Developing High Nature Value Farming and Forestry Indicators for the Scotland Rural Development Programme

Summary Report of the Technical Working Group on High Nature Value Farming and Forestry Indicators

July 2011

The Scottish Government

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This summary report is accompanied by three supplementary papers:

1. McCracken D. Describing and Characterising the Main Types of HNV farming Systems in Scotland, 2011. Scottish Agricultural College.
2. Mackey E, Blake D and McSorley C. Farmland Biodiversity: Mapping High Nature Value Farmland in Scotland, 2011. Scottish Natural Heritage.
3. Patterson G, Gilbert J. Development of Forestry High Nature Value Baseline Indicator for Scotland. 2011. Forestry Commission Scotland.

Papers are published on the Scottish Government website.

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Executive Summary

Introduction

The European Commission has produced guidance on the development of High Nature Value Farming and Forestry (HNVFF) indicators for Rural Development Programmes. Establishing the baseline situation is essential so that changes taking place in HNVFF can be reported against the baseline.

In general, there are three types of HNVFF (the types have been developed in the context of farming but can be extended to forestry):

- Type 1: Land with a high proportion of semi-natural vegetation.
- Type 2: Land with a mosaic of low intensity agriculture and natural and structural elements (field margins, hedgerows, stone walls, patches of woodland or scrub, small rivers etc).
- Type 3: Land supporting rare species or a high proportion of European or world populations.

Purpose

A Technical Working Group (TWG) was established to develop HNVFF indicators for the Scotland Rural Development Programme 2007-2013. The purpose of the work was to specify baseline indicators for HNVFF that would be amenable to tracking change over time. Delineation of specific areas as HNV was not an objective, given the dynamic nature of management systems.

Methods

The TWG characterised HNVFF and analysed existing datasets to produce HNVFF baseline indicators for Scotland. It also outlined the approach for estimating HNVFF result and impact indicators. In line with EC guidance, the work focused on classifying management systems, rather than specific sites on the ground, as HNVFF. The group defined HNV for farming and forestry using a similar approach which aimed for equivalence in biodiversity value for farming and forestry.

There were three components to the analysis: Farming Systems; Farmland Biodiversity; and Forestry. The Farmland Biodiversity analysis was used to validate the indicators produced from the Farming systems analysis. Further details of each analysis are provided in supplementary papers to this report.

The Farming Systems analysis was based on data from June Agricultural Census and IACS. The Farmland Biodiversity analysis was based on land cover, species and topographic data. The Forestry analysis was based on data from the National Inventory of Woodland and Trees.

Findings on HNVFF Baseline Indicators

The two headline baseline HNVFF indicators for SRDP are: area of UAA under HNV systems and area of woodland under HNV systems. Additional supporting indicators are also provided to give context. Together the headline and supporting indicators form the basket of baseline indicators. The indicators in Table 1 are shown for the most recent year for which data are available.

Table 1: Basket of HNVFF Baseline Indicators for SRDP

	Value	Reference Year
Headline Indicators		
% of UAA[1] estimated as HNV farming	40%	2009
Total area estimated as HNV farming (ha)	*2,284,000*	*2009*
% of woodland that is HNV forestry	41%	2010
Total area of HNV forestry (ha) [2,3]	*529,000*	*2010*
Supporting Indicators		
HNV Farming:		
Total UAA (ha) (including common grazings)	5,676,000	2009
Total number of holdings	52,000	2009
% change in UAA (ha) on previous year	-3%	2009
% change in estimated HNV on previous year	-9%	2009
% of UAA which is Common Grazing	9%	2009
HNV Forestry:		
Total forest (ha)	1,296,000	2010
% HNV Forestry which is Type A[4]	52%	2010
% HNV Forestry which is Type B[5]	48%	2010

1. Utilised Agricultural Area (including common grazings)

2. HNV Forestry excludes Northern Isles area

3. HNV Forestry - Grampian and Moray - likely to be an underestimate

4. HNV Forestry Type A - semi-natural woodland features and low intensity managed woodland

5. HNV Forestry Type B - diversity of features and low intensity managed woodland

Key points to note

The farming systems analysis is based on an analysis of 'estimated' HNV (based on classifying farm types as HNV) whereas the forestry analysis is 'actual' HNV (based on both management system and biodiversity related data). As a result of the methodological differences between the two indicators, the HNV farming and forestry indicators have not been summed together.

The baseline indicators focus on different types of HNV. The farming baseline indicator is based on the area of Type 1 HNV. This is because the presence of semi-natural vegetation (Type 1) in Scotland is a common and dominant feature of all types of HNV farming (that is, Types 2 and 3 are generally a subset of Type 1). The forestry baseline indicator is based on the area of Types 1 and 2. This is because Type 2 in forestry is found in different situations/areas from Type 1.

Conclusions

The key conclusions from the report are:

- The HNVFF baseline indicators for Scotland show 40% of farming UAA estimated as HNV and 41% of woodland area as HNV.
- Approaches to estimating HNVFF result and impact indicators for Scotland have been outlined. Further work is required and will be taken forward as part of wider ongoing evaluation activities under SRDP. This will include case study analysis.
- Integrated spatial data remains a gap and needs to be improved.

1. Introduction

1.1 EC Guidance on HNVFF indicators

1. The European Commission's Common Monitoring and Evaluation Framework (CMEF) sets out the monitoring information rural development programmes should report against. Table 1 summarises the CMEF High Nature Value Farming and Forestry (HNVFF) indicators:

Table 1: CMEF HNVFF Indicators

Indicator Number	Indicator Title	Measurement
Baseline Indicator 18	Biodiversity: High Nature Value farmland and forestry	Hectares of Utilisable Agricultural Area (UAA) under HNVFF
Result Indicator 6	Area under successful land management contributing to high nature value farming/forestry	Total hectares of HNVFF under successful land management
Impact Indicator 5	Maintenance of high nature value farming and forestry areas	Change in the extent and condition of HNVFF areas

2. The EC commissioned the Institute of European Environment Policy (IEEP) to undertake work to develop guidance on the HNVFF indicators.[1] The final guidance was subsequently published in 2009.[2] The guidance states that:

- The objective is not to delineate or designate particular areas as HNV, but rather to use rural development measures to preserve and develop HNV farming and forestry systems.
- There is no single indicator or data source appropriate for this purpose and so the impact indicator therefore consists of a basket of indicators put in place at the national and/or regional level.
- The HNV impact indicator aims to assess changes in the extent and condition of HNV farming and forestry in relation to a baseline established at the start of the programming period.

3. The guidance notes that due to current data limitations, the baseline indicator will be an indicative figure, with land-cover data the most likely source. Quantitative monitoring of this baseline extent will provide a very approximate indication of change.

4. The guidance goes on to say that the baseline HNV extent should be supplemented with additional indicators of the baseline situation, especially concerning key HNV farming/forestry practices, and the condition of associated habitats and species.

