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Scoping document: analysis of the feasibility of calculating the CMEF Context Indicator 36, "Conservation status of agricultural habitats (grasslands)", at the NUTS2 level

Celia García Feced and Sophie Condé

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Authors' affiliation:

Celia García Feced, Muséum national d'Histoire naturelle (FR)
Sophie Condé, Muséum national d'Histoire naturelle (FR)

EEA project manager:

Sylwia Gawronska, European Environment Agency (DK)

ETC/BD production support:

Muriel Vincent, Muséum national d'Histoire naturelle (FR)

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European Topic Centre on Biological Diversity
c/o Muséum national d'Histoire naturelle
57 rue Cuvier
75231 Paris cedex, France
Phone: + 33 1 40 79 38 70
E-mail: etc.biodiversity@mnhn.fr
Website: http://bd.eionet.europa.eu/

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1 Objectives and structure

As a follow-up of the scoping document "Biodiversity indicators related to agriculture" (final version, 30th September 2015), Task 1.7.4.A.III of the ETC/BD Action Plan 2015 entails the analysis of the relevance and feasibility of a specific indicator. In particular, that review revealed the need of investigating the feasibility of calculating the CMEF Context Indicator 36, "Conservation status of agricultural habitats (grasslands)", at the NUTS2 level. This seems to be the level for CMEF indicators calculation decided by DG AGRI, although in reality, among 15 indicators, 9 are only calculated at the national level and 6 are also calculated at the NUTS2 level.

Although the calculation of this indicator at the NUTS2 level is feasible from a technical point of view using GIS tools, it must be stressed that, due to the methodology used to assess the conservation status in Article 17 of the Habitats Directive, the results are likely to be unrealistic and unreliable at this scale. This document mainly aims at showing the limitations and proposing an approach for calculating this indicator at the NUTS2 level.

The report first provides an overview of the CMEF (Common Monitoring and Evaluation Framework) and the Context Indicator C.36 main characteristics (Chapter 2). It then introduces the general concepts and limitations of the assessment of habitat conservation status in Article 17 of the Habitats Directive (Chapter 3). Chapter 4 presents the spatial analysis, which has been performed at different scales (i.e., biogeographical region, NUTS2, habitat, combination of habitat and biogeographical region). The results of the calculation of the indicator at the NUTS2 level following a proposed approach are displayed in Chapter 5. Lastly, Chapter 6 enumerates the conclusions of this analysis.

2 The Common Monitoring and Evaluation Framework (CMEF) and the Context indicator 36

2.1 Introduction to CMEF

The "Common Monitoring and Evaluation Framework" (CMEF) was established by the European Commission and agreed with Member States. A set of guidelines and guidance fiches on the common indicators was put together in a handbook (DG AGRI, 2006). According to the 2013 report "Rural Development in the EU" (DG AGRI, 2013), the CMEF provided a single framework for monitoring and evaluation of all rural development interventions for the programming period 2007-2013.

A subset of the CMEF 2007-2013 set of indicators was proposed in 2014 in order to measure the implementation of the CAP 2014-2020. The framework was restructured in four types of indicators (as extracted from DG AGRI website, http://ec.europa.eu/agriculture/cap-indicators/index_en.htm, last accessed 12th October 2015), namely output, result, impact and context indicators. In particular, context indicators reflect relevant aspects of the general contextual trends in the economy, environment and society that are likely to have an influence on the implementation, achievements and performance of the CAP. A set of 45 context indicators was selected for the CAP Programme 2014-2020. These indicators, which have a EU-27/28 geographical coverage, are grouped in three sections, namely socio-economic, sectorial and environmental. Operationally, Member States, with the help of factsheets, regularly update with output and result indicators, which are further used to calculate some of the context indicators. Theoretically, the frequency of these indicators is annual but this is subject to the availability and peculiarities of some of the indicators. It must be also noted that the final lists of context, impact, result and output indicators have been included in Implementing Acts.

For further information on the CMEF and Agri-Environmental Indicators (AEIs), the scoping document "Biodiversity indicators related to agriculture" (García Feced and Condé, 2015) synthesizes their relevant aspects.

2.2 Main characteristics of the indicator C.36

The focus of this document is set on the Context Indicator C.36 "Conservation status of agricultural habitats (grasslands)". This section is intended to enumerate its main characteristics. The information here included has been extracted and synthesized from the report "CAP context indicators 2014-2020" (DG AGRI, 2014):

- **Definition**

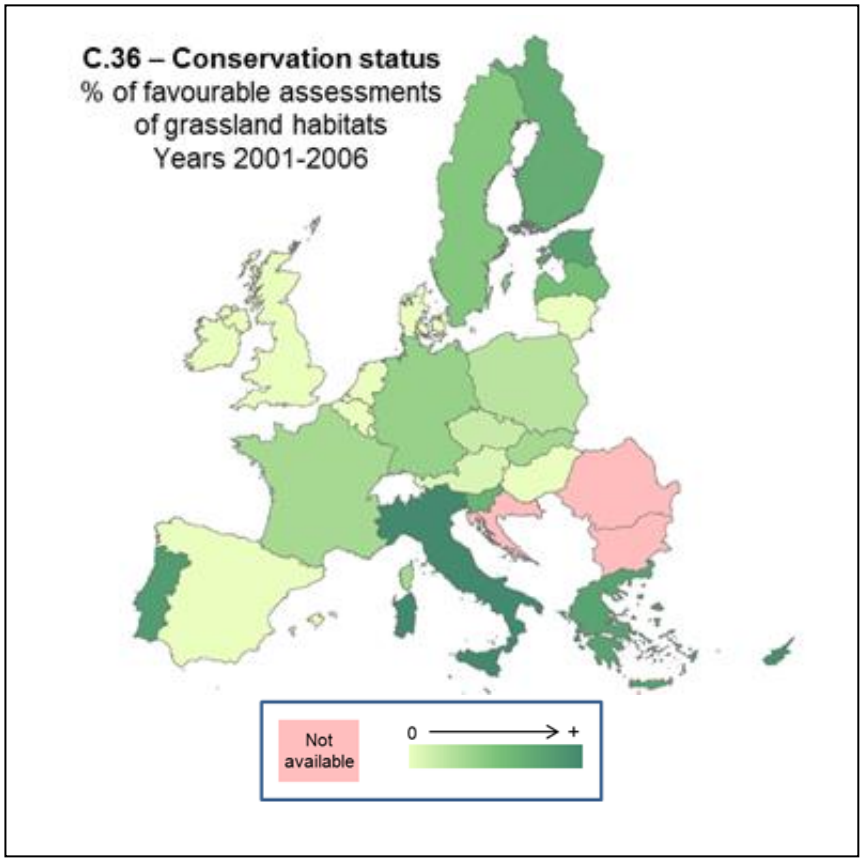
Assessments of agricultural habitats (grasslands) that have a favourable / unfavourable-inadequate / unfavourable-bad / unknown conservation status.
Notes for indicator 36:

