agricultural Region (Ha)

Permanent Grassland Requirement by Agricultural Region (Ha)	Improved Grassland	Improved Grassland (NATURA)	Unimproved Grassland	Unimproved Grassland (NATURA)	Total Permanent Grassland
Argyll & Bute	49,635	4,395	219,319	95,897	369,246
Ayrshire	84,193	342	54,626	28,404	167,565
Clyde Valley	73,454	1,085	71,637	9,013	155,188
Dumfries & Galloway	155,702	958	153,598	16,724	326,982
East Central	34,764	79	91,537	5,211	131,592
Eileanan an Iar	22,001	4,636	84,579	25,773	136,990
Fife	14,595	31	7,139	838	22,602
Highland	101,199	2,342	1,167,176	126,417	1,397,133
Lothian	22,510	-	28,667	586	51,763
North East Scotland	59,512	512	189,379	43,447	292,850
Orkney	30,754	290	22,922	5,914	59,880
Scottish Borders	79,784	304	143,927	8,653	232,668
Shetland	24,736	136	51,056	5,753	81,682
Tayside	56,257	558	275,771	39,412	371,998
Total	**809,096**	**15,668**	**2,561,333**	**412,042**	**3,798,139**

The four grassland classes can also be expressed as a percentage of all permanent grassland in each Agricultural Region. Figure 10 shows the data in chart form while Table 5 shows the same data as a table of values. These show that the percentage of permanent grassland that is improved is less than 8% in Highland rising to more than 65% in Fife. The highest percentage of NATURA improved grassland is in the Western Isles reflecting the extent of machair grazing land in this region. Nationally the split is 22% improved versus 78% unimproved grassland.

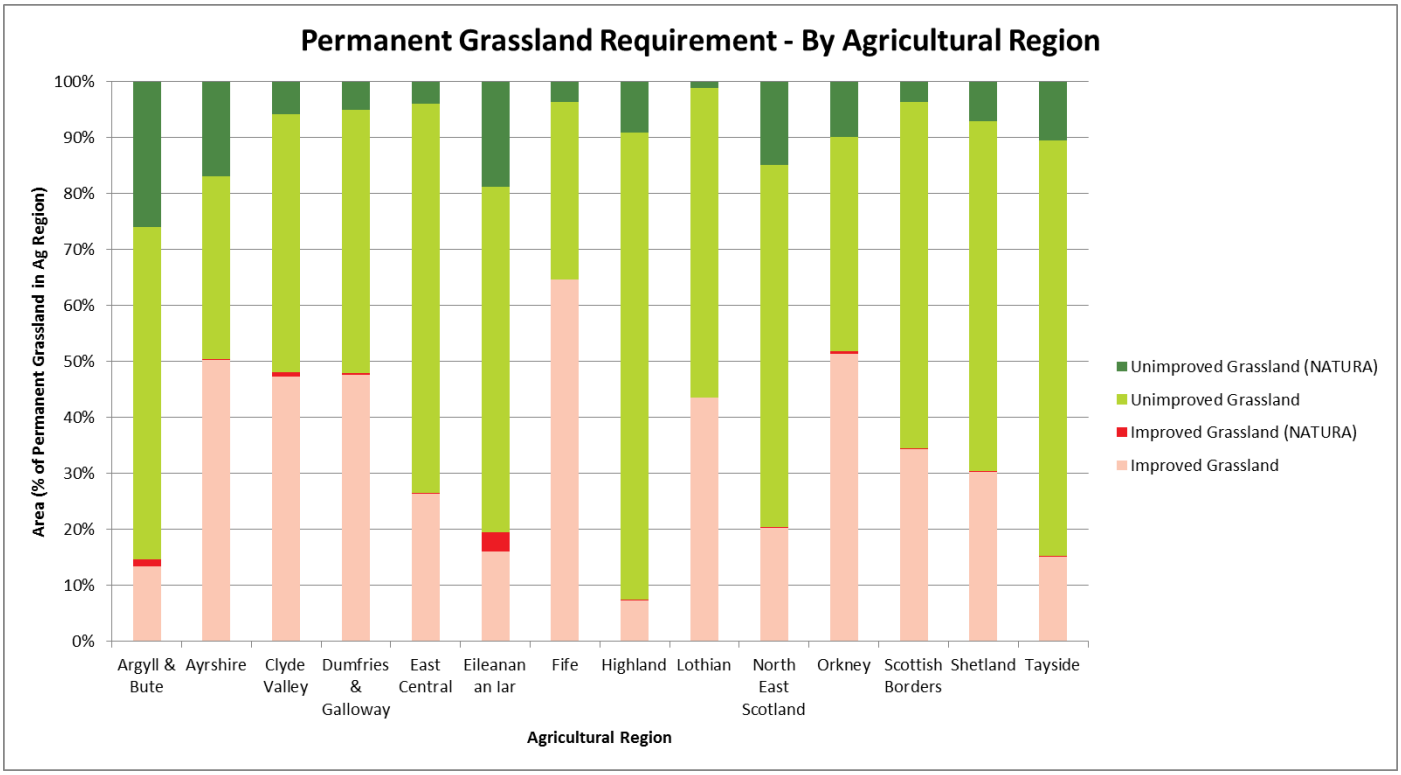

Figure 10: Permanent Grassland Requirement – By Agricultural Region (%)

Table 5: Permanent Grassland Requirement – By Agricultural Region (%)

Permanent Grassland Requirement by Agricultural Region (%)	Improved Grassland	Improved Grassland (NATURA)	Unimproved Grassland	Unimproved Grassland (NATURA)
Argyll & Bute	13.44%	1.19%	59.40%	25.97%
Ayrshire	50.25%	0.20%	32.60%	16.95%
Clyde Valley	47.33%	0.70%	46.16%	5.81%
Dumfries & Galloway	47.62%	0.29%	46.97%	5.11%
East Central	26.42%	0.06%	69.56%	3.96%
Eileanan an Iar	16.06%	3.38%	61.74%	18.81%
Fife	64.57%	0.14%	31.58%	3.71%
Highland	7.24%	0.17%	83.54%	9.05%
Lothian	43.49%	0.00%	55.38%	1.13%
North East Scotland	20.32%	0.17%	64.67%	14.84%
Orkney	51.36%	0.48%	38.28%	9.88%
Scottish Borders	34.29%	0.13%	61.86%	3.72%
Shetland	30.28%	0.17%	62.51%	7.04%
Tayside	15.12%	0.15%	74.13%	10.59%
National Percentage	21.30%	0.41%	67.44%	10.85%

3.2.2 Permanent Grassland Requirement – By Farm Type

The areas of permanent grassland can also be broken down in terms of hectares per Farm Type. Figure 11 shows the areas of permanent grassland by Farm Type while Table 6 shows the same data as a table of values.

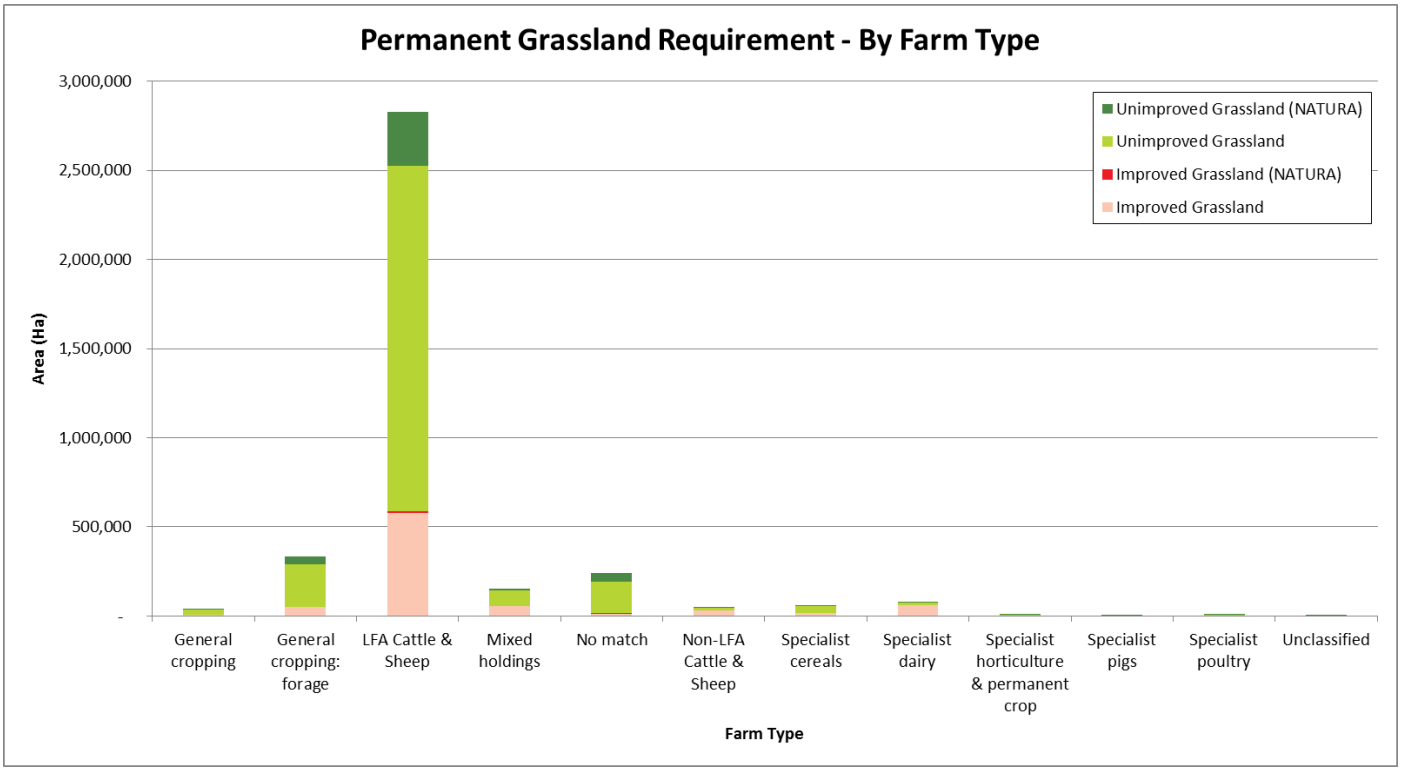

Figure 11: Permanent Grassland Requirement – By Farm Type (Ha)

Table 6: Permanent Grassland Requirement – By Farm Type (Ha)

Permanent Grassland Requirement by Farm Type (Ha)	Improved Grassland	Improved Grassland (NATURA)	Unimproved Grassland	Unimproved Grassland (NATURA)	Total Permanent Grassland
General cropping	7,832	89	26,023	397	34,342
General cropping: forage	50,462	669	237,035	44,184	332,350
LFA Cattle & Sheep	575,258	12,340	1,938,017	300,638	2,826,253
Mixed holdings	54,185	616	90,738	7,625	153,164
No match	12,990	1,338	178,567	49,903	242,799
Non-LFA Cattle & Sheep	30,049	103	16,799	1,546	48,497
Specialist cereals	15,176	384	39,471	2,405	57,436
Specialist dairy	58,340	108	16,929	2,785	78,162
Specialist horticulture & permanent crop	997	15	7,903	57	8,973
Specialist pigs	831	-	2,749	18	3,598
Specialist poultry	2,976	5	5,378	2,476	10,836
Unclassified	-	-	1,723	7	1,730
Total	**809,096**	**15,668**	**2,561,333**	**412,042**	**3,798,139**

Farm Type was defined by SG Census Branch for this analysis at the business, rather than the more usual holding, level. The category "No match" indicates those businesses not part of the Census population for which no determination of farm type could be made. As LFA Cattle & Sheep is by far the largest farm type in area terms (more than 10 times the size of the next largest farm type) this farm type dominates the chart.

The same data can again be expressed as a percentage of all permanent grassland in each farm type. Figure 12 shows the breakdown as a percentage of all permanent grassland in each farm type while Table 7 shows the same data as a table of values. This perhaps better reflects the balance of improved vs unimproved grassland across farm types. This chart highlights that for all but two farm types the area of unimproved grassland is larger than improved grassland, Specialist dairy (75%) and Non-LFA Cattle & Sheep (62%) being the exceptions. The largest farm type (LFA Cattle & Sheep) is 21% improved vs 79% unimproved – almost the same as the national percentages.

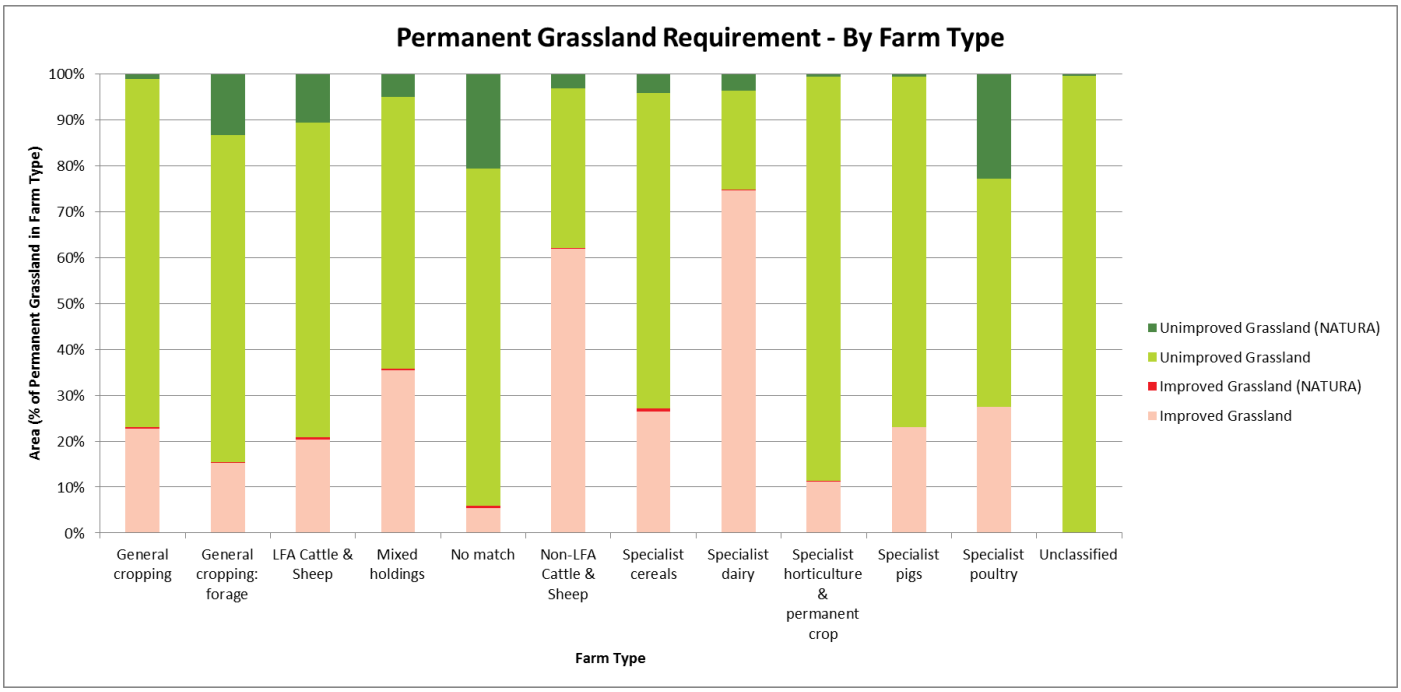

Figure 12: Permanent Grassland Requirement – By Farm Type (%)

Table 7: Permanent Grassland Requirement – By Farm Type (%)

Permanent Grassland Requirement by Farm Type (%)	Improved Grassland	Improved Grassland (NATURA)	Unimproved Grassland	Unimproved Grassland (NATURA)
General cropping	22.81%	0.26%	75.78%	1.16%
General cropping: forage	15.18%	0.20%	71.32%	13.29%
LFA Cattle & Sheep	20.35%	0.44%	68.57%	10.64%
Mixed holdings	35.38%	0.40%	59.24%	4.98%
No match	5.35%	0.55%	73.55%	20.55%
Non-LFA Cattle & Sheep	61.96%	0.21%	34.64%	3.19%
Specialist cereals	26.42%	0.67%	68.72%	4.19%
Specialist dairy	74.64%	0.14%	21.66%	3.56%
Specialist horticulture & permanent crop	11.11%	0.17%	88.08%	0.64%
Specialist pigs	23.09%	0.00%	76.42%	0.50%
Specialist poultry	27.47%	0.05%	49.63%	22.85%
Unclassified	0.00%	0.00%	99.59%	0.41%
National Percentage	21.30%	0.41%	67.44%	10.85%

3.2.3 Permanent Grassland Requirement – By Business Size

Lastly we can also show the permanent grassland requirement in terms of a classification of business size. Figure 13 shows the breakdown of permanent grassland in terms of hectares per business size category while Table 8 shows the same data as a table of values. Due to the number of businesses, and the size of those businesses the >=250Ha category dominates the chart.

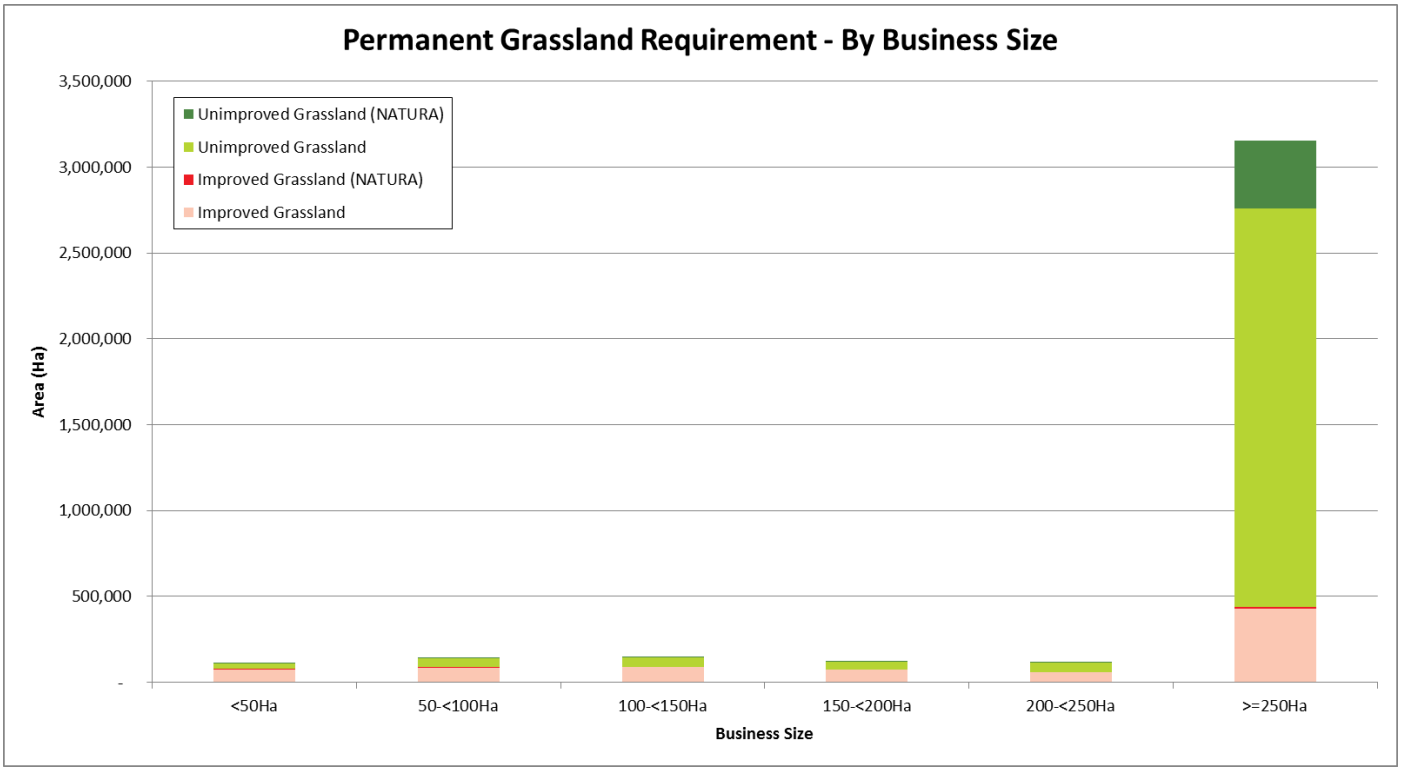

Figure 13: Permanent Grassland Requirement – By Business Size (Ha)

Table 8: Permanent Grassland Requirement – By Business Size (Ha)

Permanent Grassland Requirement by Business Size (Ha)	Improved Grassland	Improved Grassland (NATURA)	Unimproved Grassland	Unimproved Grassland (NATURA)	Total Permanent Grassland
<50Ha	75,147	2,239	33,960	2,055	113,400
50-<100Ha	86,250	1,407	50,240	3,568	141,464
100-<150Ha	89,565	1,144	53,888	3,919	148,516
150-<200Ha	71,811	671	48,122	4,486	125,090
200-<250Ha	59,143	448	53,480	3,647	116,719
>=250Ha	427,180	9,759	2,321,643	394,368	3,152,950
Total	**809,096**	**15,668**	**2,561,333**	**412,042**	**3,798,139**

Perhaps more informatively, the same data can also be expressed as a percentage of all permanent grassland in each business size category. Figure 14 presents the data in this way while Table 9 shows the values. This representation shows that there is a greater proportion of improved grassland in smaller businesses declining from 68% in the smallest class to less than 14% in the largest class.

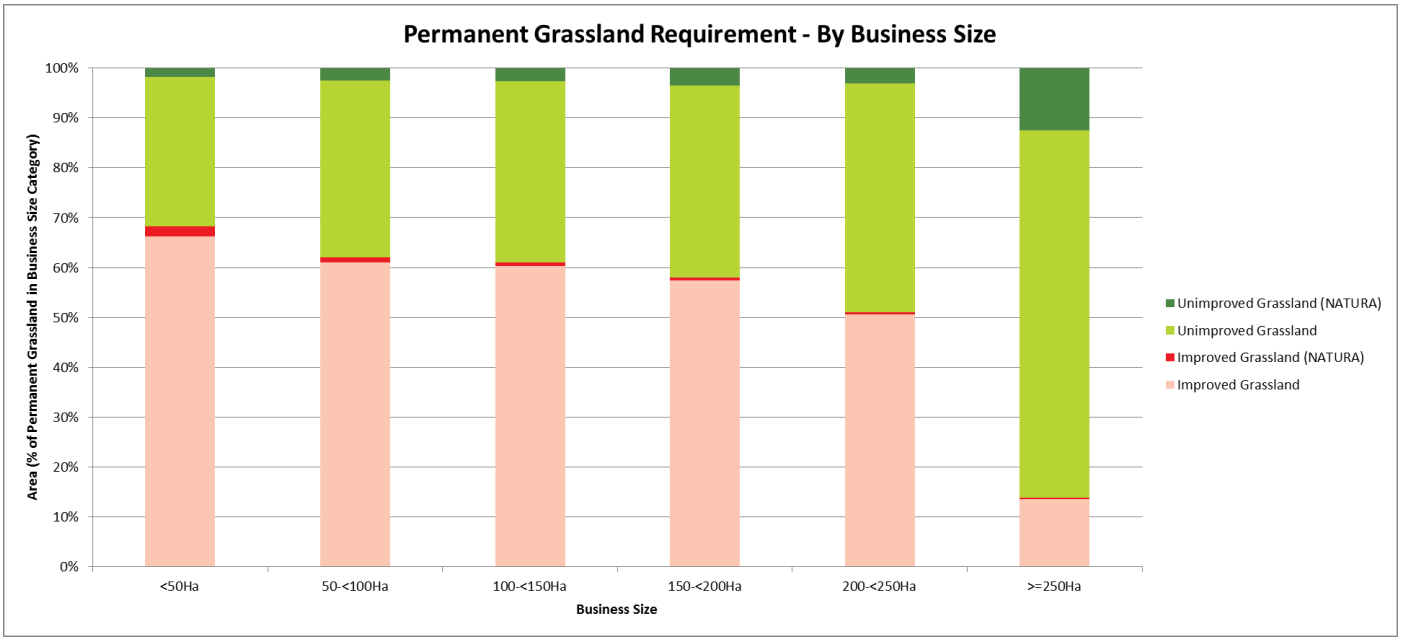

Figure 14: Permanent Grassland Requirement – By Business Size (%)

Table 9: Permanent Grassland Requirement – By Business Size (%)

Permanent Grassland Requirement by Business Size (Ha)	Improved Grassland	Improved Grassland (NATURA)	Unimproved Grassland	Unimproved Grassland (NATURA)
<50Ha	66.27%	1.97%	29.95%	1.81%
50-<100Ha	60.97%	0.99%	35.51%	2.52%
100-<150Ha	60.31%	0.77%	36.28%	2.64%
150-<200Ha	57.41%	0.54%	38.47%	3.59%
200-<250Ha	50.67%	0.38%	45.82%	3.12%
>=250Ha	13.55%	0.31%	73.63%	12.51%
National Percentage	21.30%	0.41%	67.44%	10.85%

3.2.4 Permanent Grassland Requirement – Land Parcel Analysis of PGRS by Agricultural Region

Figure 15 and Table 10 show the analysis of the number of land parcels (or FIDs[11]) in which there is at least one claim of PGRS (Grass Over 5 Years) by Agricultural Region together with the total area of those claims. Total claimed area of PGRS may be read from the left vertical axis while the count of land parcels may be read from the right vertical axis. This gives an indication of both the number of fields (202,662), and the claimed area of those fields (824,764Ha), which may have the option to be converted into arable land and thus trigger an intervention should the ratio of permanent grassland to the total agricultural area at the national level drop by more than 5%.

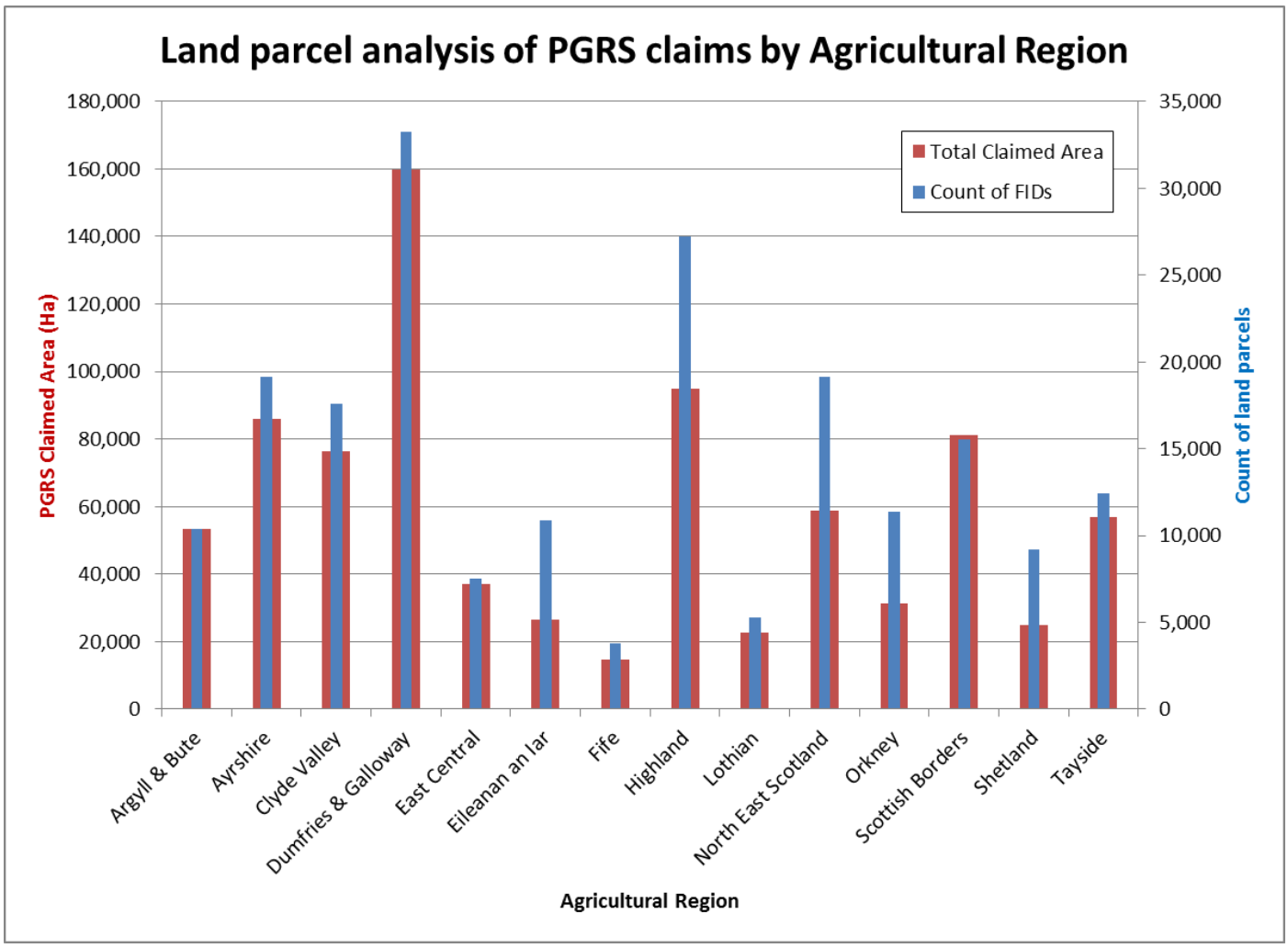

Figure 15: Permanent Grassland Requirement – Land parcel analysis of PGRS claims by Agricultural Region

Table 10: Permanent Grassland Requirement – Land parcel analysis of PGRS claims by Agricultural Region

Agricultural Region	Count of FIDs	Total Claimed Area
Argyll & Bute	10,380	53,348
Ayrshire	19,153	86,086
Clyde Valley	17,581	76,211
Dumfries & Galloway	33,264	159,675
East Central	7,512	37,217
Eileanan an Iar	10,862	26,529
Fife	3,774	14,741

[11] Note that "FID" stands for "Field Identifier" and refers to the identifier given to the land parcel in the Geographical Information System. The terms "FID" and "land parcel" may be used interchangeably in this report.

Agricultural Region	Count of FIDs	Total Claimed Area
Highland	27,242	95,029
Lothian	5,273	22,701
North East Scotland	19,112	58,681
Orkney	11,363	31,460
Scottish Borders	15,531	81,239
Shetland	9,178	25,058
Tayside	12,437	56,790
Total	**202,662**	**824,764**

3.2.5 Permanent Grassland Requirement – Business Analysis by Agricultural Region

Figure 16 and Table 11 show a business level analysis of the number of claimed land parcels with PGRS per business as well as the count of businesses and total PGRS area by Agricultural Region. Note that due to the possibility that a land parcel may contain PGRS claims by more than one business, there is unavoidably a small amount of double counting of land parcels in this representation. Compare the total number of claimed land parcels per business (205,694) with the total number of land parcels with PGRS within them (202,622) in the previous representation (see Table 10).

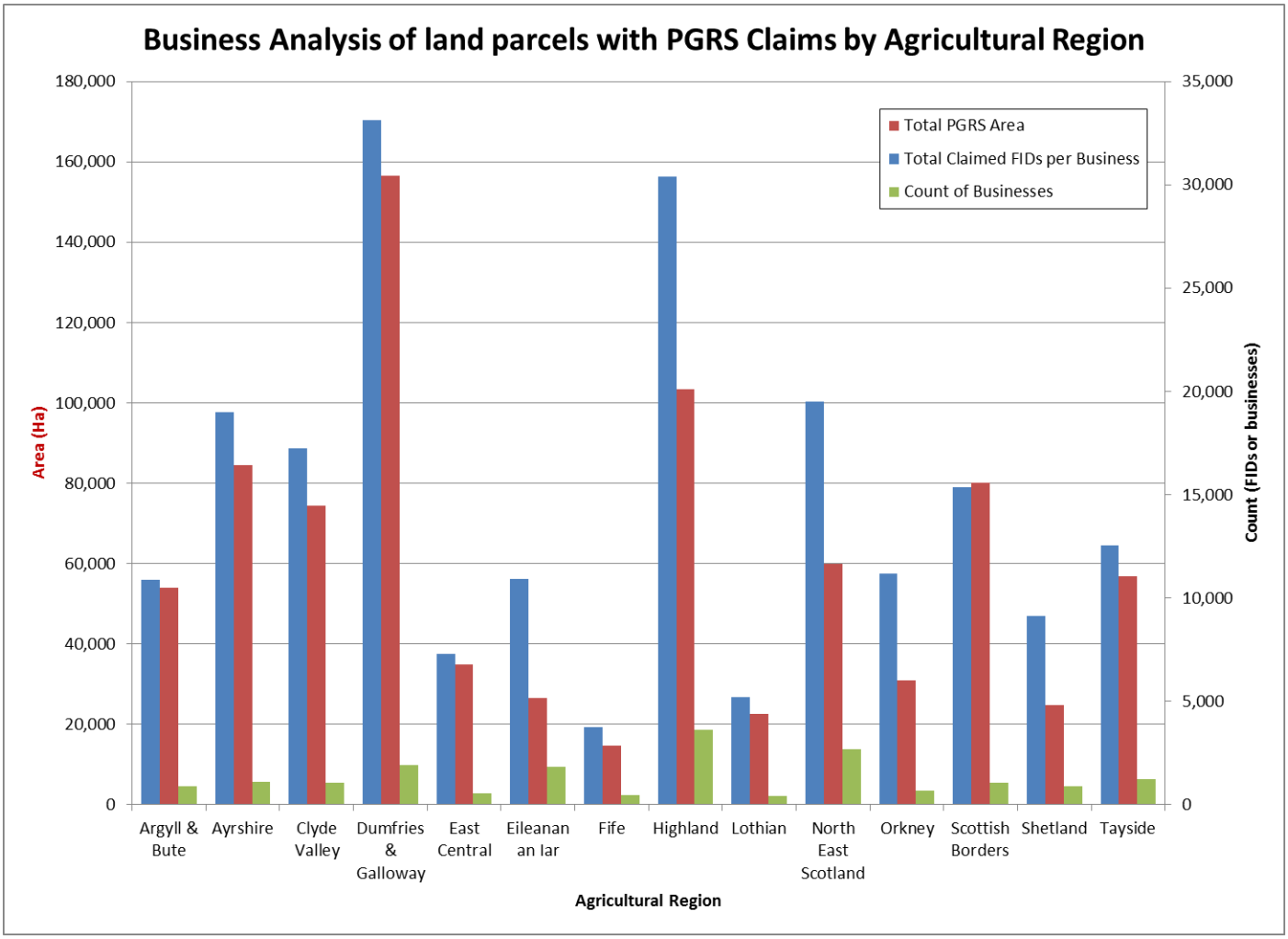

Figure 16: Permanent Grassland Requirement – Business Analysis of land parcels with PGRS Claims by Agricultural Region

Table 11: Permanent Grassland Requirement – Business Analysis of FIDs with PGRS Claims By Agricultural Region

Agricultural Region	Total Claimed FIDs per Business	Total PGRS Area	Count of Businesses
Argyll & Bute	10,889	54,030	914
Ayrshire	19,004	84,535	1,111
Clyde Valley	17,244	74,539	1,045
Dumfries & Galloway	33,149	156,660	1,932
East Central	7,303	34,844	553
Eileanan an Iar	10,924	26,638	1,822
Fife	3,756	14,625	457
Highland	30,413	103,540	3,645
Lothian	5,215	22,510	440
North East Scotland	19,510	60,024	2,701
Orkney	11,199	31,044	698
Scottish Borders	15,359	80,087	1,047
Shetland	9,155	24,873	890
Tayside	12,574	56,815	1,249
Total	**205,694**	**824,764**	**18,504**

3.2.6 Commentary on Permanent Grassland Requirement

Under the Permanent Grassland Requirement there is no need for land managers to change any management practices with the land at their disposal under Greening. Any restrictions already in place on permanent grassland will continue to apply, and only if there is a reduction in the ratio of permanent grassland (which for Greening includes rough grazing) by more than 5% compared to the total agricultural area ***at the national level*** will any government intervention be required. From page 4 of the Greening Booklet, all unimproved semi-natural areas are already protected by the Environmental Impact Assessment (Agriculture) (Scotland) Regulations 2006. This means that those grasslands (i.e. RGR) cannot be improved without first determining whether an EIA is required. Cross-compliance rules regarding ploughing of permanent grassland must also be observed. What this means is that land currently declared as rough grazing is unlikely to see any change in use as there are restrictions in place to prevent that land being ploughed. Consequently any reduction in Permanent Grassland would have to come from land which is currently declared as Grass Over 5 Years (PGRS) **but** the 5% calculation would be the ratio of RGR+PGRS to the total agricultural area of Scotland. So for ratio of Permanent Grassland to the total agricultural area to reduce by 5%, this would **all** have to come from land currently declared as PGRS.

Table 12 contains a series of calculations which outline the magnitude by which land currently declared as PGRS would need to be reduced by in order for the 5% threshold to be triggered. This suggests that PGRS would need to drop by 29.08% in order for the 5% threshold to be reached. If this calculation is correct it is highly unlikely that changes in farming practice would be of a scale needed for intervention to take place.

Table 12: Permanent Grassland Requirement – Intervention Trigger Calculations

Row	Description	Area (Ha)	Notes
Row 1	Agricultural Area	4,796,160	1
Row 2	RGR Area	2,973,375	2
Row 3	PGRS Area	824,764	3
Row 4	Permanent Grassland Area	3,798,139	4
Row 5	Permanent Grassland as percentage of Total Agricultural Area	79.19%	5
Row 6	Threshold percentage for Permanent Grassland to trigger intervention	74.19%	6
Row 7	Reduction in Permanent Grassland area needed to trigger intervention	239,808	7
Row 8	Percentage reduction in PGRS needed to trigger intervention	29.08%	8

Table 12 Notes:

1. This is the total agricultural area exclusive of any ineligible land uses.
2. This is the total area of all land currently declared as Rough Grazing in the SAF14 dataset.
3. This is the total area of all land currently declared as Grass Over 5 Years in the SAF14 dataset.
4. This is the Permanent Grassland area including both improved and unimproved grassland – the sum of Row 2 (RGR) and Row 3 (PGRS).
5. This is the current percentage of "Permanent Grassland" of the Agricultural Area.
6. This is a reduction of 5% from Row 5.
7. This is the area of Permanent Grassland that equates to 5% of the Agricultural Area.
8. This is the percentage by which PGRS would need to drop by in order for the 5% reduction in "Permanent Grassland" to be triggered.

3.3 Crop Diversification Requirement

This section contains the results of the analysis of the Crop Diversification Requirement. First the overall summary is presented in terms of counts of businesses and total arable area of those businesses in each of the four possible categories. These categories are:

- 2 crop rule applies
- 3 crop rule applies
- 3 crop 'special' rule applies (where businesses may count TGRS or Fallow as a main crop without the 75% restriction on the size of that crop provided they grow at least 2 other crops).
- Exempt

A national map of these categories is presented in Figure 17 while maps covering each of the 14 Agricultural Regions may be found in Part 3 of the Greening Review. The map is built from field-level data. In cases where a field has more than one business with an interest in it (i.e. claims by 2 or more businesses in a single land parcel), the classification of the business with the largest interest is used to categorise the field. Those fields which contain no arable land, but for which the business as a whole is subject to the crop diversification requirement, are classified as "Non-Exempt Fields With No Arable Land" and are coloured in red.