[1] http://www.ieep.eu/publications/pdfs/hnv/hnv_guidance_121007.pdf
[2] http://ec.europa.eu/agriculture/rurdev/eval/hnv/guidance_en.pdf

5. The HNV result indicator, which is also important for assessing the impact of Rural Development Programmes (RDP), is effectively a measurement of uptake of specific RDP measures relating to HNVFF.

6. Establishment of the baseline situation is crucial for estimating the HNV impact indicator as it gives an indication of changes taking place in HNVFF against this baseline. Careful interpretation of observed changes and possible RDP and other influences will be needed.[3]

1.2 Technical Working Group

7. A Technical Working Group (TWG) was set up to explore HNVFF indicators for the Scotland Rural Development Programme (SRDP). The TWG undertook work to characterise HNVFF and explored data availability and associated methodological issues. The TWG produced HNVFF baseline indicators and outlined approaches for estimating HNVFF result and impact indicators. Membership of the TWG is provided in Annex A.

[3] *Approaches for assessing the impacts of the RDPs in the context of multiple intervening factors*

2. General Approach

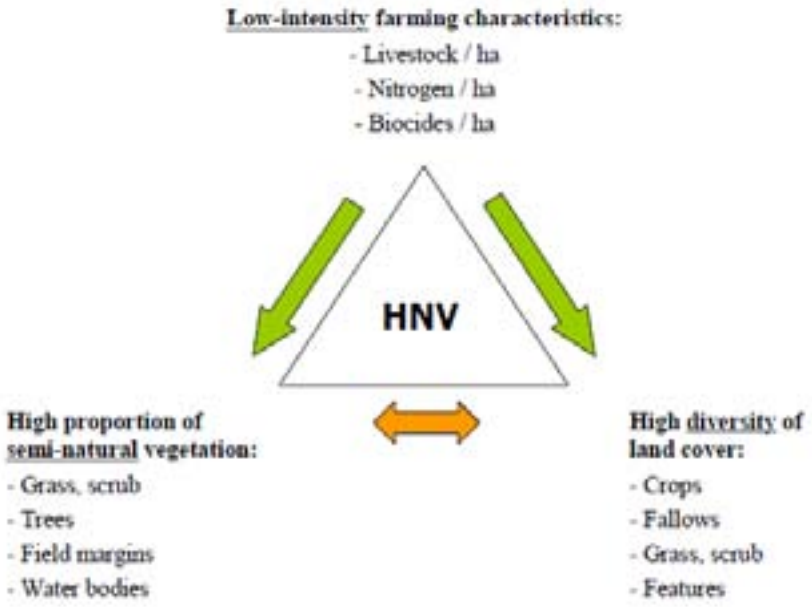
2.1 Types and Characteristics of HNV

8. The TWG followed the EC guidance. In general, there are three types of HNVFF. These types have been developed in the context of farming but can be extended to forestry. The three types are:

- Type 1: Land with a high proportion of semi-natural vegetation.
- Type 2: Land with a mosaic of low intensity agriculture and natural and structural elements (field margins, hedgerows, stone walls, patches of woodland or scrub, small rivers etc).
- Type 3: Land supporting rare species or a high proportion of European or world populations.

9. The diagram below summarises the characteristics of HNV Farming.

The Three Key Characteristics of HNV Farming



Presence of semi-natural vegetation – the biodiversity value of semi-natural vegetation, such as unimproved grazing land and traditional hay meadows, is significantly higher than intensively managed agricultural land. In addition, the presence of natural and semi-natural farmland features such as mature trees, shrubs, uncultivated patches, ponds and rocky outcrops, or linear habitats such as streams, banks, field margins and hedges, greatly increases the number of ecological niches in which wildlife can co-exist alongside farming activities.

Diversity of land cover – biodiversity is significantly higher when there is a "mosaic" of land cover and land use, including low intensity cropland, fallow land, semi-natural vegetation and farmland features. Mosaic agricultural habitats are made up of

different land uses, including parcels of farmland with different crops, patches of grassland, orchards, areas of woodland and scrub. This creates a wider variety of habitats and food sources for wildlife and therefore supports a much more complex ecology than the simplified landscapes associated with intensive agriculture.

Low intensity farming characteristics – biodiversity is usually higher on farmland that is managed at a low intensity. The more intensive use of machinery, fertilisers and pesticides and/or the presence of high densities of grazing livestock, greatly reduces the number and abundance of species on cropped and grazed land.

10. The final baseline indicators produced by the TWG focus on different types of HNV for the following reasons (further details are provided in later sections):

- The farming baseline indicator is based on the area of Type 1 HNV. This is because a comparison of the farming systems analysis with the farmland biodiversity analysis concluded that the Types 2 and 3 are generally a subset of Type 1. That is, the presence of semi-natural vegetation (Type 1) is a common and dominant feature of all types of HNV farming in Scotland.
- The forestry baseline indicator is based on the area of Types 1 and 2. This is because Type 2 in forestry is found in different situations/areas from Type 1.

2.2 HNV Forestry

11. For HNV Forestry, the EC guidance notes that there has been no systematic identification of HNV forestry across Europe, and an approach for doing so does not yet exist. Given the immaturity of the concept, therefore, the process of identifying HNV forestry lags behind that of HNV farming.

12. The EC guidance states that reflecting the definition of HNV farming and HNV features, HNV forestry can be defined as all natural forests and those semi-natural forests in Europe where the management (historical or present) supports a high diversity of native species and habitats and/or which support the presence of species of European, and/or national, and/or regional conservation concern.

13. The aim of the TWG was to develop criteria for HNV forestry that were comparable as far as possible for HNV farming. The TWG agreed that a key principle was equality of definition of HNV in terms of the level of biodiversity value considered as HNV in both farming and forestry.

14. The EC guidance raised some specific issues for HNV forestry in that regard: the guidance implies that HNV forests would need to be confined to mature and highly diverse semi-natural woodland systems and would exclude many semi-natural woods and all woods of planted origin. This would omit many woodlands of very significant biodiversity value in the UK. Given the flexibility in the guidance, and the fact that the HNV forestry indicator guidance is less well developed for HNV forestry than HNV farming, and, furthermore, that the HNV forestry has not yet been tested in practice, the TWG adopted a broad approach to defining HNV Forestry.

2.3 Key points informing overall approach

15. The key steps of the TWG were to

(a) Describe and characterise the main types of HNVFF.

(b) Develop HNVFF baseline indicators to provide quantitative assessments of extent of HNVFF.

(c) Set out an approach to estimating the HNVFF result indicator and the HNVFF impact indicator to assess quantitative *(extent)* and qualitative *(condition)* changes in HNVFF.