- *The indicator on conservation of agricultural habitats is essential for the diagnostic and SWOT of RDPs. It will enable to assess the level of ambition of the Natura 2000 measures proposed by MS in the programme for the focus area on biodiversity. The information is complementary to the Farmland Bird Index, which is not an indicator on habitats and only focused on common birds. It is also relevant for the first pillar as Ecological Focus Area (EFA), the grassland measure of the greening and cross compliance are complementary key elements which contribute to the improvement of the conservation status.*
- *Data reported by the MS for this indicator has been/will be prepared by DG ENV for their use in the RDPs:*
  - *For the 2001-2006 reporting, the figures on grassland (only dataset available in relation to agriculture since the habitats directive only covers habitats related to grassland, none on permanent crops and arable), for each MS at national level and also broken down by biogeographical level, are already available. BG, RO and HR were not covered.*
  - *For the 2007-2012 reporting, data will also be available for grassland for each MS at national level, and also broken down by biogeographical level. In some MS, the data will also most probably be collected at NUTS 2 level (UK, IT, DE, BE), but it has to be discussed with those MS their potential availability. An indicator will be provided in 2014-15 (depending on MS reporting) on the basis of the data reported by MS in 2013 and used for the monitoring of progress in reaching Target 3a of the EU 2020 Biodiversity Strategy.*
  - *For the 2013-2018 reporting, the feasibility of a split at NUTS 2 level is under discussion.*

- **Units.** Percentage of total assessments of grassland habitats for each type of assessment (i.e., Favourable, Unknown, Unfavourable-inadequate, Unfavourable-bad).
- **Focus habitats.** Although the title of this indicator refers to agricultural habitats (i.e. "Conservation status of agricultural habitats (grasslands)"), it must be emphasized that it is only calculated for grasslands since there are no cropland habitats in Annex I of the Habitats Directive. Therefore, its calculation only matches partly the MAES approach for agricultural ecosystems (i.e. croplands and grasslands).
- **Data source/s.** Member State reporting.
- **Calculation body.** DG ENV.
- **Last update:** 2001-2006.
- **Frequency.** "Conservation status" is dependant of Member States Article 17 reporting every six years. The outcomes of the reporting period 2007-2012 can be explored in the Article 17 web tool (bd.eionet.europa.eu/article17/reports2012, last accessed 3rd December 2015).

- **Data level.** National (see Map 2.1 for results of favourable assessments in reporting period 2001-2006) and biogeographical regions for each Member State.
- **Relation to SEBI indicators.** It is linked to "Habitats of European interest" (SEBI005) which shows the conservation status by main type of habitats, among them, grasslands.
- **Sub-indicators.** None.

Map 2.1 Geographic representation at the national level of the CMEF C.36 Context Indicator (data from 2014 update corresponding to reporting period 2001-2006)



Source: DG AGRI (2014). Author: Celia García Feced.

3 The assessment of the conservation status

Prior to analysing the feasibility of calculating this indicator at the NUTS2 level, it is essential to understand some general concepts on how the conservation status is assessed under the Habitats Directive. This section aims at introducing its general methodology and drawing the attention to derived limitations. With that purpose, the following information has been selected and extracted from the report "State of nature in the EU. Results from reporting under the nature directives 2007–2012" (EEA, 2015):

"Article 17 of the Habitats Directive requires that Member States regularly prepare and submit reports on progress made in implementing the directive, using a format agreed by the Habitats Committee and published in 2005 (EC, 2005). The Article 17 reports prepared by Member States have three sections, one of them being the assessments of the conservation status of habitats. Article 17 reporting covers the habitat types and species across the whole territory of the Member State concerned, not only those within Natura 2000 sites.

The Member State assessments are provided for a combination of the habitat and the biogeographical region. Nine biogeographical regions, i.e. areas which are ecologically and environmentally similar, are mentioned in the Directive: Alpine, Atlantic, Black sea, Boreal, Continental, Macaronesian, Mediterranean, Pannonian and Steppic. Member States are required to separately assess the conservation status for each species and habitat for each of the biogeographical regions in which the species or habitat is found. When a Member State lies entirely within one region, as with Luxembourg, only one report is required for each habitat type and species present. If a Member State lies across two or more regions, a report is required for each region.

The assessment, which is based on the "favourable conservation status" definition provided in Article 1 of the Directive, classifies the conservation status of a particular species or habitat as "favourable", "unfavourable-inadequate" or "unfavourable-bad", based on an evaluation of four parameters for species and habitats: range, area, structure and functions and future prospects".

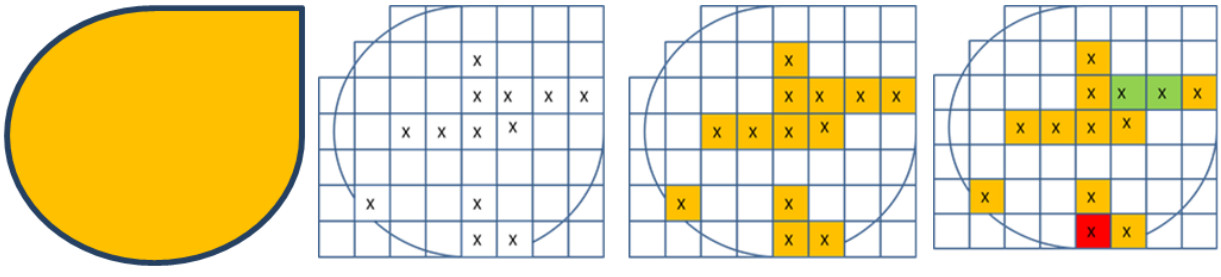
In order to alert on the spatial limitations of this methodology, Box 3.1 shows some conclusions that were drawn on a technical meeting on use of Art. 17 and Art. 12 for spatial biodiversity assessments.

Box 3.1 What should be known on spatial data if we use them? (ETC/BD, 2013; date revised: 05/09/2013)

- Member States have reported maps of both range and distribution of species and habitats. Although guidance was given, it is clear that different approaches were taken in determining range. Some maps were based on point data, polylines, other as grids of varying sizes or polygons. A variety of projections were used. Subsequently, the maps have been re-projected by ETC/BD to a standard projection (ETRS LAEA 5210) and the data were harmonized to give range and distribution on a 10 km x 10 km or equivalent grid;

- With the purpose to correlate information on conservation status with e.g. information on pressures such as changes in land-cover, it is tempting to combine the conservation status information reported at the biogeographical level (figure a) with information on species/ habitat distribution which is available at a 10 x 10 km grid (figure b); then to assume that the conservation status of a species/ habitat reported at the biogeographical level is the same in each individual grid where the species/ habitat occurs within the boundary of the biogeographical region (figure c). However, this is unlikely to represent the reality. It may well be that the status of a habitat/ species is very bad in one grid and quite good in two others (for instance in a grid that includes Natura 2000 sites designated for that species/ habitat) (figure d).