Following this breakdowns are provided by Agricultural Region, Farm Type and Business Size. In each case both figures and tables are presented.

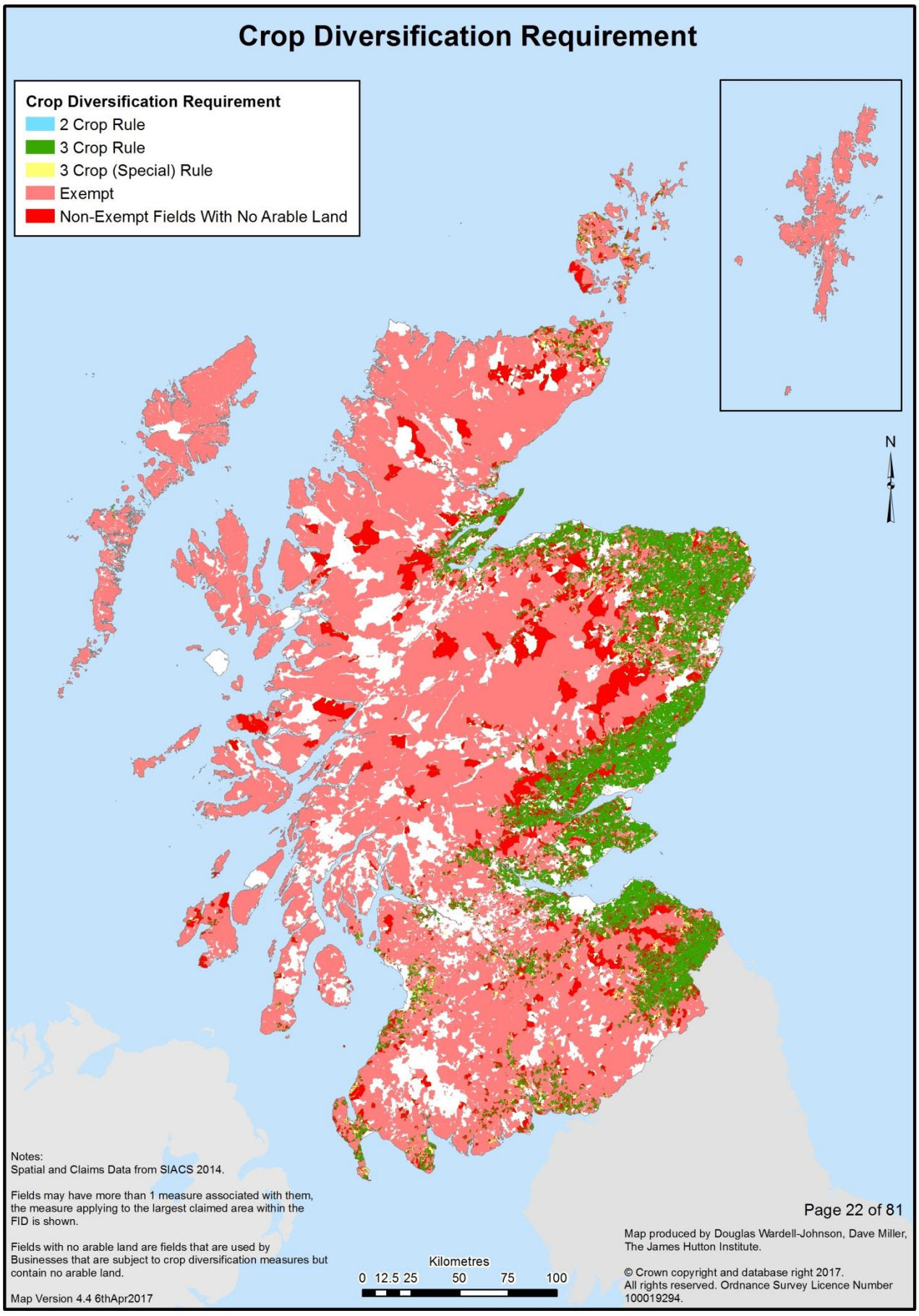

Figure 17: Crop Diversification Measure requirements map

3.3.1 Crop Diversification Requirement – Summary

Figure 18 and Table 13 show the overall summary of the Crop Diversification Requirement in terms of count of businesses and total arable area. In Figure 18 total arable area (red) may be read from the left vertical axis while counts of businesses (blue) may be read from the right vertical axis. They show that in terms of count the vast majority of businesses (77% of the total number) are exempt from the crop diversification requirement. Of the businesses subject to the requirement, the majority of the arable area (72% of the total arable area, or 94% of all arable land subject to the measure) is subject to the three crop rule.

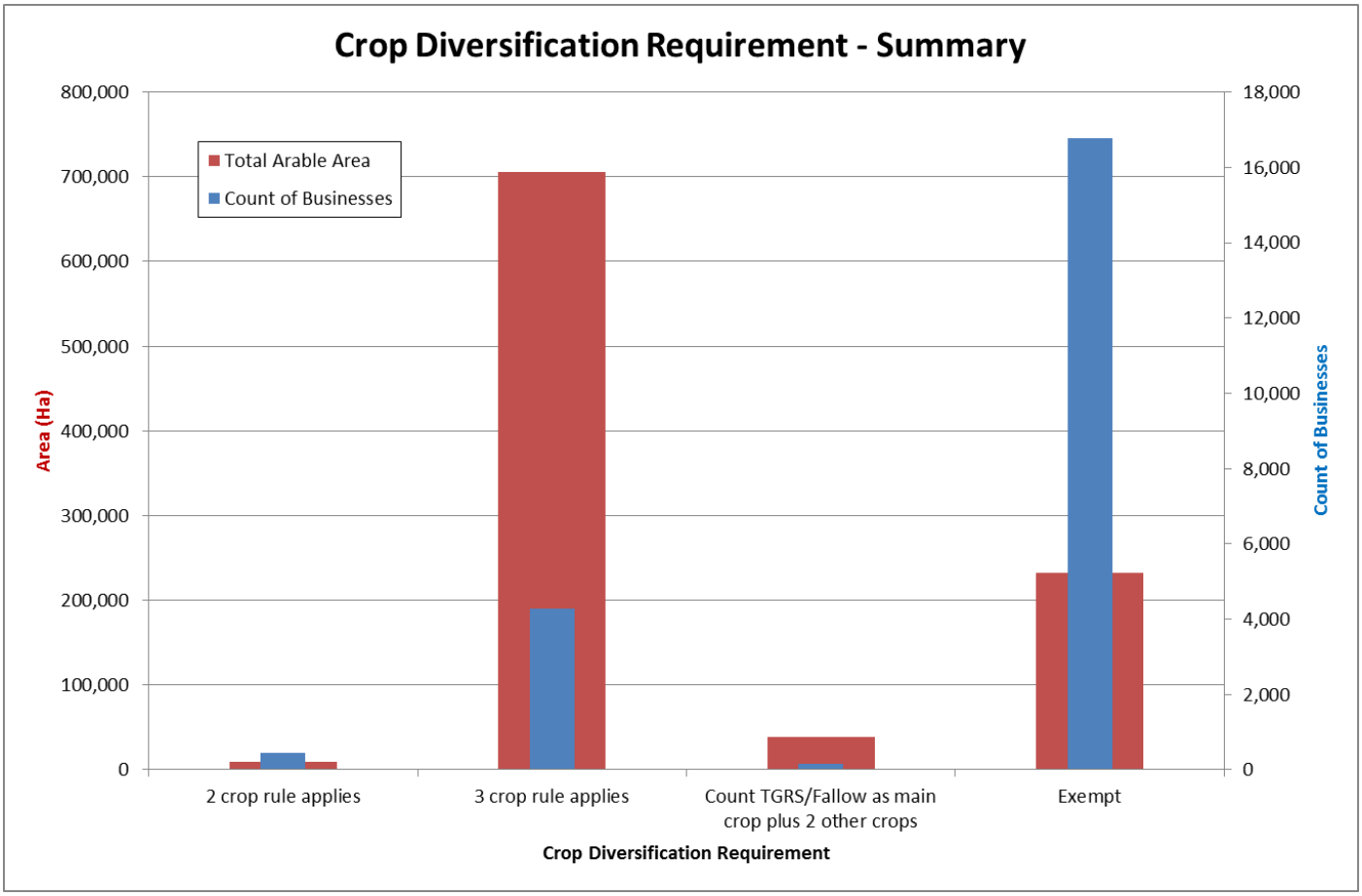

Figure 18: Crop Diversification Requirement – Summary

Table 13: Crop Diversification Requirement – Summary

Crop Diversification Requirement Category	Count of Businesses	Count of Businesses (%)	Total Arable Area	Total Arable Area (%)
2 crop rule applies	450	2.08%	8,930	0.91%
3 crop rule applies	4,274	19.74%	705,642	71.66%
Count TGRS/Fallow as main crop plus 2 other crops	151	0.70%	38,212	3.88%
Exempt	16,774	77.48%	231,948	23.55%
Total	**21,649**	**100.00%**	**984,732**	**100.00%**

3.3.2 Crop Diversification Requirement – By Agricultural Region

Figure 19 shows the crop diversification requirement by category and Agricultural Region in terms of total arable area. This shows that regionally the North East Scotland Agricultural Region contains the largest amount of arable area of any of the agricultural regions (almost twice that of Tayside), and that most of this area (81%) is subject to

the three crop rule. Figure 20 shows the crop diversification requirement by category and Agricultural Region in terms of count of businesses. This shows that, in terms of count, the majority of businesses are exempt from the requirement particularly in those regions most associated with grassland systems. Lastly Table 14 shows the same data as the previous two figures in tabular form.

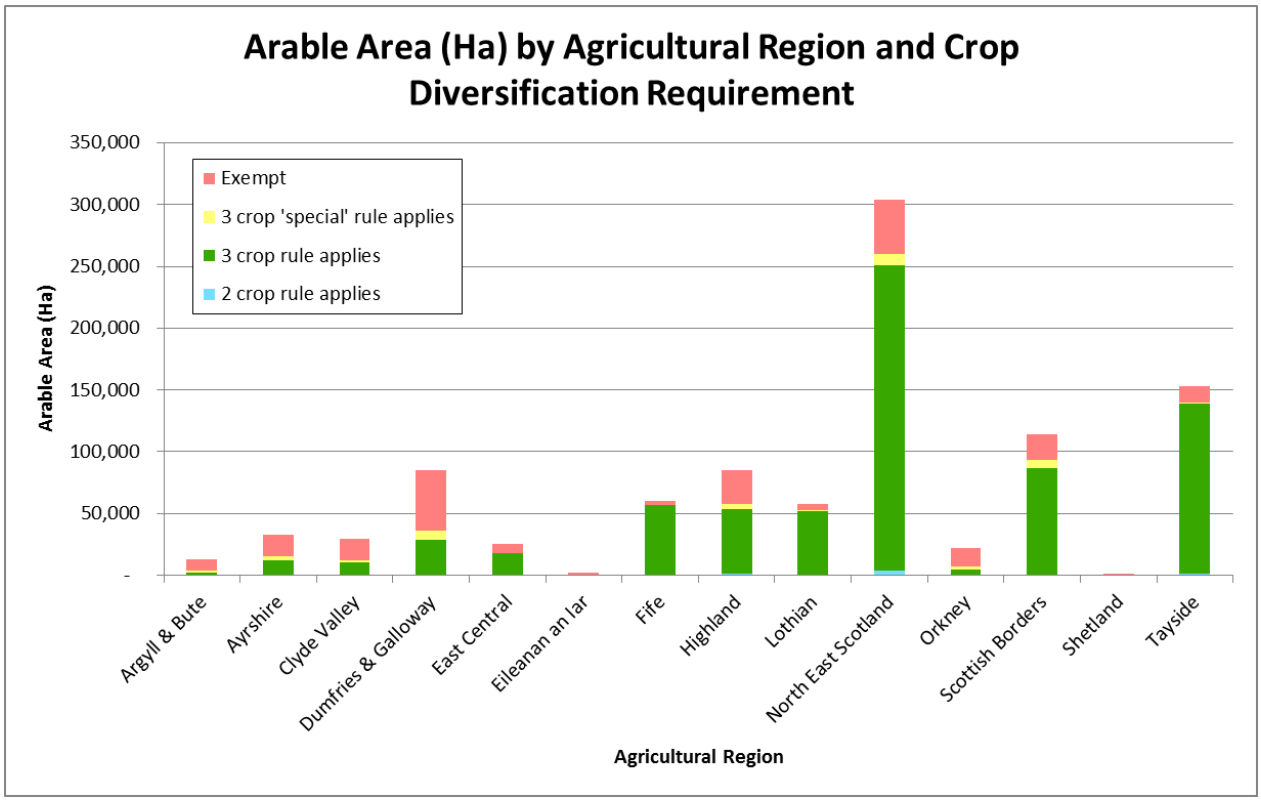

Figure 19: Crop Diversification Requirement – By Agricultural Region – Arable Area (Ha)

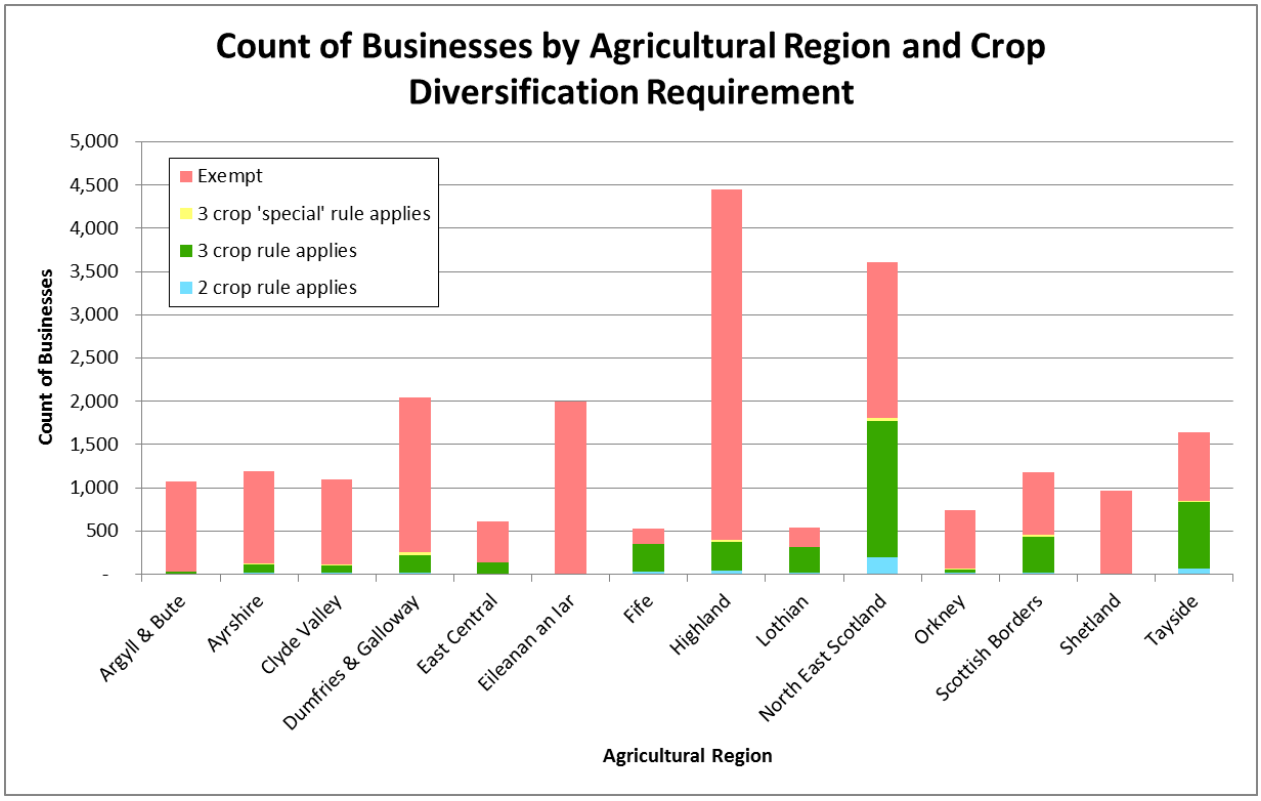

Figure 20: Crop Diversification Requirement – By Agricultural Region – Count of Businesses

Table 14: Crop Diversification Requirement – By Agricultural Region – Counts of Businesses and Arable Areas

Crop Diversification Requirement by Agricultural Region	2 crop rule applies		3 crop rule applies		3 crop 'special' rule applies		Exempt		Region Totals	
	Count	Arable Area	Count	Arable Area	Count	Arable Area	Count	Arable Area	Total Business Count	Total Arable Area
Argyll & Bute	3	53	21	2,304	4	993	1,040	9,764	1,068	13,114
Ayrshire	18	364	96	11,388	13	3,503	1,063	17,103	1,190	32,358
Clyde Valley	16	286	86	10,330	8	1,772	986	17,244	1,096	29,631
Dumfries & Galloway	18	355	199	28,396	32	7,484	1,798	49,052	2,047	85,287
East Central	11	226	123	17,372	2	341	478	7,014	614	24,953
Eileanan an Iar	3	50	1	258	-	-	1,992	1,824	1,996	2,132
Fife	24	539	321	55,975	2	489	181	3,116	528	60,119
Highland	41	849	336	52,766	15	3,587	4,054	27,507	4,446	84,710
Lothian	21	401	288	51,632	3	877	222	4,815	534	57,723
North East Scotland	197	3,828	1,578	246,755	36	9,400	1,791	44,178	3,602	304,161
Orkney	12	208	41	4,683	11	2,381	674	14,866	738	22,138
Scottish Borders	20	403	411	86,575	20	6,143	732	21,104	1,183	114,224
Shetland	-	-	-	-	-	-	962	1,057	962	1,057
Tayside	66	1,368	773	137,210	5	1,243	801	13,302	1,645	153,123
Total	**450**	**8,930**	**4,274**	**705,642**	**151**	**38,212**	**16,774**	**231,948**	**21,649**	**984,732**

The same data can be presented in terms of the relative proportions between agricultural regions. Figure 21 shows the percentage of arable area in each agricultural region and the crop diversification requirement category associated with it.

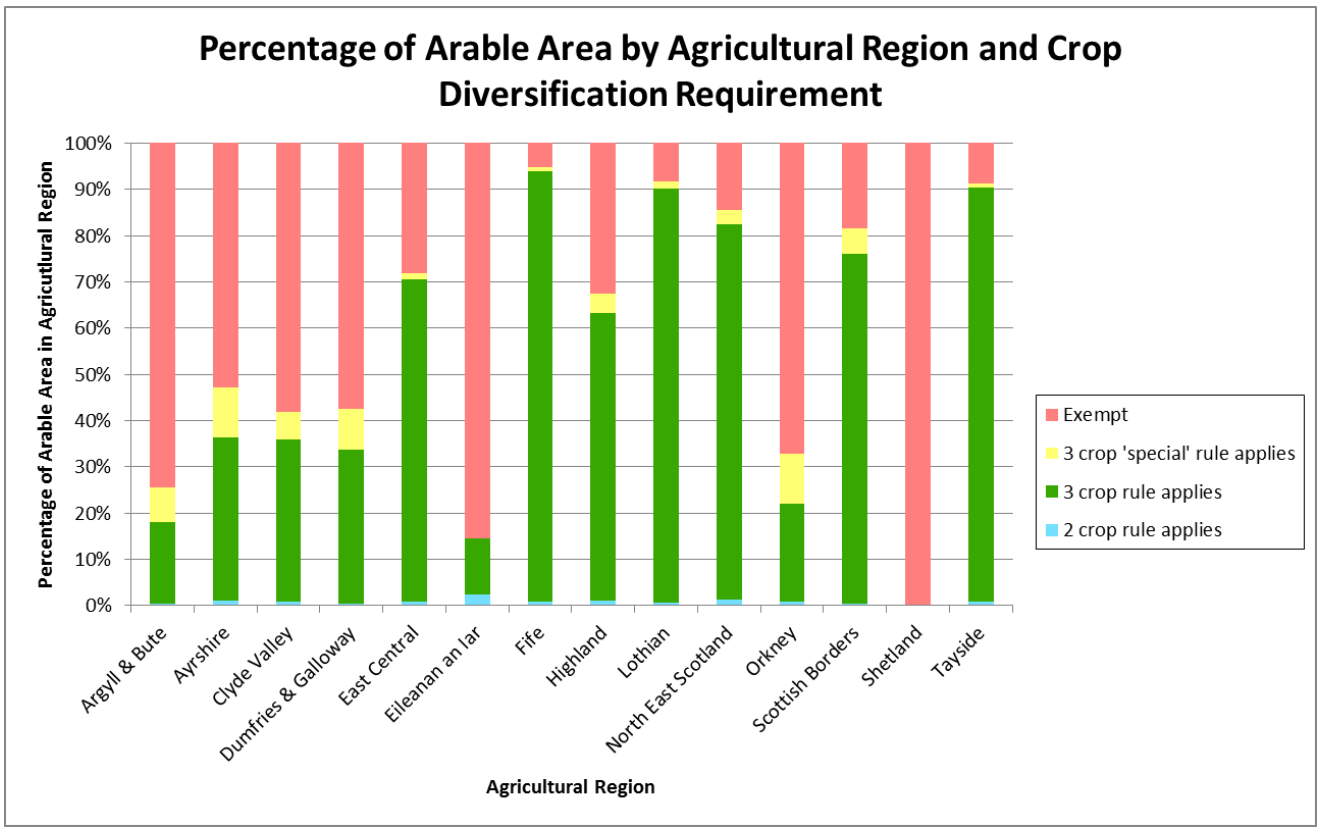

Figure 21: Crop Diversification Requirement – Percentage of Arable Area by Agricultural Region

This shows that in more extensively managed regions with a greater emphasis on grassland systems, the majority of the arable area is exempt from the requirement (e.g. Argyll & Bute, Western Isles, Orkney, Shetland) while in lowland regions most of the arable area is subject to the three crop rule (e.g. Fife, Tayside, Lothian, North-East Scotland).

Figure 22 shows the same analysis by counts of businesses. This shows that even in agricultural regions where the proportion of arable land subject to the crop diversification requirement is high (such as Fife, Tayside, Lothian, North East Scotland), between one third and one half of the businesses in these regions are exempt from the requirement. Lastly Table 15 presents the count of businesses and arable area in percentage terms in tabular form.

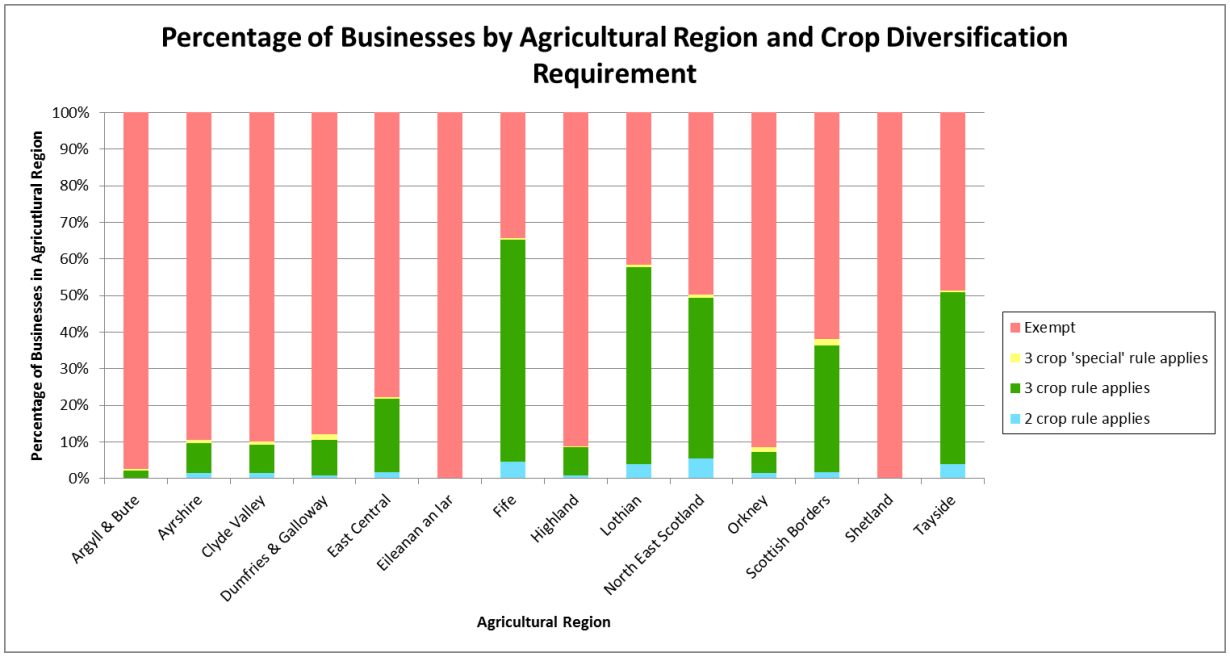

Figure 22: Crop Diversification Requirement – Percentage of Businesses by Agricultural Region

Table 15: Crop Diversification Requirement – By Agricultural Region – Percentage of Businesses and Arable Area

Crop Diversification Requirement by Agricultural Region (%)	2 crop rule applies		3 crop rule applies		3 crop 'special' rule applies		Exempt	
	Count of Businesses	Arable Area	Count of Businesses	Arable Area	Count of Businesses	Arable Area	Count of Businesses	Arable Area
Argyll & Bute	0.28%	0.40%	1.97%	17.57%	0.37%	7.57%	97.38%	74.45%
Ayrshire	1.51%	1.12%	8.07%	35.19%	1.09%	10.83%	89.33%	52.86%
Clyde Valley	1.46%	0.96%	7.85%	34.86%	0.73%	5.98%	89.96%	58.20%
Dumfries & Galloway	0.88%	0.42%	9.72%	33.29%	1.56%	8.77%	87.84%	57.51%
East Central	1.79%	0.91%	20.03%	69.62%	0.33%	1.37%	77.85%	28.11%
Eileanan an Iar	0.15%	2.35%	0.05%	12.10%	0.00%	0.00%	99.80%	85.55%
Fife	4.55%	0.90%	60.80%	93.11%	0.38%	0.81%	34.28%	5.18%
Highland	0.92%	1.00%	7.56%	62.29%	0.34%	4.23%	91.18%	32.47%
Lothian	3.93%	0.69%	53.93%	89.45%	0.56%	1.52%	41.57%	8.34%
North East Scotland	5.47%	1.26%	43.81%	81.13%	1.00%	3.09%	49.72%	14.52%
Orkney	1.63%	0.94%	5.56%	21.15%	1.49%	10.76%	91.33%	67.15%
Scottish Borders	1.69%	0.35%	34.74%	75.79%	1.69%	5.38%	61.88%	18.48%
Shetland	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Tayside	4.01%	0.89%	46.99%	89.61%	0.30%	0.81%	48.69%	8.69%

3.3.3 Crop Diversification Requirement – By Farm Type

Figure 23 and Figure 24 show the Crop Diversification Requirement by category and Farm Type in terms of arable area and count of businesses respectively while Table 16 shows the same data in table form.

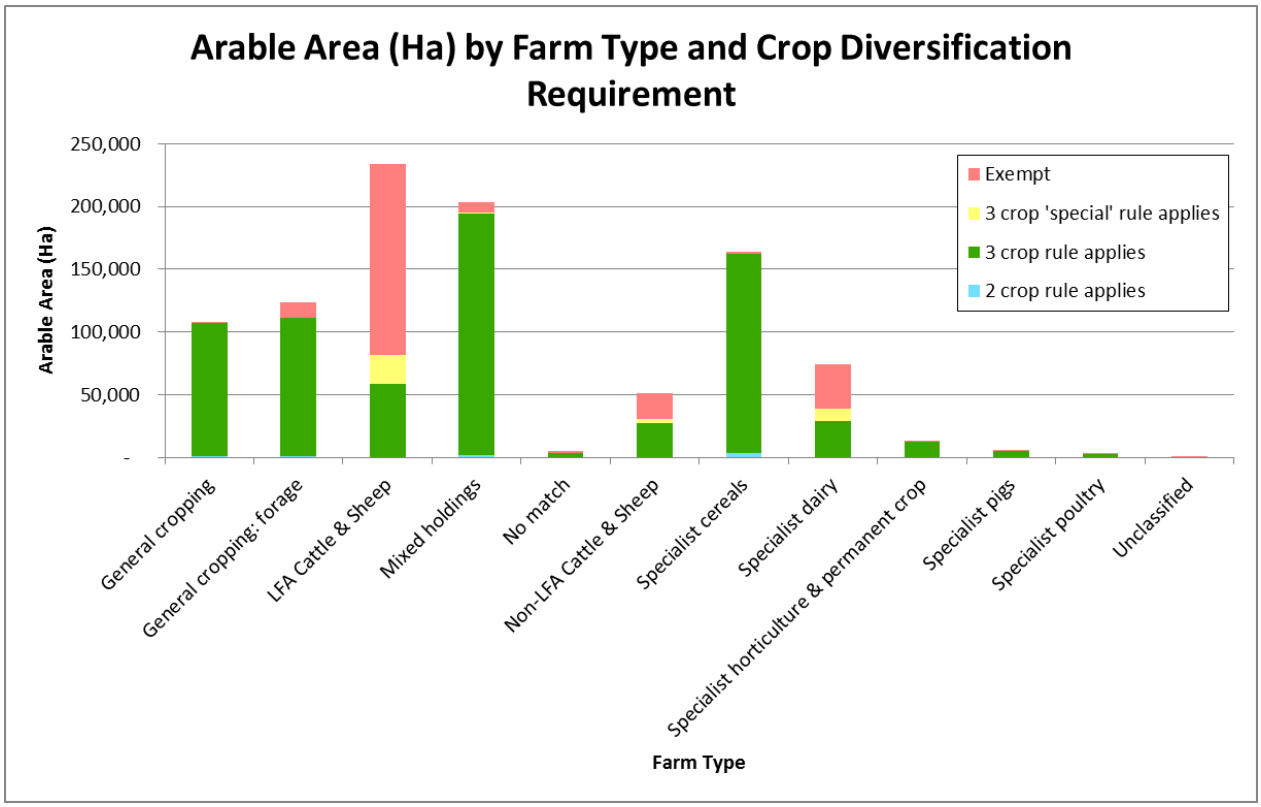

Figure 23: Crop Diversification Requirement – By Farm Type – Arable Area (Ha)

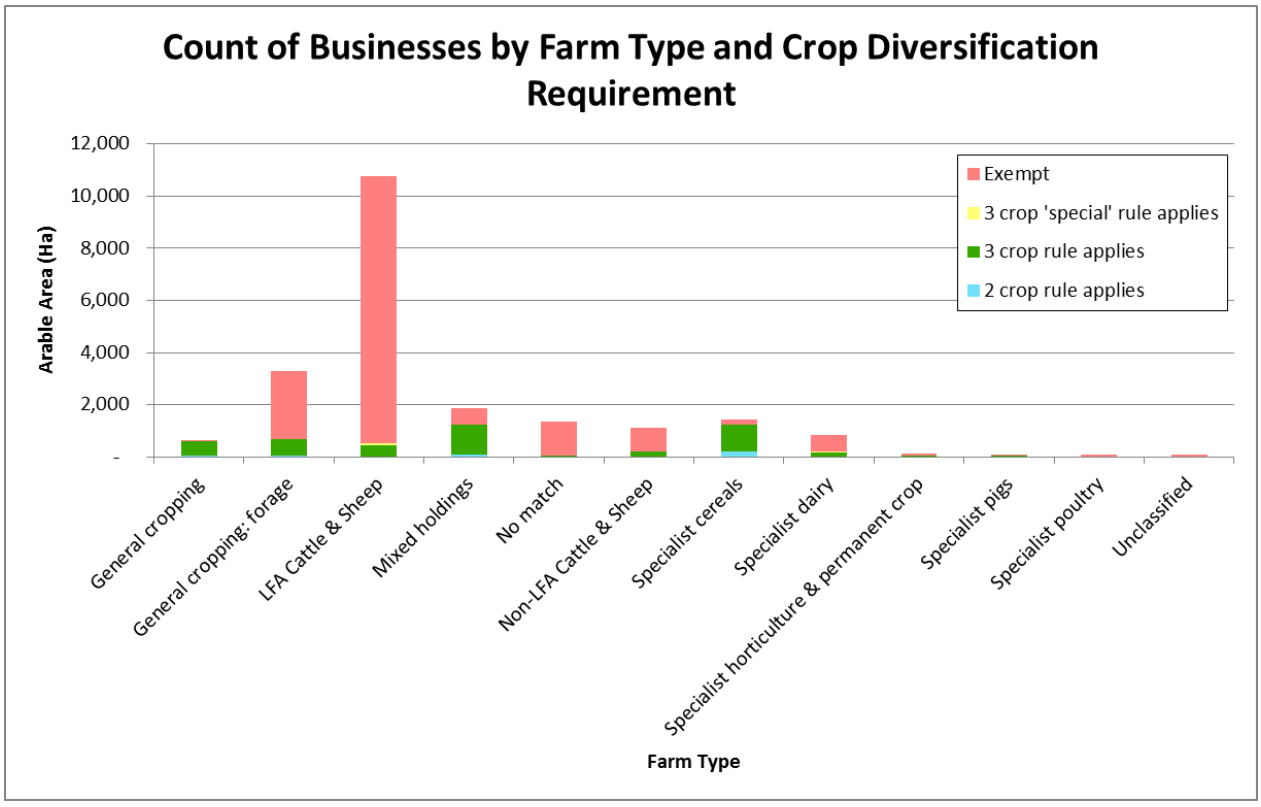

Figure 24: Crop Diversification Requirement – By Farm Type – Count of Businesses

Table 16: Crop Diversification Requirement – By Farm Type (Count, Area (Ha))

Crop Diversification Requirement By Farm Type	2 crop rule applies		3 crop rule applies		3 crop 'special' rule applies		Exempt		Region Totals	
	Count	Ha	Count	Ha	Count	Ha	Count	Ha	Count	Ha
General cropping	33	689	562	106,302	-	-	49	630	644	107,621
General cropping: forage	56	1,137	611	110,093	1	148	2,605	12,202	3,273	123,580
LFA Cattle & Sheep	23	450	413	58,157	91	23,462	10,212	151,496	10,739	233,565
Mixed holdings	87	1,722	1,150	192,814	4	1,073	624	7,544	1,865	203,153
No match	10	196	28	3,230	-	-	1,300	1,574	1,338	4,999
Non-LFA Cattle & Sheep	23	485	186	27,262	12	3,084	893	20,838	1,114	51,669
Specialist cereals	203	3,904	1,043	158,607	-	-	206	1,189	1,452	163,700
Specialist dairy	1	17	185	29,179	40	9,766	628	35,341	854	74,303
Specialist horticulture & permanent crop	7	152	49	12,346	-	-	60	409	116	12,907
Specialist pigs	5	127	32	5,242	1	178	21	97	59	5,645
Specialist poultry	2	50	15	2,412	2	501	68	596	87	3,559
Unclassified	-	-	-	-	-	-	108	31	108	31
Total	**450**	**8,930**	**4,274**	**705,642**	**151**	**38,212**	**16,774**	**231,948**	**21,649**	**984,732**

The category "No match" indicates those businesses not part of the Census population for which no calculation of farm type could be made. The analysis shows that of those businesses subject to the three crop rule the largest area and highest number are in the mixed holdings category. The chart also shows that, as may be expected, LFA Cattle & Sheep farms are largely exempt from the crop diversification requirement, this is also true for Non-LFA Cattle And Sheep and Dairy businesses but to a lesser degree.

Figure 25, Figure 26, and Table 17 show the same analysis as a percentage of each farm type.