16. The main part of the work of the TWG was taking forward the detail of steps (a) and (b).

17. The following general points were agreed by the TWG as informing the overall approach:

- The focus of the work on characteristics of HNV was on finding surrogate indicators (i.e. systems characteristics that are considered optimal for biodiversity).
- The farming or forestry system rather than the specific site was classified as HNV.
- A set of transparent, repeatable rules was required.
- A basket of baseline HNVFF indicators was to be produced.
- The presentation of HNVFF indicators was not to be by map but maps can be used to help develop the approach.
- Equivalence of definition of HNV in terms of the level of biodiversity value that is considered as HNV in both farming and forestry was required. It was noted that the EC guidance sets the bar differently for forestry and it was agreed to use the flexibility provided within the EC guidance and to adopt a broad definition of HNV forestry. This allowed both young and mature woodlands as well as mature woods to count as long as they are sufficiently biodiverse.
- Regional breakdowns of HNVFF baseline indicators were to be presented in order to aid interpretation.
- The focus of the work was on the technical/analytical side as the policy perspective was outside the remit of the group.
- The indicators were not be used to inform site specific management decisions but rather would be used to monitor how rural development measures are influencing the HNVFF as a whole.

3. Farming Systems (HNV Type 1)

18. The farming systems analysis was undertaken by SAC. Further details are provided in a Supplementary Paper *Describing and Characterising the main types of HNV farming systems in Scotland*. Note that the initial estimates of HNV for 2009 provided in the Supplementary paper differ slightly from the final estimates of 2009 provided below (since the latter were calculated following a further refinement of the data extraction process by Scottish Government statisticians).

3.1 Methods

3.1.1 Characterising farming systems

19. HNV farming systems were characterised by farm type. Existing farm typologies were used as the starting point for the characterisation rather than reinventing new classifications.

20. The major broad farming systems that occur in Scotland (and which formed the focus of estimating the likely extent and broad distribution of HNV farming) were listed in order of likelihood of being HNV (based on the characteristics of the majority of farms practising each system).

21. A number of systems occurring in Scotland (i.e. arable systems, dairy systems, mixed arable & horticulture systems, horticulture systems, pig systems, poultry systems) are very specialised and the vast majority are managed very intensively. Hence the majority of farms practising such systems cannot be considered to be of HNV (in terms of any strong positive link between the system characteristics and farmland biodiversity value).

22. The other farming systems occurring in Scotland (i.e. crofting, sheep systems, beef cattle systems, combined sheep & cattle systems, mixed livestock and arable systems) have a higher possibility of being HNV, but this is very dependent on the range of habitats occurring at a farm holding level (especially those utilised as forage and fodder resources) and the intensity at which these are managed.

23. The approach taken therefore focused on considering the livestock-dominated farming systems occurring in Scotland (i.e. crofting, sheep systems, beef cattle systems, combined sheep & cattle systems) and attempting to estimate the number and extent of these with HNV characteristics, using the proportion of rough grazing on the farm holding as a surrogate for the amount of semi-natural habitat which may form the forage and fodder resource and a broad calculation of livestock densities as a surrogate for the intensity at which forage resources across the farm holding are utilised.

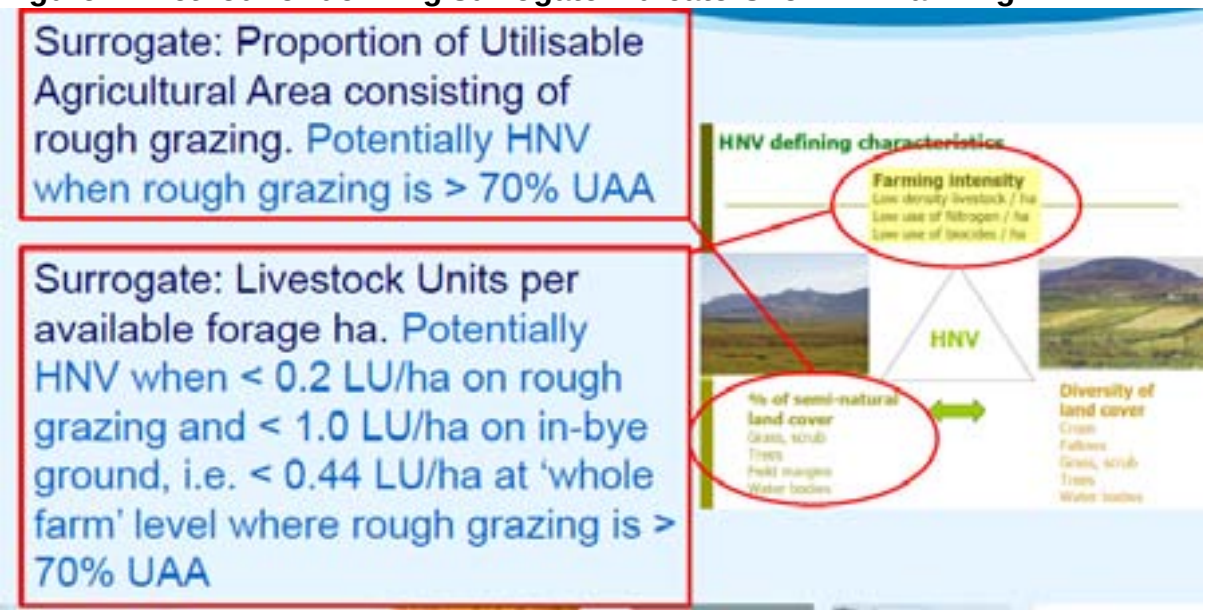
24. Crofting was highlighted as being an important HNV system in Scotland. Crofting does not, however, feature in existing farm typologies and so crofting was not treated as a specific farm type in the analysis.

25. The approach was to identify holdings in Scotland potentially with HNV characteristics; it was not about mapping where individual holdings with such HNV

characteristics occur. The aim was to look for a robust, broad estimate of number and extent of such holdings at national/regional level.

26. Figure 1 summarises the method and surrogates for semi-natural land cover and farming intensity (the former based on Utilisable Agricultural Area (UAA) of rough grazing and latter based on livestock units (LU) per hectare).

Figure 1: Method for deriving surrogate indicators for HNV farming



27. The following categories were used:

(a) Initially split into four rough grazing categories (None, < 30% UAA, 30-70% UAA, > 70% UAA).

(b) Then within each rough grazing category, split into five sub-categories of livestock grazing density at 'farm' level' (No livestock, < 0.2 LU/ha, 0.2-0.5 LU/ha, 0.5-1.0 LU/ha, > 1.0 LU/ha).

28. These thresholds have been set based on previous work and on the basis that if there is more than 70% of the UAA on a farm holding consisting of rough grazing then this puts a constraint on the ability of the farmer to try to increase profitability by increasing the intensity of management on the in-bye ground. Obviously it is feasible to try to increase profitability in those situations by increasing livestock numbers, hence the reason for including the overall stocking density threshold.