Therefore, upscaling the spatial information on conservation status originally available at the biogeographical level to finer scales may lead to an oversimplification of the reality.



a) Biogeographic CS assessment of species A

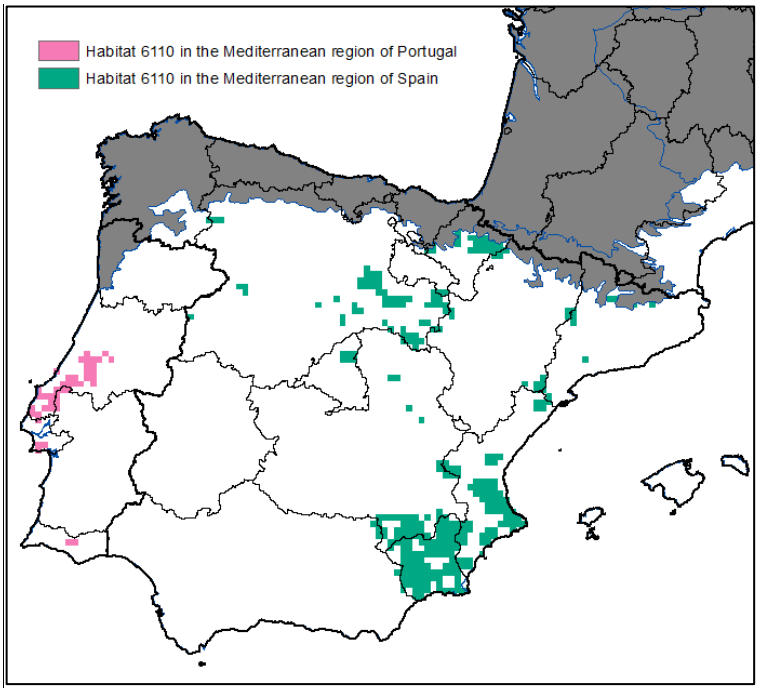
b) Distribution of species A in that region

c) Downscaling artificially biogeographic CS to species A distribution grids

d) Possible reality of the CS of species A in the region

Map 3.1 shows an example of the potential implications that are explained in the box. In Spain, the conservation status assigned to this particular combination of habitat and biogeographical region will be the same in grids that are very far from each other. This is likely an oversimplification of the reality. In Portugal, this particular habitat is more concentrated and therefore the assignation of conservation status might be more realistic.

Map 3.1 Distribution of grassland habitat type 6110 in the Mediterranean regions of Portugal and Spain



Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. Author: Celia García Feced.

4 Spatial analysis at different scales

General methodology of the spatial analysisSince there are no cropland habitats in Annex I of the Habitats Directive, this indicator only covers grassland habitat types. For the analysis, a subset of the habitats distribution layer was used, corresponding to the grassland habitat types of Annex I of the Habitats Directive (EC, 2013a), i.e., codes starting with 6 (31 grassland habitat types, see complete list in Appendix 1). Grasslands are described in the State of Nature report (EEA, 2015) as follows:

"Grasslands are areas dominated by two kinds of grassy vegetation (including tall forbs, mosses and lichens): (a) managed pastures, and (b) natural and seminatural (extensively managed) grasslands (EC, 2013b). Grasslands are widely distributed in the EU, although natural grasslands are mostly restricted to areas above the treeline in the mountains; in other areas, grasslands are a result of human activity and without continued management will transition into woodland (Halada et al., 2011). Grasslands cover approximately 10% of the EU land area (ETC/BD, 2011) and provide a variety of services, including livestock production, regulation and maintenance services and cultural services (EC, 2013b)".

It must be noted that the State of Nature report follows the MAES approach, where 45 Annex I habitat types are associated with the MAES grassland ecosystem (Roscher et al., 2015; see complete list in

Appendix 2). However, this CMEF indicator is only calculated for grassland habitats of community interest, i.e. 31 habitat types.

The spatial analysis has been performed using GIS tools available in the software ArcGIS 10.0 (ESRI). Three main source layers have been used for the analysis: NUTS0 and NUTS2, biogeographical regions and habitats distribution. They have all been downloaded from EEA webpage (http://www.eea.europa.eu/data-and-maps/data, last accessed 9th October 2015). Table 4.1 summarizes their metadata.

Table 4.1 Characteristics of the GIS source layers used for the spatial analysis

	NUTS0 and NUTS2 (EEA, 2012)	BIOGEOGRAPHICAL REGIONS (EEA, 2012)	HABITATS DISTRIBUTION (EEA, 2012)
Definition	GISCO administrative boundaries (NUTS) v9 generalised using the 1 km reference grid for the Land cover accounts project (LEAC)	Official delineations of biogeographical regions used in the Habitats Directive (92/43/EEC) and for the EMERALD Network set up under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	Distribution of habitat types of Annex I of the Habitats Directive (presence/absence in 10x10 km grids)
Format	Polygon shapefile	Polygon shapefile	Polygon shapefile
Temporal coverage		2008-2011	2007-2012
Geographic coverage	EU	Europe	EU
Geographic accuracy	1 000 m		10 km
Scale of the dataset	1:1000000	1:10000000	1:10000000
Rights	EEA standard re-use policy	EEA standard re-use policy	EEA standard re-use policy
Coordinate reference system	EPSG:3035	EPSG:3035	EPSG:3035
Data sources	EUROSTAT GISCO Database. Layer NUTS v9	Bundesamt fur Naturschutz (BfN), 2003. Map of natural vegetation of Europe. Web site: http://www.bfn.de/. National data included	Reporting from EU Member States under Article 17 of the Habitats Directive to the European Commission. Compiled by EEA and ETC/BD, 2014, date of delivery (date sent to the Data Service): February 2015.
Publication year	2012	2012	2015
Website	http://www.eea.europa.eu/data-and-maps/data/administrative-land-accounting-units#tab-metadata	http://www.eea.europa.eu/data-and-maps/data/biogeographical-regions-europe#tab-metadata	http://www.eea.europa.eu/data-and-maps/data/article-17-database-habitats-directive-92-43-eec-1#tab-gis-data
Observations		A new version of the layer has been recently released (7th August 2015) but the changes do not affect the analysis	

The information on conservation status of the grassland habitats was extracted from the Article 17 dataset (available from http://www.eea.europa.eu/data-and-maps/data/article-17-database-habitats-directive-92-43-eec-1#tab-european-data, last accessed 12th October 2015). This dataset contains a support version of tabular data as reported by Member States, targeted for the assessment process by the experts of the Article 17 habitats and species conservation status at the European level for the 2007-2012 reporting period, along with the resulting biogeographical assessments collected using the web assessment tool between the 6th of March 2014 and the 7th of July 2014. In particular, the table