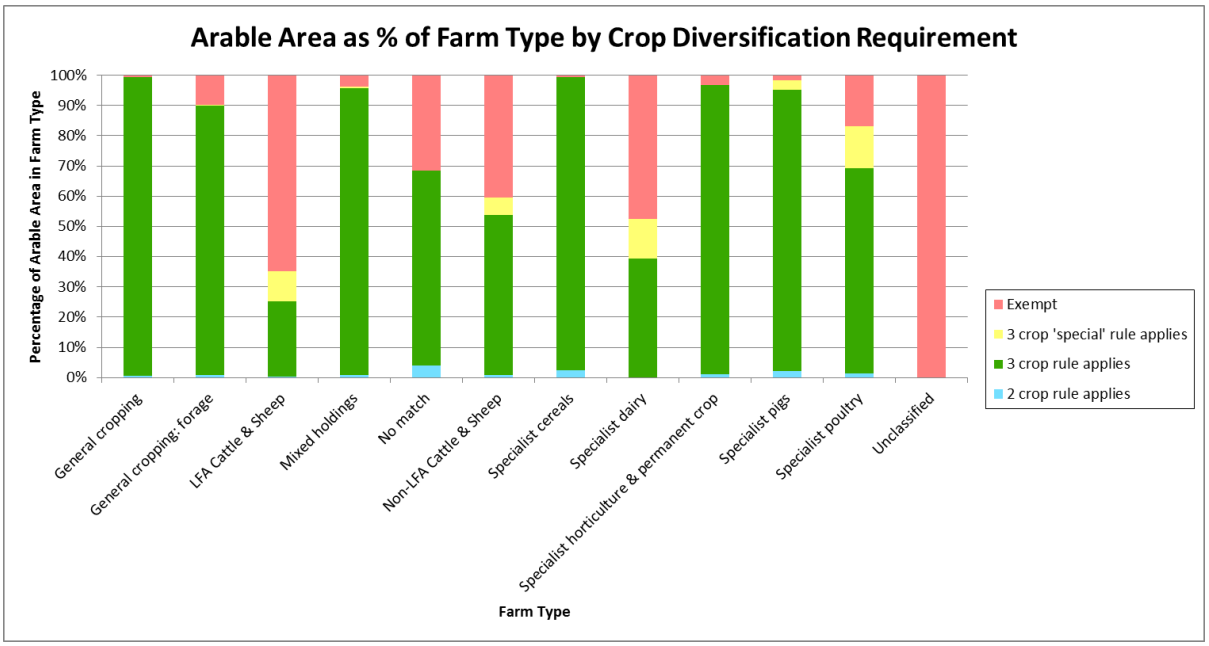

Figure 25: Crop Diversification Requirement – By Farm Type – Percentage of Arable Area (Ha)

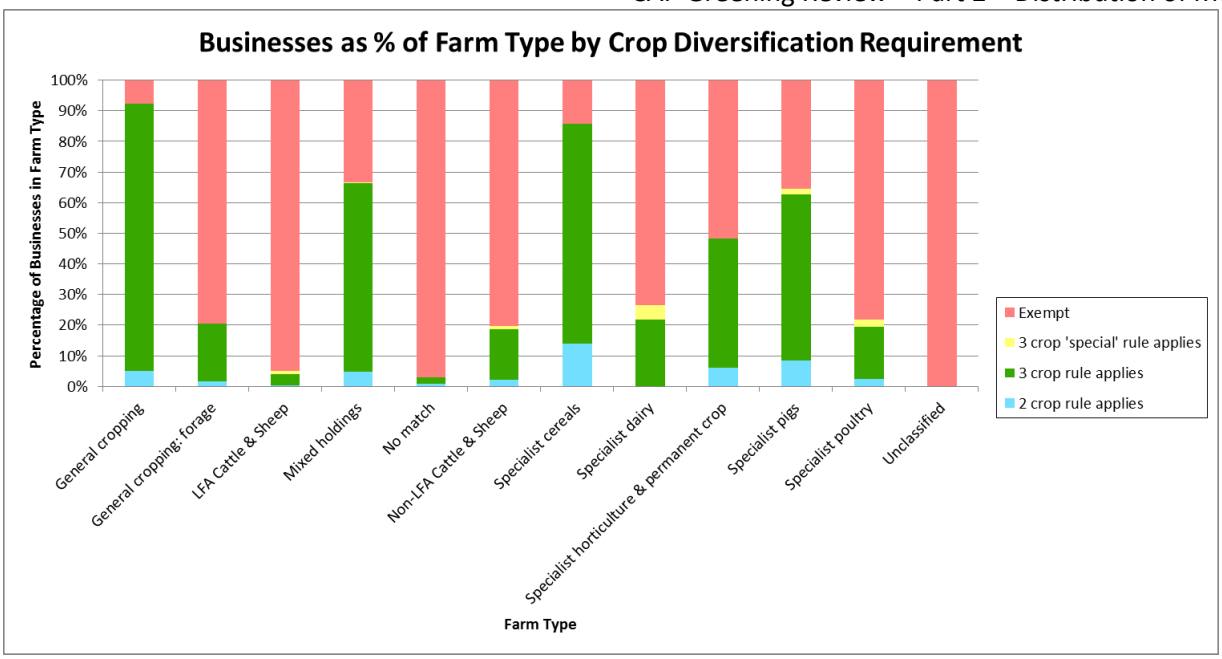

Figure 26: Crop Diversification Requirement – By Farm Type – Percentage of Businesses (%)

Table 17: Crop Diversification Requirement – By Farm Type (%)

Crop Diversification Requirement by Farm Type (% of Farm Type)	2 crop rule applies		3 crop rule applies		3 crop 'special' rule applies		Exempt	
	Count	Ha	Count	Ha	Count	Ha	Count	Ha
General cropping	5.12%	0.64%	87.27%	98.77%	0.00%	0.00%	7.61%	0.59%
General cropping: forage	1.71%	0.92%	18.67%	89.09%	0.03%	0.12%	79.59%	9.87%
LFA Cattle & Sheep	0.21%	0.19%	3.85%	24.90%	0.85%	10.05%	95.09%	64.86%
Mixed holdings	4.66%	0.85%	61.66%	94.91%	0.21%	0.53%	33.46%	3.71%
No match	0.75%	3.92%	2.09%	64.60%	0.00%	0.00%	97.16%	31.48%
Non-LFA Cattle & Sheep	2.06%	0.94%	16.70%	52.76%	1.08%	5.97%	80.16%	40.33%
Specialist cereals	13.98%	2.39%	71.83%	96.89%	0.00%	0.00%	14.19%	0.73%
Specialist dairy	0.12%	0.02%	21.66%	39.27%	4.68%	13.14%	73.54%	47.56%
Specialist horticulture & permanent crop	6.03%	1.17%	42.24%	95.66%	0.00%	0.00%	51.72%	3.17%
Specialist pigs	8.47%	2.26%	54.24%	92.86%	1.69%	3.16%	35.59%	1.72%
Specialist poultry	2.30%	1.40%	17.24%	67.78%	2.30%	14.07%	78.16%	16.75%
Unclassified	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%

3.3.4 Crop Diversification Requirement – By Business Size

Figure 27 and Table 18 show the crop diversification requirement by business size in terms of counts of businesses and total arable area. In this representation each business has been classified into 50Ha categories up to >=250Ha based on the total IACS claimed area per business. In Figure 27 total arable area (red) may be read from the left vertical axis while count of businesses (blue) may be read from the right vertical axis. Table 19 shows the values as percentages of all areas and businesses in the size category.

This analysis shows that small businesses (<50 Ha) are almost entirely exempt from the rule (93% exempt), and that where the rule does apply it is predominantly associated with the largest businesses (64% of businesses ≥250 Ha). Overall 77% of businesses are exempt from the requirement but 76% of the area is subject to it.

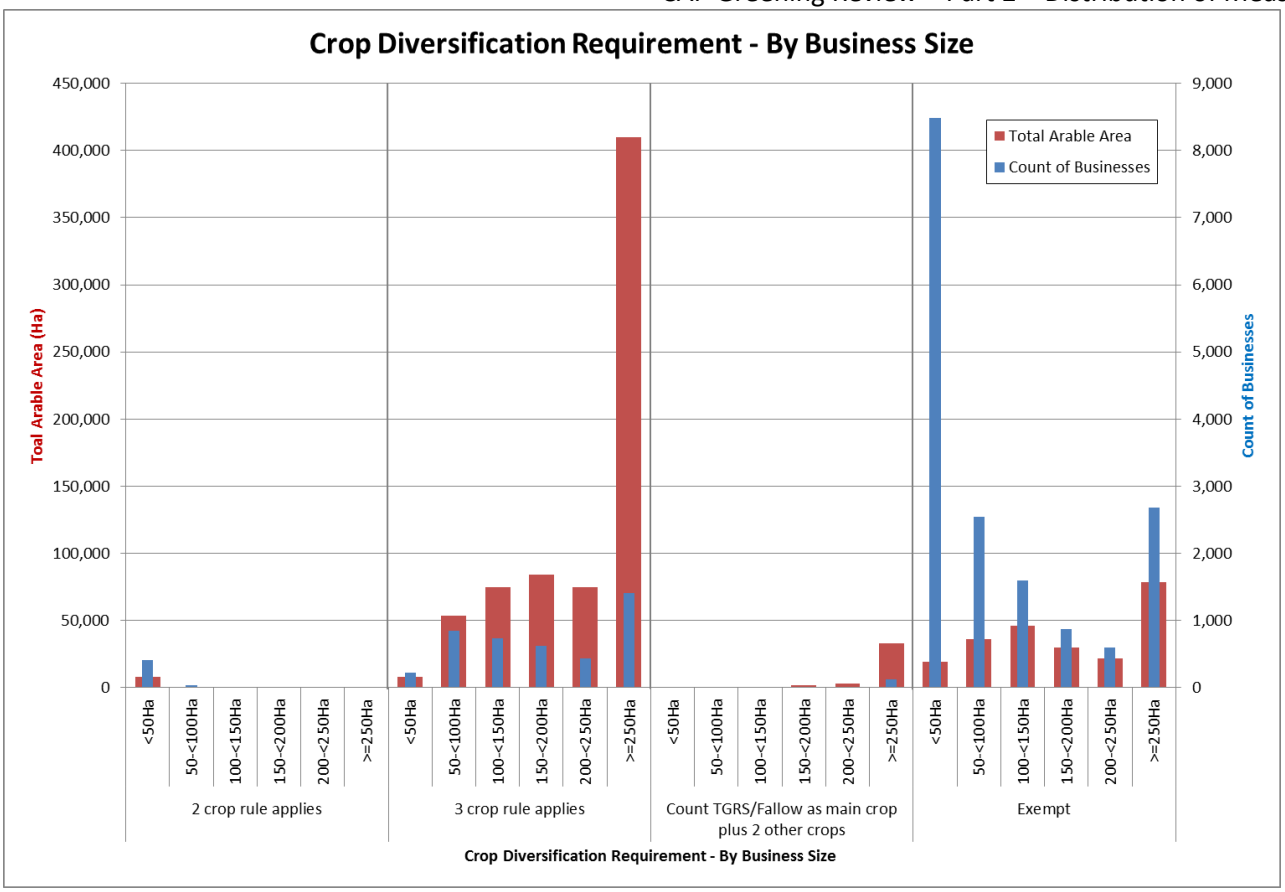

Figure 27: Crop Diversification Requirement – By Business Size

Table 18: Crop Diversification Requirement – By Business Size

Crop Diversification Requirement - Business Size	2 crop rule applies		3 crop rule applies		3 crop 'special' rule applies		Exempt	
	Count	Area	Count	Area	Count	Area	Count	Area
<50Ha	406	7,917	218	8,217	-	-	8,485	19,169
50-<100Ha	38	875	842	53,412	-	-	2,544	36,242
100-<150Ha	3	80	741	74,741	1	138	1,591	46,309
150-<200Ha	-	-	617	84,424	12	1,955	870	29,950
200-<250Ha	-	-	442	75,019	18	3,169	604	21,778
>=250Ha	3	58	1,414	409,829	120	32,950	2,680	78,499
Total	**450**	**8,930**	**4,274**	**705,642**	**151**	**38,212**	**16,774**	**231,948**

Table 19: Crop Diversification Requirement – By Business Size (% of category)

Crop Diversification Requirement - Business Size (%)	2 crop rule applies		3 crop rule applies		3 crop 'special' rule applies		Exempt	
	Count	Area	Count	Area	Count	Area	Count	Area
<50Ha	4.46%	22.42%	2.39%	23.28%	0.00%	0.00%	93.15%	54.30%
50-<100Ha	1.11%	0.97%	24.59%	59.00%	0.00%	0.00%	74.30%	40.03%
100-<150Ha	0.13%	0.07%	31.72%	61.63%	0.04%	0.11%	68.11%	38.19%
150-<200Ha	0.00%	0.00%	41.16%	72.57%	0.80%	1.68%	58.04%	25.75%
200-<250Ha	0.00%	0.00%	41.54%	75.04%	1.69%	3.17%	56.77%	21.79%
>=250Ha	0.07%	0.01%	33.53%	78.61%	2.85%	6.32%	63.55%	15.06%
National Percentage	2.08%	0.91%	19.74%	71.66%	0.70%	3.88%	77.48%	23.55%

3.3.5 Commentary on Crop Diversification Requirement

In summary the crop diversification requirement targets 72% of the total arable area in Scotland while 77% of businesses are exempt from the requirement. In terms of the balance between the 2-crop, 3-crop, and 3-crop special rules 94% of all arable land subject to the crop diversification requirement falls under the three crop rule.

Regionally those regions with lower proportions of arable area are entirely or almost entirely excluded from the measure. In terms of counts of businesses these include Shetland (100% exempt), Western Isles (99.8% exempt), Argyll & Bute (97.4% exempt), Orkney (91.3% exempt), Highland (91.2% exempt) with Clyde Valley, Ayrshire, and Dumfries & Galloway all over 88% exempt. In contrast more than half of the businesses in Fife (65.8%), Lothian (58.4%), Tayside (51.3%), and North East Scotland (50.28%) are subject to the measure.

In terms of farm type some farm types are almost entirely within the scope of the requirement. In General Cropping businesses for example 99.4% of all arable area is subject to the measure with 98.8% subject to the three crop rule. Similarly in Specialist Cereals businesses 99.3% of the area is subject to the measure as is 96.8% of Specialist Horticulture and 96.3% of Mixed Holdings. The LFA Cattle & Sheep farm type – by far the largest farm type – is 65% exempt in terms of area or 95% exempt by count of businesses.

Lastly in terms of business size, generally speaking the larger the business the more likely it is that the crop diversification requirement will apply. For the smallest businesses, those less than 50Ha in size, 93% of all businesses in this size category are exempt from the crop diversification requirement. In area terms the smallest businesses are 54% exempt – a level which declines with increasing business size until the largest businesses, those greater than 250Ha, of which only 15% are exempt.

3.4 Crop Diversification Assessment

For the Crop Diversification Requirement, SAF14 also allows the quantification of the degree to which businesses would have met the requirement in 2014. Figure 28 presents a national map of where, based on the 2014 SAF data, there will be a need to consider changes in patterns of land use (Pass/Fail for each of the crop diversification options). The subsections that then follow present assessments first in overall terms followed by a deeper analysis for those businesses subject to the 3 crop rule in terms of Agricultural Region, Farm Type and Business Size.

Caveats to the assessment

The analysis identifies those businesses that would not have passed the crop diversification assessment with their pattern of land use in 2014. It does not assess the degree of change required for individual businesses to meet the criteria. The analysis thus does not assess the degree of burden that meeting the Crop Diversification Requirement implies.

It would be possible to assess the degree of failure (i.e. up to a maximum of 25% of the included land area for a mono-culture business and with up to 5% as a third crop if none is present). Yet even if these assessments were made the burden implied by compliance (financially, in terms of risk or change to management) would depend more on the nature of the land use choices made in 2015 than on their overall extent. For example, businesses with Temporary Grassland (TGRS) that lack a third crop could designate and manage an area of TGRS as Fallow (FALW or FALW-5) to deliver both Ecological Focus Area and third crop requirements. A further analysis of the actual changes undertaken by the businesses identified here will be made using 2015 and 2016 SAF data.

Note that these caveats are particularly significant for interpreting the mapping of the Crop Diversification Assessment since all non-exempt fields in businesses that fail to meet the criteria are shown (see Figure 28). This mapping is intended to highlight clearly the distribution of businesses that would need to adapt not to show the extent of land that would have to change to meet the Crop Diversification Requirement.

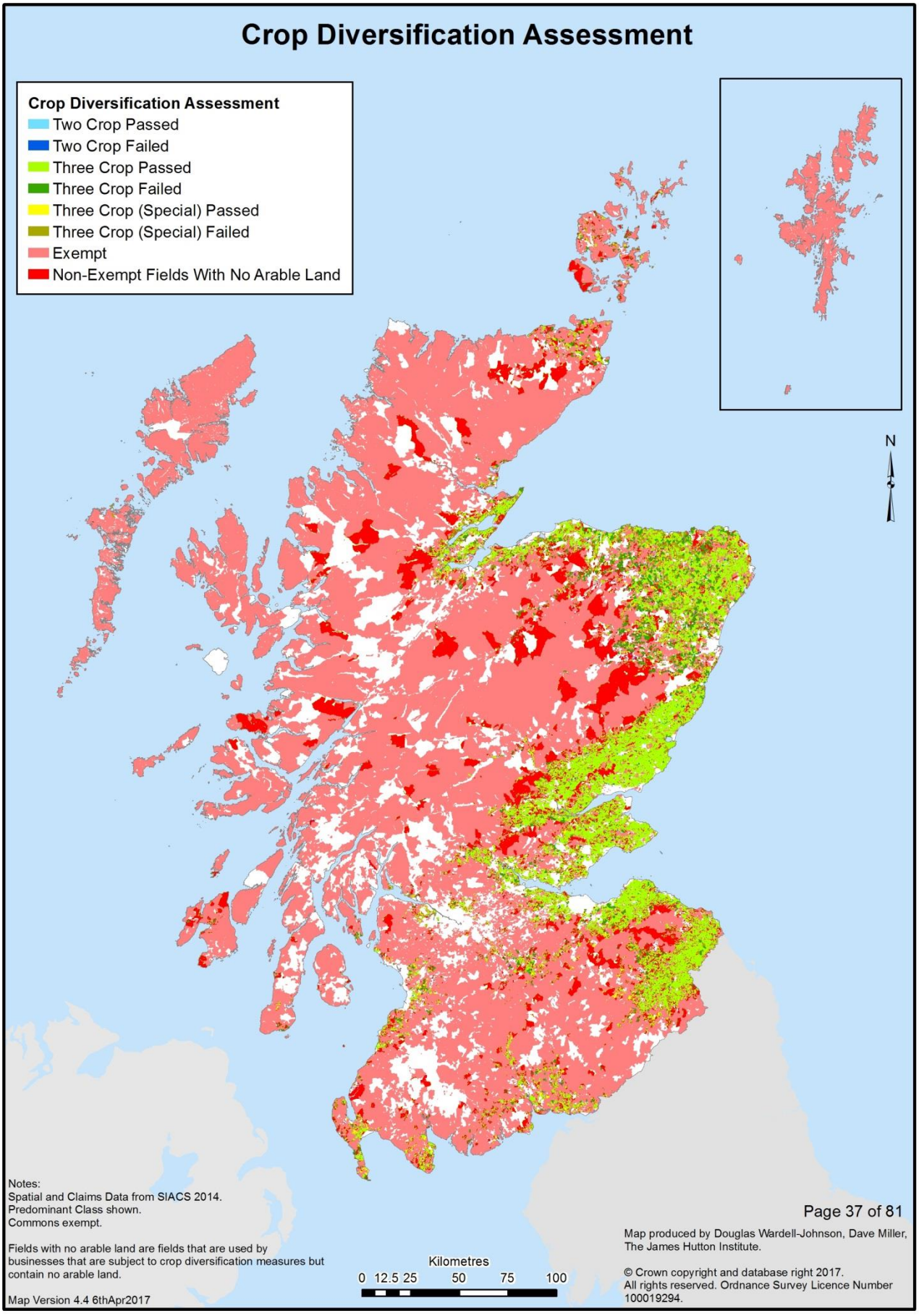

Figure 28: National coverage Crop Diversification Measure Assessment map

3.4.1 Crop Diversification Assessment – Overall Summary

Figure 29 and Table 20 show a summary in terms of counts of businesses and total arable areas of the businesses which fall into each of the possible categories in terms of the pass/fail status of those businesses. In Figure 29 total arable area (red) may be read from the left vertical axis while count of businesses (blue) may be read from the right vertical axis. This analysis shows that the majority of businesses subject to the 3 crop rule are already meeting the requirement (3,030 of 4,274 or 71% of businesses see the "3 crop rule applies" columns in Figure 29). In area terms this equates to 571,397 Ha from a total arable area subject to the requirement of 752,785 Ha or 76%.

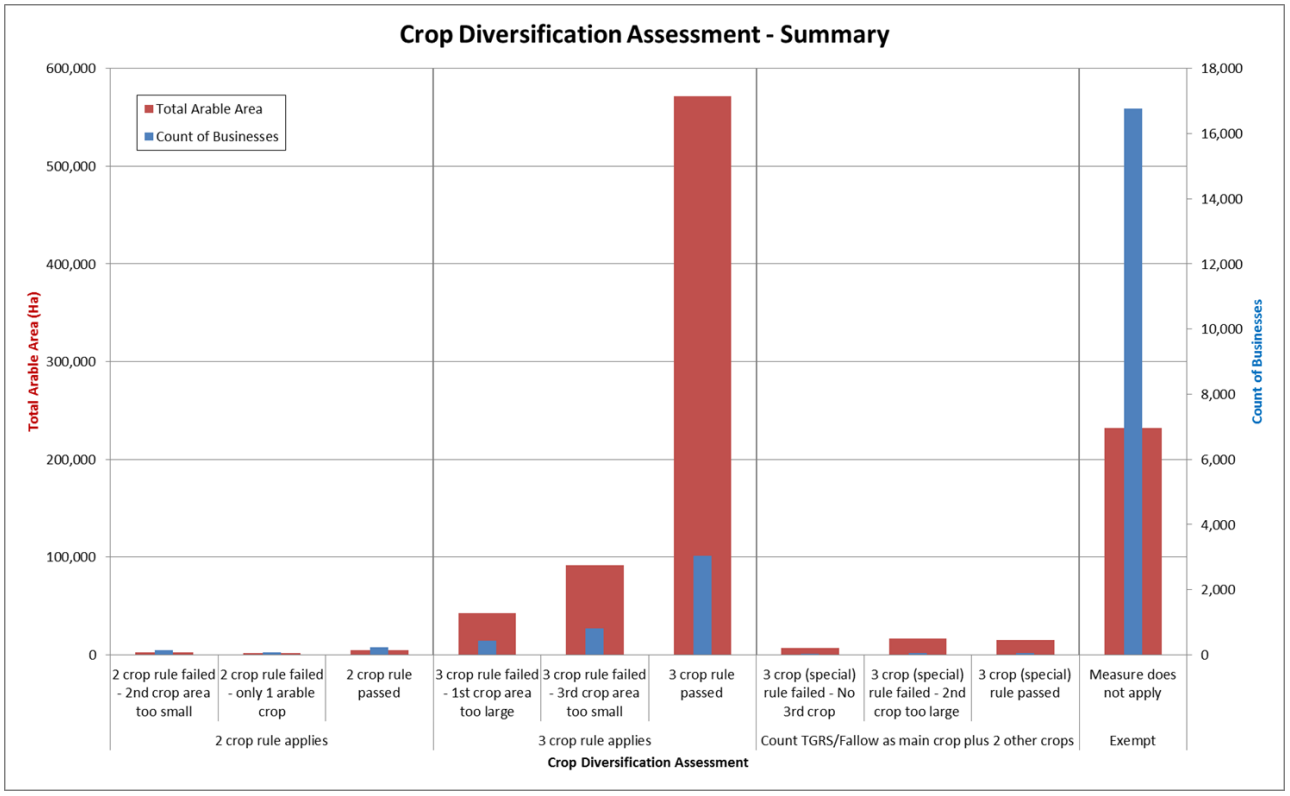

Figure 29: Crop Diversification Assessment – Summary

Table 20: Crop Diversification Assessment – Summary

Crop Diversification Assessment	Count of Businesses	Total Arable Area
2 crop rule applies	**450**	**8,930**
2 crop rule failed - 2nd crop area too small	134	2,660
2 crop rule failed - only 1 arable crop	84	1,439
2 crop rule passed	232	4,832
3 crop rule applies	**4,274**	**705,642**
3 crop rule failed - 1st crop area too large	423	42,384
3 crop rule failed - 3rd crop area too small	821	91,861
3 crop rule passed	3,030	571,397
Count TGRS/Fallow as main crop plus 2 other crops	**151**	**38,212**
3 crop (special) rule failed - No 3rd crop	29	6,608
3 crop (special) rule failed - 2nd crop too large	60	16,415
3 crop (special) rule passed	62	15,189
Exempt	**16,774**	**231,948**
Measure does not apply	16,774	231,948
Grand Total	**21,649**	**984,732**

3.4.2 Crop Diversification Assessment – 3 Crop Rule Only – By Agricultural Region

Since most non-exempt businesses are subject to the 3 crop rule (4,274 of a total number of non-exempt businesses of 4,875 or 88%), the following analyses concentrate on those businesses only. Figure 30 and Table 21 show the breakdown by Agricultural Region of those businesses subject to the 3 crop rule and whether they pass/fail the criteria. While the majority of businesses pass the 3 crop rule there are notable challenges for the North East Scotland Agricultural Region. In terms of count, 487 businesses fail the rule since the 3rd crop area is too small. This includes some businesses which only grow two crops. Similarly another 210 businesses fail the rule as their first crop area is too large (i.e. it exceeds the 75% limit). The number of businesses failing the 3 crop rule is therefore 697 from a total number of businesses in the region subject to the 3 crop rule of 1,578. For these businesses, adjustments will need to be made to either the number of crops grown or the balance between areas of crops grown.

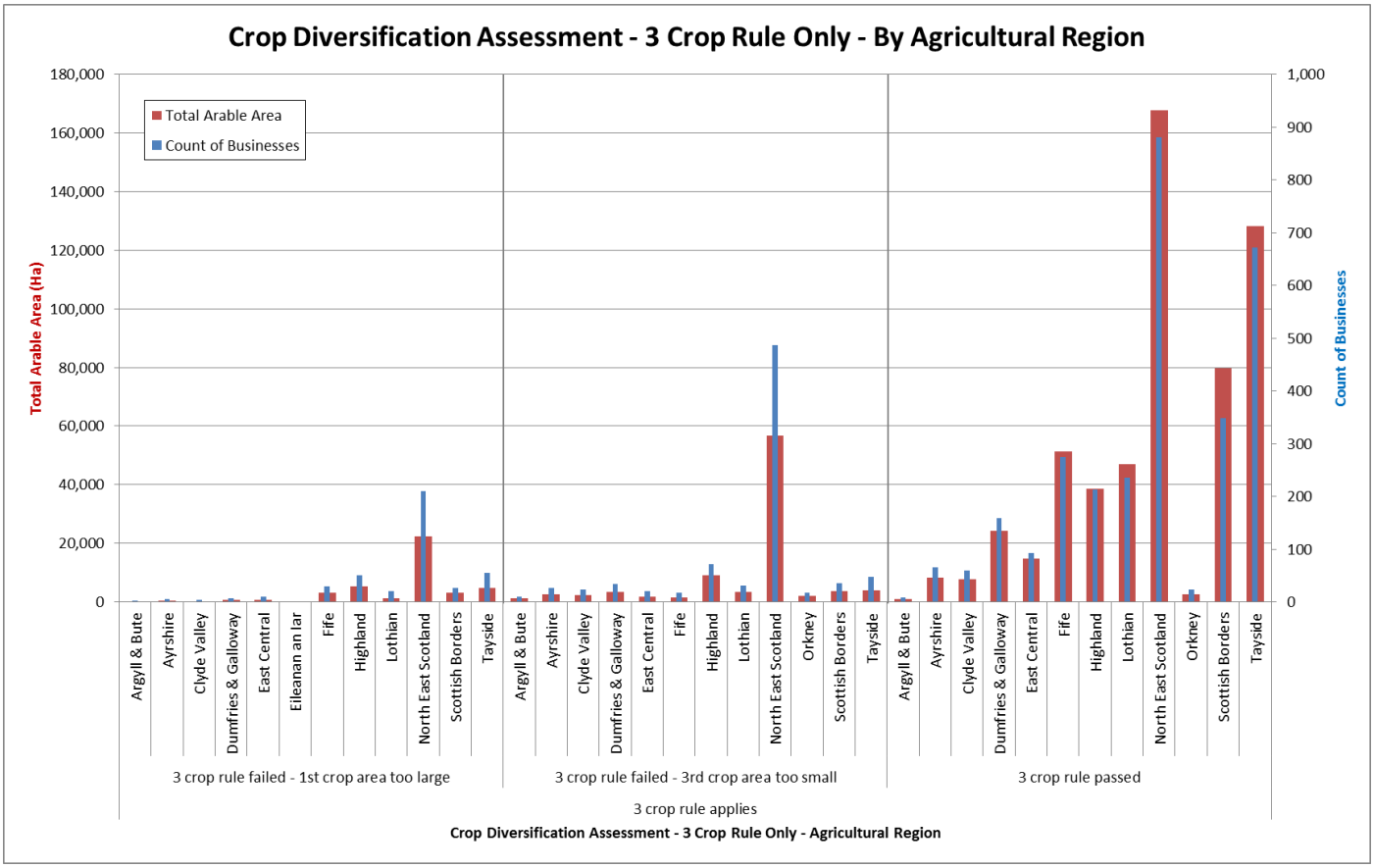

Figure 30: Crop Diversification Assessment – 3 Crop Rule Only – By Agricultural Region

Table 21: Crop Diversification Assessment – 3 Crop Rule Only – By Agricultural Region

Crop Diversification Assessment By Agricultural Region – 3 crop rule only	3 crop fails - 1st too large		3 crop fails - 3rd too small		3 crop pass		Region Totals	
	Count of Businesses	Arable Area	Count of Businesses	Arable Area	Count of Businesses	Arable Area	Total Count	Total Arable Area
Argyll & Bute	2	127	10	1,329	9	849	21	2,304
Ayrshire	5	448	26	2,686	65	8,253	96	11,388
Clyde Valley	4	171	23	2,321	59	7,837	86	10,330
Dumfries & Galloway	7	627	34	3,486	158	24,283	199	28,396
East Central	10	809	20	1,706	93	14,857	123	17,372
Eileanan an Iar	1	258	0	-	0	-	1	258

Crop Diversification Assessment By Agricultural Region – 3 crop rule only	3 crop fails - 1st too large		3 crop fails - 3rd too small		3 crop pass		Region Totals	
	Count of Businesses	Arable Area	Count of Businesses	Arable Area	Count of Businesses	Arable Area	Total Count	Total Arable Area
Fife	30	3,063	17	1,498	274	51,414	321	55,975
Highland	51	5,277	72	8,981	213	38,508	336	52,766
Lothian	21	1,305	31	3,343	236	46,984	288	51,632
North East Scotland	210	22,289	487	56,620	881	167,845	1578	246,755
Orkney	0	-	18	2,048	23	2,635	41	4,683
Scottish Borders	27	3,161	36	3,792	348	79,622	411	86,575
Tayside	55	4,850	47	4,050	671	128,310	773	137,210
Total	**423**	**42,384**	**821**	**91,861**	**3030**	**571,397**	**4274**	**705,642**

The same data can be presented in terms of the percentages of all businesses and the arable area subject to the 3 crop rule in each Agricultural Region. Figure 31 shows, for the 3 crop rule only, the percentages of businesses in each category while Figure 32 shows the same data for arable area. Table 22 shows the same data in tabular form for the counts of businesses and arable area.

These figures illustrate the challenges faced in some regions with low percentages of businesses which pass the 3 crop rule. In Argyll & Bute, 58% of businesses subject to the 3 crop rule fail (63% of arable area) while in Orkney and North East Scotland 44% of businesses subject to the 3 crop rule fail the criteria. Note that the single business subject to the 3 crop rule in Eileanan an Iar fails the criteria (hence the 100% failure rate). In other regions the pass rate is much higher. In Tayside, 87% of businesses subject to the 3 crop rule (and 94% of arable area) pass the criteria while in Fife 85% of businesses subject to the 3 crop rule (and 92% of arable area) pass the criteria. Similarly in the Borders 85% of businesses subject to the 3 crop rule (and 92% of arable area) pass the criteria.

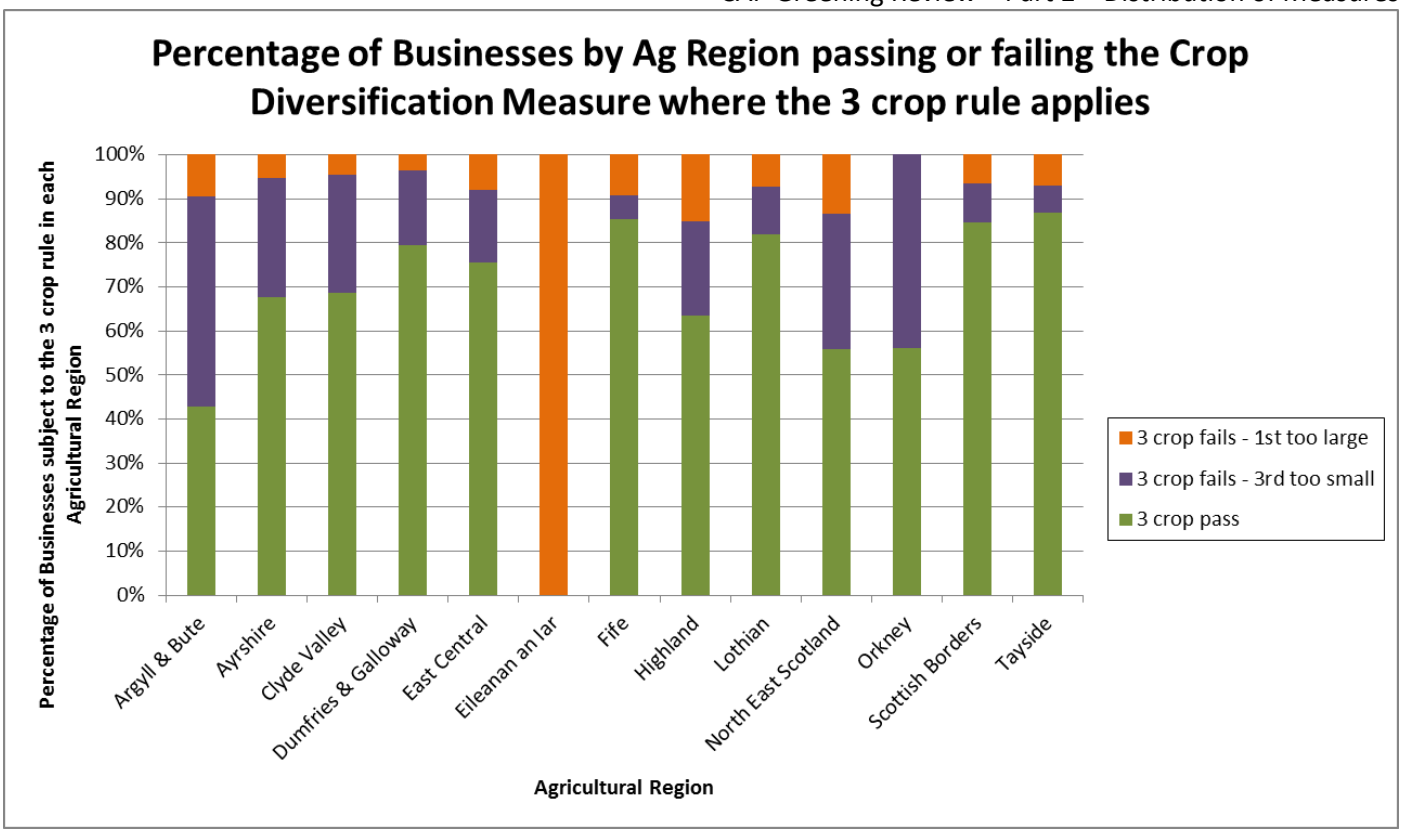

Figure 31: Crop Diversification Assessment – 3 Crop Rule Only – Percentage of Businesses by Agricultural Region

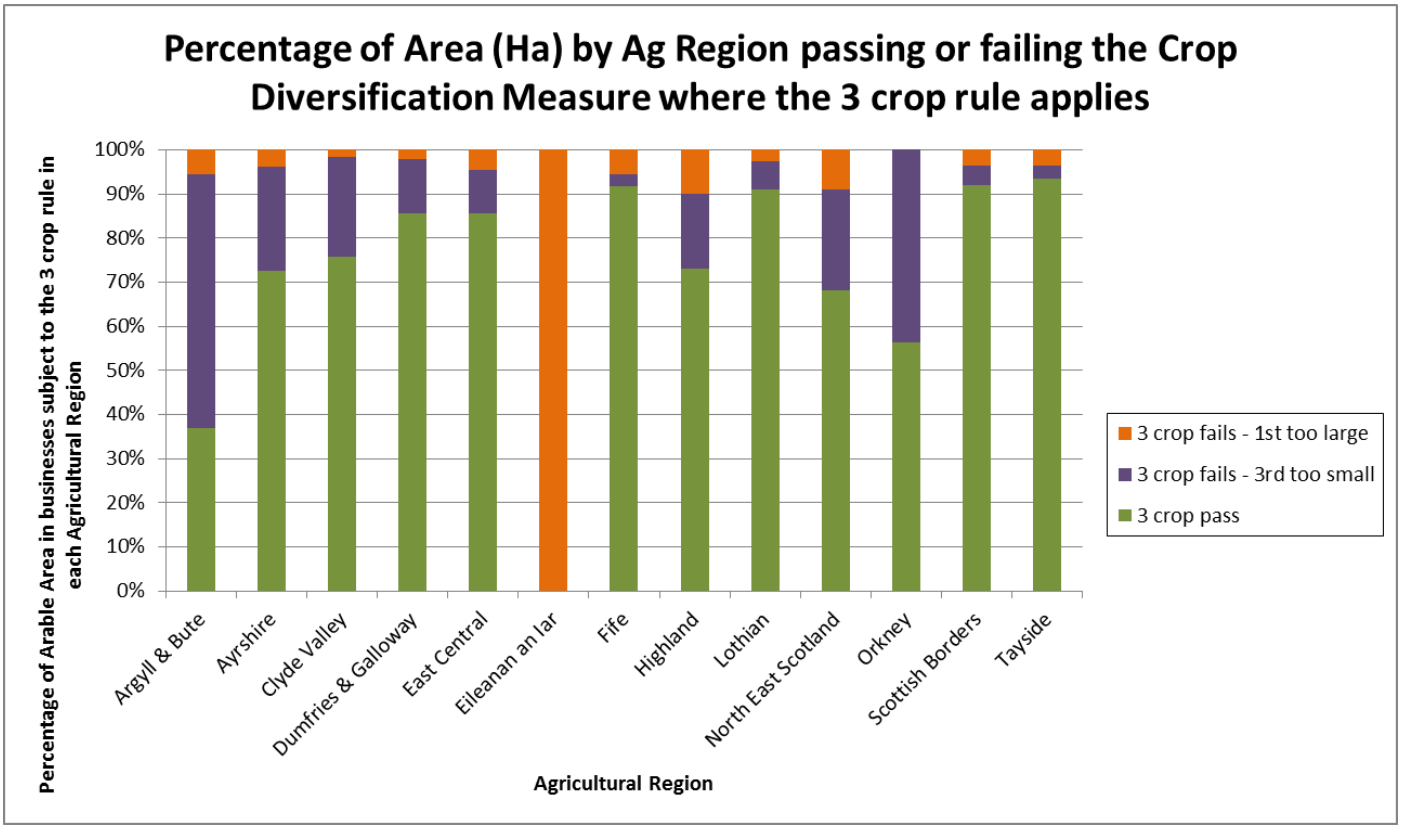

Figure 32: Crop Diversification Assessment – 3 Crop Rule Only – Percentage of Arable Area by Agricultural Region

Table 22: Crop Diversification Assessment – 3 Crop Rule Only – Percentages by Agricultural Region

Crop Diversification Assessment By Agricultural Region – 3 crop rule only	3 crop fails - 1st too large		3 crop fails - 3rd too small		3 crop pass	
	Count of Businesses	Arable Area	Count of Businesses	Arable Area	Count of Businesses	Arable Area
Argyll & Bute	9.52%	5.51%	47.62%	57.66%	42.86%	36.83%
Ayrshire	5.21%	3.94%	27.08%	23.59%	67.71%	72.47%
Clyde Valley	4.65%	1.66%	26.74%	22.47%	68.60%	75.87%
Dumfries & Galloway	3.52%	2.21%	17.09%	12.28%	79.40%	85.52%
East Central	8.13%	4.66%	16.26%	9.82%	75.61%	85.52%
Eileanan an Iar	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Fife	9.35%	5.47%	5.30%	2.68%	85.36%	91.85%
Highland	15.18%	10.00%	21.43%	17.02%	63.39%	72.98%
Lothian	7.29%	2.53%	10.76%	6.48%	81.94%	91.00%
North East Scotland	13.31%	9.03%	30.86%	22.95%	55.83%	68.02%
Orkney	0.00%	0.00%	43.90%	43.73%	56.10%	56.27%
Scottish Borders	6.57%	3.65%	8.76%	4.38%	84.67%	91.97%
Tayside	7.12%	3.53%	6.08%	2.95%	86.80%	93.51%

3.4.3 Crop Diversification Assessment – 3 Crop Rule only – By Farm Type

Figure 33 and Table 23 contain the same data for businesses subject to the 3 crop rule categorised by Farm Type. Figure 34, Figure 35 and Table 24, contain the same data expressed as the percentage of businesses subject to the 3 crop rule. This analysis shows that, while most businesses and arable area in all farm types pass the 3-crop rule where it applies, for a subset of farm types there are some issues. For Specialist Cereals businesses 397 of a total of 1,043 or 38% of the type fail the 3 crop rule (more for too large a first crop). Similarly in Mixed Holdings businesses, 379 of a total of 1,150 or 33% of the category also fail the rule (mainly in this case since the third crop is too small).