29. A decision was required as to whether to include the common grazings[4] as part of the estimated HNV baseline. It was agreed to include the common grazing areas in the baseline area of HNV because if common grazings were excluded this would substantially underestimate the area of HNV.

30. As the administration of Rural Priorities scheme within SRDP is based on 11 Regional Proposal Assessment Committee (RPAC) areas, these areas were also used to measure regional variation.

[4] Area of grazing land used by a number of crofters and others who hold shares in that land.

3.1.2 Data

31. Data from the June Agricultural Census (JAC) and Single Application Form (SAF, part of the Integrated Administration and Control System (IACS)) were used. The SAF-IACS/JAC data was used to provide a broad estimate (at a whole of Scotland and RPAC regional level) of the number (and total extent) of farm holdings meeting HNV characteristic threshold levels, while the analyses of Scotland wide JAC data was used to guide the selection of Farm Types to include in the estimated HNV calculations.

32. Holdings in the JAC were allocated to a farm type and then the rough grazing and livestock number figures were identified from the SAF-IACS/JAC by farm type. HNV holdings were considered to be those Farm Type Cattle & Sheep (LFA) which had an overall holding stocking density of less than 0.5 LU/ha and more than 70% of the holding UAA consisting of rough grazing. Holdings were allocated to their respective RPACs and the analyses conducted at the RPAC level.

33. For each RPAC area, the following was presented:

- Total UAA
- UAA of estimated HNV (based on hectares of the holding)
- Estimated HNV in RPAC as % of RPAC UAA
- Estimated HNV in RPAC as % of total estimated HNV in Scotland

34. The extent of common grazings in each RPAC were calculated based on data available at the parish level rather than holding level because neither the JAC and SAF-IACS datasets indicate the common grazing areas available to individual holdings. SAF-IACS does not collect data from common grazings so it is not possible to determine livestock units and rough grazing areas associated with the common grazing areas.

35. The data sources used to develop the baseline HNV farming indicator are collected each year meaning that the baseline indicator can be updated year on year.

3.2 Findings

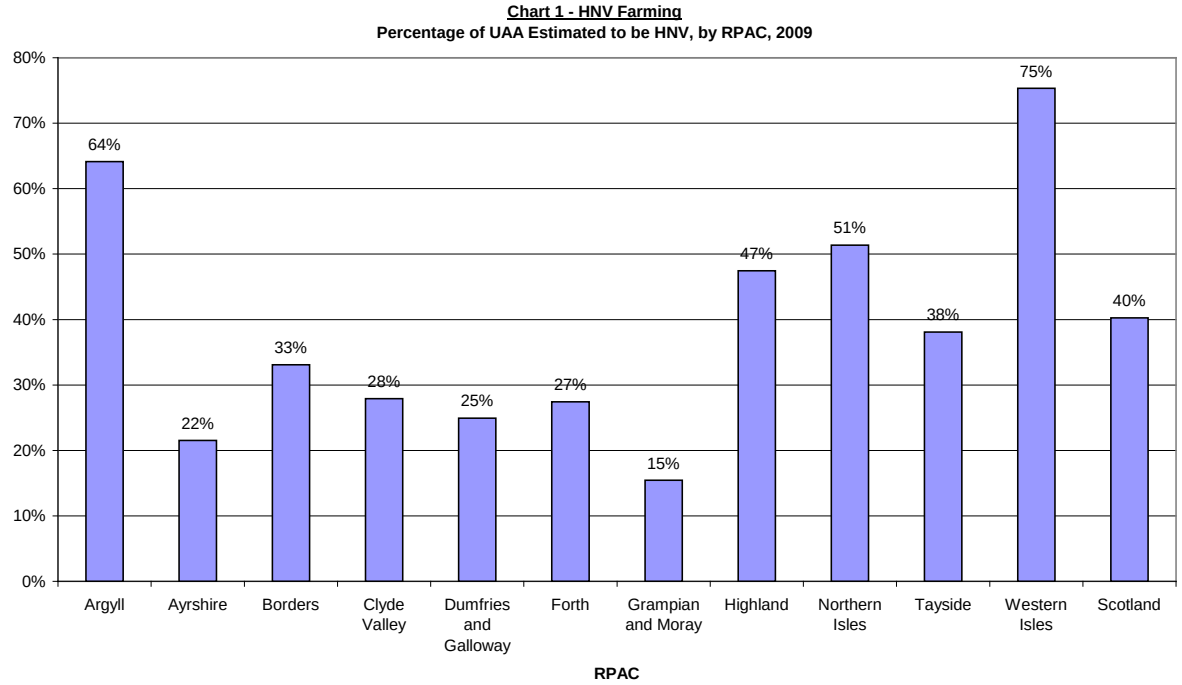
3.2.1 Headline indicator

36. The baseline HNV indicator from the farming systems analysis for the most recent year for which data are available (2009) shows that:

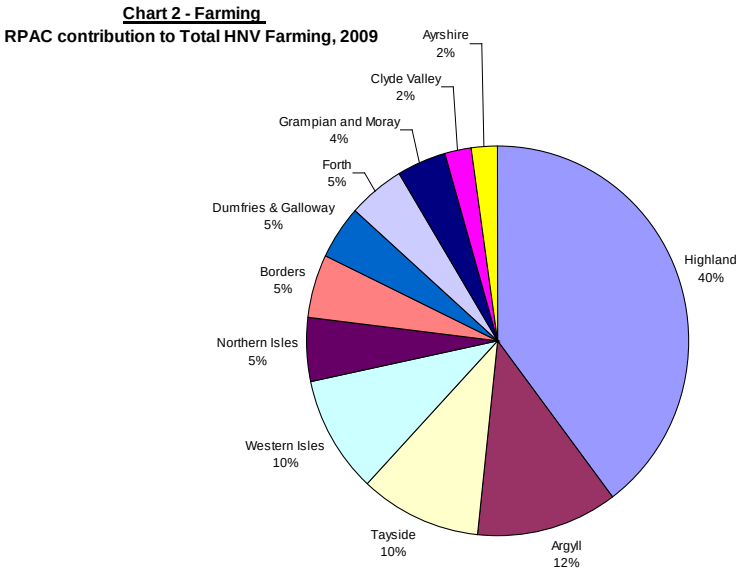
- 40% of Utilisable Agricultural Area (UAA) in Scotland is estimated as being under HNV farming systems (2,284,000 ha)
- Common grazing account for 9% of total UAA and over 20% of the estimated extent of HNV.

3.2.2 Regional analysis

37. Chart 1 below shows the % of UAA estimated as HNV for most recent year for which data are available by RPAC area (2009). The Western Isles has the highest share of its own area of UAA estimated as HNV (75%). Data on trends are presented in Annex B.