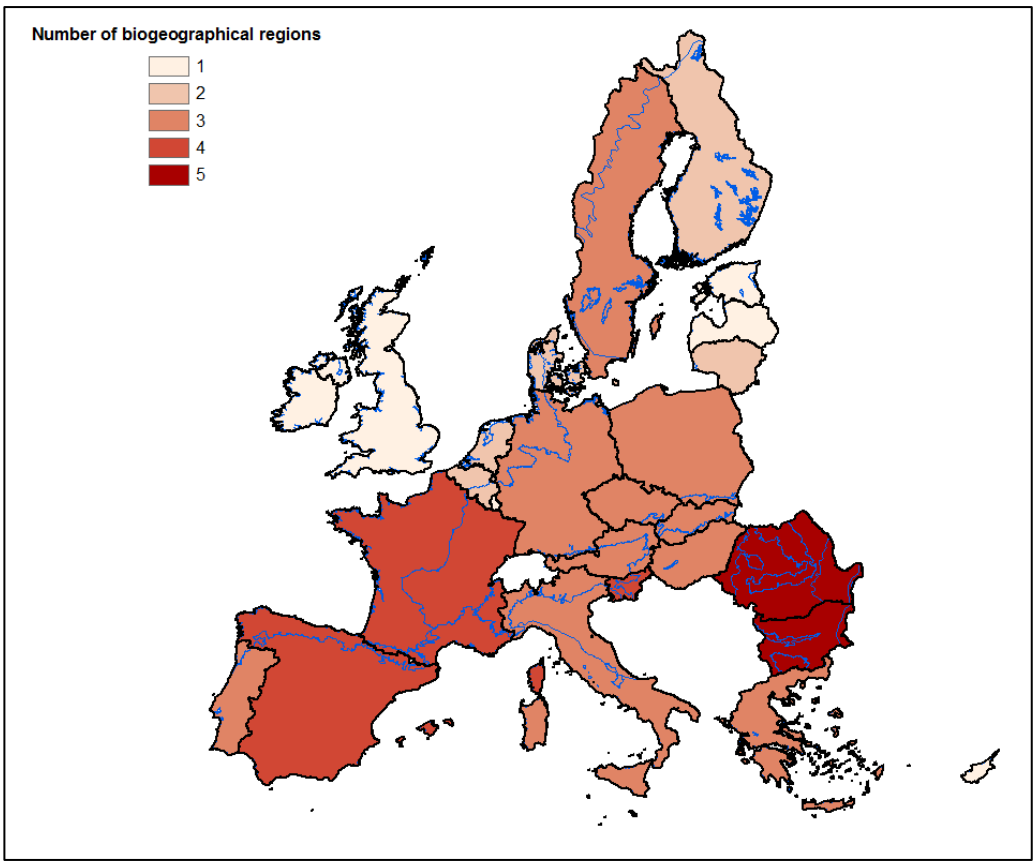
used was “data_habitats_regions_MS_level” that refers to Member State assessments. This table was joined to the grassland habitat distribution layer using a concatenation of these fields: country, region and habitat code. The field informing about the conservation status is “conclusion_assessment”, which integrates the assessments of the four parameters range, area, structure and functions, and future prospects. A similar analysis could therefore be made using any of these parameters.

In order to show the complexity and reliability of the calculation of the indicator, a number of overlays between the source layers and subsequent processing were performed. The following sections present the results of the analysis at different scales: biogeographical region (4.2), NUTS2 (4.3), habitat (4.4) and the combination of habitat and biogeographical region (4.5). All the maps have been elaborated by the authors on the basis of data from the previously mentioned layers and datasets. It must be emphasized that none of them has been verified by any validation body and therefore they can only be used for an overview.

4.1 Biogeographical region (BGR) level

Map 4.1 shows the variability in number of biogeographical regions by country, with a range from 1 to 5. In the Member States with only one BGR such as Ireland, United Kingdom, Estonia and Latvia, the complexity of the calculation of the indicator at the NUTS2 level will therefore not be affected by the BGRs. The calculation of C.36 will be increasingly more complex in the countries with a higher number of BGRs. The complexity will be particularly high in countries like Romania and Bulgaria, comprised by 5 different BGRs, and Spain and France, with 4.

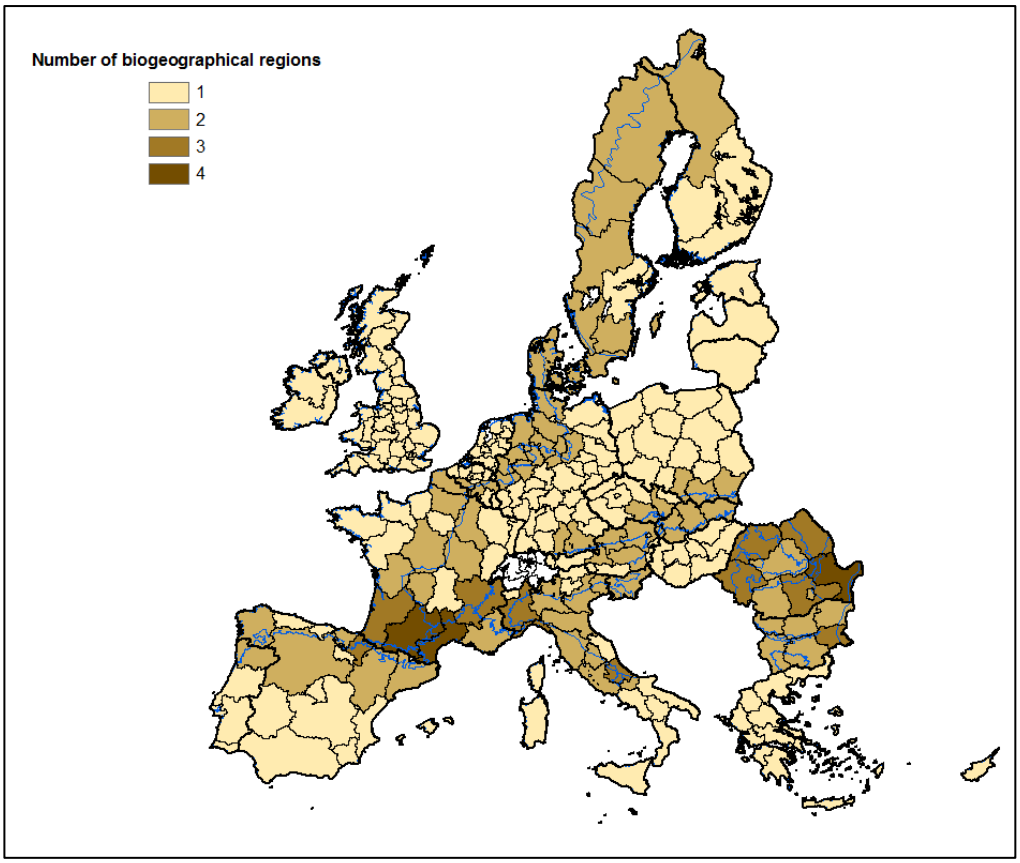
Map 4.1 Biogeographical regions by Member State



Sources: NUTS0 (EEA, 2012); Biogeographical regions (EEA, 2012); see Table 4.1 for more details on source layers. Author: Celia García Feced. Notes: the blue line delimits the biogeographical regions. Slovenia and Hungary have respectively 4 and 3 regions but in both cases 2 of those regions are very small. The Macaronesian islands of Spain and Portugal are not shown in this map but they are considered in the overall count.