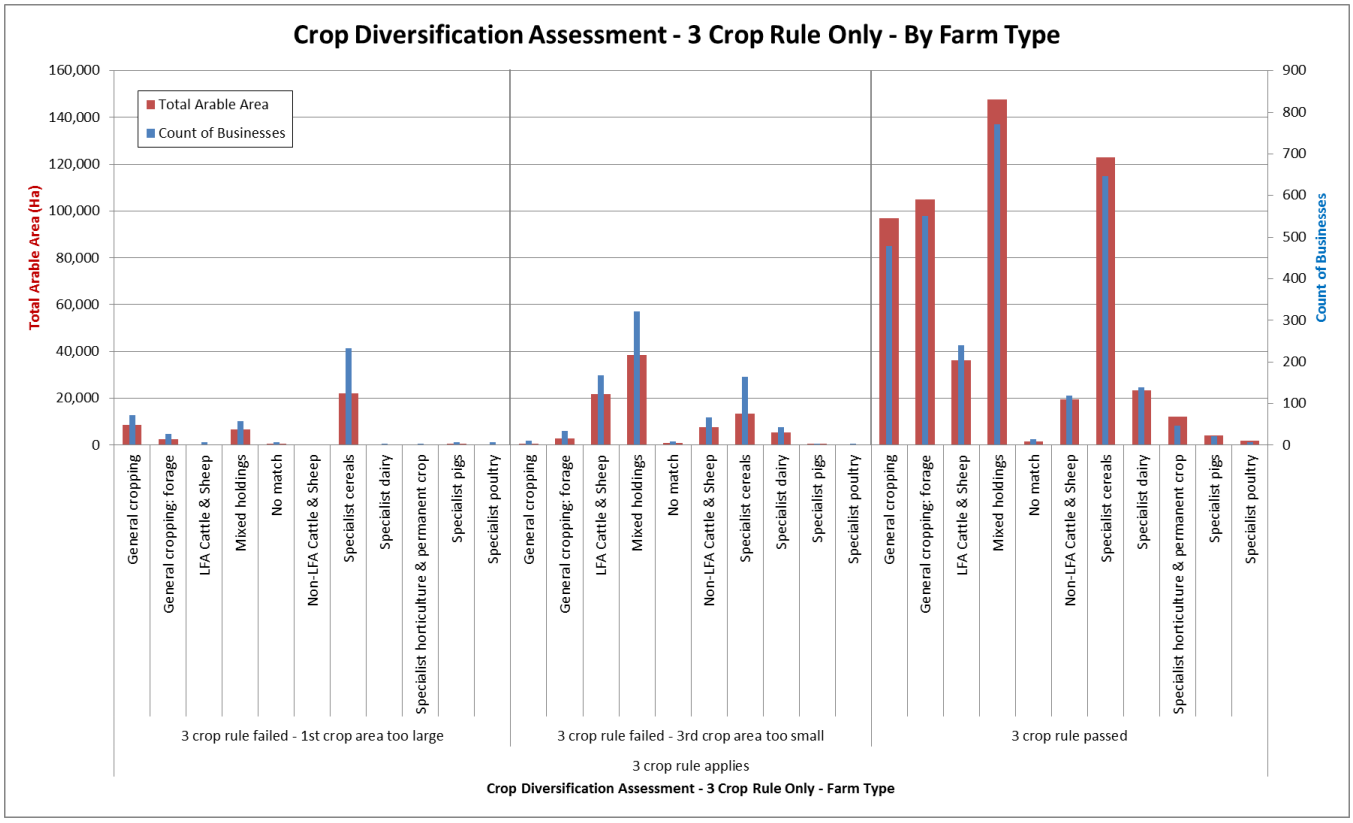

Figure 33: Crop Diversification Assessment – 3 Crop Rule Only - By Farm Type

Table 23: Crop Diversification Assessment – 3 Crop Rule Only – Count and Area by Farm Type

Crop Diversification Assessment – 3 crop rule only – by Farm Type	3 crop fails - 1st too large		3 crop fails - 3rd too small		3 crop pass		Farm Type Totals	
	Count	Area	Count	Area	Count	Area	Count	Area
General cropping	72	8,651	11	663	479	96,988	562	106,302
General cropping: forage	27	2,499	34	2,778	550	104,815	611	110,093
LFA Cattle & Sheep	7	285	167	21,692	239	36,180	413	58,157
Mixed holdings	58	6,751	321	38,313	771	147,750	1,150	192,814
No match	6	620	8	949	14	1,661	28	3,230
Non-LFA Cattle & Sheep	1	57	66	7,753	119	19,452	186	27,262
Specialist cereals	233	22,070	164	13,554	646	122,982	1,043	158,607
Specialist dairy	3	159	43	5,538	139	23,482	185	29,179
Specialist horticulture & permanent crop	3	366	-	-	46	11,981	49	12,346
Specialist pigs	7	580	4	477	21	4,184	32	5,242
Specialist poultry	6	345	3	144	6	1,923	15	2,412
TOTAL	423	42,384	821	91,861	3030	571,397	4,274	705,642

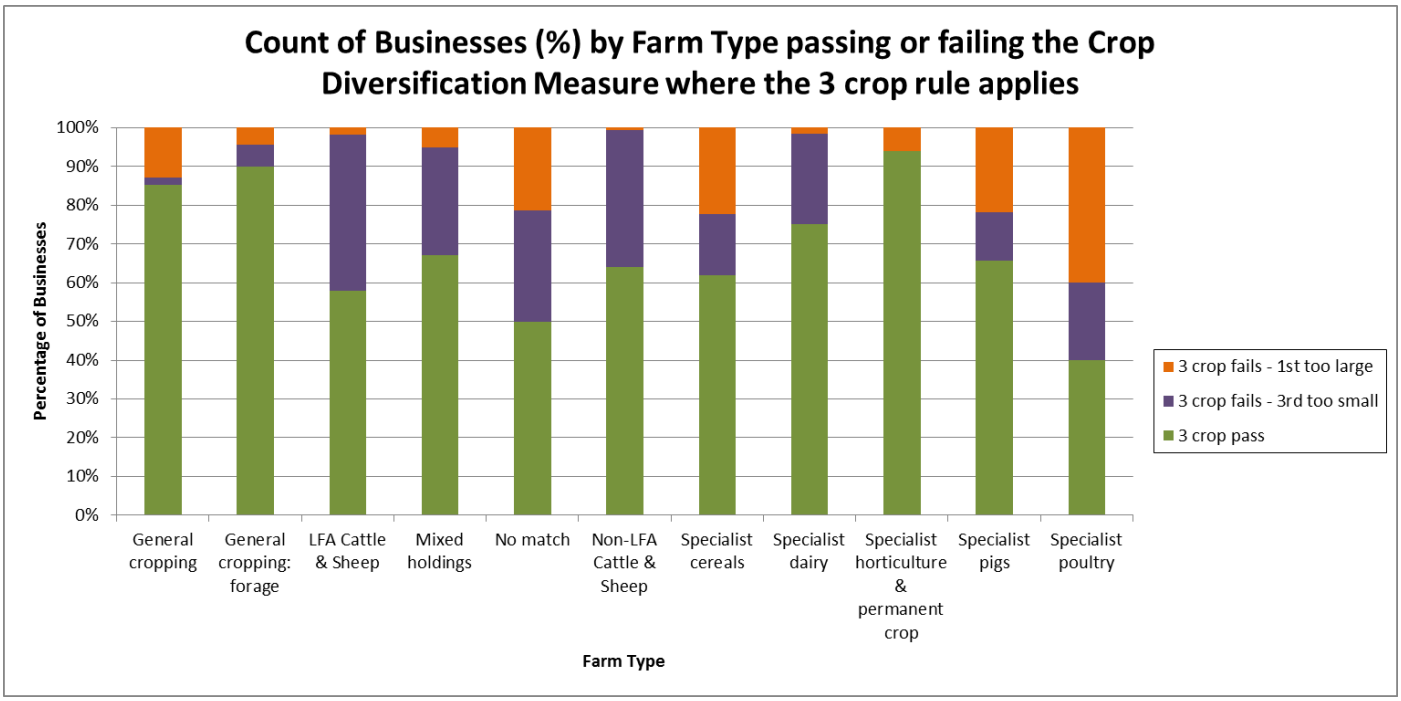

Figure 34: Crop Diversification Assessment – 3 Crop Rule Only – Count of Businesses By Farm Type (%)

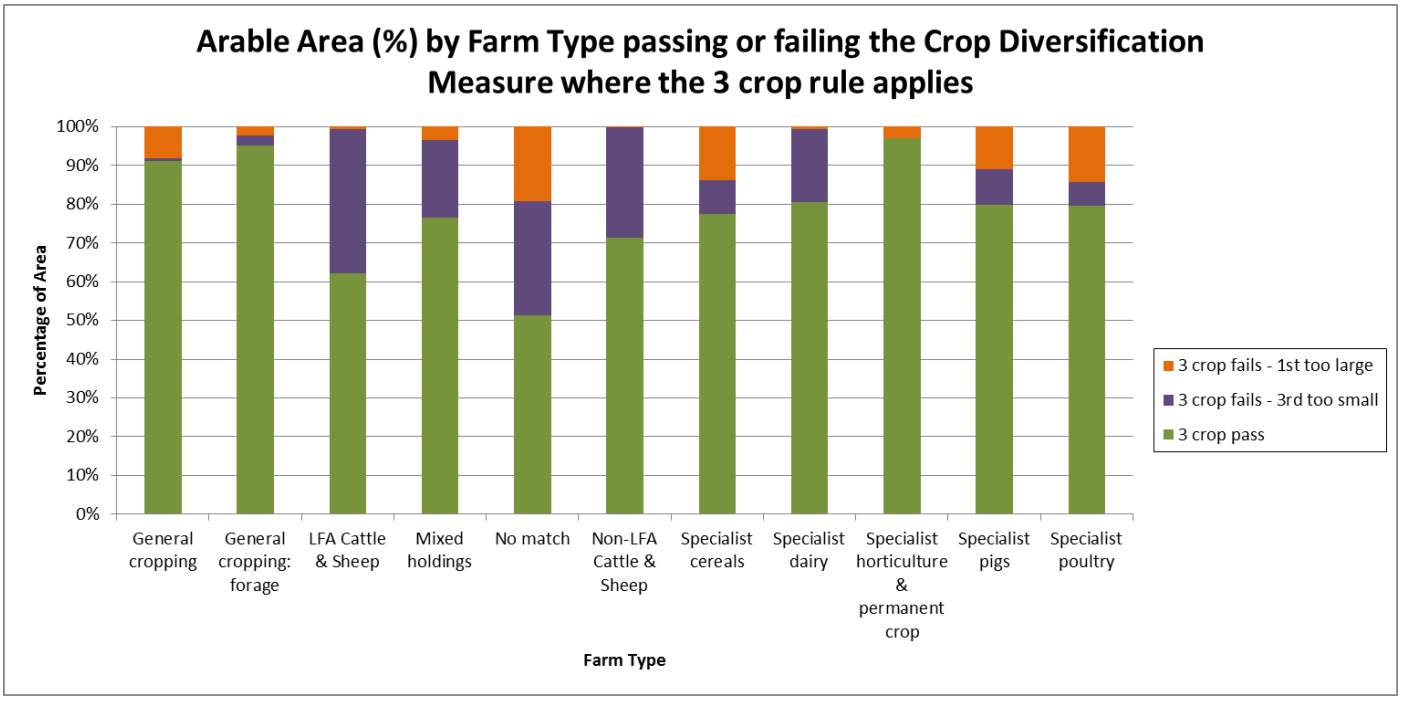

Figure 35: Crop Diversification Assessment – 3 Crop Rule Only – Arable Area By Farm Type (%)

Table 24: Crop Diversification Assessment – 3 Crop Rule Only – By Farm Type (%)

Crop Diversification Assessment – 3 crop rule only – % of Farm Type	3 crop fails - 1st too large		3 crop fails - 3rd too small		3 crop pass	
	Count	Area	Count	Area	Count	Area
General cropping	12.81%	8.14%	1.96%	0.62%	85.23%	91.24%
General cropping: forage	4.42%	2.27%	5.56%	2.52%	90.02%	95.21%
LFA Cattle & Sheep	1.69%	0.49%	40.44%	37.30%	57.87%	62.21%
Mixed holdings	5.04%	3.50%	27.91%	19.87%	67.04%	76.63%
No match	21.43%	19.21%	28.57%	29.37%	50.00%	51.42%
Non-LFA Cattle & Sheep	0.54%	0.21%	35.48%	28.44%	63.98%	71.35%
Specialist cereals	22.34%	13.92%	15.72%	8.55%	61.94%	77.54%
Specialist dairy	1.62%	0.54%	23.24%	18.98%	75.14%	80.48%
Specialist horticulture & permanent crop	6.12%	2.96%	0.00%	0.00%	93.88%	97.04%
Specialist pigs	21.88%	11.07%	12.50%	9.10%	65.63%	79.83%
Specialist poultry	40.00%	14.29%	20.00%	5.99%	40.00%	79.72%

3.4.4 Crop Diversification Assessment – 3 Crop Rule Only – By Business Size

Finally, Figure 36 and Table 25 show the same businesses subject to the 3 crop rule classified by business size. The same data is presented in percentage terms in Figure 37, Figure 38 and Table 26. In general, these show that larger businesses are more likely to pass the 3 crop rule.

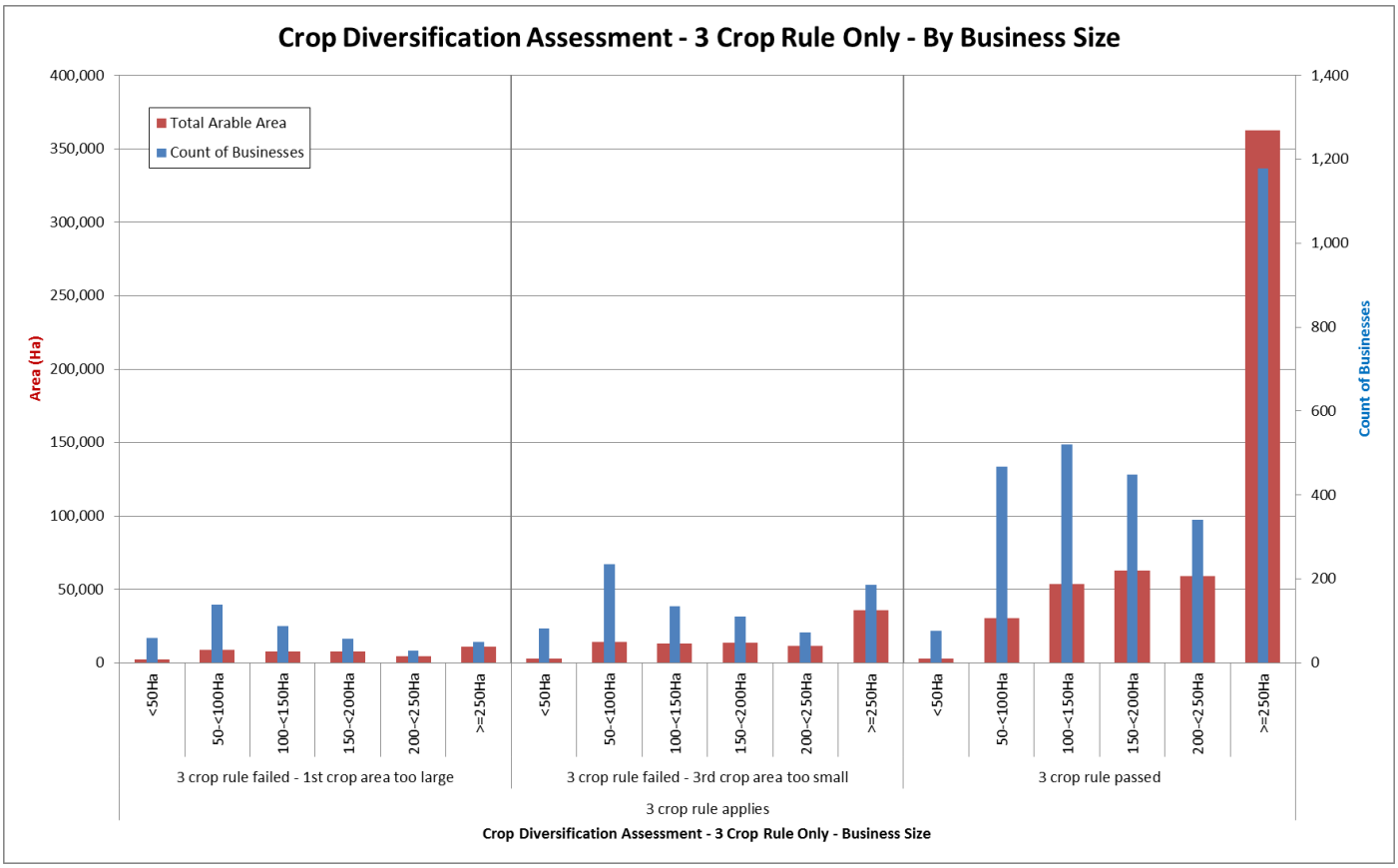

Figure 36: Crop Diversification Assessment – 3 Crop Rule Only – By Business Size

Table 25: Crop Diversification Assessment – 3 Crop Rule Only – By Business Size

Crop Diversification Assessment - Business Size - 3 crop rule only	3 crop rule failed - 1st crop area too large		3 crop rule failed - 3rd crop area too small		3 crop rule passed		Total	
	Count	Area	Count	Area	Count	Area	Count	Area
<50Ha	60	2,239	82	3,060	76	2,917	218	8,217
50-<100Ha	139	8,761	235	14,389	468	30,262	842	53,412
100-<150Ha	87	7,913	134	12,965	520	53,863	741	74,741
150-<200Ha	58	7,754	111	13,881	448	62,789	617	84,424
200-<250Ha	29	4,471	73	11,507	340	59,041	442	75,019
>=250Ha	50	11,247	186	36,059	1,178	362,523	1,414	409,829
Total	**423**	**42,384**	**821**	**91,861**	**3,030**	**571,397**	**4,274**	**705,642**

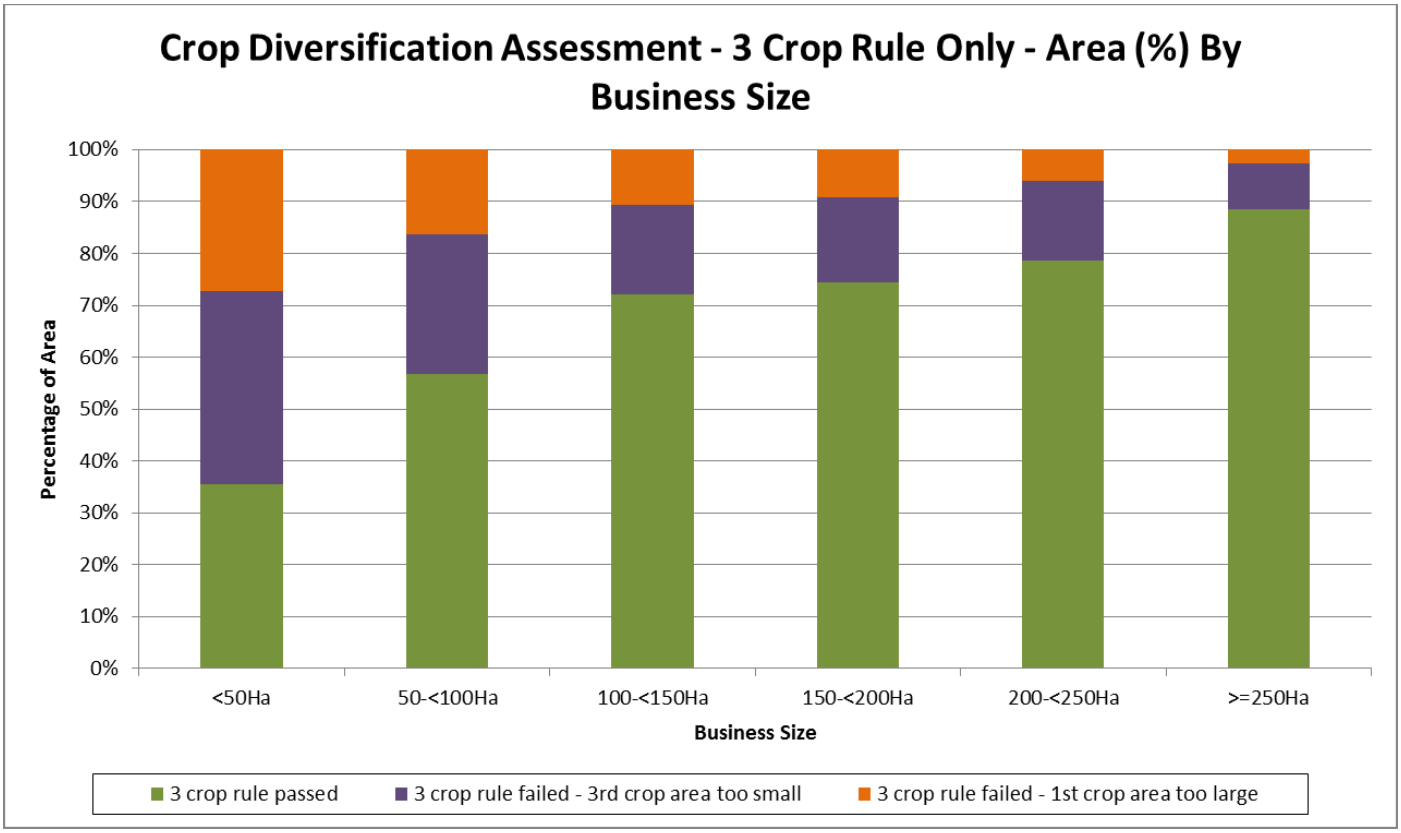

Figure 37: Crop Diversification Assessment – 3 Crop Rule Only – Arable Area (%) By Business Size

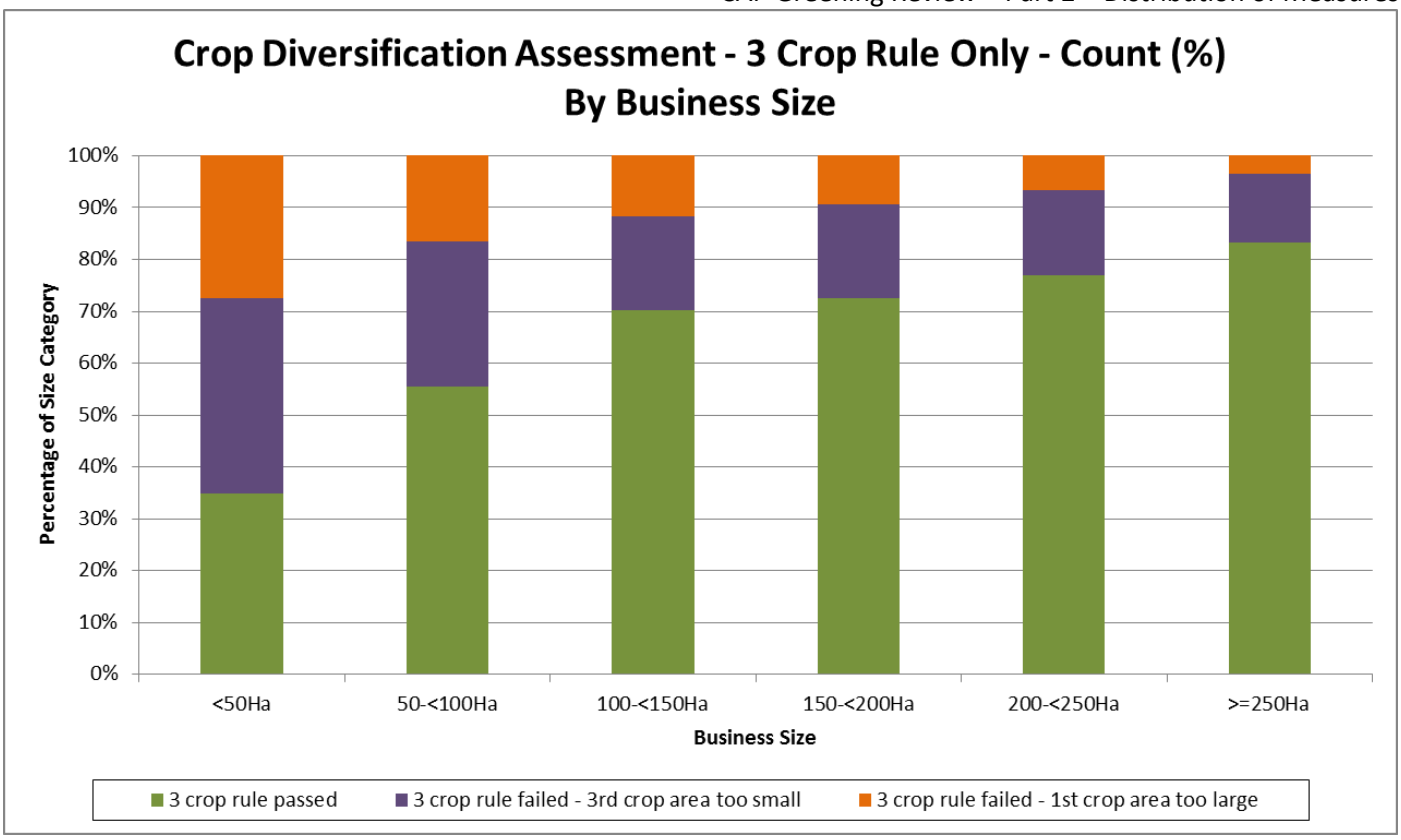

Figure 38: Crop Diversification Assessment – 3 Crop Rule Only – Count (%) By Business Size

Table 26: Crop Diversification Assessment – 3 Crop Rule Only – Count and Area By Business Size (%)

Crop Diversification Assessment - Business Size - 3 crop rule only - % of category	3 crop rule failed - 1st crop area too large		3 crop rule failed - 3rd crop area too small		3 crop rule passed		Total	
	Count	Area	Count	Area	Count	Area	Count	Area
<50Ha	27.52%	27.25%	37.61%	37.25%	34.86%	35.51%	100.00%	100.00%
50-<100Ha	16.51%	16.40%	27.91%	26.94%	55.58%	56.66%	100.00%	100.00%
100-<150Ha	11.74%	10.59%	18.08%	17.35%	70.18%	72.07%	100.00%	100.00%
150-<200Ha	9.40%	9.18%	17.99%	16.44%	72.61%	74.37%	100.00%	100.00%
200-<250Ha	6.56%	5.96%	16.52%	15.34%	76.92%	78.70%	100.00%	100.00%
>=250Ha	3.54%	2.74%	13.15%	8.80%	83.31%	88.46%	100.00%	100.00%

3.4.5 Commentary on Crop Diversification Assessment

The previous sections have summarised the degree to which the crop diversification requirement is currently being met. Around three quarters of businesses subject to the crop diversification requirement already pass the requirement with most being subject to the three crop rule. Regionally, of those businesses subject to the three crop rule the proportion of businesses passing the requirement varies from 0% in the Western Isles (although only 1 business is subject to the rule) up to 87% in Tayside. For some regions the rate of failure may be similar but the cause can be for different reasons. North East Scotland and Orkney both have a pass rate of 56% for the three crop rule but failures in Orkney are entirely due to the small size, or absence, of a third crop. In North East Scotland 13% fail since the first crop exceeds the 75% threshold limit while another 31% fail due either to the absence of a third crop or the small size of the third crop. These percentage values also need to be set in the context of the actual

areas affected. In Orkney, the area is 4,683 Ha while in North East Scotland it is 246,755 Ha, yet smaller areas may still have significance for the viability of local farming systems.

This analysis does not quantify the degree to which businesses may need to make changes to their cropped areas. Such an analysis would require a more in-depth analysis of both claimed areas and proximity to threshold limits, and preferably the analysis of real change between 2014 and 2015 or 16. It does, however, indicate the relative balance between regions and sectors where some changes to current farming practice may be required. In terms of farm type, the crop diversification requirement affects most those businesses classified as Mixed Holdings, Specialist Cereals, General Cropping, and General Cropping: Forage. The largest arable area of farm types subject to the three crop rule is in Mixed Holdings (192,814 Ha) where 67% of businesses and 77% of area pass the requirement. Failures in this farm type largely occur because of the absence, or limited extent, of a 3rd crop. In Specialist Cereals businesses (158,607 ha in businesses subject to the 3 crop rule) 62% of businesses and 78% of area pass the requirement. Failures in this farm type mainly occur due to the large size of the principal crop (22% of businesses, 14% of area) rather than the small size, or absence, of the third crop (16% of businesses, 9% of area). For General Cropping, and General Cropping: Forage businesses, the pass rate is much higher for those businesses subject to the three crop rule with pass rates of 85% of businesses and 91% of area for General Cropping and 90% of businesses and 95% of area for General Cropping: Forage. In terms of business size, as would be expected, the general trend is that the larger businesses are more likely to pass the three crop rule than smaller businesses with the pass rate increasing with corresponding increase in business size.

3.5 Ecological Focus Area Requirement

For the Ecological Focus Area Requirement it is possible to analyse the extent to which the requirement applies. It is not possible to assess the extent to which it is currently being met since data collected in the Single Application Form in 2014 does not distinguish between some of the options available under the EFA requirement. It may be possible to use some of the data under Rural Priorities measures to identify some options (e.g. buffer strips and field margins) but it would not be possible to identify businesses which sow catch crops or green cover. As a result any assessment based on current RP measures would only be partial. Figure 39 presents a national map of those businesses that would be subject to an EFA requirement based on their SAF 14 data (see part 3 for regional maps). The subsections that follow then present an analysis of the distribution of the ecological focus area requirement in Scotland with breakdowns by region, sector and farm type where appropriate.

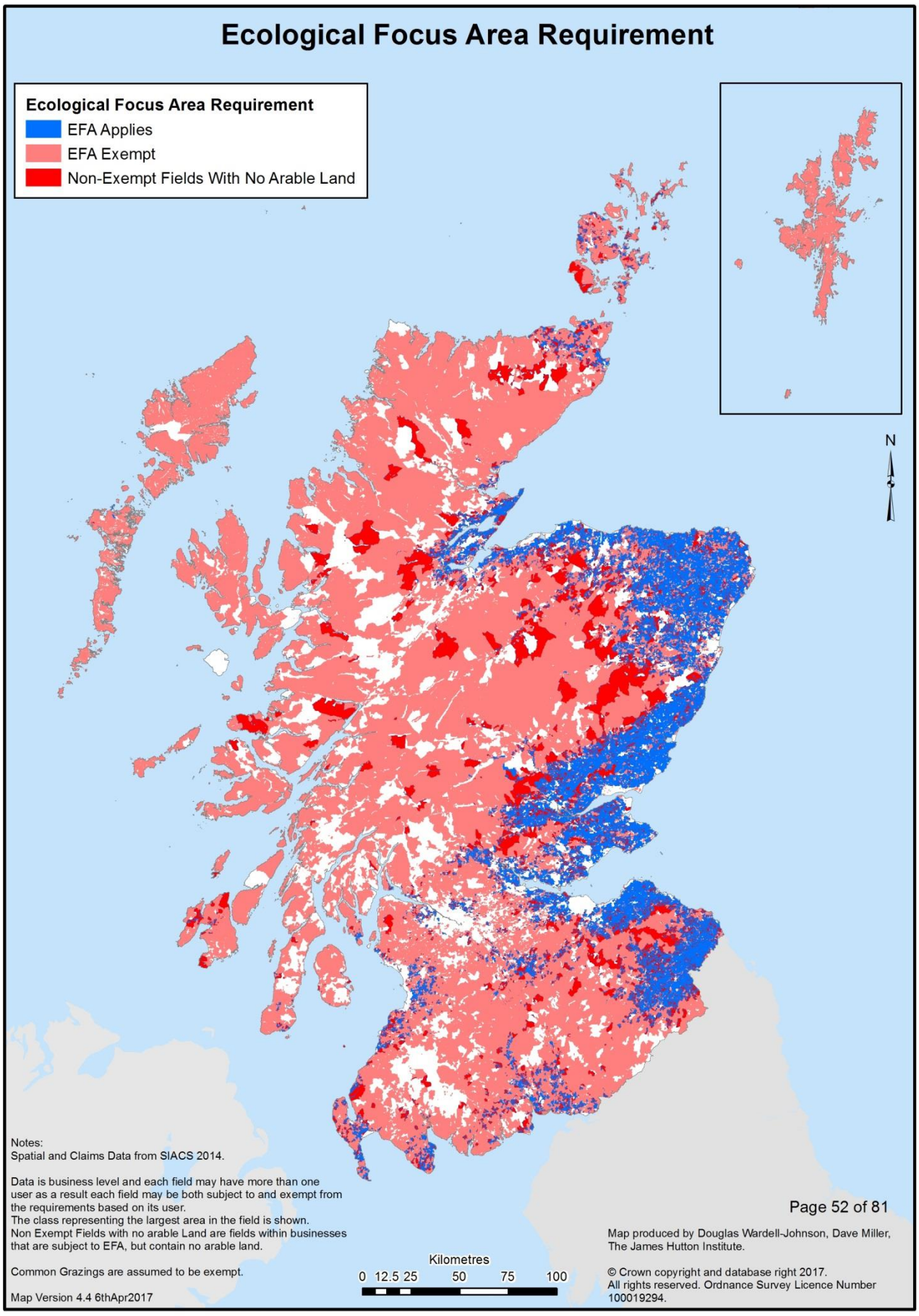

Figure 39: Example of National Ecological Focus Area Requirement map

3.5.1 Ecological Focus Area Requirement – Summary

Figure 40 and Table 27 show the national level summary of the Ecological Focus Area Requirement. Two possible categories exist – either a business is exempt or it must devote 5% of its arable area (or equivalent[12]) to an ecological focus area. In Figure 40 the red bars show the total arable area of those businesses which fall into each of the two categories while the orange bars show the 5% area calculation. Both of these should be read from the left vertical axis. Blue bars correspond to the count of businesses in each case and should be read from the right vertical axis. This analysis shows that overall, in terms of count, the majority (78%) of businesses are exempt from the EFA requirement while the majority of arable area (77%) is included in the requirement. At the national level, 3.83% of arable area or 37,680Ha (or equivalent) must be declared as an ecological focus area.

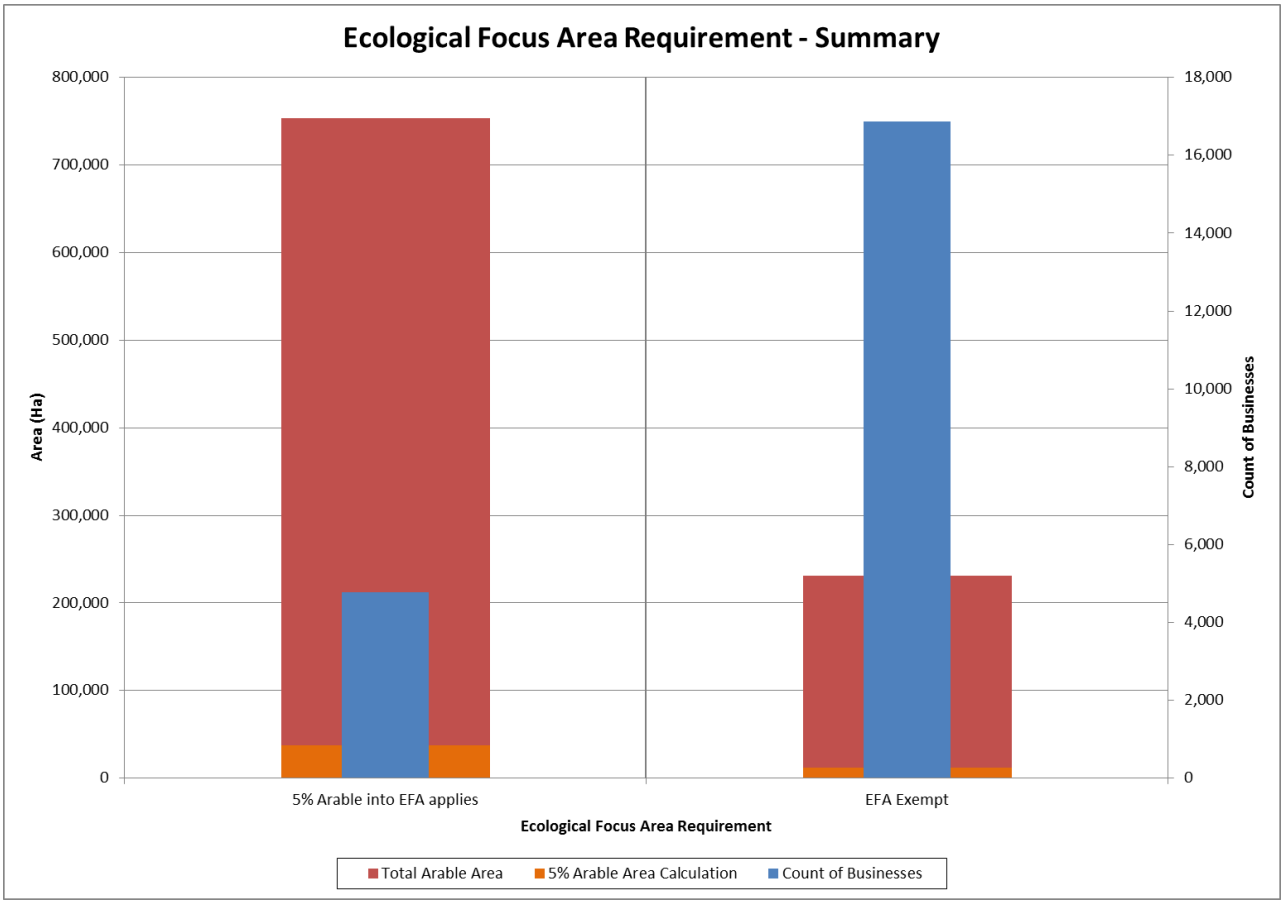

Figure 40: Ecological Focus Area Requirement – Summary

Table 27: Ecological Focus Area Requirement – Summary

EFA Requirement - Summary	Count of Businesses	Count of Businesses (%)	Total Arable Area	Total Arable Area (%)	5% Arable Area Calculation
5% Arable into EFA applies	4,778	22.07%	753,601	76.53%	37,680
EFA Exempt	16,871	77.93%	231,131	23.47%	11,557
Total	**21,649**	**100.00%**	**984,732**	**100.00%**	**49,237**

3.5.2 Ecological Focus Area Requirement – By Agricultural Region

Figure 41 and Table 28 show the Ecological Focus Area requirement data broken down by Agricultural Region while Table 29 shows the same data in percentage terms. This representation allows a within-region comparison between

[12] The 5% calculation of arable area is made, but land managers have the flexibility to use a number of options in order to meet the requirement including the use of options which have an area multiplier. This means that the actual area which must be identified as an ecological focus area may be less than, equal to, or more than, the 5% calculation of arable area.

the counts and areas of those businesses subject to the requirement versus those businesses which are exempt. In Figure 41 area should be read from the left vertical axis while count of businesses should be read from the right vertical axis. Shetland is missing from the left hand side of the chart since all businesses in Shetland are exempt from the EFA requirement. This analysis shows that in area terms the North East Scotland Agricultural Region is the most exposed to the EFA requirement (12,997Ha of 37,680Ha or 34% of the total EFA required area at the national level). In percentage terms, 95% of the arable area in Fife is associated with businesses for which an EFA requirement applies corresponding to 66% of all businesses in the region. In Tayside the figures are 91% of arable area and 50% of businesses while in North East Scotland 85% of arable area is associated with businesses subject to the EFA requirement and 49% of businesses. Conversely Shetland is entirely excluded from the EFA requirement, while 85% of the arable area in the Western Isles and almost 100% of businesses are excluded. Similarly 97% of businesses in Argyll & Bute, 92% of businesses in Orkney, and 90% of businesses in Clyde Valley are exempt.