38. In terms of total area of HNV, Chart 2 shows that Highland RPAC area contributes most to the total area estimated as HNV (40% of the total area estimated as HNV).



3.3 Interpretation

39. The baseline indicator can track broad HNV estimates on 91% of overall total UAA (i.e. excluding the common grazing area). As c. 20% of the estimated HNV baseline is under common grazings, the baseline indicator can track broad changes in HNV estimates on 80% of the overall total area estimated to be under HNV farming systems.

40. Should the value of the baseline indicator shift, more in-depth analysis can be conducted to identify what might be driving the change. This could include a closer look at destocking of livestock. For example, there may be a need to consider holdings dropping out as a result of holdings no longer keeping livestock and this could be considered as part of the basket of indicators.

4. Farmland Biodiversity (HNV Types 1, 2 and 3)

41. The farmland biodiversity analysis was undertaken by Scottish Natural Heritage (SNH). Further details are provided in Supplementary paper 2.

4.1 Methods

4.1.1 Defining Types of HNV

42. The analysis focused on mapping Type 1, 2 and 3 HNV according to physical definitions in the guidance.

43. For Type 1, semi natural land cover was mapped from Land Cover Map 2000.

44. Type 2 characteristics are not available from existing maps and so a composite analysis of structural, species and farming elements was undertaken. The approach to Type 2 was as follows:

- Structural elements such as hedges were not mapped but field margins, river and loch edges were identified from Ordnance Survey MasterMap. Type 2 was defined as where two out of three of the following criteria were met: (a) top quartile of the structural mosaic (b) two or more of the species group were present in a 1km square (c) Parish livestock density of <0.1 LU/ha.
- Species indicative of Type 2 HNV farmland, identified by specialists in SNH and elsewhere.
- The intensity of agricultural management was estimated by Scottish Government at the parish scale from fallow and livestock figures in the Scottish Integrated Administration and Control System (SIACS).

45. Type 3 (important areas for wildlife) was based on designated site boundaries from SPA (Special Protected Areas), SAC (Special Areas of Conservation) and biological SSSI (Sites of Special Scientific Interest).

4.1.2 Data

46. UAA from SIACS 2007 was used to map farmland, as opposed to woodland, sporting estate and built-up areas. Land Cover Map 2000, being the most up-to-date map at the time, was used to map semi-natural habitats.

47. Species data (lower plants, vascular plants, butterflies, mammals and birds) came from the National Biodiversity Network (NBN), the British Trust for Ornithology and SNH.

48. Data for the analysis were the most current for characterising the baseline state and providing spatial context for indicators based on annual farming systems statistics, but are unsuited in themselves for tracking change annually.

4.2 Findings

49. The area of potential HNV farmland is 3,989,966 ha, of which 96% is covered by Type 1. It represents 71% of the UAA. Types 1, 2 and 3 overlap so are non-

additive, but their individual extents are as follows: Type 1 3,843,525; Type 2 409,442 ha; Type 3 705,048 ha.

50. The area estimated as HNV in the Farming Biodiversity Analysis (3,989,966 ha) is larger than in the area estimated as HNV in the Farming Systems Analysis (2,284,137 ha, see paragraph 36 above). This suggests that not all semi-natural habitat is well suited to farming and/or not all livestock systems are managed optimally for nature. Conversely, 57% of semi-natural habitat (2,284,137 divided by 3,989,966) does appear to be managed optimally within livestock farming systems for wildlife.

4.3 Interpretation

51. In comparison with Farming Systems Analysis, the total Type 1 HNV area is significantly larger for the following reasons:

- The SNH approach identifies the potential overall total occurrence of HNV-associated habitats irrespective of whether they are a major component of individual holdings or not. Conversely, the Farming Systems Analysis data indicate that in many cases these habitats only make up a small proportion of any one holding and/or occur at low levels across a wider range of Farm Types than simply Cattle & Sheep (LFA). Hence a proportion of the hectares identified by SNH is not a significant component of the underlying farming system on which it occurs and therefore is discounted in the Farming Systems calculations.
- The data used for the Farming Systems Analysis (June census/SAF-IACS) also indicates that in many cases a lot of the HNV habitats identified by SNH as occurring within the UAA are either not grazed at all or stocked at LU/ha densities that are higher than the HNV thresholds being used in the June census/SAF-IACS approach.

52. The Farming Systems Analysis, which can be tracked annually from agricultural statistics, is therefore used in the baseline HNVFF indicators

53. The Farming Biodiversity Analysis shows that the predominant type of HNV farming is Type 1. On this basis, HNV farmland can be approximated by the area under Type 1 (semi-natural vegetation). This is justified for two reasons: a) Type 1 incorporates almost all Type 2 and Type 3; and b) a case study suggests that when Type 2 occurs alone, e.g. as relic structural features (walls) on improved land (e.g. under silage), it has little evident influence on biodiversity compared with adjacent semi-natural vegetation.

54. In conclusion, the Farming Biodiversity Analysis has been essential to understanding the relationship between farming and wildlife habitat, and in validating the HNV farming indicator based on the Farming Systems Analysis. Although unsuited to tracking trends annually, it could be repeated periodically where data updates become available.

5. Forestry (HNV Types 1 and 2)

The forestry analysis was undertaken by Forestry Commission Scotland. Further details are in Supplementary paper 3.

5.1 Methods

5.1.1 Classification systems

55. The method defined three types of HNV forestry. The approach aims to meet the principles set out in section 2.3 by seeking to mirror the method used in farming systems and so levelling the playing field in terms of assessing the biodiversity value of farming and forestry.

56. Table 2 shows the major woodland categories or management systems present in Scottish forests and considers these in relation to the three types of HNV category (Types A, B and C).

Table 2: Woodland management systems and relevant types of HNV forestry

Woodland management system	**Type A Semi-natural features and low intensity management**	**Type B Diversity of features and low intensity**	**Type C Species of conservation concern**	**Expected HNV proportion**	**Notes**
Native woodlands (Semi-natural and planted)	x			all	Count under A but most could also qualify under B
Plantations on ancient woodland sites PAWS	x			all	Count under A but most could also qualify under B
Broadleaved and mixed woods: mainly non-native.		x	(x)	most	Count under B; some might also qualify under A
Coniferous woods: mainly non-native.		x	(x)	some	Count under B; some might also count qualify under A

(x) = Some non-native woods that do not count under Type B might qualify by supporting specific species of conservation concern.

57. For Type A, a wood must both contain a considerable proportion of semi-natural woodland features and be managed in a low intensity manner. This will enable high woodland biodiversity to be sustained or developed. The Type A category for the HNV Forestry indicator therefore includes:

- All native woods (woods with over 50% canopy of native species) =A1

- PAWS which are not counted in A1 (including ancient wood pasture if over 20% canopy cover) =A2.

58. Only the wooded area was counted as native woodland; open or felled areas were included within the analysis for Type B.