This means that these countries contain a higher number of NUTS2 with several BGRs, making its calculation more complex and unrealistic. This aspect is reflected in Map 4.2, where the number of different BGRs existing in each NUTS2 is shown. According to this map, there are 3 NUTS2 containing 4 BGRs (Midi-Pyrénées and Languedoc-Roussillon in France, and South East of Romania) and 10 NUTS2 with 3 BGRs, mainly located in Spain, France, Italy, Romania and Bulgaria. Moreover, there are many NUTS2 that fall in the boundary between two BGRs, and consequently containing at least 2 BGRs.

Map 4.2 Biogeographical regions in each NUTS2

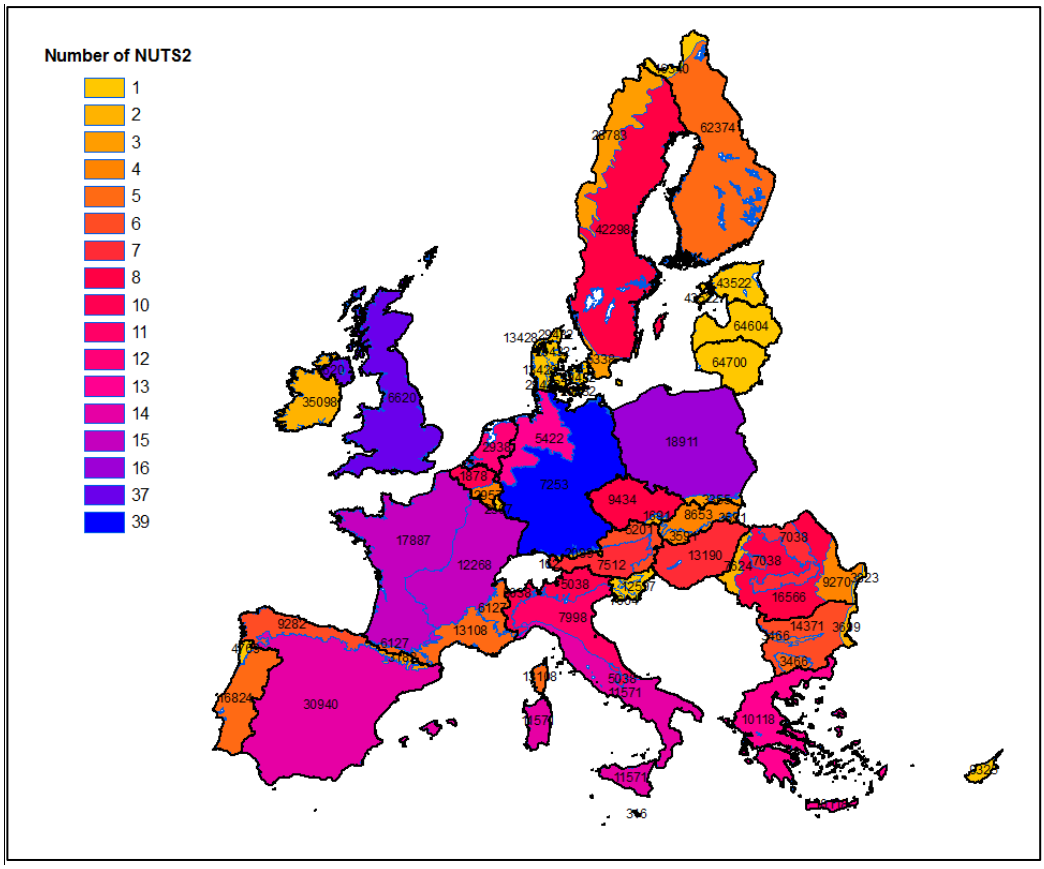


Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); see Table 4.1 for more details on source layers. Author: Celia García Feced. Note: the blue line delimits the biogeographical regions.

4.2 NUTS2 level

Map 4.3 refers to the number of NUTS2 existing in each biogeographical region within each country. The label within each polygon represents the average area of the NUTS2 portions. The highest amount of NUTS2 are found in the Continental region of Germany (39 NUTS2) and the United Kingdom (37 NUTS2). Amounts between 11 and 16 NUTS2 (less than half of Germany and UK) are found in regions such as the Mediterranean in Spain, Italy and Greece, the Atlantic and Continental in France, and the Continental in Poland. On the other hand, the Baltic countries and other Member States such as Ireland, Denmark, Slovenia and Cyprus, are comprised by only 1 to 3 NUTS2. These results reflect the heterogeneity in number and surface of the administrative regions across Europe. A more even reference may be convenient for the calculation of the C.36 indicator, maybe using the commonly used NUTS2/3 framework.

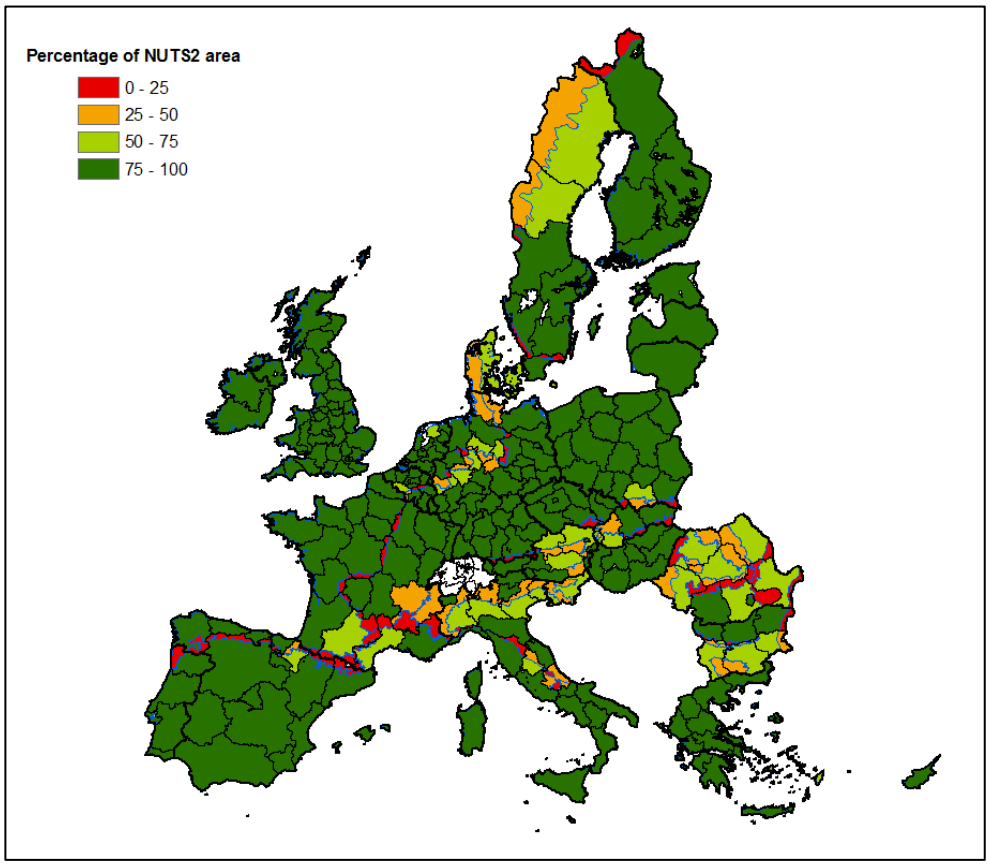
Map 4.3 NUTS2 by biogeographical region and Member State