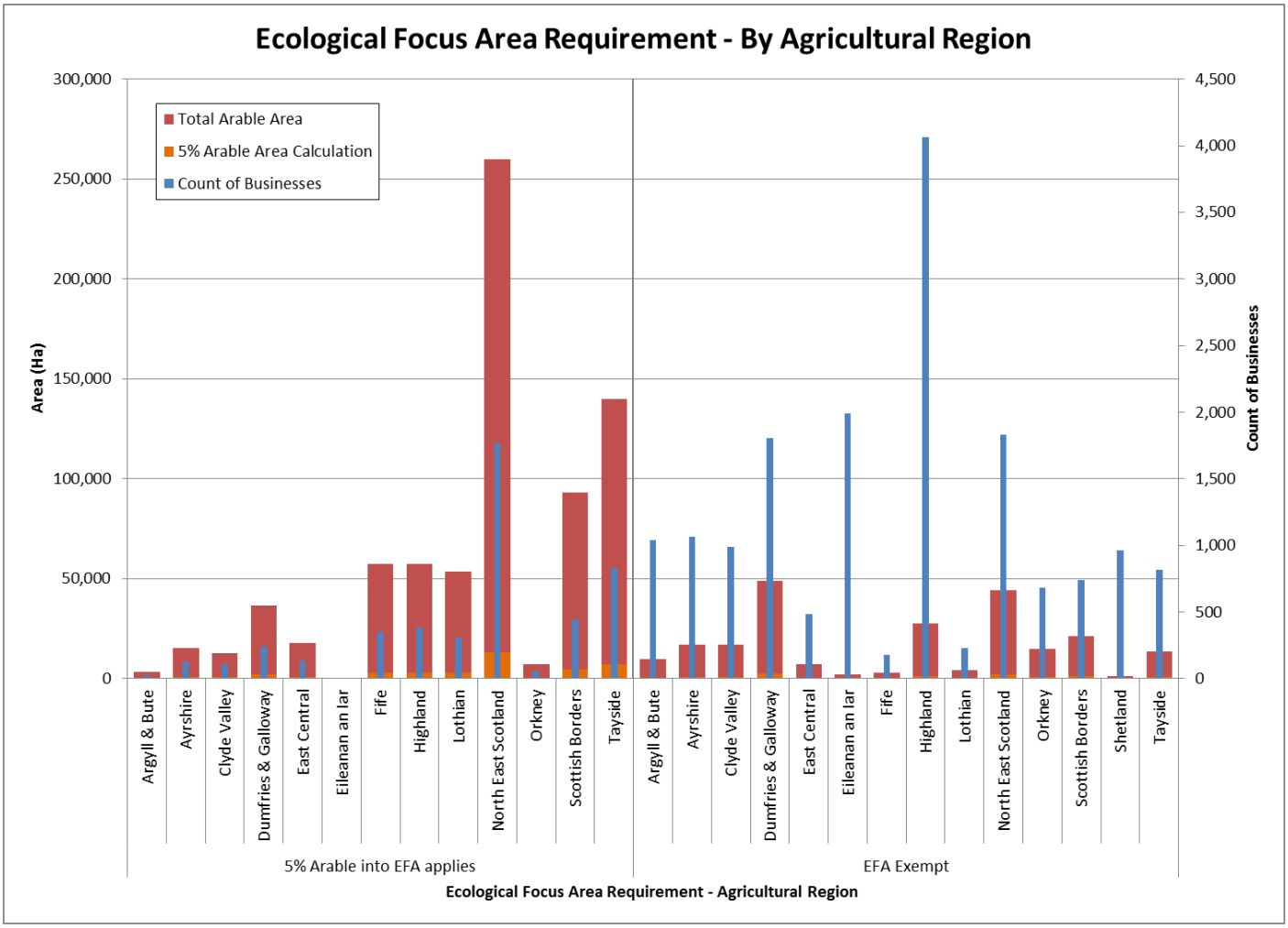

Figure 41: Ecological Focus Area Requirement – By Agricultural Region

Table 28: Ecological Focus Area Requirement – By Agricultural Region

EFA Requirement by Agricultural Region	5% Arable into EFA applies			EFA Exempt		Total	
	Count	Arable Area	5% Arable Area	Count	Arable Area	Count	Arable Area
Argyll & Bute	27	3,336	167	1,041	9,778	1,068	13,114
Ayrshire	125	15,324	766	1,065	17,034	1,190	32,358
Clyde Valley	106	12,516	626	990	17,115	1,096	29,631
Dumfries & Galloway	243	36,326	1,816	1,804	48,962	2,047	85,287

East Central	133	17,901	895	481	7,052	614	24,953
Eileanan an Iar	4	322	16	1,992	1,810	1,996	2,132
Fife	351	57,302	2,865	177	2,817	528	60,119
Highland	382	57,160	2,858	4,064	27,550	4,446	84,710
EFA Requirement by Agricultural Region	**5% Arable into EFA applies**			**EFA Exempt**		**Total**	
	Count	Arable Area	5% Arable Area	Count	Arable Area	Count	Arable Area
Lothian	307	53,387	2,669	227	4,336	534	57,723
North East Scotland	1,769	259,949	12,997	1,833	44,213	3,602	304,161
Orkney	57	7,183	359	681	14,955	738	22,138
Scottish Borders	447	93,070	4,653	736	21,155	1,183	114,224
Shetland	-	-	-	962	1,057	962	1,057
Tayside	827	139,825	6,991	818	13,297	1,645	153,123
Total	**4,778**	**753,601**	**37,680**	**16,871**	**231,131**	**21,649**	**984,732**

Table 29: Ecological Focus Area Requirement – By Agricultural Region (%)

EFA Requirement by Agricultural Region (%)	**5% Arable into EFA applies**			**EFA Exempt**	
	Count	Arable Area	5% Arable Area	Count	Arable Area
Argyll & Bute	2.53%	25.44%	1.27%	97.47%	74.56%
Ayrshire	10.50%	47.36%	2.37%	89.50%	52.64%
Clyde Valley	9.67%	42.24%	2.11%	90.33%	57.76%
Dumfries & Galloway	11.87%	42.59%	2.13%	88.13%	57.41%
East Central	21.66%	71.74%	3.59%	78.34%	28.26%
Eileanan an Iar	0.20%	15.09%	0.75%	99.80%	84.91%
Fife	66.48%	95.31%	4.77%	33.52%	4.69%
Highland	8.59%	67.48%	3.37%	91.41%	32.52%
Lothian	57.49%	92.49%	4.62%	42.51%	7.51%
North East Scotland	49.11%	85.46%	4.27%	50.89%	14.54%
Orkney	7.72%	32.45%	1.62%	92.28%	67.55%
Scottish Borders	37.79%	81.48%	4.07%	62.21%	18.52%
Shetland	0.00%	0.00%	0.00%	100.00%	100.00%
Tayside	50.27%	91.32%	4.57%	49.73%	8.68%
National Percentage	22.07%	76.53%	3.83%	77.93%	23.47%

3.5.3 Ecological Focus Area Requirement – By Farm Type

Figure 42 and Table 30 show the breakdown by farm type of the Ecological Focus Area requirement while Table 31 shows the same data in percentage terms. In Figure 42 area may be read from the left vertical axis while count of businesses may be read from the right vertical axis. The category "No match" represents those businesses which return a SAF but which do not appear in the June Agricultural Census. This analysis shows that Mixed Holdings and Specialist Cereals farm types are the most exposed to the EFA requirement.

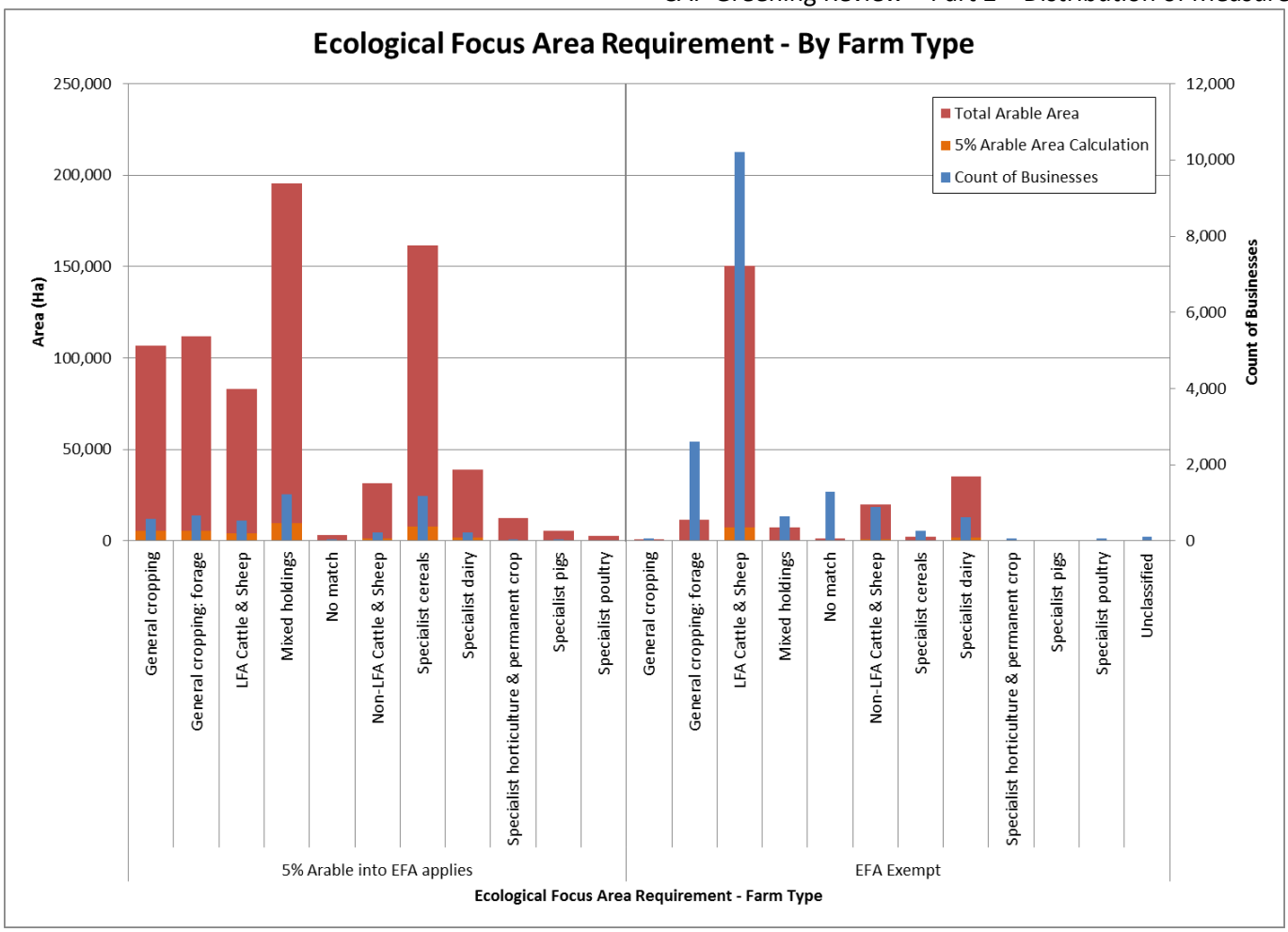

Figure 42: Ecological Focus Area Requirement – By Farm Type

Table 30: Ecological Focus Area Requirement – By Farm Type

EFA Requirement by Farm Type	5% Arable into EFA applies			EFA Exempt		Total	
	Count	Arable Area	5% Arable Area	Count	Arable Area	Count	Arable Area
General cropping	585	106,764	5,338	59	857	644	107,621
General cropping: forage	664	111,755	5,588	2,609	11,825	3,273	123,580
LFA Cattle & Sheep	527	83,128	4,156	10,212	150,437	10,739	233,565
Mixed holdings	1,219	195,533	9,777	646	7,620	1,865	203,153
No match	36	3,415	171	1,302	1,584	1,338	4,999
Non-LFA Cattle & Sheep	225	31,515	1,576	889	20,154	1,114	51,669
Specialist cereals	1,185	161,617	8,081	267	2,083	1,452	163,700
Specialist dairy	225	38,867	1,943	629	35,436	854	74,303
Specialist horticulture & permanent crop	55	12,496	625	61	411	116	12,907
Specialist pigs	38	5,547	277	21	97	59	5,645
Specialist poultry	19	2,962	148	68	596	87	3,559
Unclassified	-	-	0	108	31	108	31
Total	**4,778**	**753,601**	**37,680**	**16,871**	**231,131**	**21,649**	**984,732**

Table 31: Ecological Focus Area Requirement – By Farm Type (%)

EFA Requirement by Farm Type (%)	5% Arable into EFA applies			EFA Exempt		Total	
	Count	Arable Area	5% Arable Area	Count	Arable Area	Count	Arable Area
General cropping	90.84%	99.20%	4.96%	9.16%	0.80%	100.00%	100.00%
General cropping: forage	20.29%	90.43%	4.52%	79.71%	9.57%	100.00%	100.00%
LFA Cattle & Sheep	4.91%	35.59%	1.78%	95.09%	64.41%	100.00%	100.00%
Mixed holdings	65.36%	96.25%	4.81%	34.64%	3.75%	100.00%	100.00%
No match	2.69%	68.32%	3.42%	97.31%	31.68%	100.00%	100.00%
Non-LFA Cattle & Sheep	20.20%	60.99%	3.05%	79.80%	39.01%	100.00%	100.00%
Specialist cereals	81.61%	98.73%	4.94%	18.39%	1.27%	100.00%	100.00%
Specialist dairy	26.35%	52.31%	2.62%	73.65%	47.69%	100.00%	100.00%
Specialist horticulture & permanent crop	47.41%	96.82%	4.84%	52.59%	3.18%	100.00%	100.00%
Specialist pigs	64.41%	98.28%	4.91%	35.59%	1.72%	100.00%	100.00%
Specialist poultry	21.84%	83.25%	4.16%	78.16%	16.75%	100.00%	100.00%
Unclassified	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%
National Percentage	22.07%	76.53%	3.83%	77.93%	23.47%	100.00%	100.00%

3.5.4 Ecological Focus Area Requirement – By Business Size

Figure 43 and Table 32 show the breakdown by business size of the Ecological Focus Area requirement in terms of counts and areas while

Table 33 shows the same data as a percentage of each business size category.

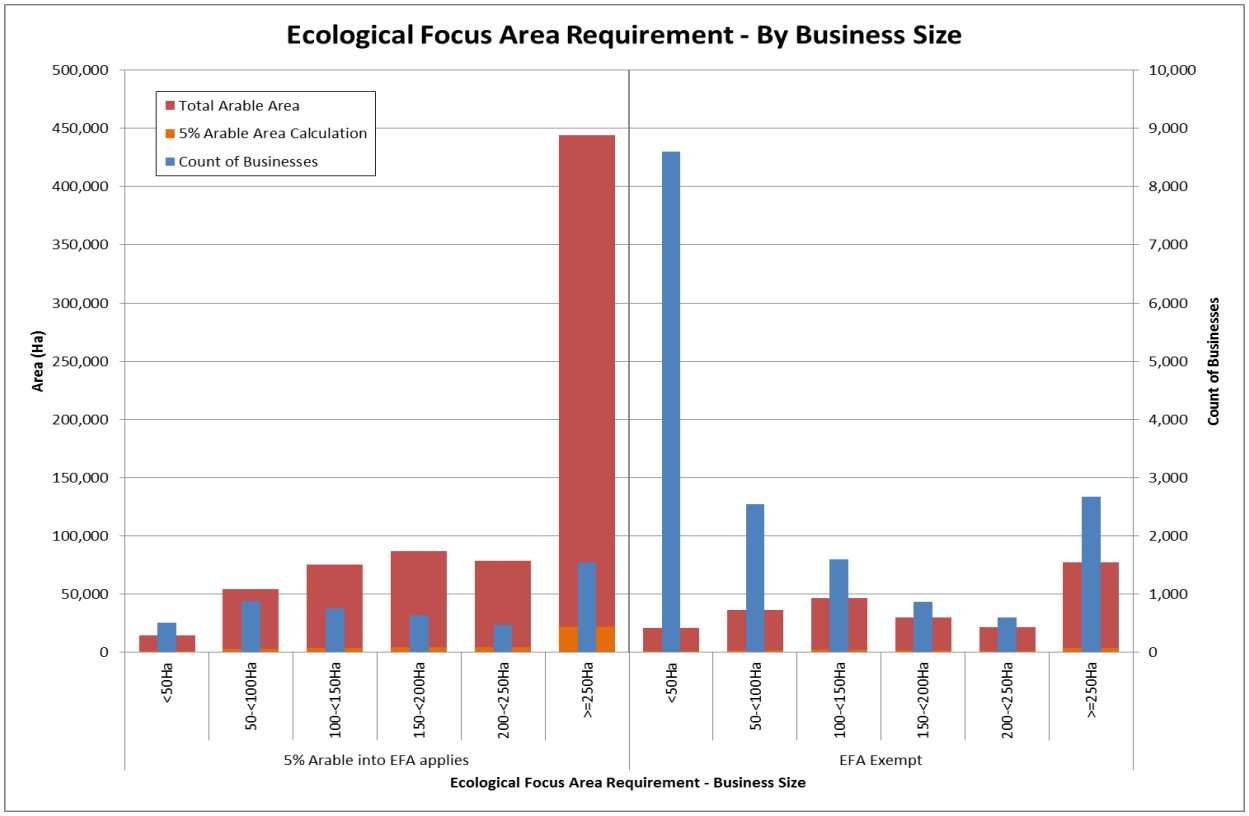

Figure 43: Ecological Focus Area Requirement – By Business Size

Table 32: Ecological Focus Area Requirement – By Business Size

Ecological Focus Area Requirement - Business Size	5% Arable into EFA			Exempt		Total	
	Count	Area	5% Area	Count	Area	Count	Area
<50Ha	511	14,693	735	8,598	20,610	9,109	35,303
50-<100Ha	880	54,367	2,718	2,544	36,162	3,424	90,529
100-<150Ha	747	75,039	3,752	1,589	46,229	2,336	121,268
150-<200Ha	633	86,817	4,341	866	29,513	1,499	116,330
200-<250Ha	462	78,304	3,915	602	21,662	1,064	99,966
>=250Ha	1,545	444,380	22,219	2,672	76,956	4,217	521,336
Total	**4,778**	**753,601**	**37,680**	**16,871**	**231,131**	**21,649**	**984,732**

Table 33: Ecological Focus Area Requirement – By Business Size (%)

Ecological Focus Area Requirement - Business Size (%)	5% Arable into EFA			Exempt		Total	
	Count	Area	5% Area	Count	Area	Count	Area
<50Ha	5.61%	41.62%	2.08%	94.39%	58.38%	100.00%	100.00%
50-<100Ha	25.70%	60.05%	3.00%	74.30%	39.95%	100.00%	100.00%
100-<150Ha	31.98%	61.88%	3.09%	68.02%	38.12%	100.00%	100.00%
150-<200Ha	42.23%	74.63%	3.73%	57.77%	25.37%	100.00%	100.00%
200-<250Ha	43.42%	78.33%	3.92%	56.58%	21.67%	100.00%	100.00%
>=250Ha	36.64%	85.24%	4.26%	63.36%	14.76%	100.00%	100.00%
National Percentage	22.07%	76.53%	3.83%	77.93%	23.47%	100.00%	100.00%

This analysis shows that in general terms the larger the business the more likely it is to be subject to the ecological focus area requirement. Less than 6% of businesses under 50Ha in size are subject to the requirement while the highest percentage is for businesses 200-<250Ha in size where the figure is 43%. In the largest businesses (those >250Ha) the figure is 37% while nationally the overall figure is 22%. In terms of the amount of area under each size category that would be required to fulfil the ecological focus area requirement, the percentage varies between 2%-4% with the national figure 3.83%.

3.5.5 Commentary on Ecological Focus Area Requirement

There is a distinct regional pattern in the ecological focus area requirement with some regions entirely exempt (e.g. Shetland) while more productive arable areas are subject to the measure to a greater degree. The degree to which businesses must take the EFA requirement into consideration varies from less than 3% of business in Argyll & Bute to more than 66% of businesses in Fife. In terms of area those agricultural regions with the most exposure to the ecological focus area requirement are Fife (4.77% of arable area) Lothian (4.62%), Tayside (4.57%), and North East Scotland (4.27%). In terms of farm type, although LFA Cattle & Sheep is by far the largest in terms of area, it is largely exempt from the measure with only 4.91% of businesses and 1.78% of arable area subject to the measure. Conversely General Cropping (4.96% of arable area), Specialist Cereals (4.94% of arable area) and Mixed Holdings enterprises (4.81% of arable area) have both high percentages and also larger areas which need to be included in an ecological focus area. In terms of business size smaller businesses (<50Ha) are more likely to be exempt from the requirement than any other business size with the proportion of businesses which are exempt generally decreasing with increasing business size. The proportion of area across all business sizes which needs to be assigned to an EFA varies between 2.08% (<50Ha) and 4.26% (>=250Ha).

Overall, the Ecological Focus Area requirement means that 3.83% of the total arable area, or equivalent, is assigned to an Ecological Focus Area. This is 37,680Ha. According to the June Agricultural Census data for 2014[13], 11,910Ha of land was in fallow in 2014 which is approximately 1/3rd of the total required area. However in the SAF14 dataset the total declared under crop codes "FALW" (Fallow) or "FALW-5" (Fallow Land For More Than 5 Years) is only 6,827Ha. The reasons for this discrepancy between reported figures for fallow land in the June Census data for 2014 and those declared under crop codes for fallow in SAF14 have not been determined. The difference may be as a result of the different populations of businesses that submit a SAF and those that do not since those businesses not submitting a SAF may carry a higher proportion of fallow land compared to the SAF population. Whatever the reasons for the discrepancy in reported figures, it is clear that currently declared fallow land alone is not sufficient to meet the conditions of the ecological focus area requirement and that this area is likely to increase in 2015 in order to meet it.

In addition to fallow land, buffer strips and field margins may also count towards the EFA requirement and these options have an area multiplier of 1.5. In the SAF14 data these are likely to have been declared as TGRS, PGRS or even RGR if present since the crop codes in use in 2014 do not distinguish these elements. Nitrogen-fixing crops (subject to management conditions) and catch crops or green cover may also count towards the EFA area requirement although the multipliers for these are lower (0.7 and 0.3 respectively). New crop codes required to capture qualifying crops have been introduced for 2015. In terms of 2014 figures peas and beans amount to 7,940 Ha in the JAC14 figures or 21% of the required area (equivalent to 15% when weighting is applied). In the SAF14 dataset the total area of crop codes declared as "BEAN" (Beans for Human Consumption), "PEAS" (Peas For Human Consumption) or "PP" (Protein Peas) amounts to 8,341Ha or 22% of the required area (equivalent to 15% when weighting is applied).

The degree to which businesses may be meeting the EFA requirement is uncertain – as data collected in SAF14 is insufficient to allow a complete analysis. From the limited evidence available it is likely that EFA requirements are not being met by current patterns of land use and that some businesses will need to adjust their activities in order to meet them. Since most businesses subject to the ecological focus area requirement are also subject to the crop diversification requirement, it is possible that land uses that help to meet both will be favoured. Fallow counts as a separate crop, has a *1 multiplier and can be argued to be simple and low risk in terms of verification and inspection. This may make it an attractive option. Some nitrogen-fixing crops could provide a financial return from the EFA area but their lower weighting (of 0.7), plus the limitations on management means that uptake is probably less likely. The attractiveness of catch crops or green cover to meet the EFA requirement is unclear.

[13] http://www.gov.scot/Publications/2014/10/6277/downloads

3.6 Permanent Grassland Equivalence

As described in section 2.7 further analysis of possible options for the Permanent Grassland equivalence measure was requested. Under equivalence, the additional requirements as then drafted would be limited to land claimed as Grass Over 5 Years (PGRS). The following subsections include various exploratory work on land claimed as PGRS in 2014. This starts with analysis of the regional distribution of PGRS. It then assesses the degree to which PGRS exists with other land uses in the same land parcel and the effect of applying a qualifying criterion for a field to count as PGRS. Thresholds of 40% and 50% were considered and other threshold options illustrated. Field-level size thresholds were explored to identify small PGRS fields that could be excluded. Similarly, business level thresholds were explored to identify those businesses whose PGRS area is small when compared to the overall mix of other land uses. The rationale was to identify businesses with small in-bye areas and large areas of rough grazing. These businesses could then possibly be excluded from any permanent grassland equivalence requirement. Finally, the section considers the relationship between land parcels with PGRS and Nitrate Vulnerable Zones, in which certain restrictions on management of grasslands already apply (and which could mean equivalence would be less necessary).

3.6.1 Grass Over 5 Years (PGRS) with other land uses

Figure 44 and Table 34 show how PGRS is combined with other land uses. The graph and table show that PGRS can be combined with up to twelve other land uses but in the majority of cases and for the majority of area it occurs as a single land use. The PGRS and other land use areas are read off the left axis and the count of land parcels from the right. The "Total PGRS %" column in Table 34 gives the percentage of area of all claims within the category made up of PGRS.

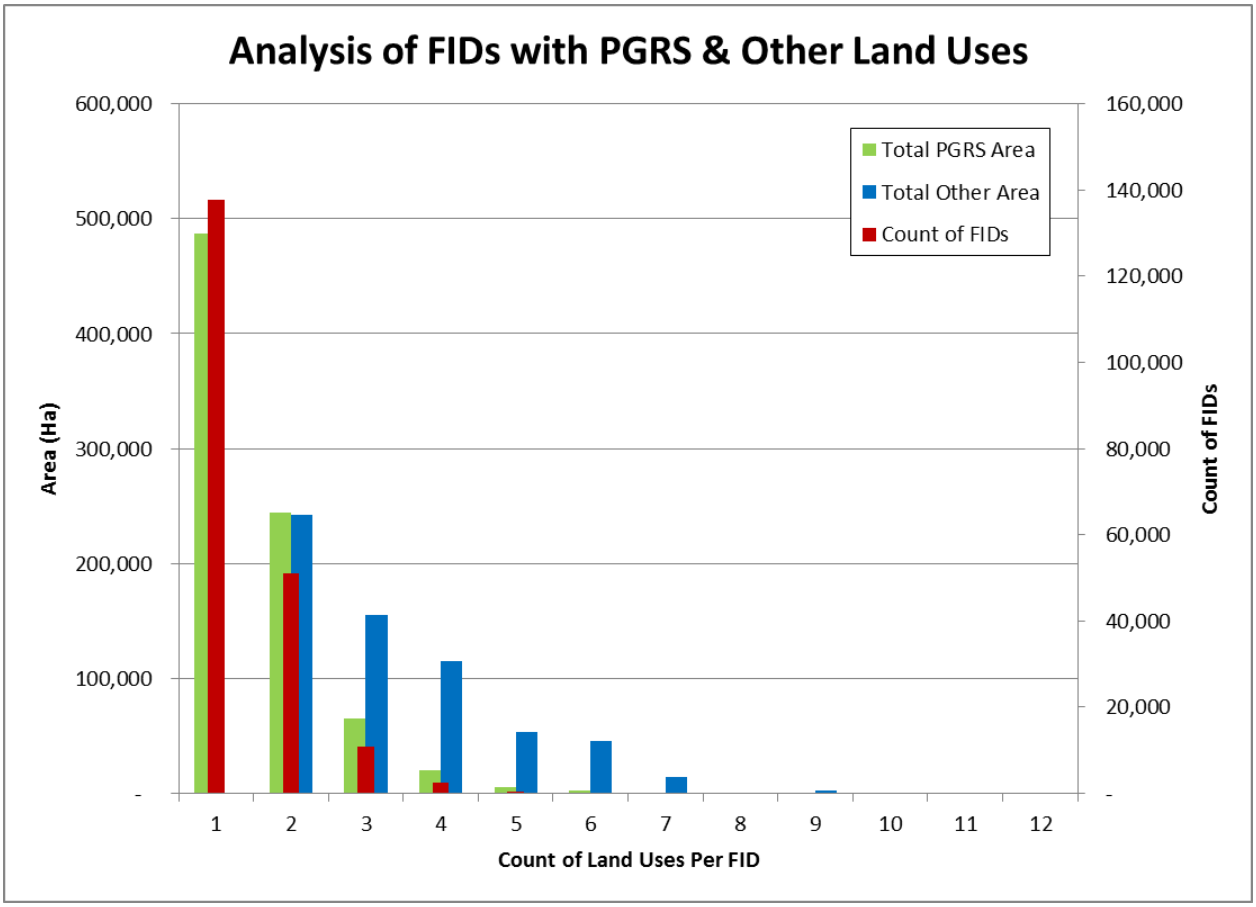

Figure 44: Analysis of FIDs with PGRS & Other Land Uses

Table 34: Land parcels with PGRS and Other Land Uses

Land Use Count	Count of Records	Total PGRS Area	Total Other Area	Total Area	Total PGRS %
1	137,634	487,505	-	487,505	100%
2	50,989	244,511	242,679	487,191	50%
3	10,826	64,979	155,029	220,008	30%
4	2,535	19,799	114,772	134,571	15%
5	505	5,566	53,567	59,133	9%
6	133	1,966	45,995	47,962	4%
7	25	238	14,456	14,695	2%
8	6	7	67	74	10%
9	4	86	2,664	2,750	3%
10	1	100	244	344	29%
11	2	4	22	26	14%
12	2	3	20	24	14%
Total	**202,662**	**824,764**	**629,517**	**1,454,281**	

3.6.2 Grass Over 5 Years (PGRS) with other land uses by Agricultural Region

Figure 45 and Table 35 show a summary breakdown of parcels with a claim for PGRS alone and PGRS with other land uses, grouped by Agricultural Region. The figure shows the PGRS area (green) and the total area in blue. The lower proportion of PGRS area versus total area in e.g. Highland indicates the presence of more mixed land parcels in such regions. This highlights that any thresholding decisions will have greater significance for some regions than others.

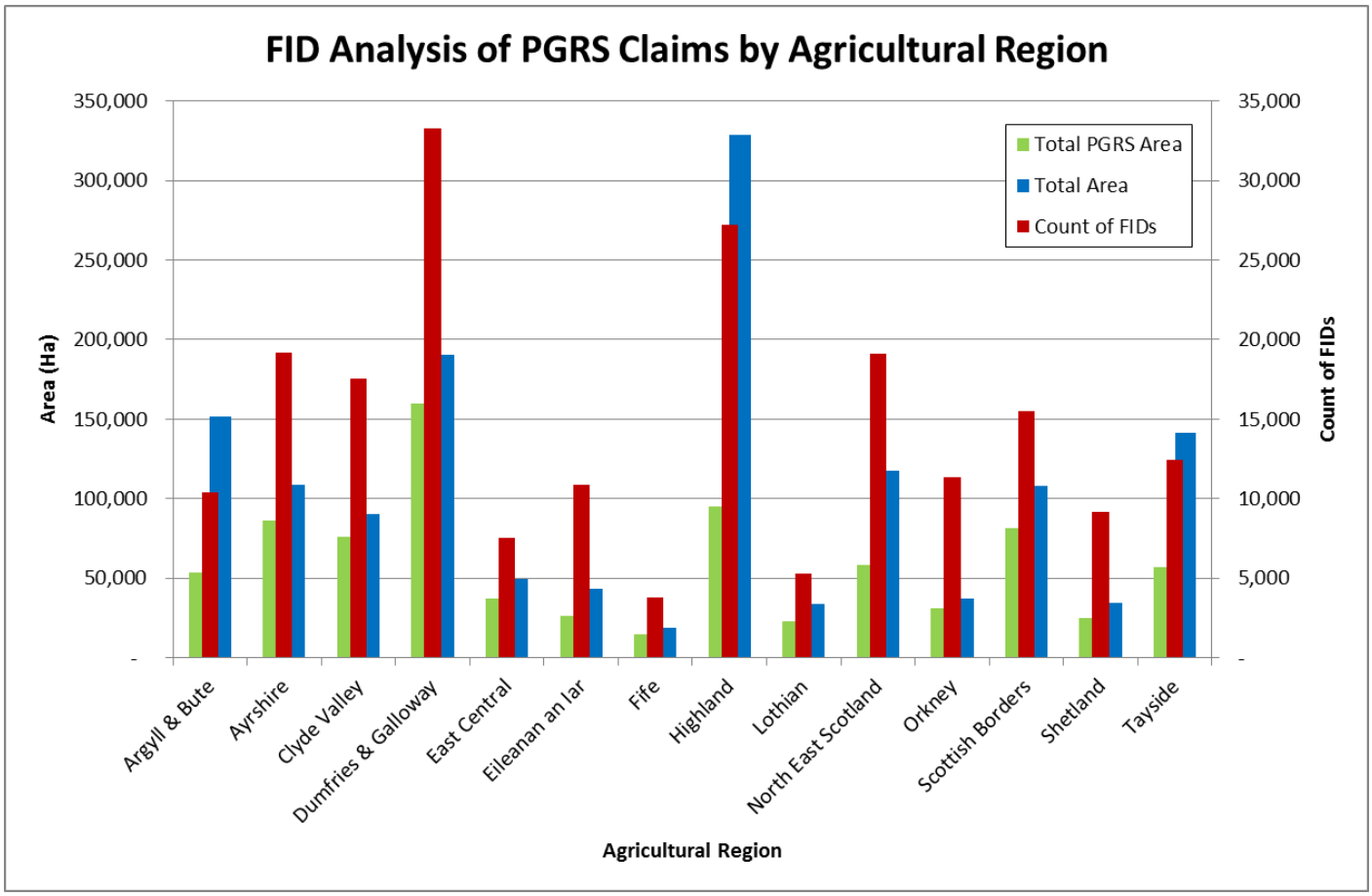

Figure 45: FID Analysis of PGRS claims by Agricultural Region

Table 35: FID Analysis of PGRS claims by Agricultural Region

Agricultural Region	Total PGRS Area	Total Area	Count of FIDs
Argyll & Bute	53,348	151,780	10,380
Ayrshire	86,086	108,810	19,153
Clyde Valley	76,211	90,245	17,581
Dumfries & Galloway	159,675	190,403	33,264
East Central	37,217	49,338	7,512
Eileanan an Iar	26,529	43,413	10,862
Fife	14,741	19,087	3,774
Highland	95,029	328,537	27,242
Lothian	22,701	33,862	5,273
North East Scotland	58,681	117,330	19,112
Orkney	31,460	37,270	11,363
Scottish Borders	81,239	108,230	15,531
Shetland	25,058	34,600	9,178
Tayside	56,790	141,377	12,437
Total	**824,764**	**1,454,281**	**202,662**

3.6.3 Thresholding PGRS land parcels at 40% by Agricultural Region

Due to the large number of land parcels with PGRS as only one of a number of land uses, an analysis was requested which applied minimum thresholds on the share of PGRS required for the land parcel to be included within the scope of the Permanent Grassland equivalence measure. Figure 46 shows the consequences of using a 40% threshold per land parcel, with far less difference between the PGRS alone and the total area values. Table 36 tabulates the data in the figure. Comparing with Table 35 the count of land parcels at the 40% threshold is 190,098 compared to the total with no threshold applied of 202,662.

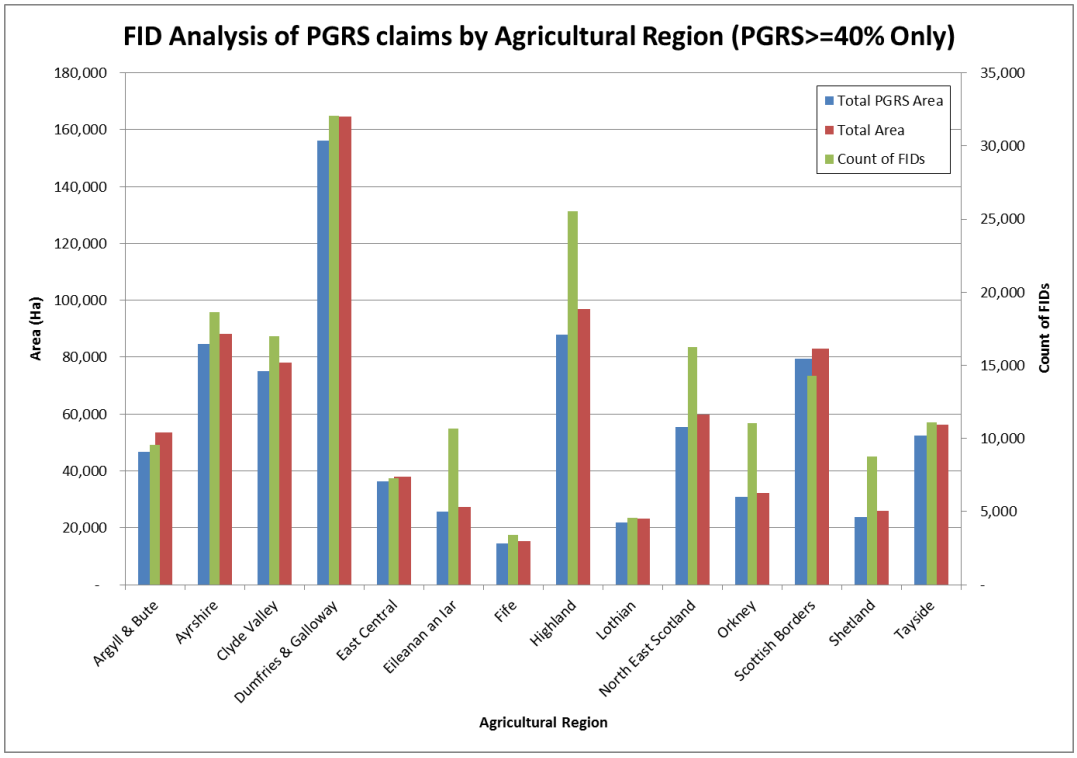

Figure 46: FID Analysis of PGRS claims by Agricultural Region (PGRS >=40% Only)

Table 36: FID Analysis of PGRS claims by Agricultural Region (PGRS >=40% Only)

Agricultural Region	Total PGRS Area	Total Area	Count of FIDs
Argyll & Bute	46,588	53,466	9,552
Ayrshire	84,518	88,250	18,651
Clyde Valley	75,029	77,977	16,980
Dumfries & Galloway	156,219	164,610	32,065
East Central	36,234	37,911	7,258
Eileanan an Iar	25,792	27,239	10,675
Fife	14,426	15,381	3,392
Highland	88,004	97,011	25,546
Lothian	21,945	23,100	4,572
North East Scotland	55,374	59,762	16,222
Orkney	30,898	32,273	11,027
Scottish Borders	79,464	83,016	14,305
Shetland	23,659	26,047	8,780
Tayside	52,370	56,261	11,073
Total	**790,520**	**842,305**	**190,098**

3.6.4 Thresholding PGRS land parcels at 50% by Agricultural Region

Figure 47 shows the outcome using a 50% threshold with the data tabulated in Table 37. The count of land parcels drops from 190,098 at 40% to 187,922 at 50%.