59. For Type B, non-native woods can qualify for Type B, which requires a diversity of features combined with low intensity, as for Type 2 HNV farmland Many native and ancient woods are likely to meet these criteria also, but as all of them have been counted as Type A, these categories have not been assessed for Type B.

60. For Type B, diversity features needed to be considered and thresholds to qualify as HNV tested. Six diversity criteria were used (three of these are components of the woodland biodiversity indicators defined in both the Scottish Biodiversity Strategy and the Scottish Forestry Strategy), and various threshold levels were tested for each. The criteria and the selected threshold values are shown Table 3. The final approach was to include as HNV all plots where at least two of the features were present at or above selected threshold levels, as this signifies significant biodiversity value, at least equivalent to that of Type 2 farmland.

Table 3. Selected thresholds –Type B HNV Forestry

Criterion	Threshold value
Percentage of native species*	20%
Old growth woodland*	Presence only
Number of habitat patches (sections)**	3
Volume of deadwood, m^3/ha***	15 m^3/ha
Shrub layer under canopy, cover***	10 %
Number of species***	3

*assessed for each wooded section
**assessed across the 1ha square
*** assessed in the 0.25ha structure assessment square

61. The supplementary paper shows the main categories of woodland and how far they provide the three criteria used for defining HNV farming (semi natural features, low intensity and diversity of land cover).

5.1.2 Data

62. The baseline indicator data have been derived from the 1995-99 National Inventory of Woodlands and Trees (NIWT) including information on composition from sample squares and a woodland map. The NIWT map was based on aerial photographs which were taken in 1988 (Land Cover Map, LCM88), and then updated from records of planting and felling subsequently to the reference date of 1995. NIWT included nearly 15,000 squares which were representative of Scottish woodlands. Each square was 1ha. Squares were divided and mapped into sections, with boundaries according to age or species differences between wooded stands or between wooded and open patches. In each square a sub-square of 0.25ha was assessed in more detail to give information on structure (structure assessment square).

63. Areas of HNV Forestry were estimated by scaling up the proportions of sample areas that met criteria for Type A or Type B to the whole woodland area of Scotland Woodland areas were derived from the NIWT woodland map for 1995, which is the year for which the data was derived. The resulting area estimates were then uprated annually for the period from 2007-2010. The uprating was based on changes in total woodland areas for each year, which are published annually as 'Forestry Facts and Figures' by the Forestry Commission[5].

64. A breakdown of total HNV Forestry areas by RPAC areas was also calculated.

65. Future data for HNV Forestry will be based mainly on the successor to the NIWT, the National Forest Inventory (NFI), which is now underway as a rolling survey. The first cycle will take until 2016 to complete. After this it is hoped to be able to update area figures annually. Baseline spatial and statistical data will also be available by 2013 for all native woodlands over 0.5ha from the Native Woodlands Survey of Scotland (NWSS). This has a sampling period of 2006-2012 and will give a comprehensive picture of extent and condition. Further information on the NFI is available at http://www.forestry.gov.uk/inventory and for the NWSS is at http://www.forestry.gov.uk/forestry/INFD-76AHC7

5.2 Findings

5.2.1 Headline indicator

66. The baseline HNV indicators from the forestry systems analysis for the most recent year for which data are available (2010) are shown in Table 4. The Type A area is approximately 277k hectares or 21.4% of total woodland while the Type B area is approximately 251k hectares or 19.4% of total woodland. The percentage of total woodland under HNV Forestry Type A and Type B is 40.8%.

Table 4: Area under HNV Type A and Type B Forestry, 2010

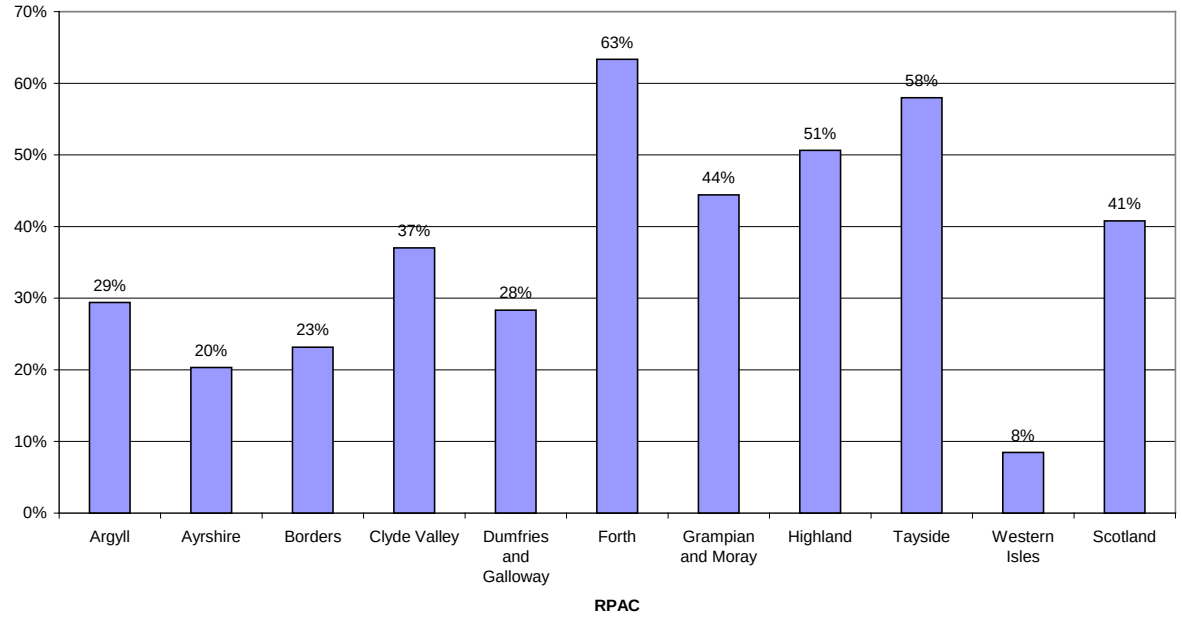
Type	Area (ha)	Percentage of total woodland
A1 Native	215,000	16.6
A2 Ancient (mainly non-native)	62,000	4.8
Type A	**277,000**	**21.4**
Type B Non-native (sum of B2-6)	**251,000**	**19.4**
Total HNV	**529,000**	**40.8**
Total Woodland	**1,296,000**	

[5] http://www.forestry.gov.uk/forestry/INFD-7AQF6J

5.2.2 Regional Analysis

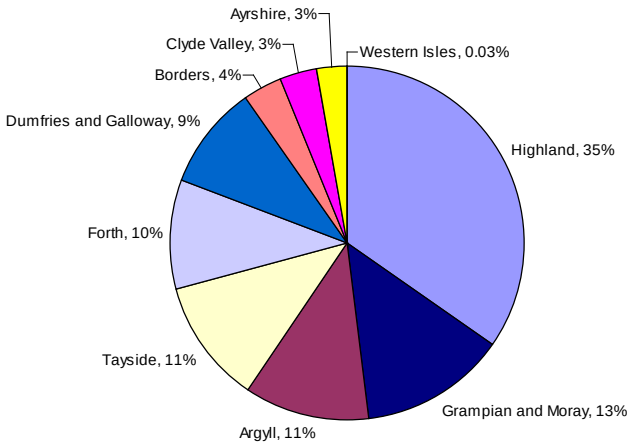
67. Chart 3 below shows the most recent year for which data area available (2010) by RPAC area (2010). For Scotland as a whole, 41% of woodland is estimated as HNV. The Forth area has the highest share of its own area of woodland estimated as HNV (63%).