Sources: NUTS0 (EEA, 2012); Biogeographical regions (EEA, 2012); see Table 4.1 for more details on source layers. Author: Celia García Feced. Notes: the blue line delimits the biogeographical regions. The label inside the polygons represents the average area of the NUTS2 portions.

As shown in Map 4.2, there are many NUTS2 comprised by different BGRs. The portions formed by these BGRs can be extensive or very small. Map 4.4 displays the percentage of the area of each portion of the NUTS2 classified in four equal groups. In order to show an alternative of calculation, a rule considering that the Conservation Status of a particular NUTS2 is reliable if the area of one of the portions (the one given the Conservation Status) is higher to, for example, 75% of the total surface. This artefact could be useful in many cases but would create issues in NUTS2 where the sum of the different small portions is higher than 25% or in NUTS2 such as the Italian Piemonte where one portion has 25-50% and other 50-75%.

Map 4.4 Share of area of the NUTS2 of each portion created by the biogeographical regions

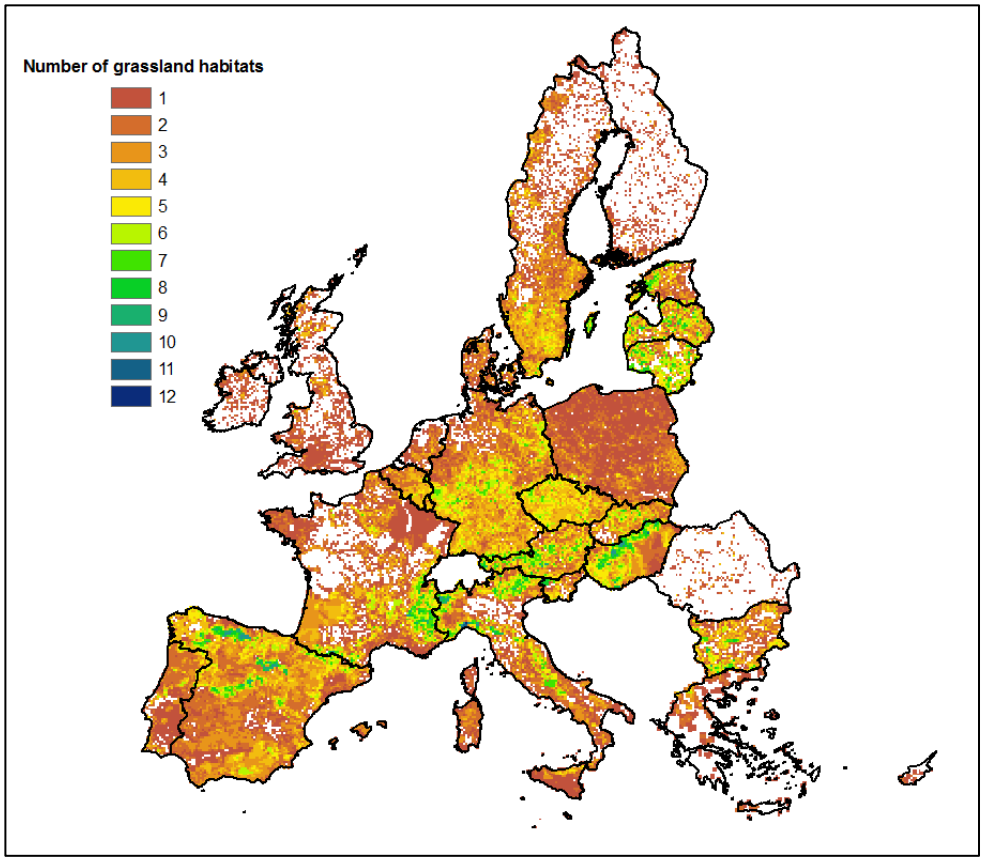


Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); see Table 4.1 for more details on source layers. Author: Celia García Feced. Note: the blue line delimits the biogeographical regions.

4.3 Habitat level

Map 4.5 displays the amount of different grassland habitats existing in each 10 km grid. The range varies from 1 to 12 habitats, which shows the heterogeneous level of complexity of grasslands across the European Union. There are areas where just one grassland habitat has been identified and therefore its assigned conservation status may be considered closer to reality. However, the uncertainty increases as the number of habitats identified in one grid grows. This is particularly noticeable in grids located along the main European mountain ranges, with more than 6 grassland habitats in most of the cases. An exemption to that is the Carpathians area in Romania, but there seems to be a misrepresentation of Romanian grassland habitats in the map. Grids in the Baltic countries also show high variety of grassland habitats.