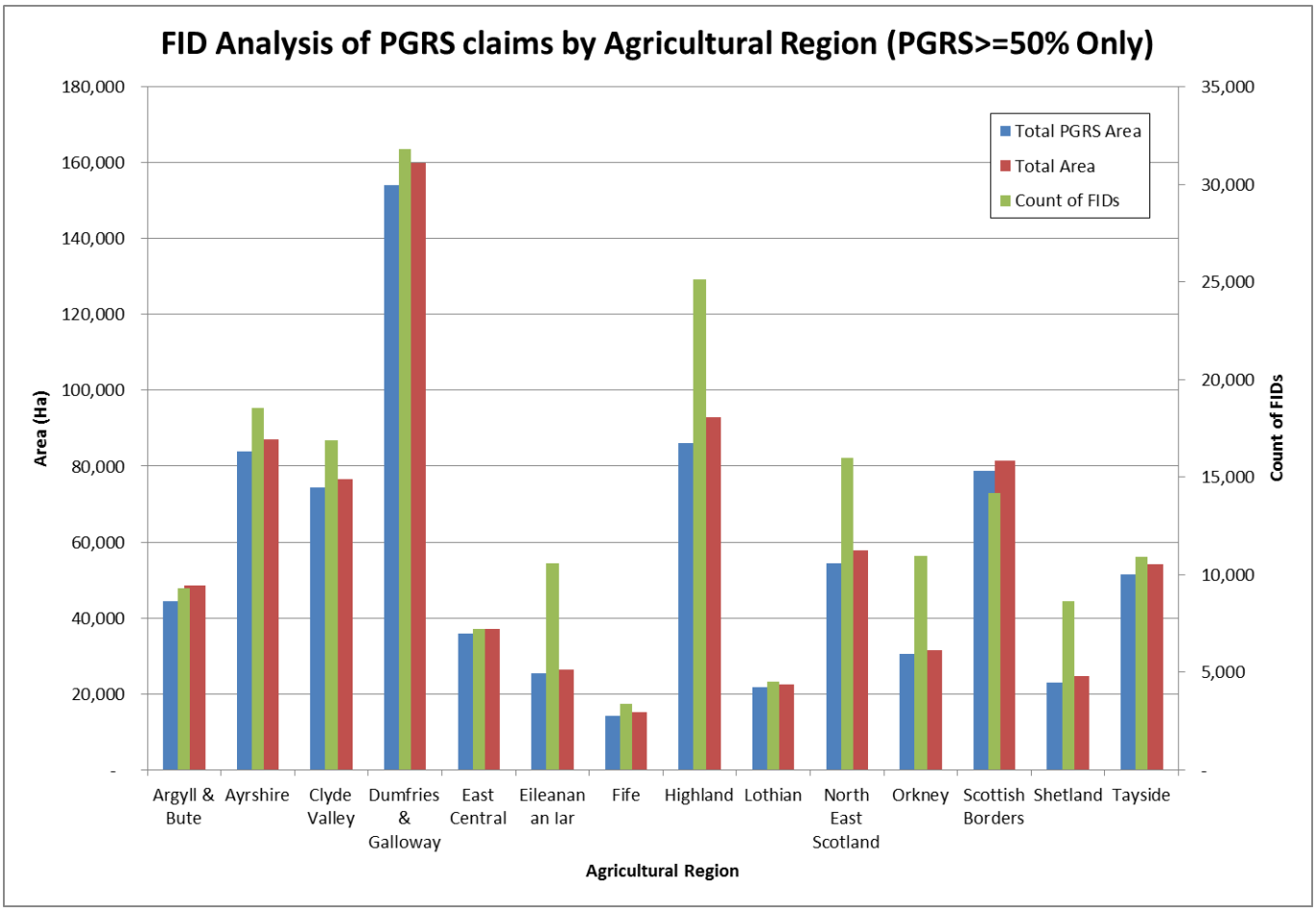

Figure 47: FID Analysis of PGRS claims by Agricultural Region (PGRS >=50% Only)

Table 37: FID Analysis of PGRS claims by Agricultural Region (PGRS >=50% Only)

Agricultural Region	Total PGRS Area	Total Area	Count of FIDs
Argyll & Bute	44,372	48,489	9,291
Ayrshire	83,955	87,007	18,546
Clyde Valley	74,449	76,685	16,863
Dumfries & Galloway	154,143	159,999	31,793
East Central	35,911	37,201	7,191
Eileanan an Iar	25,442	26,485	10,581
Fife	14,279	15,059	3,354
Highland	86,181	93,025	25,135
Lothian	21,704	22,578	4,525
North East Scotland	54,443	57,722	15,967
Orkney	30,578	31,578	10,939
Scottish Borders	78,703	81,361	14,199
Shetland	23,059	24,723	8,615
Tayside	51,410	54,165	10,923
Total	**778,630**	**816,077**	**187,922**

3.6.5 Frequency analysis of land parcels with PGRS claims by percentage of PGRS

The limited differences between the analyses at 40% and 50% thresholds and the desire to look at other threshold options meant that a frequency analysis was undertake. In Figure 48 the blue bars represent the count of land parcels at threshold percentages between 5% and 100% (on the horizontal axis). This demonstrates that the vast majority of PGRS claims occur in fields where PGRS makes up >95% of the claimed area within those FIDs.

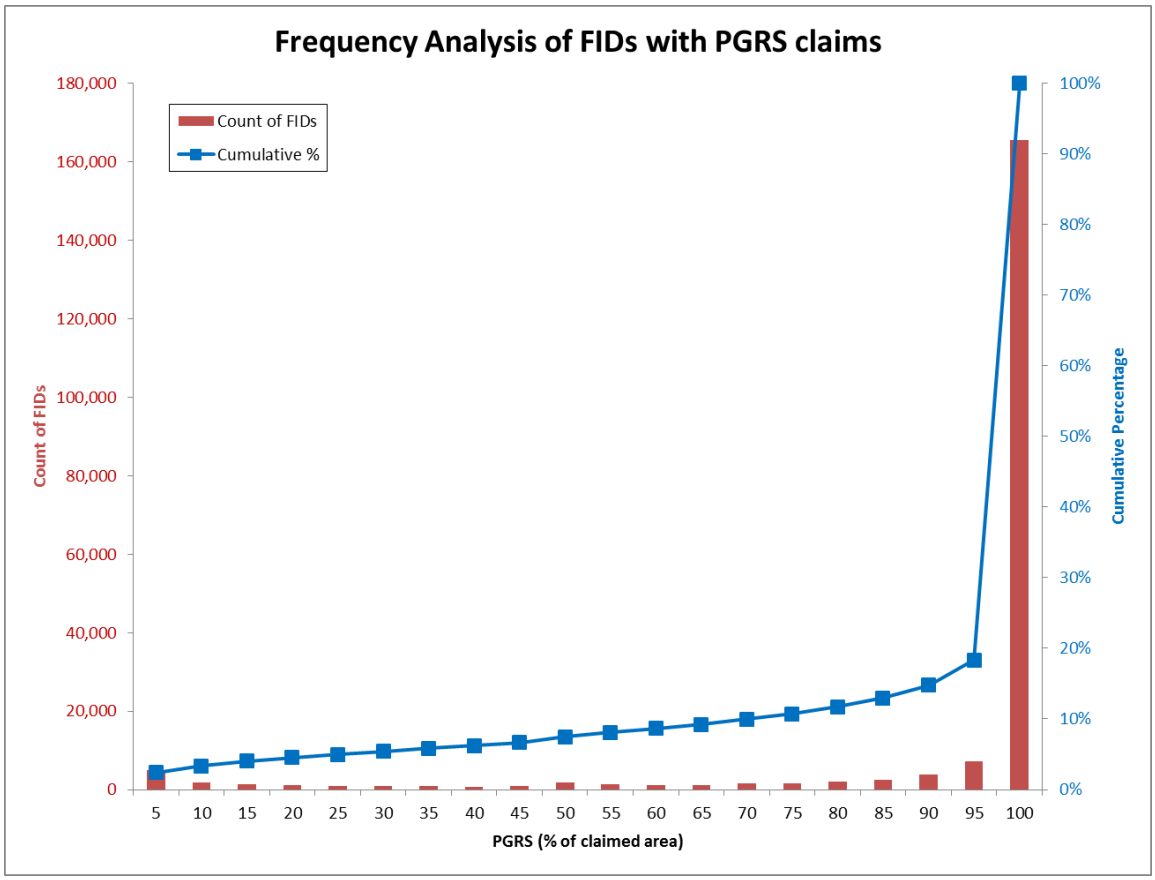

Figure 48: Frequency Analysis of FIDs with PGRS claims

3.6.6 Minimum PGRS Claim Size Threshold Analysis

Consideration was also given to whether or not a minimum claim size threshold for PGRS could be applied, and if so, what area and count of fields would be excluded. To support this analysis a series of threshold values was applied to explore the area and count of land parcels excluded for a variety of minimum claim size thresholds. Figure 49 shows the result of this analysis with thresholds in steps of 0.1Ha up to a value of 1.0Ha. The total PGRS area excluded is read from the left axis and the count of land parcels from the right. The same data is presented in Table 38. This shows that an area of just under 25,000 Ha (~3% of all PGRS area) would be excluded if a 1 Ha minimum size threshold were applied yet this eliminates over 50,000 individual land parcels (~26% of PGRS land parcels). There is thus clear potential for minimum size threshold values to reduce burden while not undermining the coverage achieved in area terms.

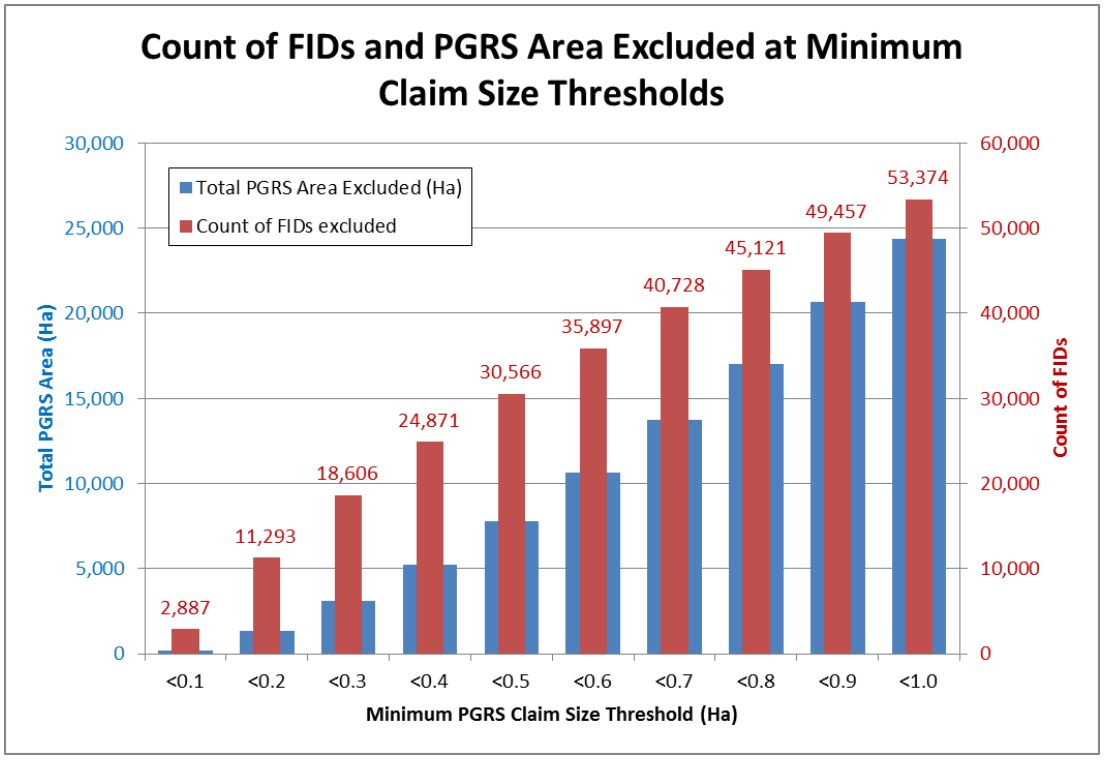

Figure 49: Count of FIDs and PGRS Area Excluded at Minimum Claim Size Thresholds

Table 38: Count and Area of PGRS FIDs excluded at selected minimum claim sizes

Min PGRS Claim Threshold (Ha)	Total PGRS Area Excluded (Ha)	Count of FIDs excluded
<0.1	159	2,887
<0.2	1,348	11,293
<0.3	3,111	18,606
<0.4	5,254	24,871
<0.5	7,765	30,566
<0.6	10,646	35,897
<0.7	13,751	40,728
<0.8	17,013	45,121
<0.9	20,660	49,457
<1.0	24,354	53,374

The analysis can be taken a stage further as shown in Figure 50. In this representation all claims for PGRS have been ordered by size (read along the horizontal axis – note the use of a base 10 log scale). The count of land parcels (red line) should be read from the left vertical axis while the cumulative PGRS area (see blue line) should be read from the right vertical axis. What the figure shows is how many land parcels would be excluded if any minimum size threshold for claimed area were applied.

Examples:

1) As noted above, if a minimum claim size of 1.0 Ha is applied then this would remove around 50,000 FIDs from the requirement (53,374 FIDs in total amounting to 24,353 Ha). This is 26% of the land parcels in which PGRS is claimed but only 3% of the total PGRS area.
2) If a minimum claim size of 2.0 Ha is applied then this would remove around 85,000 FIDs from the requirement (86,283 FIDs in total amounting to 72,348 Ha). This is 43% of the land parcels in which PGRS is claimed but only 9% of the total PGRS area.
3) If a minimum claim size of 3.0 Ha is applied then this would remove around 110,000 FIDs from the requirement (112,202 FIDs in total amounting to 136,174 Ha). This is 55% of the land parcels in which PGRS is claimed but only 17% of the total PGRS area.
4) If a minimum claim size of 4.0 Ha is applied then this would remove around 130,000 FIDs from the requirement (133,727 FIDs in total amounting to 210,740 Ha). This is 66% of the land parcels in which PGRS is claimed but only 26% of the total PGRS area.
5) If a minimum claim size of 5.0 Ha is applied then this would remove around 150,000 FIDs from the requirement (150,249 FIDs in total amounting to 284,458 Ha). This is 74% of the land parcels in which PGRS is claimed but only 34% of the total PGRS area.

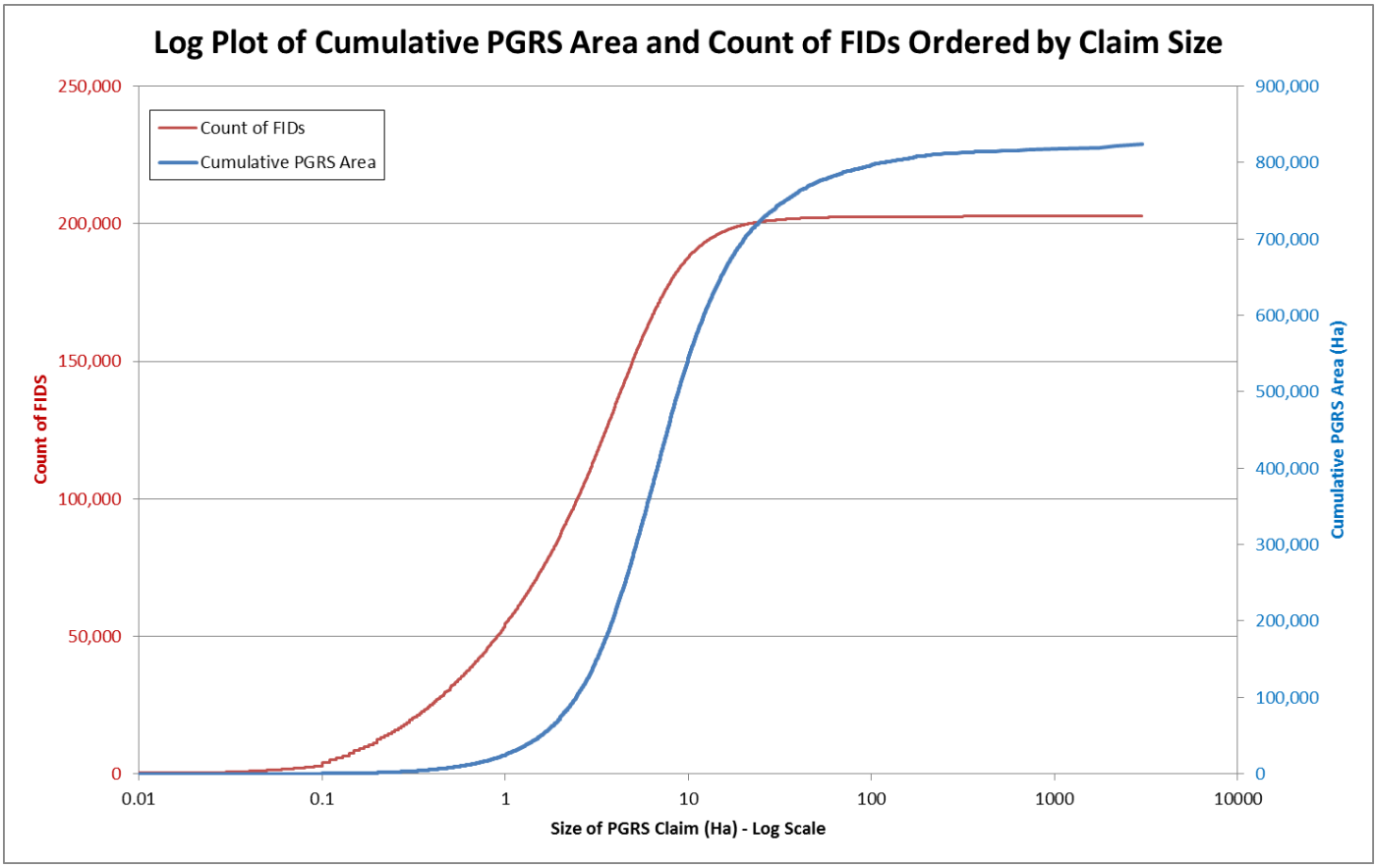

Figure 50: Log plot of cumulative PGRS area and count of FIDs ordered by claim size

3.6.7 PGRS land parcels by Basic Payment Scheme regionalisation and LFASS Grazing Category

Consideration was given to applying the permanent grassland equivalence measure to only those areas outside a Natura or SSSI site and which are in Region 1 of the Basic Payment Scheme (BPS) regionalisation. In order to support this option reference was made to a draft BPS regions map generated by the research team. It should be noted that this draft BPS regions map used a different and simplified methodology and was strictly an indicative draft based on SAF 14 data to support a high-level analysis of the options. The draft maps thus contain some incorrect classifications. Further work by RPID was subsequently undertaken to define and then finalise the BPS regions.

Figure 51 shows the breakdown of PGRS by BPS region and LFASS Grazing Category. Eligible grass is PGRS within BPS Region 1 which is not inside the limits of Natura or SSSI sites – this would be 94% of all PGRS. This analysis also shows that 43% of eligible grass in is Grazing Category D that is land with historically higher stocking densities where effort for soil testing could be focused. Table 39 presents the same data with the eligible grass area highlighted.

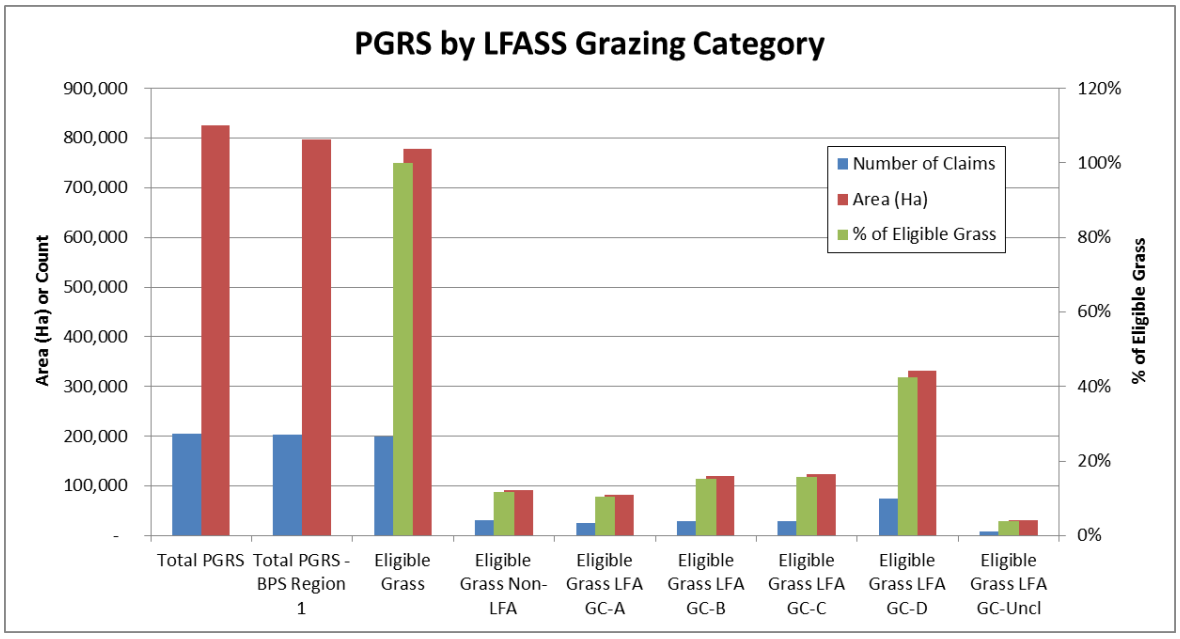

Figure 51: Breakdown of PGRS claimed areas by LFASS Grazing Category

Table 39: Breakdown of PGRS claimed areas by LFASS Grazing Category

Description	Number of Claims	Area (Ha)	% of 'Eligible Grass'
Total PGRS	205,757	824,764	N/A
Total PGRS - BPS Region 1	202,274	797,870	N/A
Total PGRS - BPS Region 1 - Non Natura/SSSI	**198,750**	**779,154**	100%
Total PGRS - BPS Region 1 - Non Natura/SSSI - Non-LFA	31,358	91,696	12%
Total PGRS - BPS Region 1 - Non Natura/SSSI - LFA GC-A	24,993	82,173	11%
Total PGRS - BPS Region 1 - Non Natura/SSSI - LFA GC-B	29,911	119,558	15%
Total PGRS - BPS Region 1 - Non Natura/SSSI - LFA GC-C	28,685	122,813	16%
Total PGRS - BPS Region 1 - Non Natura/SSSI - LFA GC-D	75,159	331,835	43%
Total PGRS - BPS Region 1 - Non Natura/SSSI - LFA GC-Uncl.	8,207	30,608	4%

Note that there is a slight difference between the total area of the grazing category breakdown and the area of eligible grass due to the inability to identify LFA status for some 257 claims in the analysis framework totalling 470.43 Ha of eligible grass.

The spatial distribution of all land parcels with claims for PGRS that are inside BPS Region 1 and are not in a NATURA or SSSI designated area and their LFASS Grazing Category is shown in Figure 52.

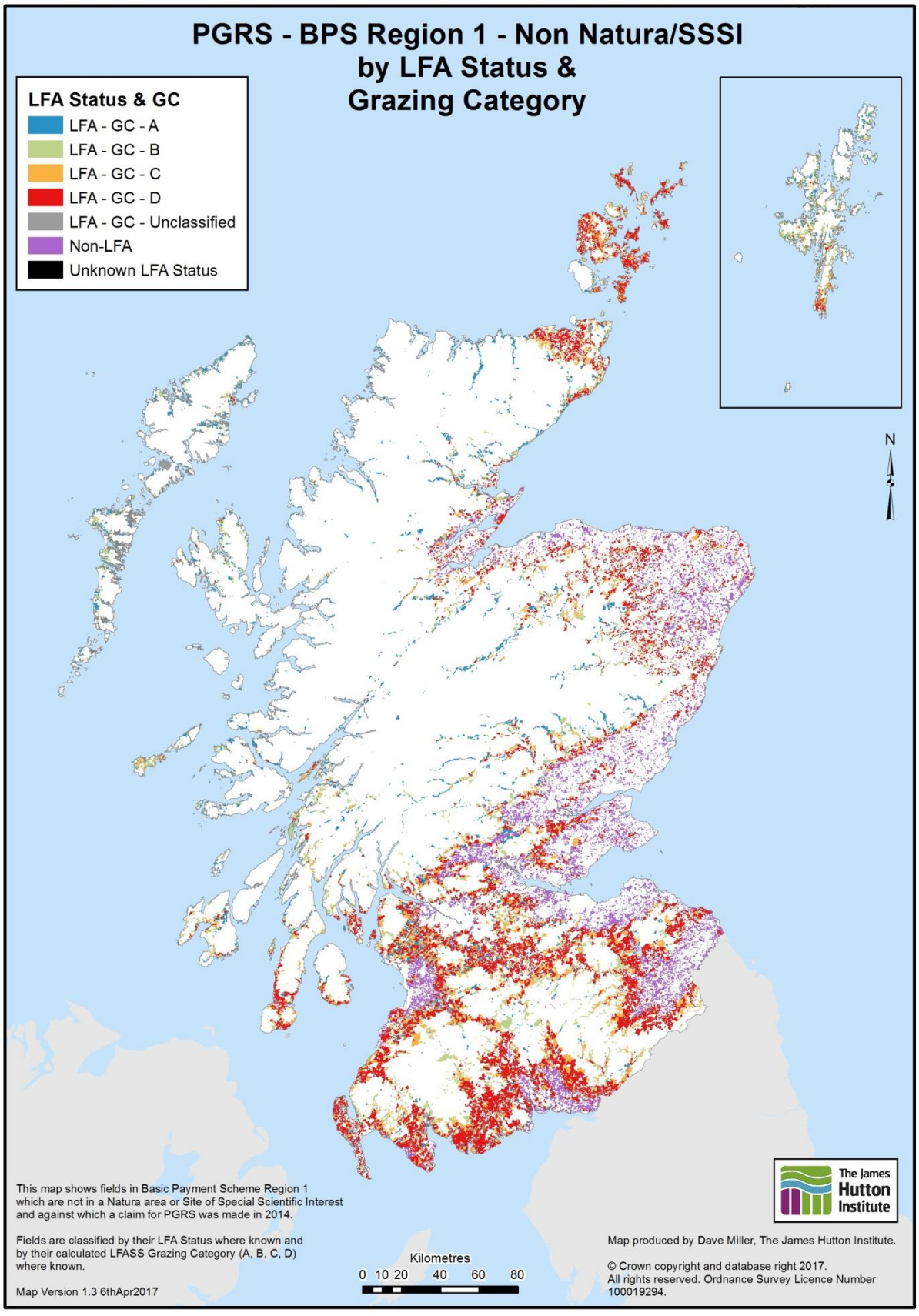

Figure 52: Fields with claims for PGRS in BPS Region 1 and not in a NATURA or SSSI designated area by LFASS Grazing Category

The same data can be broken down by Agricultural Region. Figure 53 and Table 40 show the Eligible Grass area broken down by LFASS Grazing Category and by Agricultural Region. Colours in Figure 53 and in subsequent charts match the colours used in the regional map book of the same data in the sister document to this technical report (see Part 3). This representation shows well the regional distribution of BPS region one PGRS and thus the likely burden sharing of any PGRS equivalence measure based on BPS regions and LFASS Grazing Categories. It also highlights the concentration of intensively used PGRS in certain regions. Dumfries & Galloway has both the largest area of Eligible Grass and the largest area of Eligible Grass in LFASS Grazing Category D (the most intensive of the 4 grazing categories) which is more than twice the area of any other region.

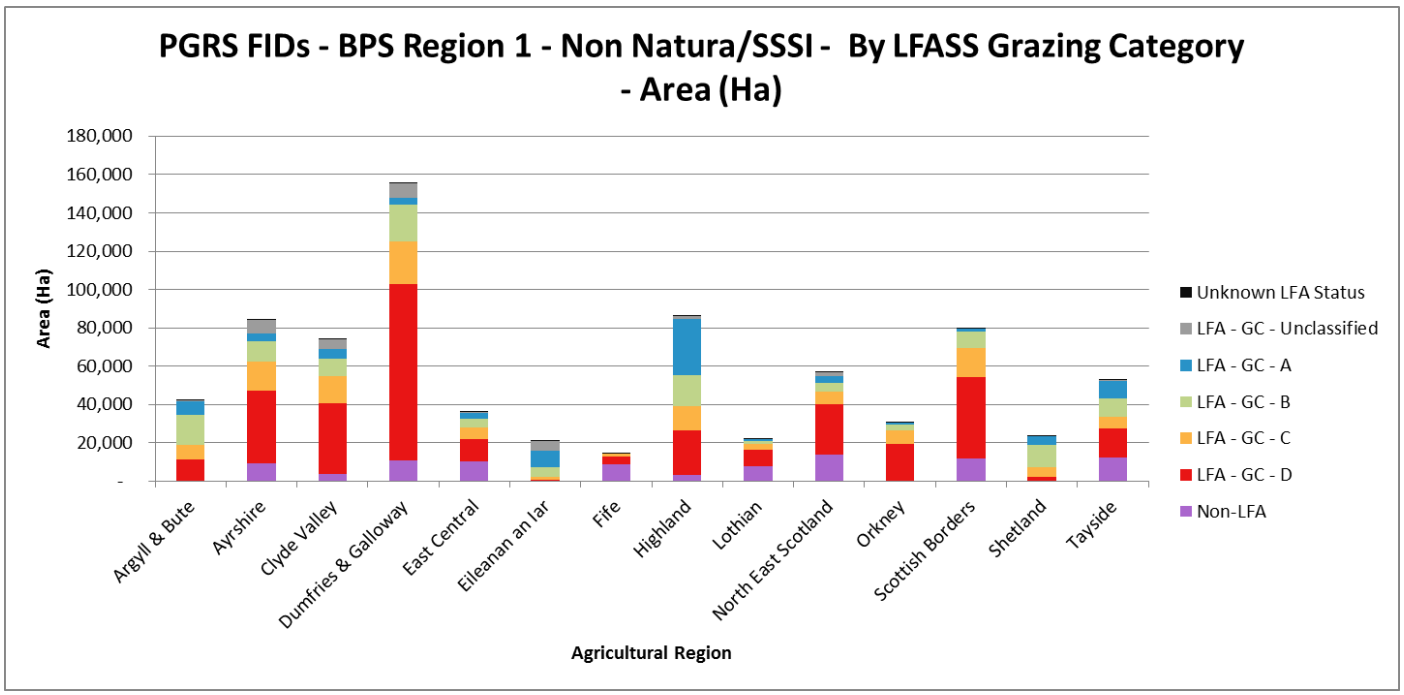

Figure 53: Eligible Grass by Agricultural Region and LFASS Grazing Category (Ha)

Table 40: Eligible Grass by Agricultural Region and LFASS Grazing Category (Ha)

Eligible Grass (Ha)	Non-LFA	LFA - GC - D	LFA - GC - C	LFA - GC - B	LFA - GC - A	LFA - GC - Unclassified	Unknown LFA Status	Total
Argyll & Bute	49	11,203	7,562	15,717	6,877	819	31	42,259
Ayrshire	9,409	37,829	15,255	10,256	4,240	7,345	71	84,405
Clyde Valley	3,496	37,342	13,732	9,314	5,251	4,979	43	74,158
Dumfries & Galloway	10,774	91,814	22,477	19,283	3,671	7,378	43	155,440
East Central	10,383	11,569	5,938	4,686	2,975	612	69	36,232
Eileanan an Iar		480	1,620	4,954	8,946	4,899	25	20,923
Fife	8,928	3,901	1,335	114	6	102	22	14,408
Highland	3,360	23,223	12,265	16,246	29,538	1,422	46	86,100
Lothian	7,481	8,762	2,982	1,878	550	458	23	22,133
North East Scotland	13,816	26,438	6,617	4,367	3,677	1,619	33	56,568
Orkney		19,381	7,191	2,870	875	257	2	30,575
Scottish Borders	11,540	42,826	14,962	8,787	1,298	299	20	79,732
Shetland		2,212	4,747	11,652	4,757	74	9	23,452
Tayside	12,459	14,854	6,130	9,435	9,512	344	35	52,770
Total	**91,696**	**331,835**	**122,813**	**119,558**	**82,173**	**30,608**	**470**	**779,154**

The same data can be presented as percentages of eligible grass in each Agricultural Region. Table 41 shows this representation with the Agricultural Regions ordered first by Non-LFA percentage followed by LFA GC-D percentage. This is to reflect increasing land use intensity through the regions. This again highlights where the burden of any PGRS equivalence measure on this basis would fall, particularly within the LFA region.

Table 41: Eligible Grass by Agricultural Region and Grazing Category (% of Region)

Eligible Grass (% of Region)	Non-LFA	LFA Grazing Category					Unknown LFA Status
		D	C	B	A	Unclassified	
Fife	61.97%	27.08%	9.27%	0.79%	0.04%	0.71%	0.15%
Lothian	33.80%	39.59%	13.47%	8.49%	2.48%	2.07%	0.11%
East Central	28.66%	31.93%	16.39%	12.93%	8.21%	1.69%	0.19%
North East Scotland	24.42%	46.74%	11.70%	7.72%	6.50%	2.86%	0.06%
Tayside	23.61%	28.15%	11.62%	17.88%	18.03%	0.65%	0.07%
Scottish Borders	14.47%	53.71%	18.77%	11.02%	1.63%	0.37%	0.03%
Ayrshire	11.15%	44.82%	18.07%	12.15%	5.02%	8.70%	0.08%
Dumfries & Galloway	6.93%	59.07%	14.46%	12.41%	2.36%	4.75%	0.03%
Clyde Valley	4.71%	50.36%	18.52%	12.56%	7.08%	6.71%	0.06%
Highland	3.90%	26.97%	14.24%	18.87%	34.31%	1.65%	0.05%
Argyll & Bute	0.11%	26.51%	17.89%	37.19%	16.27%	1.94%	0.07%
Orkney	0.00%	63.39%	23.52%	9.39%	2.86%	0.84%	0.01%
Shetland	0.00%	9.43%	20.24%	49.68%	20.29%	0.32%	0.04%
Eileanan an Iar	0.00%	2.29%	7.74%	23.68%	42.76%	23.41%	0.12%

3.6.8 Area and percentage of business thresholds (20-20) analysis

A further analysis was requested which sought to quantify the counts and areas of businesses which may be excluded were a measure to be introduced which took into account both the PGRS area and the % of the business that PGRS represents. The thinking was that thresholds could be introduced to exclude from the requirement those businesses where the 'eligible grass' is small, and is also a small proportion of a business that mainly depends on rough grazing, such as those with a small amount of in-bye land.

The model for exemption was phrased as: "Businesses where the eligible land (Region 1 PGRS not in a NATURA site/SSSI) is less than x% of the combined BPS regions 2 & 3 in that business, unless the area of PGRS exceeds y hectares." Both x and y were variables to be set.

Note that there were some businesses (7,725 in total) with PGRS in Region 1 but with no land in BPS regions 2 and 3. This would as initially formulated result in null values (attempting to divide by zero). As a result, for these businesses the percentage value was fixed at 100% to ensure that they always form part of the 'Greater than x%' threshold category.

In testing, limits of 20% and 20Ha were initially set. Those businesses for which eligible grass makes up less than 20Ha and eligible grass is less than 20% of the business were those considered for exemption. Table 42 shows the outcomes of applying the 20-20 rule. The top part of the table provides the key for interpretation with the red cells highlighting the exemptions. Three metrics are presented – count of businesses, total eligible grass area and the exemptions and number of PGRS claims (an indication of the number of land parcels). The analysis shows that only a

tiny proportion of eligible grass (8,293 Ha of a total of 779,154 Ha of PGRS or 1.06%) would be excluded if these threshold levels were to be applied. The threshold would exclude a more significant number of businesses (4,891) as highlighted by Figure 54.