Chart 3 - HNV Forestry
Percentage of Forestry Estimated to be HNV, by RPAC, 2009



68. In terms of total area of HNV, Chart 4 shows that Highland RPAC area contributes the most to the total area of woodland estimated as HNV (35% of the total area estimated as HNV).

Chart 4 - Forestry
RPAC contribution to Total HNV Forestry, 2010



5.3 Interpretation

69. Woodland tends to be either strongly native or strongly non-native in composition with not much gradation in between.

70. The farming analysis is based on 'estimated' HNV whereas the forestry analysis is based more on 'actual' HNV. As a result of the difference between the two indicators, the areas of HNVFF indicators were not summed together

71. For Type C, there could be an equivalent category for forest areas supporting species of conservation concern found in areas that don't count as Type A or B. A possible example is where Sitka spruce forest of low diversity can support important black grouse populations or red squirrel stronghold sites. However, since no Type 3 indicator has been developed for farming, there was no need to develop a forestry equivalent at this time.

72. There may be pressure to extend the use of HNV concepts and indicators into, for example, targeting support payments for agriculture. However, given the limitations of the approach and the difficulties of comparing HNV Farming with HNV Forestry, it will be important to avoid using HNV as a form of "designation" when considering grant applications for woodland creation.

73. The approach used here is being shared with the other UK countries. FC would like to develop a joint approach which can be used to influence the HNV Forestry guidance and definitions in the EC, as well as the uses to which the indicators are put.

6. Proposals for Estimating HNVFF Result and Impact Indicators

6.1 EC Guidance

74. The HNVFF result indicator is "Total hectares of HNV farming and forestry under successful land management". The HNVFF impact indicator is "Changes in the extent and condition of high nature value areas".

75. The EC guidance sets out the challenges associated with estimating the HNVFF result and impact indicators:

- Assessing changes in the condition of HNVFF is an important aspect of the monitoring and evaluation of the impact of rural development programmes if potentially irreversible changes in farming practices and declines in the associated biodiversity are to be detected.
- The capacity to assess changes in the condition of HNVFF is constrained by the lack of available data at the present time and so any assessments of such changes are likely to be qualitative and thus should be interpreted by specialists.
- There are inherent difficulties in evaluating what proportion of the changes observed may be attributed to the interventions under the programmes and what proportion result from other factors.

6.2 Result indicator in SRDP

76. The HNVFF result indicator is effectively a measurement of uptake of specific SRDP measures relating to HNVFF. The result indicator will be reported annually where possible.

77. Estimating the result indicator will require information on:

a. An assessment of SRDP measures contributing to HNVFF.
b. The number of businesses taking up the relevant measures.
c. The hectares under the relevant measures.
d. Geographic location of the business taking up the relevant measures.
e. Whether the farming system associated with the business is classified as HNV or not.

78. For (a), the intention is to identify those measures that contribute to HNV. This is not straightforward as:

- There is a distinction between measures that underpin the HNV system and measures that enhance HNV.
- There is a need to develop a categorisation that can identify where the biggest HNV benefits may arise (which itself will depend on where the measure is taking place and the intensity of it).
- For HNV Forestry, it will not be straightforward to estimate the proportion of HNV Forestry types under suitable SRDP schemes (or management on the National Forest Estate) because spatial SRDP data are not yet available and because areas of HNV Forestry derive from sample plot and not spatial data. However it should be possible to combine plot data, or Native Woodland Survey maps with maps of suitable management schemes to estimate Results indicators for Type A and Type B HNV. This will be supplemented by cases studies of representative sample HNV areas.

79. For (b) and (c), information will be available from the SRDP IT system.

80. For (d), there is no spatial data captured in the SRDP IT system at present. For Forestry, there is no spatial data for Type B forestry as it is based on sample plots. Therefore, the only spatial unit that it is possible to report against is the RPAC area.

6.3 Impact indicator in SRDP

81. The HNVFF impact indicator needs to be estimated at the end of the programme. Both quantitative and qualitative indicators are required to assess quantitative (extent) and qualitative (condition) changes.

82. The EC guidance on impact indicators[6] sets out requirements under the following headings:

- Gauging the evidence
- Identifying drivers of change
- Understanding change and interpretation
- Additional indicators

83. Table 6 summarises how these aspects will be addressed in SRDP. Data will be collected as part of the SRDP ongoing evaluation process. Programme evaluators will be commissioned to conduct the final assessment of the overall impact.

[6] Approaches for assessing the impacts of the RDPs in the context of multiple intervening. factors http://enrd.ec.europa.eu/app_templates/filedownload.cfm?id=6999FF39-0307-D7F3-EE33-16D47E2C2144

Table 6. Approach to Estimating HNVFF Impact Indicator for SRDP

Aspect	Approach
Gauging the evidence	Extent (quantitative change against the baseline) o Trend in baseline HNVFF headline indicators (area of HNV) (by Scotland and RPAC region) o Trend in baseline HNVFF supporting indicators (by Scotland and RPAC region)* o Trend in result HNVFF indicator (area under successful management) (by Scotland and RPAC region) o Site specific farm level measurements of change in HNVFF from natural heritage monitoring study$
	Condition (qualitative change) o Case studies of HNV farming to provide description of change in specific farming that are known to be important for nature values. o Data from NFI and Native Woodland Survey will update HNV Forestry condition estimates, supplemented by case studies to provide description of change in specific forestry practices that are known to be important for nature values.
Identifying drivers of change	Extent (quantitative change against the baseline) o Stocking rates (Scotland and RPAC region) o Holdings no longer keeping livestock (Scotland and RPAC region) o Farmer attitudes (from natural heritage monitoring study) $ o Woodland creation and loss and other land use changes o Changes in woodland design or composition Condition (qualitative change) o Information from case studies
Understanding change and interpretation	Integrated analysis of all available information on extent and condition set out above.
Additional Indicators	Cross check against other indicators: o Findings from monitoring of SRDP biodiversity measures (indicators on species populations and habitats). o Trend in farmland and woodland birds indices. o Trends in relevant Scottish biodiversity strategy indicators. o Information on farming practices in Scotland from the EU Farm Structure Survey 2010.