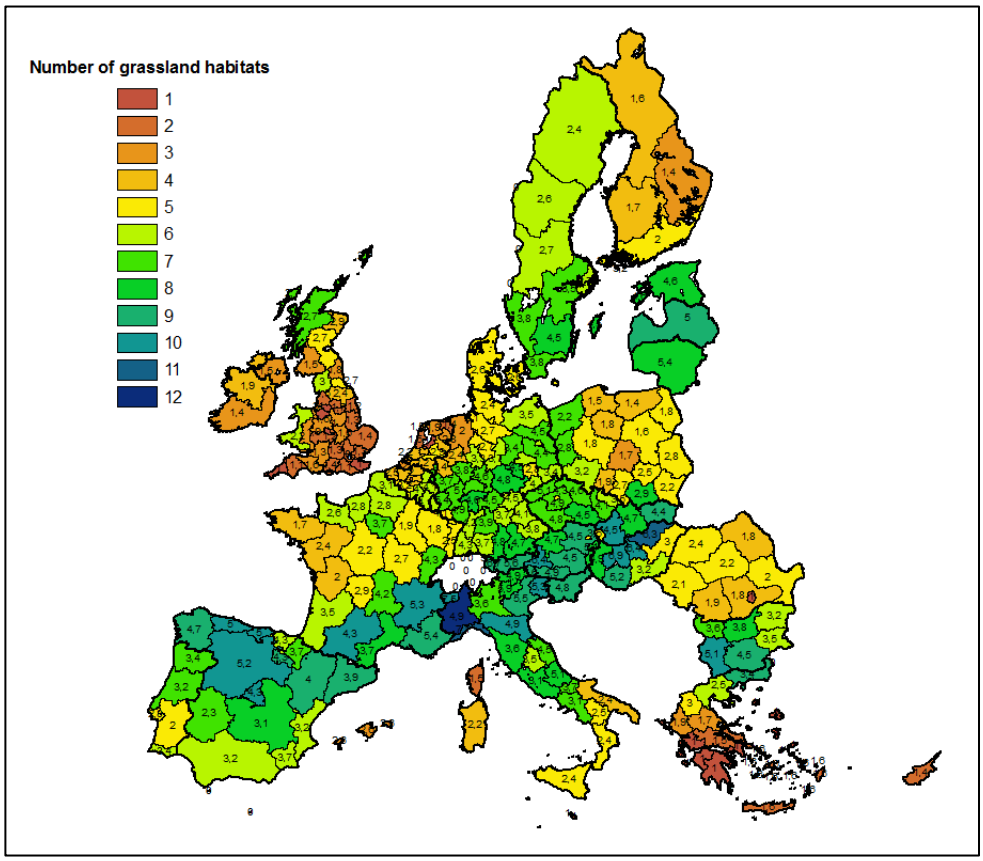
Map 4.5 Number of different grassland habitats in each 10 km grid



Sources: NUTS0 (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. Author: Celia García Feced.

The representation of this complexity at the NUTS2 scale can be seen in Map 4.6 that depicts the maximum number of grassland habitats that can be found within their boundaries. The average number of grassland habitats of the grids contained into them is also shown in the label. In general, countries with NUTS2 containing a lower number of habitats are Ireland, UK, The Netherlands, Finland, Poland, Romania and Greece. By contrast, NUTS2 containing mountain ranges usually have higher number of grassland habitats. Also, as mentioned before, the Baltic countries present considerable grassland variety. The maximum number of different habitats (i.e., 12) is found in Piemonte (Italy) although the average among its grids is 4,94 habitats. The NUTS2 with the highest average of habitats (i.e., 7,45) is its neighbouring region, Liguria.

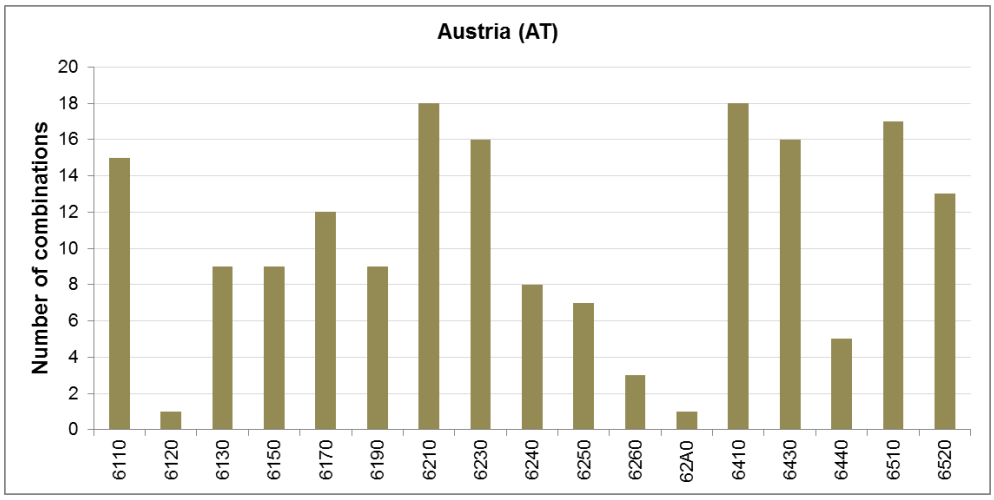
Map 4.6 Number of different grassland habitats in each NUTS2



Sources: NUTS2 (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. Author: Celia García Feced. Note: The label inside the NUTS2 refers to the average number of grassland habitats per NUTS2.

Information on all the habitats existing in a particular country can also be extracted. Graph 4.1 shows an example for the habitats that are present in Austria. It can be noticed that many habitats are distributed across more than 8 combinations of NUTS2 and BGRs, even reaching 18 in two of them (6210 and 6410).

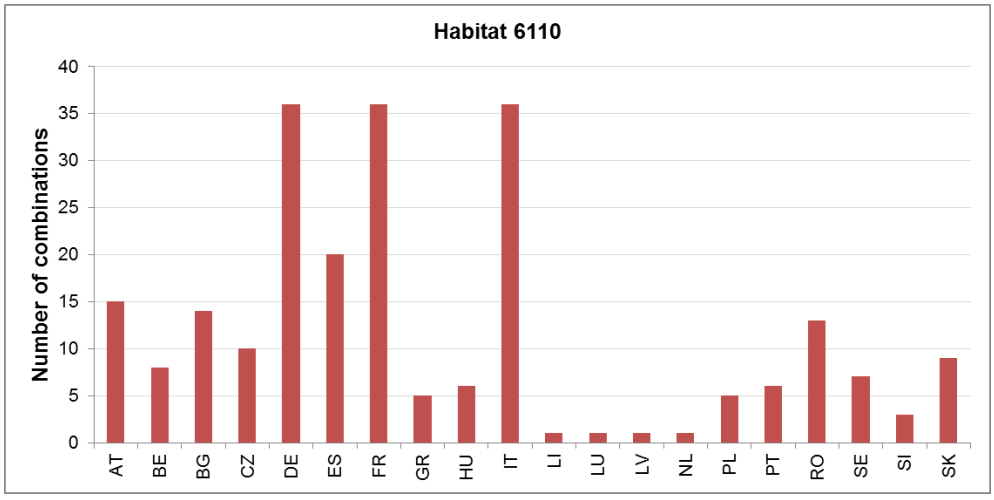
Graph 4.1 Number of combinations (NUTS2 + biogeographical region) in each of the habitats existing in Austria



Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. Author: Celia García Feced.

Conversely, information on how a specific habitat is distributed across all the countries can also be extracted. Graph 4.2 represents the number of combinations for the habitat 6110 as an example. It can be seen that in Germany, France and Italy it is dispersed in 36 combinations of NUTS2 and BGR, which gives an idea of the complexity of the conservation status assessment.