Table 42: Eligible Grass 20Ha and 20% Analysis – alternative representation

Metrics	Less than 20 Ha threshold	Greater than 20 Ha threshold	
Less than 20% threshold	Exempt	Not Exempt	(row total)
Greater than 20% threshold	Not Exempt	Not Exempt	(row total)
	(column total)	(column total)	(grand total)

Count of businesses	Less than 20 Ha threshold	Greater than 20 Ha threshold	
Less than 20% threshold	4,891	987	**5,878**
Greater than 20% threshold	8,340	7,431	**15,771**
	13,231	**8,418**	21,649

Total 'Eligible Grass' Area	Less than 20 Ha threshold	Greater than 20 Ha threshold	
Less than 20% threshold	8,293	80,454	**88,747**
Greater than 20% threshold	62,010	628,396	**690,406**
	70,303	**708,850**	779,154

Count of 'Eligible Grass' Claims	Less than 20 Ha threshold	Greater than 20 Ha threshold	
Less than 20% threshold	5,421	18,361	**23,782**
Greater than 20% threshold	38,852	136,116	**174,968**
	44,273	**154,477**	198,750

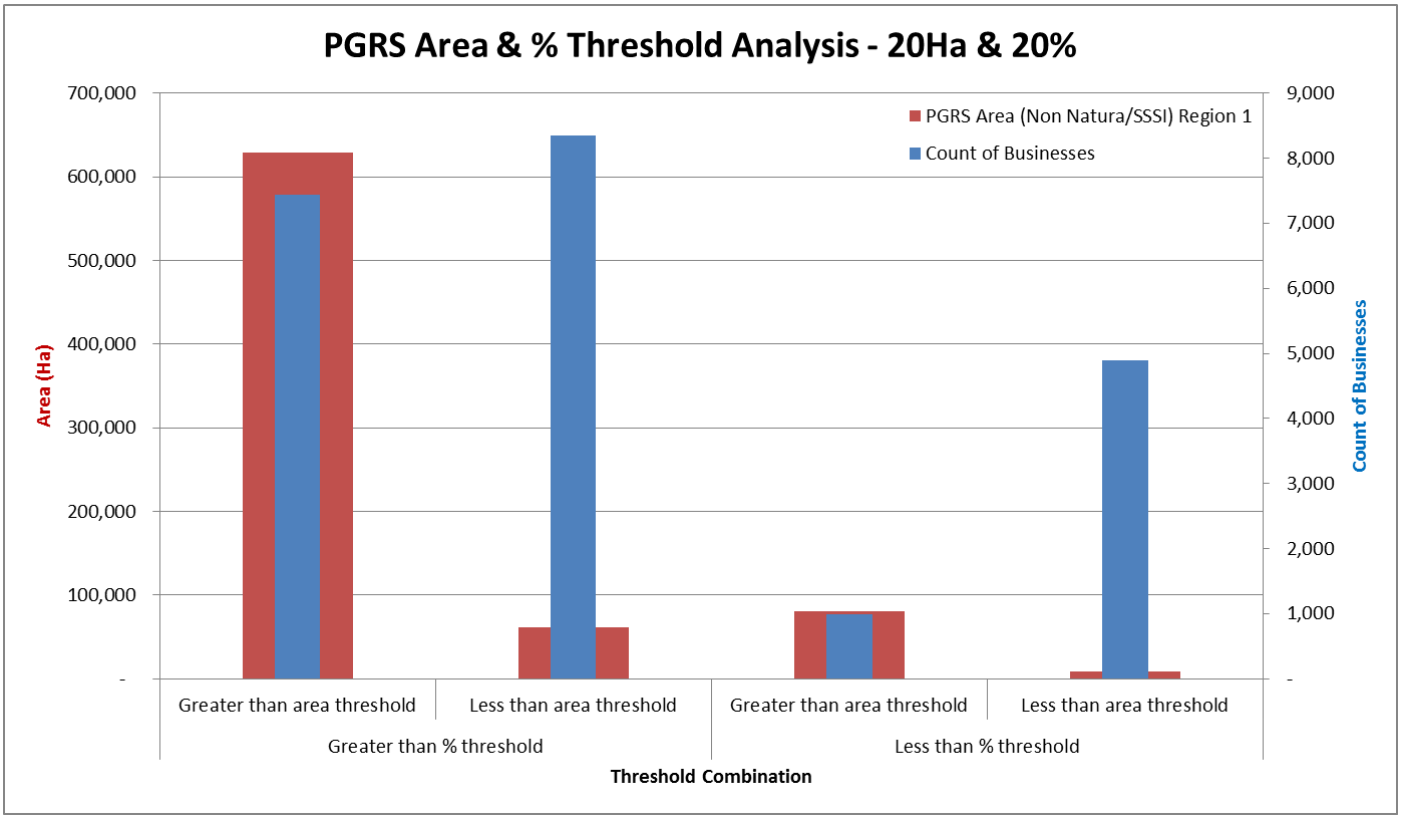

Figure 54: Eligible Grass 20% and 20 Ha Analysis

3.6.9 PGRS land parcels in the Nitrate Vulnerable Zones (NVZs)

Consideration was given to the degree to which measures within the Nitrate Vulnerable Zones (NVZs) could in effect already be delivering the same outcomes as were sought by a PGRS equivalence measure. Inside the NVZs land managers are already bound by certain restrictions placed on their management of the land in accordance with the requirements of *The Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008*[14]. The NVZs boundary was redrawn in February 2015 with the revised boundaries are shown in Figure 55.

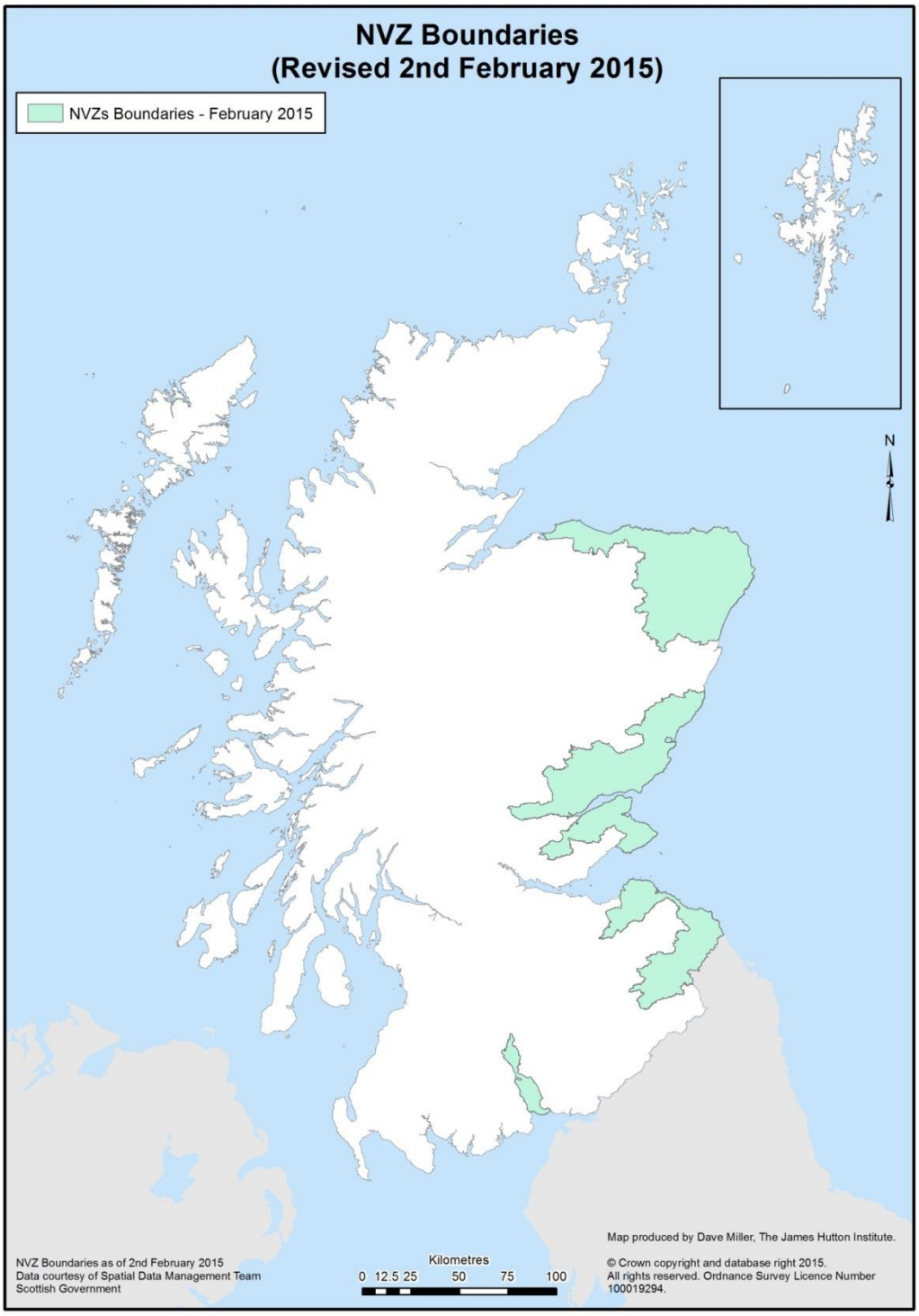

Figure 55: Revised Nitrate Vulnerable Zones – as of February 2015

[14] http://www.legislation.gov.uk/ssi/2008/298/contents/made

The proportion of PGRS grassland within the NVZ boundary was estimated by overlaying the NVZs mapping and the SAF14 land parcel data. Figure 56 shows a regional breakdown of all land parcels with a claim for PGRS, split between those inside the NVZs boundary and those beyond. Total PGRS areas are shown in blue with those areas inside the NVZ boundary shown in red. Similarly counts of all PGRS land parcels are shown in green with those fields inside the NVZ boundary in purple. Table 43 shows the same data in tabular form. This analysis shows the degree to which PGRS management in some regions is influenced by NVZs regulations (e.g. North East Scotland) while PGRS management in other regions is unaffected by such restrictions (e.g. Ayrshire). Overall, except for North East Scotland the proportion of PGRS inside NVZs is small.

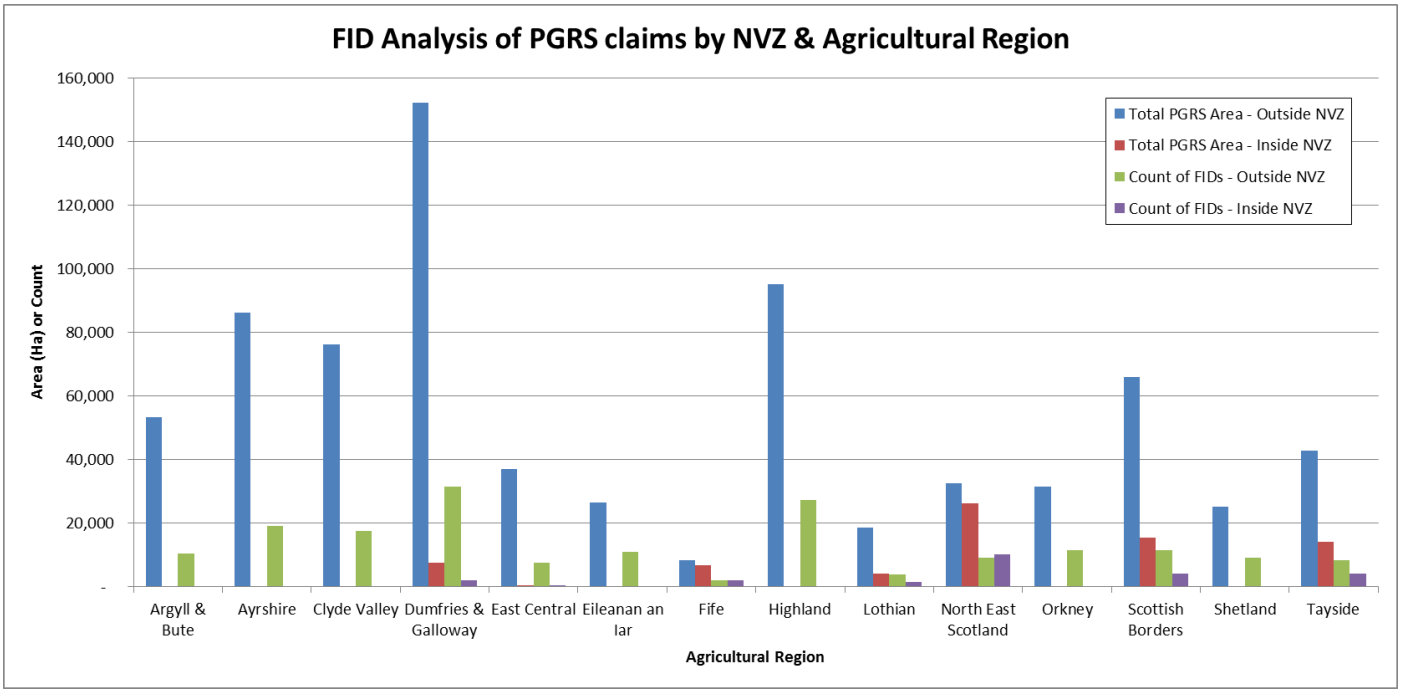

Figure 56: FID Analysis of PGRS claims by NVZ & Agricultural Region

Table 43: FID Analysis of PGRS claims by NVZ & Agricultural Region

	Total PGRS Area		Count of FIDs			
Agricultural Region	**Outside NVZ**	**Inside NVZ**	**Outside NVZ**	**Inside NVZ**	**Total PGRS Area**	**Total Count of FIDs**
Argyll & Bute	53,348		10,380		53,348	10,380
Ayrshire	86,086		19,153		86,086	19,153
Clyde Valley	76,211		17,581		76,211	17,581
Dumfries & Galloway	152,204	7,471	31,404	1,860	159,675	33,264
East Central	36,854	363	7,424	88	37,217	7,512
Eileanan an Iar	26,529		10,862		26,529	10,862
Fife	8,169	6,571	1,920	1,854	14,741	3,774
Highland	95,029		27,242		95,029	27,242
Lothian	18,603	4,098	3,844	1,429	22,701	5,273
North East Scotland	32,443	26,238	9,019	10,093	58,681	19,112
Orkney	31,460		11,363		31,460	11,363
Scottish Borders	65,868	15,372	11,554	3,977	81,239	15,531
Shetland	25,058		9,178		25,058	9,178
Tayside	42,639	14,150	8,374	4,063	56,790	12,437
Total	**750,501**	**74,263**	**179,298**	**23,364**	**824,764**	**202,662**

3.7 Organic Businesses

As noted in section 2.4 businesses which are certified as organic are exempt from the crop diversification and ecological focus area requirements, and those with a part of their business as organic have the option to benefit from the exemption or to meet the requirements across all of their arable land. In order to assess the extent to which the organic exemption may apply, and in the absence of a list of organic producers, reference was made to claims made under the Rural Development Contracts Rural Priorities options for those options which relate to conversion to, or maintenance of, organic farming. These provide an indication at the field level of those claims which may be considered organic. Where a field contained a claim against one of the 8 relevant measures, the field was flagged as organic and all claims within the field were considered to be organic for the purposes of greening. Table 44 contains the total claimed areas under each of the organic RP option codes. These are made by a total of 228 businesses.

Table 44: Claimed areas under Organic Rural Priorities options in SAF14

RP Code	Area (Ha)	Option Description
RP21401A	2,086	Conversion to organic farming - arable
RP21401B	3,372	Conversion to organic farming - improved grassland
RP21401C	302	Conversion to organic farming - fruit and vegetables
RP21401D	11,709	Conversion to organic farming - rough grazing
RP21401E	10,538	Maintenance of organic farming - arable
RP21401F	12,458	Maintenance of organic farming - improved grassland
RP21401G	344	Maintenance of organic farming - fruit and vegetables
RP21401H	37,229	Maintenance of organic farming - rough grazing
Total	**78,037**	

The areas of organic production have been flagged in the datasets that support this analysis. Since this area is less than 2% of the total arable area, it was decided not to present a separate set of results for organic businesses due to the small impact that these business would have on the overall figures.

4 APPENDICES

4.1 Business Characterisation

This appendix details the underpinning SAF14 data used in the review. It presents summaries of the data (as area and counts of businesses) by Agricultural Region, Farm Type, and business size. It is included to provide context for the results from analysis of the CAP Greening measures.

4.1.1 Total Area and Count of Businesses by Agricultural Region

Figure 57 shows the total declared area per business in the SAF14 dataset by Agricultural Region. Businesses – blue indicates those businesses in receipt of Single Farm Payment in 2014 while red indicates other businesses that while submitting a SAF did not hold, or activate, any SFPS entitlement in 2014. Table 45 shows the same data.

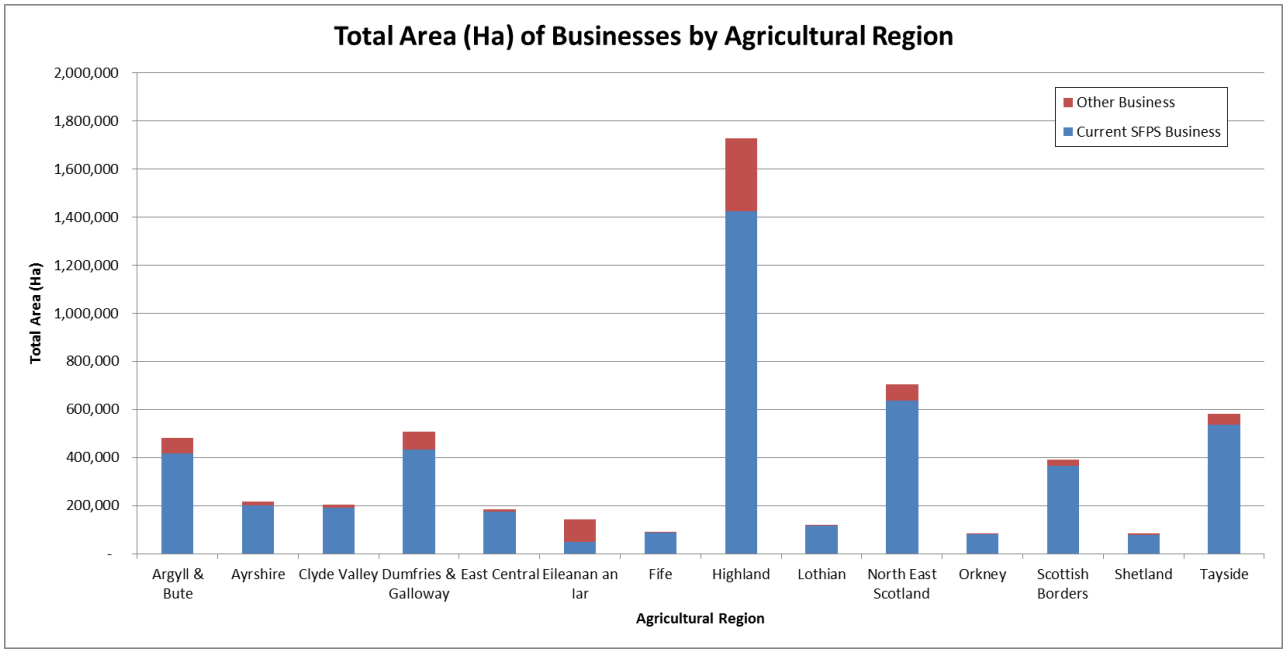

Figure 57: Total Area (Ha) of Businesses by Agricultural Region

Table 45: Total Area (Ha) of Businesses by Agricultural Region

Agricultural Region (Ha)	Current SFPS Business	Other Business	Total
Argyll & Bute	418,078	64,218	482,296
Ayrshire	202,050	15,418	217,468
Clyde Valley	190,990	13,987	204,976
Dumfries & Galloway	433,635	75,044	508,679
East Central	173,195	9,612	182,807
Eileanan an Iar	47,887	93,757	141,644
Fife	86,398	2,403	88,801
Highland	1,423,164	305,117	1,728,281
Lothian	115,256	5,366	120,622
North East Scotland	636,599	66,935	703,534
Orkney	80,723	1,931	82,654
Scottish Borders	365,221	24,665	389,886
Shetland	77,145	7,035	84,180
Tayside	534,951	47,410	582,361
Total	**4,785,291**	**732,897**	**5,518,188**

Figure 58 and Table 46 show the same data in terms of counts of businesses.

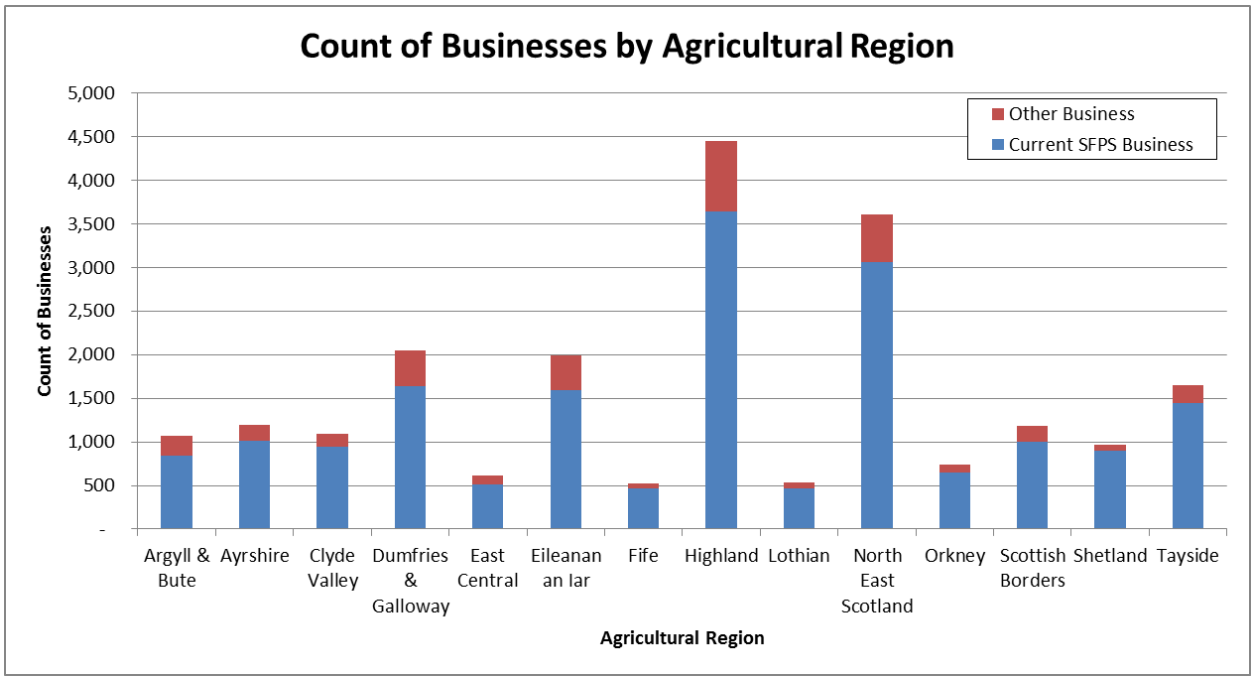

Figure 58: Count of Businesses by Agricultural Region

Table 46: Count of Businesses by Agricultural Region

Agricultural Region (Count of Businesses)	Current SFPS Business	Other Business	Total
Argyll & Bute	846	222	1,068
Ayrshire	1,012	178	1,190
Clyde Valley	943	153	1,096
Dumfries & Galloway	1,640	407	2,047
East Central	516	98	614
Eileanan an Iar	1,597	399	1,996
Fife	470	58	528
Highland	3,646	800	4,446
Lothian	463	71	534
North East Scotland	3,061	541	3,602
Orkney	648	90	738
Scottish Borders	1,001	182	1,183
Shetland	900	62	962
Tayside	1,448	197	1,645
Total	**18,191**	**3,458**	**21,649**

4.1.2 Total Area and Count of Businesses by Farm Type

Figure 59 shows the total declared area per business in the SAF14 dataset by farm type. Farm Type comes from Census recalculations of farm type calculated at the business, rather than holding, level. The category "No match" indicates those businesses not part of the Census population for which no calculation of Farm Type could be made. Blue indicates those businesses in receipt of Single Farm Payment in 2014 while red indicates other businesses that while submitting a SAF did not hold, or activate, any SFPS entitlement in 2014. Table 47 shows the same data. Figure 60 and Table 48 show the same data in terms of count of businesses. The category "No Match" indicates entities

which appear in the SAF14 dataset but which do not form part of the June Agricultural Census (e.g. Sheep Stock Clubs, Landless Holdings[15] etc.) while "Unclassified" represents those holdings which appear in JAC but which do not have a calculation of farm type applied. In terms of farm type, the LFA Cattle & Sheep category is by far the largest class in both area and count with 61% of all area and 50% of all businesses.

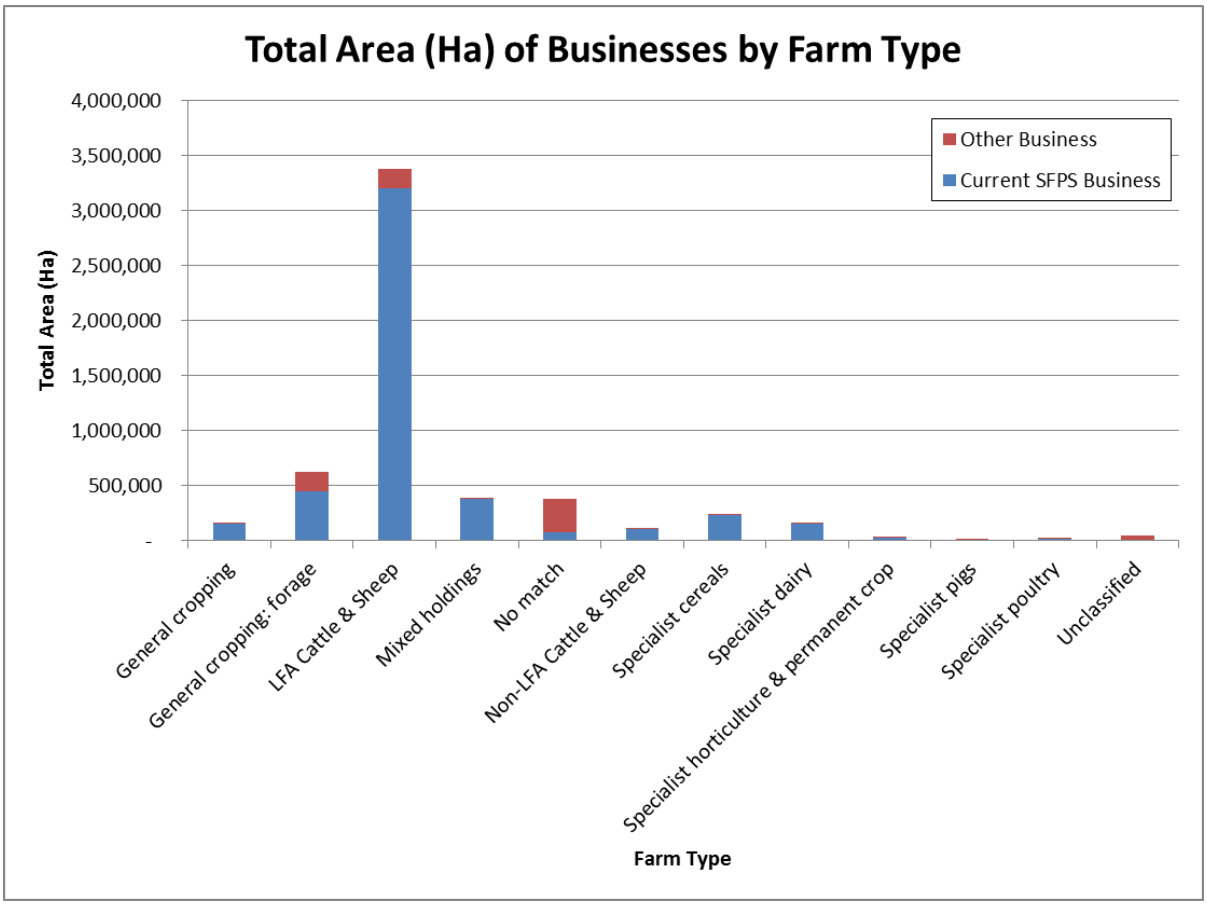

Figure 59: Total Area (Ha) of Businesses by Farm Type

Table 47: Total Area (Ha) of Businesses by Farm Type

Farm Type (Ha)	Current SFPS Business	Other Business	Total
General cropping	152,778	1,963	154,741
General cropping: forage	443,290	176,895	620,185
LFA Cattle & Sheep	3,197,676	176,419	3,374,096
Mixed holdings	380,299	8,625	388,924
No match	72,741	302,732	375,473
Non-LFA Cattle & Sheep	98,981	7,123	106,104
Specialist cereals	235,249	7,370	242,619
Specialist dairy	155,043	3,561	158,604
Specialist horticulture & permanent crop	23,230	344	23,573
Specialist pigs	8,949	2,107	11,056
Specialist poultry	14,072	1,016	15,087
Unclassified	2,983	44,742	47,725
Total	**4,785,291**	**732,897**	**5,518,188**

[15] Holdings which do not own any land but only rent in land. These holdings submit a SAF but do not appear in the JAC.

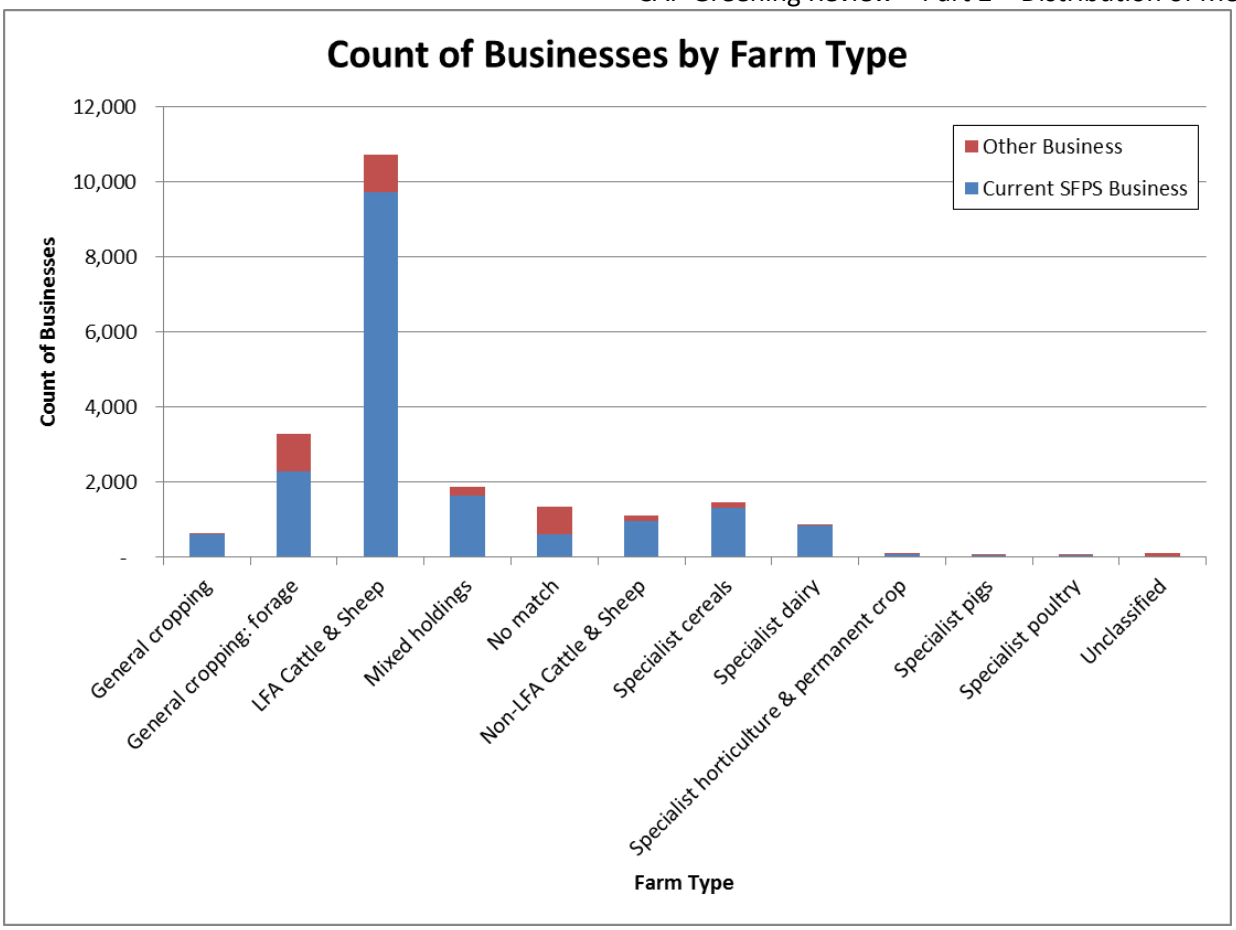

Figure 60: Count of Businesses by Farm Type

Table 48: Count of Businesses by Farm Type

Farm Type (Count of Businesses)	Current SFPS Business	Other Business	Total
General cropping	618	26	644
General cropping: forage	2,275	998	3,273
LFA Cattle & Sheep	9,733	1,006	10,739
Mixed holdings	1,648	217	1,865
No match	616	722	1,338
Non-LFA Cattle & Sheep	950	164	1,114
Specialist cereals	1,319	133	1,452
Specialist dairy	826	28	854
Specialist horticulture & permanent crop	89	27	116
Specialist pigs	48	11	59
Specialist poultry	58	29	87
Unclassified	11	97	108
Total	**18,191**	**3,458**	**21,649**

4.1.3 Total Area and Count of Businesses by Business Size

One means by which business size may be classified is to calculate the Standard Labour Requirement (SLR). Standard Labour Requirement represents the amount of labour required by a holding, or business, to carry out all of its agricultural activity and is used to classify farm size. While SLR has been successfully used by the project team to

classify business size in the past, the calculation per business would not have been available in time to be used in the analysis presented here. Consequently, an alternative representation of business size was adopted following a similar classification used in previous work by the project team based on total claimed area.

Total claimed area for each business was calculated and each business assigned to one of six size classes generated in 50 Ha cohorts up to the largest class of >=250 Ha. Figure 61 shows the total area of businesses in each of the six size brackets while Table 49 shows the same data. Figure 62 shows the count of businesses in each size classification, tabulated in Table 50. Comparing the figures highlights that in terms of count almost half the businesses (42%) are less than 50 Ha in size but this cohort makes up less than 3% of total claimed area.

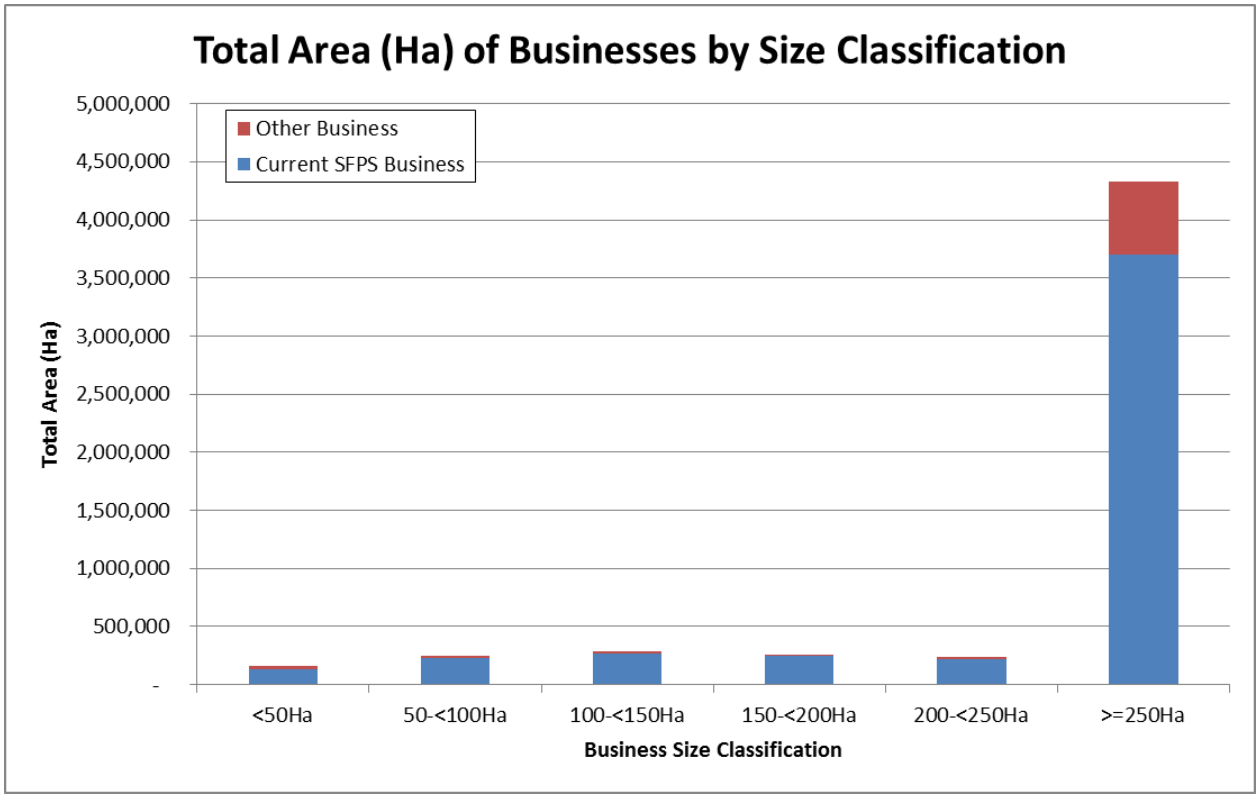

Figure 61: Total Area (Ha) of Businesses by Size Classification

Table 49: Total Area (Ha) of Businesses by Size Classification

Size Classification (Ha)	Current SFPS Business	Other Business	Total
<50Ha	129,302	30,709	160,011
50-<100Ha	224,453	23,941	248,394
100-<150Ha	268,554	19,517	288,071
150-<200Ha	241,649	18,039	259,688
200-<250Ha	220,362	16,818	237,180
>=250Ha	3,700,972	623,873	4,324,844
Total	**4,785,291**	**732,897**	**5,518,188**

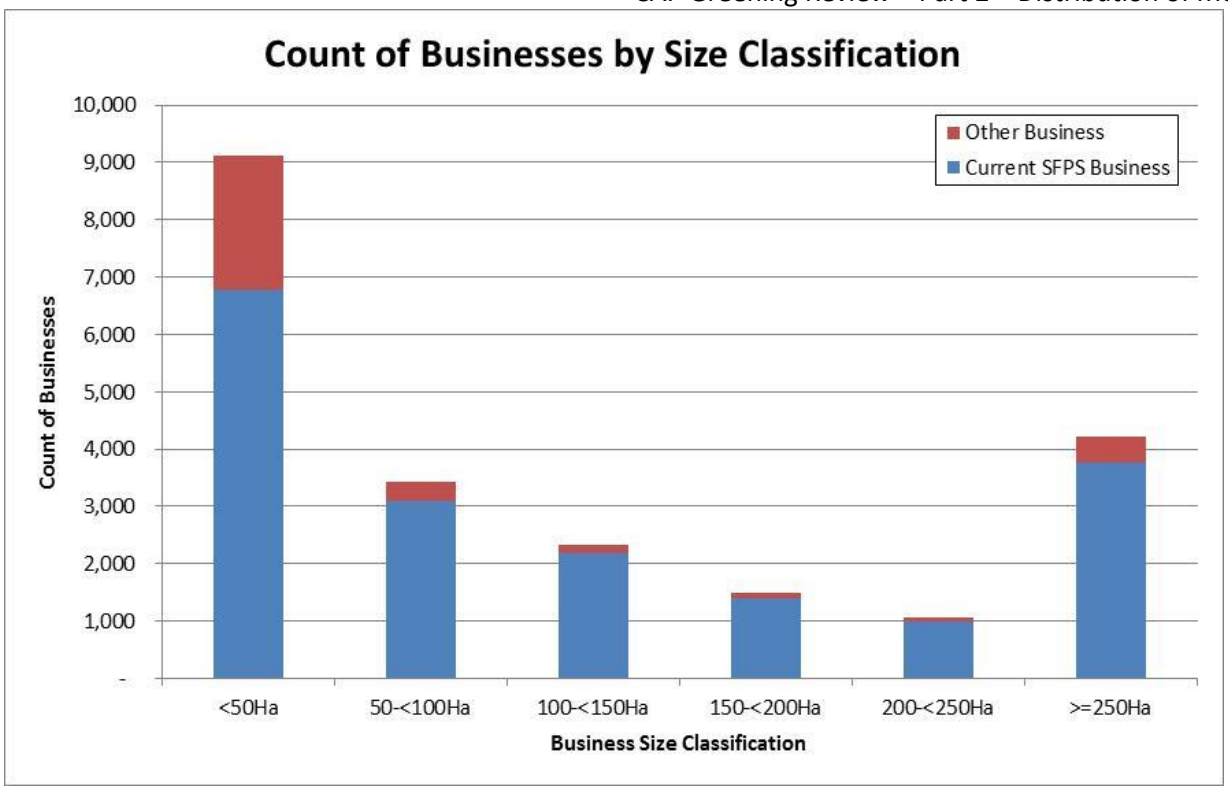

Figure 62: Count of Businesses by Size Classification

Table 50: Count of Businesses by Size Classification

Size Classification (Count of Businesses)	Current SFPS Business	Other Business	Total
<50Ha	6,777	2,332	9,109
50-<100Ha	3,086	338	3,424
100-<150Ha	2,177	159	2,336
150-<200Ha	1,395	104	1,499
200-<250Ha	989	75	1,064
>=250Ha	3,767	450	4,217
Total	**18,191**	**3,458**	**21,649**

4.1.4 Analysis of Land Type by Agricultural Region

In addition to the differences in size between the Agricultural Regions, the mix of land use per regions also varies significantly. Figure 63 and Table 51 show the total area per Agricultural Region broken-down across six land types, namely:

- RGR (Rough Grazing)
- PGRS (Grass Over 5 Years)
- TGRS (Grass Under 5 Years)
- Cropping
- Permanent Crop
- Ineligible Area

This analysis shows that most of the claimed area in Highland is made up of rough grazing while Dumfries & Galloway has the largest area of land declared as Grass Over 5 Years (PGRS) of any region in the country. North East Scotland also has the largest area of both cropping land and temporary grassland (Grass Under 5 Years).