* Further data sources are below

$ Further details of Natural Heritage Monitoring study are below

6.3.1 Natural Heritage Monitoring Study

The Scottish Government commissioned a monitoring study in July 2011 on *Measuring the natural heritage outcomes resulting from the biodiversity measures in the 2007-2013.* The project will propose indicators and develop a sampling frame to measure farm level natural heritage outcomes associated with biodiversity measures in SRDP. This will include assessing opportunities to capture HNVFF indicators.

6.3.2 Farming data

84. For farming data, the indicators will be based on June Agricultural Census and SIACS data.

85. In the longer term, more information on the area of common grazings may be available, as part of the development of the Register of Crofts.

6.3.3 Forestry data

86. For Forestry data, the replacement for the National Inventory of Woodlands and Trees, the National Forest Inventory (NFI) will be used to provide information for the Impact indicator in terms of both quantity and quality. When the NFI sample square data is available from 2016 the equivalent data will be used to that used from NIWT in the baseline. There will not be an exact correspondence in the methods of collecting the information between NIWT and NFI, but it will be very close. Native and ancient woodland areas (type A) could also be updated from 2013 with the results of the Native Woodland Survey of Scotland, which will give a more accurate complete inventory and map for Type A, rather than an estimate based on sample squares.

87. The main parameters to be used for condition will be similar to those used to help define HNV Forestry Type B areas. These should be refined at a further stage. For native woods (Type A), the quality parameters could be those used for the Biodiversity action plan reporting of native woodland condition.

7. Discussion

7.1 Spatial data

88. Throughout the work of the TWG the lack of data at appropriate spatial units has limited the level at which HNV can be calculated and mapped. Integrated spatial data remains a gap and needs to be improved.

89. In future, there may be a greater role for GIS and remote sensing in monitoring. For example, the Natural Heritage Monitoring Study referred to above is using remote sensing as the basis of the sampling frame. This sort of approach could be adopted further in future.

90. There is scope to link up with other work going on in the Scottish Government on habitat mapping. For example, the Scottish Government Rural Payments and Inspections Directorate (RPID) is updating its IT system to resolve issues over identifying eligible land for farming payment. Other work is also underway on peat erosion monitoring which is using photo and satellite imaging.

7.2 Use of indicators

91. The work of the TWG has focused on characterising HNVFF and on producing baseline HNVFF indicators. The indicators are to be used to monitor change in HNV over time.

92. There is no single indicator or data source appropriate for monitoring HNVFF. The monitoring therefore consists of a basket of indicators.

93. The indicators are not be used to inform site specific management decisions but rather are to be used to monitor how rural development measures are influencing HNVFF as a whole.

7.3 Next steps

- Annual updating of baseline indicators by SG and FCS
- Specific piece of work on SRDP measures by SG (with SAC, FCS)
- Natural heritage monitoring contract by SG
- Case studies by FCS and SNH
- Remainder of the work to be included as part of ongoing evaluation activities and co-ordinated by SG

Annex A – Membership of Technical Working Group

Member	Organisation
Kathy Johnston (Chair)	Scottish Government, Rural Analytical Unit, Rural and Environment Science and Analytical Services
Elisabeth Boyling	Scottish Government, Rural Analytical Unit, Rural and Environment Science and Analytical Services
Joanna Drewitt	Scottish Government, Environment Analytical Unit, Rural and Environment Science and Analytical Services
Justin Gilbert	Forestry Commission
Lorraine Gormley	Scottish Government, Natural Resources Division
Davy McCracken	Scottish Agricultural College
Ed Mackey	Scottish Natural Heritage
Katrina Marsden	The Royal Society for the Protection of Birds
Gordon Patterson	Forestry Commission Scotland
Susie Turpie	Scottish Government, Natural Resources Division

Annex B - Trend Data on HNV Farming

Estimated HNV Farming (E-HNV), 2007-2009

	2007				2008				2009			
RPAC	**UAA**	**E-HNV**	**E-HNV as a % of UAA**	**E-HNV as a % of total P-HNV**	**UAA**	**E-HNV**	**E-HNV as a % of UAA**	**E-HNV as a % of total E-HNV**	**UAA**	**E-HNV**	**E-HNV as a % of UAA**	**E-HNV as a % of total E-HNV**
Argyll	454,616	312,722	69%	12%	455,212	308,903	68%	12%	432,687	277,541	64%	12%
Ayrshire	225,128	49,828	22%	2%	221,824	52,680	24%	2%	221,955	47,779	22%	2%
Borders	358,260	121,433	34%	5%	354,339	118,422	33%	5%	354,554	117,308	33%	5%
Clyde Valley	200,063	57,221	29%	2%	198,848	58,724	30%	2%	197,612	55,163	28%	2%
D&G	425,550	123,706	29%	5%	418,668	117,420	28%	5%	419,114	104,433	25%	5%
Forth	383,847	99,016	26%	4%	383,211	101,117	26%	4%	378,937	103,916	27%	5%
Gramp/Moray	629,284	108,312	17%	4%	645,314	106,443	16%	4%	625,891	96,761	15%	4%
Highland	2,013,628	1,098,007	55%	43%	2,023,166	1,055,206	52%	42%	1,906,325	904,385	47%	40%
North Isles	238,809	123,365	52%	5%	242,683	122,585	51%	5%	235,895	121,188	51%	5%
Tayside	603,798	261,026	43%	10%	598,671	248,138	41%	10%	603,406	229,832	38%	10%
West Isles	307,145	228,195	74%	9%	310,071	228,235	74%	9%	299,732	225,832	75%	10%
Total	**5,840,128**	**2,582,830**	**44%**	**100%**	**5,852,006**	**2,517,874**	**43%**	**100%**	**5,676,108**	**2,284,137**	**40%**	**100%**

Source: SAF-IACS data

Footnotes:

1. Non-SAF area data has been included in the estimation of the amount of HNV farmland.

Glossary

Abbreviation	Definition
CMEF	Common Monitoring and Evaluation Framework
EC	European Commission
FCS	Forestry Commission Scotland
ha	Hectares
IACS	Integrated Administration and Control System
JAC	June Agricultural Census
LCM	Land Cover Map
LU	Livestock Unit
NFI	National Forest Inventory
NIWT	National Inventory of Woodlands and Trees
NWSS	Native Woodlands Survey of Scotland
RPAC	Regional Proposal Assessment Committee
RPID	Rural Payments and Inspections Directorate
SAC	Scottish Agricultural College
SAF	Single Application Form
SIACS	Scotland Integrated Administration and Control System
SNH	Scottish Natural Heritage
SRDP	Scotland Rural Development Programme
TWG	Technical Working Group
UAA	Utilisable Agricultural Area

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