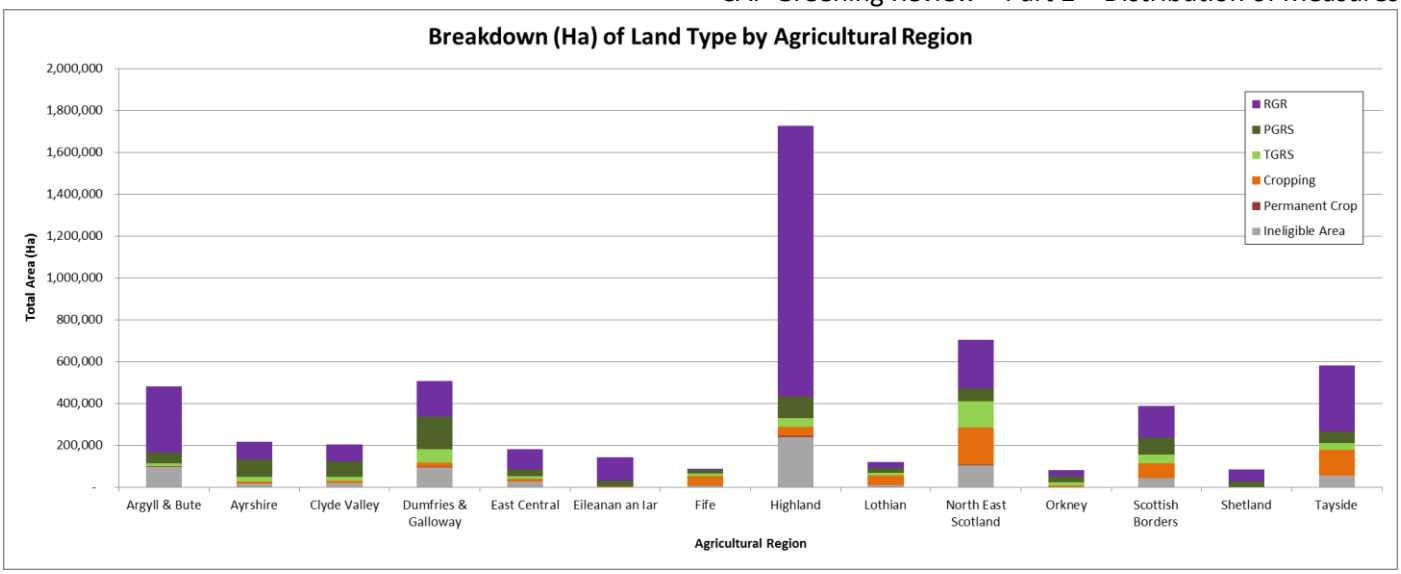

Figure 63: Breakdown (Ha) by Land Type and Agricultural Region

Table 51: Total Area and Breakdown (Ha) by Land Type and Agricultural Region

Agricultural Region (Ha)	Total Area	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area
Argyll & Bute	482,296	315,216	54,030	10,598	2,516	1,250	98,685
Ayrshire	217,468	83,030	84,535	23,368	8,990	135	17,410
Clyde Valley	204,976	80,650	74,539	20,735	8,896	294	19,864
Dumfries & Galloway	508,679	170,322	156,660	64,654	20,633	545	95,865
East Central	182,807	96,748	34,844	12,328	12,626	222	26,040
Eileanan an Iar	141,644	110,353	26,638	1,137	995	27	2,495
Fife	88,801	7,976	14,625	12,283	47,836	111	5,970
Highland	1,728,281	1,293,593	103,540	42,422	42,289	6,588	239,850
Lothian	120,622	29,252	22,510	12,880	44,843	67	11,069
North East Scotland	703,534	232,826	60,024	124,347	179,814	1,522	105,000
Orkney	82,654	28,836	31,044	16,639	5,499	14	622
Scottish Borders	389,886	152,580	80,087	43,496	70,729	1,012	41,982
Shetland	84,180	56,810	24,873	793	264	0	1,440
Tayside	582,361	315,183	56,815	32,679	120,444	1,502	55,737
Total	**5,518,188**	**2,973,375**	**824,764**	**418,358**	**566,374**	**13,289**	**722,028**

This land type data can also be represented as a proportion of each Agricultural Region (Figure 64 and Table 52). This emphasises the extreme contrasts between regions that challenge the design of any policy measures. For example two thirds of both Argyll & Bute and Shetland, and approximately three quarters of both Highland and the Western Isles consists of rough grazing while 54% of Fife is under cropping. The greatest proportion of permanent grassland (PGRS) is seen in Ayrshire (39%) while Orkney, Shetland, Clyde Valley, and Dumfries & Galloway all have 30% or more of their land under this land type.

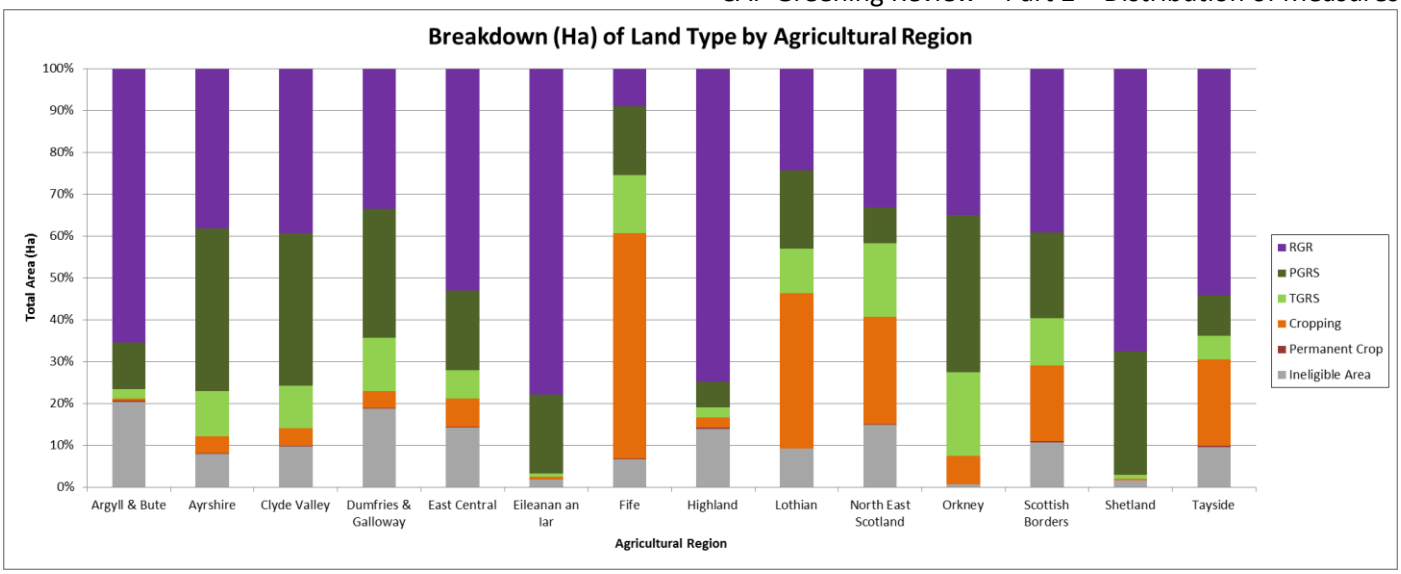

Figure 64: Breakdown (% of Region) of Land Type by Agricultural Region

Table 52: Breakdown (% of Region) of Land Type by Agricultural Region

Agricultural Region (% of Region)	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area	Total
Argyll & Bute	65.36%	11.20%	2.20%	0.52%	0.26%	20.46%	100%
Ayrshire	38.18%	38.87%	10.75%	4.13%	0.06%	8.01%	100%
Clyde Valley	39.35%	36.36%	10.12%	4.34%	0.14%	9.69%	100%
Dumfries & Galloway	33.48%	30.80%	12.71%	4.06%	0.11%	18.85%	100%
East Central	52.92%	19.06%	6.74%	6.91%	0.12%	14.24%	100%
Eileanan an Iar	77.91%	18.81%	0.80%	0.70%	0.02%	1.76%	100%
Fife	8.98%	16.47%	13.83%	53.87%	0.12%	6.72%	100%
Highland	74.85%	5.99%	2.45%	2.45%	0.38%	13.88%	100%
Lothian	24.25%	18.66%	10.68%	37.18%	0.06%	9.18%	100%
North East Scotland	33.09%	8.53%	17.67%	25.56%	0.22%	14.92%	100%
Orkney	34.89%	37.56%	20.13%	6.65%	0.02%	0.75%	100%
Scottish Borders	39.13%	20.54%	11.16%	18.14%	0.26%	10.77%	100%
Shetland	67.49%	29.55%	0.94%	0.31%	0.00%	1.71%	100%
Tayside	54.12%	9.76%	5.61%	20.68%	0.26%	9.57%	100%
National Percentage	53.88%	14.95%	7.58%	10.26%	0.24%	13.08%	100%

Lastly, Table 53 shows the same land type data per region but expressed instead as the percentage share for the region of the total area for that type nationally. This analysis shows that Highland has almost half (44%) of all rough grazing in the country. North East Scotland, the second largest region, has 32% of all cropping and almost 30% of temporary grassland in the country. One fifth (19%) of all improved grassland in the country is in Dumfries & Galloway. While the analysis does highlight regional contrasts it should also be borne in mind that such summaries are also highly influenced by the differences in size between the Agricultural Regions.

Table 53: Breakdown (% of Class) of Land Type By Agricultural Region

Agricultural Region (% of Land Type)	Total Area	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area
Argyll & Bute	8.74%	10.60%	6.55%	2.53%	0.44%	9.41%	13.67%
Ayrshire	3.94%	2.79%	10.25%	5.59%	1.59%	1.02%	2.41%
Clyde Valley	3.71%	2.71%	9.04%	4.96%	1.57%	2.21%	2.75%
Dumfries & Galloway	9.22%	5.73%	18.99%	15.45%	3.64%	4.10%	13.28%
East Central	3.31%	3.25%	4.22%	2.95%	2.23%	1.67%	3.61%
Eileanan an Iar	2.57%	3.71%	3.23%	0.27%	0.18%	0.20%	0.35%
Fife	1.61%	0.27%	1.77%	2.94%	8.45%	0.83%	0.83%
Highland	31.32%	43.51%	12.55%	10.14%	7.47%	49.58%	33.22%
Lothian	2.19%	0.98%	2.73%	3.08%	7.92%	0.50%	1.53%
North East Scotland	12.75%	7.83%	7.28%	29.72%	31.75%	11.45%	14.54%
Orkney	1.50%	0.97%	3.76%	3.98%	0.97%	0.10%	0.09%
Scottish Borders	7.07%	5.13%	9.71%	10.40%	12.49%	7.62%	5.81%
Shetland	1.53%	1.91%	3.02%	0.19%	0.05%	0.00%	0.20%
Tayside	10.55%	10.60%	6.89%	7.81%	21.27%	11.31%	7.72%
Total	100%	100%	100%	100%	100%	100%	100%

4.1.5 Analysis of Land Type by Farm Type

A similar analysis can be performed for the land type characteristics of each Farm Type. Table 54 shows the breakdown of land type per Farm Type in area terms. Figure 65 shows the same data as a percentage of each Farm Type (tabulated in Table 55). These charts and tables give an indication of the broad balance between land types used by each of the Farm Types. A characteristic signature of similar proportions of land types can be seen among related farm types For example. Specialist Cereals has a similar set of land type proportions to General Cropping, while Non-LFA Cattle & Sheep has a similar set of land type proportions to Specialist Dairy. More extensive systems see overall higher proportions of rough grazing.

Table 54: Breakdown (Ha) of Land Type by Farm Type

Land Type by Farm Type (Ha)	Total Area	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area
General cropping	154,741	26,421	7,921	8,192	99,429	290	12,488
General cropping: forage	620,185	281,218	51,131	31,100	92,480	3,680	160,575
LFA Cattle & Sheep	3,374,096	2,238,655	587,598	186,656	46,909	5,940	308,338
Mixed holdings	388,924	98,363	54,802	77,152	126,002	1,293	31,314
No match	375,473	228,471	14,328	2,116	2,883	410	127,265
Non-LFA Cattle & Sheep	106,104	18,345	30,152	36,219	15,449	115	5,823
Specialist cereals	242,619	41,876	15,560	18,610	145,090	396	21,086
Specialist dairy	158,604	19,714	58,448	55,091	19,212	64	6,076
Specialist horticulture & permanent crop	23,573	7,961	1,012	1,094	11,813	853	841
Specialist pigs	11,056	2,767	831	886	4,759	1	1,812
Specialist poultry	15,087	7,854	2,982	1,241	2,318	14	679
Unclassified	47,725	1,730	-	-	31	232	45,732
Total	**5,518,188**	**2,973,375**	**824,764**	**418,358**	**566,374**	**13,289**	**722,028**

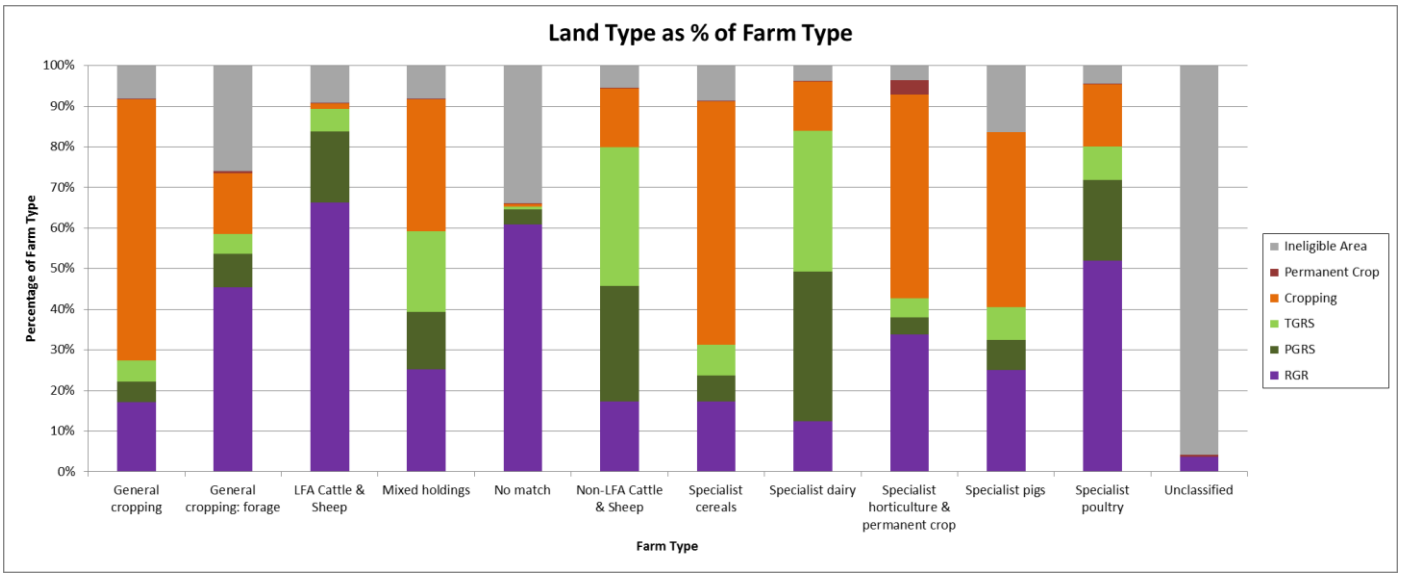

Figure 65: Land Type as % Farm Type

Table 55: Land Type as % of Farm Type

Land Type as % of Farm Type	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area
General cropping	17.07%	5.12%	5.29%	64.25%	0.19%	8.07%
General cropping: forage	45.34%	8.24%	5.01%	14.91%	0.59%	25.89%
LFA Cattle & Sheep	66.35%	17.41%	5.53%	1.39%	0.18%	9.14%
Mixed holdings	25.29%	14.09%	19.84%	32.40%	0.33%	8.05%
No match	60.85%	3.82%	0.56%	0.77%	0.11%	33.89%
Non-LFA Cattle & Sheep	17.29%	28.42%	34.14%	14.56%	0.11%	5.49%
Specialist cereals	17.26%	6.41%	7.67%	59.80%	0.16%	8.69%
Specialist dairy	12.43%	36.85%	34.74%	12.11%	0.04%	3.83%
Specialist horticulture & permanent crop	33.77%	4.29%	4.64%	50.11%	3.62%	3.57%
Specialist pigs	25.03%	7.51%	8.01%	43.04%	0.01%	16.39%
Specialist poultry	52.06%	19.76%	8.23%	15.36%	0.09%	4.50%
Unclassified	3.63%	0.00%	0.00%	0.06%	0.49%	95.82%
National Percentage	53.88%	14.95%	7.58%	10.26%	0.24%	13.08%

Finally the same data can be manipulated to show the share of each land type used by each Farm Type (Table 56). This gives an indication of the 'take' between Farm Types of the different land types and highlights where the sectoral burden will fall for any measure defined on the basis of land types. LFA Cattle & Sheep is a dominant Farm Type with 61% of the total area, 75% of all rough grazing and 71% of all PGRS (Grass Over 5 Years). In contrast, 26% of all cropping land is used by Specialist Cereals businesses with 22% used by Mixed Holdings.

Table 56: Farm Type as % of Land Type

Farm Type as % of Land Type	Total Area	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area
General cropping	2.80%	0.89%	0.96%	1.96%	17.56%	2.19%	1.73%
General cropping: forage	11.24%	9.46%	6.20%	7.43%	16.33%	27.69%	22.24%
LFA Cattle & Sheep	61.14%	75.29%	71.24%	44.62%	8.28%	44.70%	42.70%
Mixed holdings	7.05%	3.31%	6.64%	18.44%	22.25%	9.73%	4.34%
No match	6.80%	7.68%	1.74%	0.51%	0.51%	3.08%	17.63%
Non-LFA Cattle & Sheep	1.92%	0.62%	3.66%	8.66%	2.73%	0.86%	0.81%
Specialist cereals	4.40%	1.41%	1.89%	4.45%	25.62%	2.98%	2.92%
Specialist dairy	2.87%	0.66%	7.09%	13.17%	3.39%	0.48%	0.84%
Specialist horticulture & permanent crop	0.43%	0.27%	0.12%	0.26%	2.09%	6.42%	0.12%
Specialist pigs	0.20%	0.09%	0.10%	0.21%	0.84%	0.01%	0.25%
Specialist poultry	0.27%	0.26%	0.36%	0.30%	0.41%	0.11%	0.09%
Unclassified	0.86%	0.06%	0.00%	0.00%	0.01%	1.74%	6.33%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

4.1.6 Analysis of Land Type by Business Size

The distribution of land types may also be viewed via the business size categorisation. Figure 66 shows the land type mix per business size category in area terms using the same business size categorisation as seen previously (also in Table 57). The largest size category >=250 Ha dominates the chart. The alternative view where the areas are expressed as a % of the size category is shown in Figure 67 with the corresponding table of values shown in Table 57. This shows that permanent and temporary grassland are the dominant land types for businesses smaller than 50 Ha in size than any other category. As size increases there is an increase in cropping land present up to the >250Ha class. The proportion of rough grazing across these size classes remains near close to 20%. For the largest category there is a marked change in the proportion of rough grazing land which makes up almost two thirds of the total area of the largest businesses.

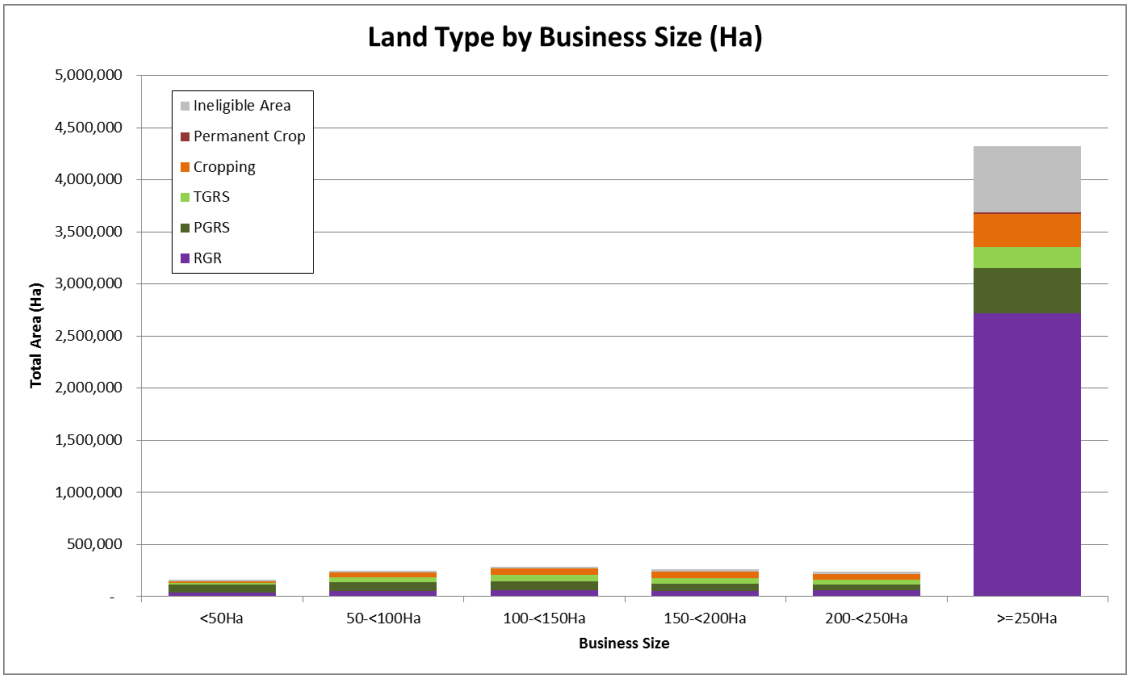

Figure 66: Land Type by Business Size (Ha)

Table 57: Land Type by Business Size (Ha)

Land Type by Business Size (Ha)	Total Area	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area
<50Ha	160,011	36,015	77,385	19,960	15,343	573	10,735
50-<100Ha	248,394	53,807	87,656	45,959	44,570	295	16,106
100-<150Ha	288,071	57,807	90,710	59,388	61,880	557	17,730
150-<200Ha	259,688	52,608	72,482	48,956	67,375	593	17,675
200-<250Ha	237,180	57,128	59,591	41,614	58,352	966	19,529
>=250Ha	4,324,844	2,716,011	436,940	202,482	318,854	10,306	640,253
Total	**5,518,188**	**2,973,375**	**824,764**	**418,358**	**566,374**	**13,289**	**722,028**

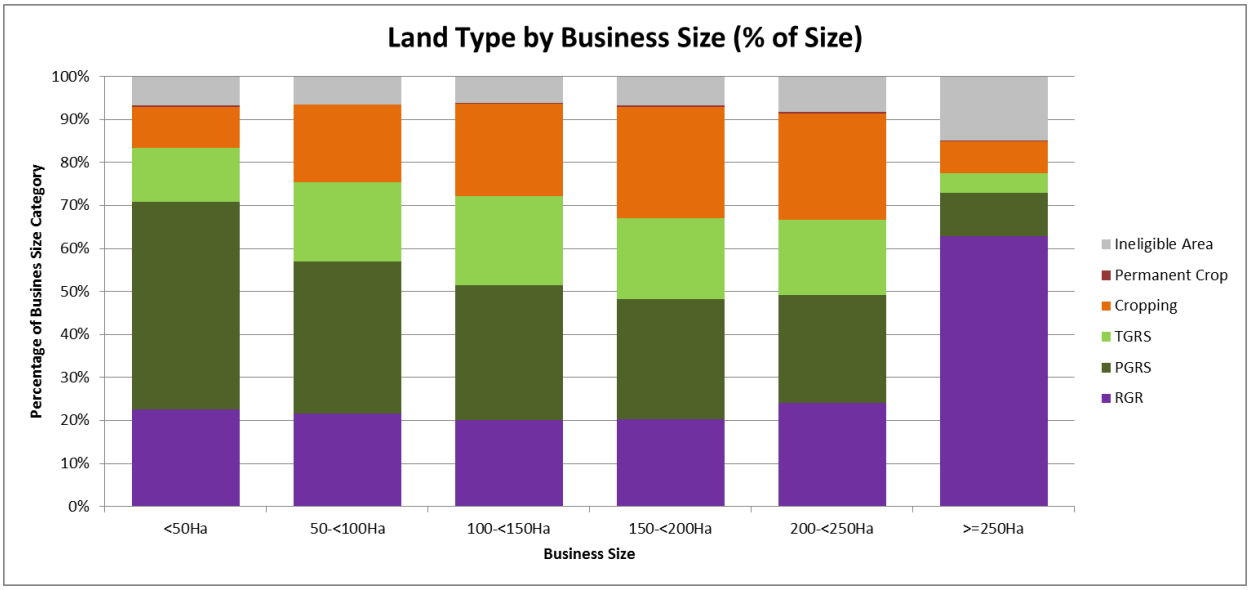

Figure 67: Land Type by Business Size (% of Size Category)

Table 58: Land Type by Business Size (% of Size Category)

% of Size Category	RGR	PGRS	TGRS	Cropping	Permanent Crop	Ineligible Area
<50Ha	22.51%	48.36%	12.47%	9.59%	0.36%	6.71%
50-<100Ha	21.66%	35.29%	18.50%	17.94%	0.12%	6.48%
100-<150Ha	20.07%	31.49%	20.62%	21.48%	0.19%	6.15%
150-<200Ha	20.26%	27.91%	18.85%	25.94%	0.23%	6.81%
200-<250Ha	24.09%	25.12%	17.55%	24.60%	0.41%	8.23%
>=250Ha	62.80%	10.10%	4.68%	7.37%	0.24%	14.80%
National Percentage	53.88%	14.95%	7.58%	10.26%	0.24%	13.08%

4.2 Crop Code Lookup Table

During the course of the analysis it was necessary to classify the IACS crop codes used in 2014 in a number of different ways. Table 59 contains a summary of the main classifications used. Additional classifications were added later via interaction with other datasets (e.g. NATURA or SSSI sites in the case of permanent grassland). The following gives a brief explanation of the contents for each of the columns in the table.

- Crop Code = This is the short code used for each of the crops, or land uses, against which a declaration was made in the SAF 2014 dataset.
- Description = This is the full text description for each of the crop codes.
- Classification = This is the assignment of each of the crop codes into one of seven categories. These were necessary to perform calculations against all three greening requirements. The list of categories is as follows:
    - Arable – Temporary Grassland
    - Arable – Fallow
    - Arable – Other
    - Permanent Crop
    - Permanent Grassland – Improved
    - Permanent Grassland – Unimproved
    - Ineligible
- Genus = Latin name for the genus for certain identified arable, or permanent, crops.
- Crop family = Under the crop diversification requirement, only crops belonging to different crop 'families' count as different crops to fulfil the requirement. The crop family column lists the qualifying crop families as they apply to 2014 crop codes following the lookup table provided for 2015 crop codes listed in Annex D of the Basic Payments Scheme Greening Booklet. All crops classified as Arable in the classification column have an entry in this column. In the event that an arable crop is classified as "N/A" in the Crop Family column, this indicates that the crop may be considered as a unique crop for the purposes of the crop diversification requirement.
- Nitrogen Fixing Crop = This is a flag field (Y/N) containing those crops codes used in 2014 which were expected to count as Nitrogen Fixing Crops for the purposes of the ecological focus area requirement. Note that many of the crops which count as nitrogen fixing crops in 2015 were not declared in 2014 (e.g. Alfalfa, Birdsfoot trefoil, Chickpea, Clover, Lentil, Vetch).

In addition to this lookup table, there should also have been a column to identify catch crops or green cover. This would have been necessary for the identification of whether a business was meeting its EFA requirement in 2014. However, the list of crop codes in 2014 did not facilitate the reliable identification of catch crops or green cover. In the case of catch crops, i.e. undersown grass, this was not recorded in 2014. For green cover, of the qualifying crops (Rye, Vetch, Phacelia, Barley, Mustad, Oats, Alfalfa) only two (Barley, Oats) appears in the 2014 list. While these appear in 2014 the management of these crops is not known (i.e. whether they would qualify as EFA or not). As a result, this part of the analysis was discontinued.

Table 59: SAF14 Crop Code Lookup Table

Crop Code	Description	Classification	Genus	Crop family	Nitrogen Fixing Crop	Notes
ALMS	ALMONDS	Permanent Crop				
AMCP	AROMATIC, MEDICAL AND CULINARY PLANTS	Arable - Other	N/A	N/A		
ARTC	ARTICHOKES	Arable - Other	cynara	N/A		
ASPG	ASPARAGUS	Arable - Other	asparagus	N/A		
ASSF	ARABLE SILAGE FOR STOCK FEED	Arable - Other	N/A	N/A		
BEAN	BEANS FOR HUMAN CONSUMPTION	Arable - Other		N/A	Yes	Old Class - Now split into spring and winter - see new codes.
BFLO	BULBS FLOWERS	Arable - Other	N/A	N/A		Class now listed as "BULBS/FLOWERS"
BKB	BLACKBERRIES	Permanent Crop				
BLB	BILBERRIES (AND OTHER FRUITS OF THE GENUS VACCINIUM)	Permanent Crop	vaccinum	Blueberry family		
BLROPEN	BLACKCURRANTS GROWN IN THE OPEN	Permanent Crop				
BLRPOLY	BLACKCURRANTS GROWN IN OPEN SOIL UNDER TEMPORARY WALK-IN STRUCTURES	Permanent Crop				
BLUOPEN	Blueberries - Grown in the open	Permanent Crop	vaccinum	Blueberry family		
BLUPOLY	Blueberries - Grown in open soil under temporary walk-in structures	Permanent Crop	vaccinum	Blueberry family		
BPP	BEDDING AND POT PLANTS	Arable - Other	N/A	N/A		
BSP	BRUSSEL SPROUTS	Arable - Other	brassica oleracea	Cabbage family		
BW	BUCKWHEAT	Arable - Other	fagopyrum	N/A		
CABB	CABBAGES	Arable - Other	brassica oleracea	Cabbage family		Now described as CABBAGES AND SAVOYS under same short code.
CALA	CALABRESE	Arable - Other	brassica oleracea	Cabbage family		
CANS	CANARY SEED	Arable - Other	phalaris	N/A		

Crop Code	Description	Classification	Genus	Crop family	Nitrogen Fixing Crop	Notes
CARR	CARROTS	Arable - Other	daucus	N/A		
CAUL	CAULIFLOWER	Arable - Other		Cabbage family		
COMM	COMMON GRAZING	Permanent Grassland - Unimproved				
EX-SS	EX STRUCTURAL SET-ASIDE (AFFORESTED LAND ELIGIBLE FOR SFPS)	Permanent Crop	N/A	N/A		
FALW	FALLOW	Arable - Fallow	N/A	Fallow		See also new class FALLOW CROP DIVERSIFICATION
FALW5	FALLOW LAND FOR MORE THAN 5 YEARS	Arable - Fallow	N/A	Fallow		See also new class FALLOW CROP DIVERSIFICATION
FB	FIELD BEANS	Arable - Other	vicia	Spring beans & vetch		
GCM	GREEN COVER MIXTURE	Arable - Other	N/A	N/A		
GSB	GOOSEBERRIES	Permanent Crop				
LEEK	LEEKS	Arable - Other	allium	Onion		
LETT	LETTUCE	Arable - Other	lactuca	N/A		
LGB	LOGANBERRIES	Permanent Crop				
LIEM	LFASS INELIGIBLE ENVIRONMENTAL MANAGEMENT	Permanent Grassland - Unimproved	N/A	N/A		Replaced by LFASS INELIGIBLE ENVIRONMENTAL MANAGEMENT - Arable
LIN	LINSEED	Arable - Other	linum	Flax & linseed		
LLO	LAND LET OUT TO OTHERS	Ineligible				Old code replaced by crop-specific LLO codes
MAIZ	MAIZE	Arable - Other	zea	N/A		Note this class is now called FORAGE MAIZE with same crop code
MC	MIXED CEREALS	Arable - Other		N/A		
MSC	MISCANTHUS	Permanent Crop				Permanent crop in England?
NEWTRS	NEW WOODLAND (ELIGIBLE FOR SFPS)	Permanent Crop				

Crop Code	Description	Classification	Genus	Crop family	Nitrogen Fixing Crop	Notes
NUFS	NURSERY - FRUIT STOCK	Permanent Crop	N/A	Nursery stock		
NUOT	NURSERY - ORNAMENTAL TREES	Permanent Crop	N/A	Nursery stock		
NURRS	NURSERY - ROSES AND ROSE STOCK	Permanent Crop	N/A	Nursery stock		
NURS	NURSERIES	Permanent Crop	N/A	Nursery stock		
NUSH	NURSERY - SHRUBS	Permanent Crop	N/A	Nursery stock		
OCS	OTHER CROPS FOR STOCK FEED	Arable - Other		N/A		
OCSB	FODDER BEET	Arable - Other	beta vulgaris	Beets		
OCSK	KALE AND CABBAGES FOR STOCKFEED	Arable - Other	brassica oleracea	Cabbage family		
ONU	OTHER NURSERY STOCKS	Permanent Crop	N/A	Nursery stock		
OSFRT	OTHER SOFT FRUIT	Permanent Crop	N/A	N/A		
OTH	OTHER LAND	Ineligible				
OVEG	OTHER VEGETABLES	Arable - Other	N/A	N/A		
PEAS	PEAS FOR HUMAN CONSUMPTION	Arable - Other	pisum	See new category	Yes	Old Class - this has been split into winter and spring which each fall into a different cropping family.
PEM	POSITIVE ENVIRONMENTAL MANAGEMENT	Arable - Other		N/A		
PGRS	GRASS OVER 5 YEARS	Permanent Grassland - Improved				
PP	PROTEIN PEAS	Arable - Other	pisum	See new category	Yes	Old class - this has been split into winter and spring protein peas which fall into different crop families.
PRSL	PONDS, RIVERS, STREAMS OR LOCHS	Ineligible				
RASP	RASPBERRIES	Permanent Crop				
RASP-OPEN	RASPBERRIES GROWN IN THE OPEN	Permanent Crop				
RASP-POLY	RASPBERRIES GROWN IN OPEN SOIL UNDER TEMPORARY WALK-IN	Permanent Crop				

Crop Code	Description	Classification	Genus	Crop family	Nitrogen Fixing Crop	Notes
	STRUCTURES					
RAST	RAPE FOR STOCK FEED	Arable - Other		Turnip family		
RCG	REED CANARY GRASS	Permanent Crop				
RGR	ROUGH GRAZING	Permanent Grassland - Unimproved				
RHB	RHUBARB	Permanent Crop				
RRC	REDCURRANTS	Permanent Crop				
RYB	ROADS, YARDS OR BUILDINGS	Ineligible				
RYE	RYE	Arable - Other	secale	N/A		
SB	SPRING BARLEY	Arable - Other	hordeum	N/A		
SCR	SCREE OR SCRUB	Ineligible				
SL	SWEET LUPINS	Arable - Other	lupinus	N/A	Yes	
SO	SPRING OATS	Arable - Other	avena	N/A		
SOR	SORGHUM	Arable - Other	sorghum	N/A		
SOSR	SPRING OILSEED RAPE	Arable - Other		Spring oilseed and swedes		
SPOT	SEED POTATOES	Arable - Other	solanum	Potato family		
SRC	SHORT ROTATION COPPICE	Permanent Crop				
STRB	STRAWBERRIES	Arable - Other	fragaria	Strawberries		
STRB-GLS	STRAWBERRIES-GROWN UNDER GLASS	Arable - Other	fragaria	Strawberries		
STRB-OPEN	STRAWBERRIES GROWN IN THE OPEN	Arable - Other	fragaria	Strawberries		
STRB-POLY	STRAWBERRIES GROWN IN OPEN SOIL UNDER TEMPORARY WALK-IN STRUCTURES	Arable - Other	fragaria	Strawberries		
STS	SHOPPING TURNIPS SWEDES	Arable - Other		Spring oilseed and swedes		Old Class - see new class SWS
SW	SPRING WHEAT	Arable - Other	triticum	N/A		
TFRT	TOP FRUIT	Permanent Crop	N/A	N/A		

Crop Code	Description	Classification	Genus	Crop family	Nitrogen Fixing Crop	Notes
TGRS	GRASS UNDER 5 YEARS	Arable - Temporary Grassland	N/A	Temporary Grass		Old Class - replaced by year-specific classes in 2015.
TRIT	TRITICALE	Arable - Other	triticosecale	N/A		
TSB	TREES SHRUBS & BUSHES	Ineligible				
TSWS	TURNIPS SWEDES FOR STOCK FEED	Arable - Other		Turnip family - see note		Note that this class has been split into two separate classes for 2015. Turnips for Stock Feed (TSF) drops into Turnip family while Swedes for Stock Feed (SSF) drops into Spring oilseed and swedes family.
TURF	TURF PRODUCTION	Arable - Other	N/A	N/A		
WAF	WOODLAND AND FORESTRY	Ineligible				
WB	WINTER BARLEY	Arable - Other	hordeum	N/A		
WBS	WILD BIRD SEED	Arable - Other	N/A	N/A		
WCC	WHOLE CROP CEREALS	Arable - Other	N/A	N/A		
WDG	OPEN WOODLAND(GRAZED)	Permanent Grassland - Unimproved				
WO	WINTER OATS	Arable - Other		N/A		
WOSR	WINTER OILSEED RAPE	Arable - Other		N/A		
WPOT	WARE POTATOES	Arable - Other	solanum	Potato family		
WW	WINTER WHEAT	Arable - Other	triticum	N/A		