Graph 4.2 Number of combinations (NUTS2 + biogeographical region) of the habitat 6110 in all countries

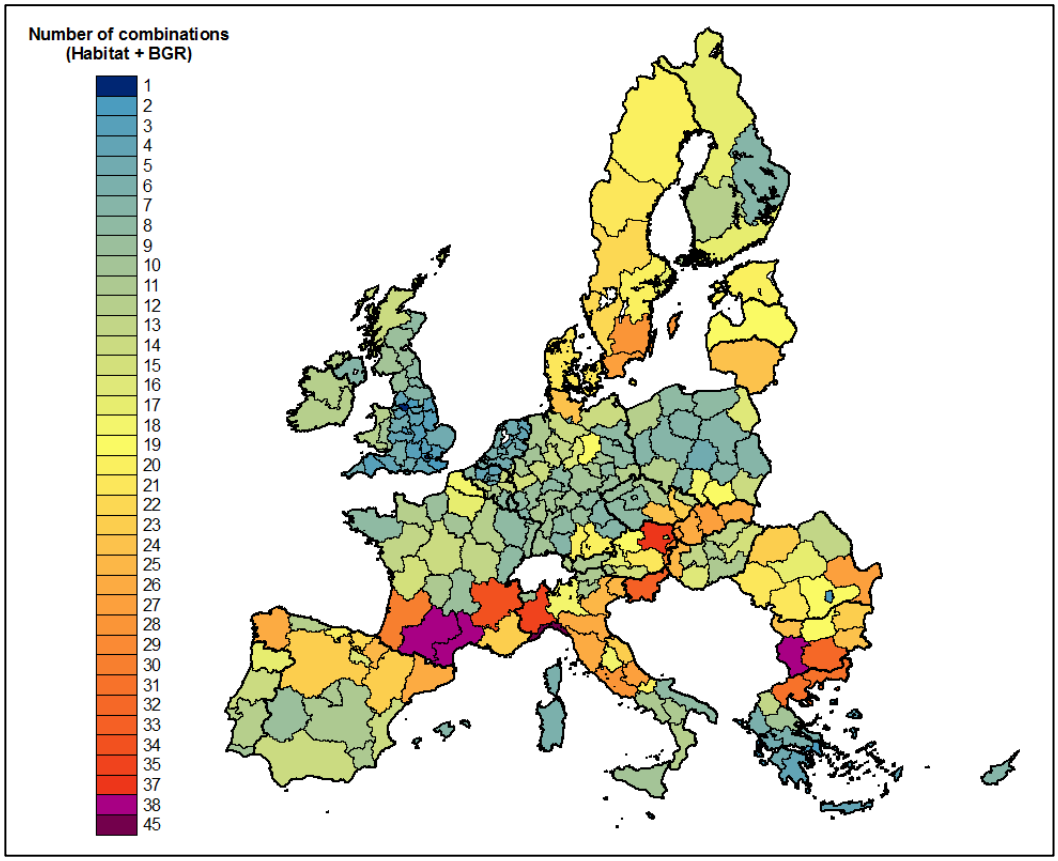


Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. Author: Celia García Feced.

4.4 Combination of habitat and biogeographical region

As explained above, assessments of the conservation status are provided by Member States for each combination of habitat and biogeographical region. Map 4.7 depicts the variability in number of this combination across NUTS2. This map is particularly interesting given the scope of this document. In short, it shows the number of assessments that are potentially available for each NUTS2 and from which the indicator should be derived. In principle, and not taking into account the problematic with the distance between habitats that are very sparse (as described in Section 3), in NUTS2 where the number of combinations is low, the indicator may be more reliable. These NUTS2 mostly occur in countries such as UK, The Netherlands and Greece. However, this reliability decreases as the number of assessments increases. This is particularly remarkable in NUTS2 of Mediterranean and mountainous regions. Extreme cases are Liguria in Italy (45 different combinations), Midi-Pyrénées and Languedoc-Roussillon in France (38) and South West of Bulgaria (38).

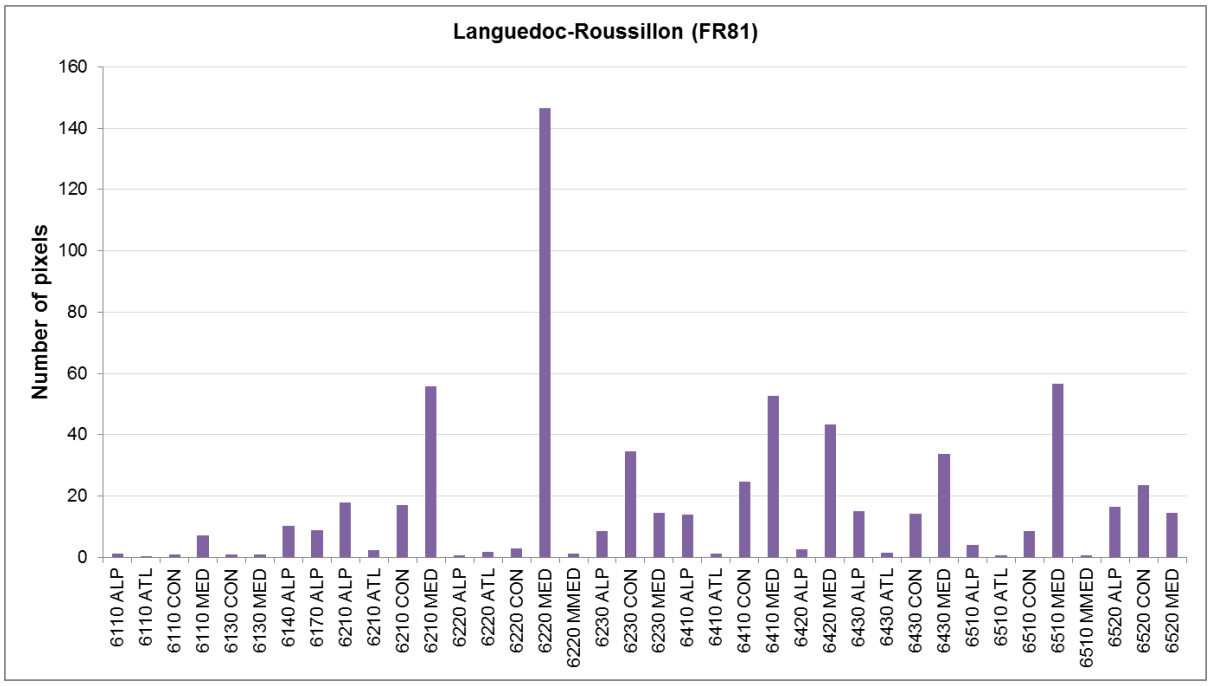
Map 4.7 Number of different combinations (habitat + biogeographical region) in each NUTS2



Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. Author: Celia García Feced.

Among them, the region of Languedoc-Roussillon has been selected to show in detail the number of grids existing in each of the possible combinations (Graph 4.3). As can be seen, the habitat 6220 in the Mediterranean region is the more abundant with 142 grids. In this sense, a potential alternative for delivering the indicator at the NUTS2 level could be to assign the conservation status of the most abundant combination. However, as this example shows, many other relevant and abundant combinations would be neglected and it would be an oversimplification of reality.

Graph 4.3 Distribution of the 38 different combinations of habitat and biogeographical region existing in the region of Languedoc-Roussillon (FR81)



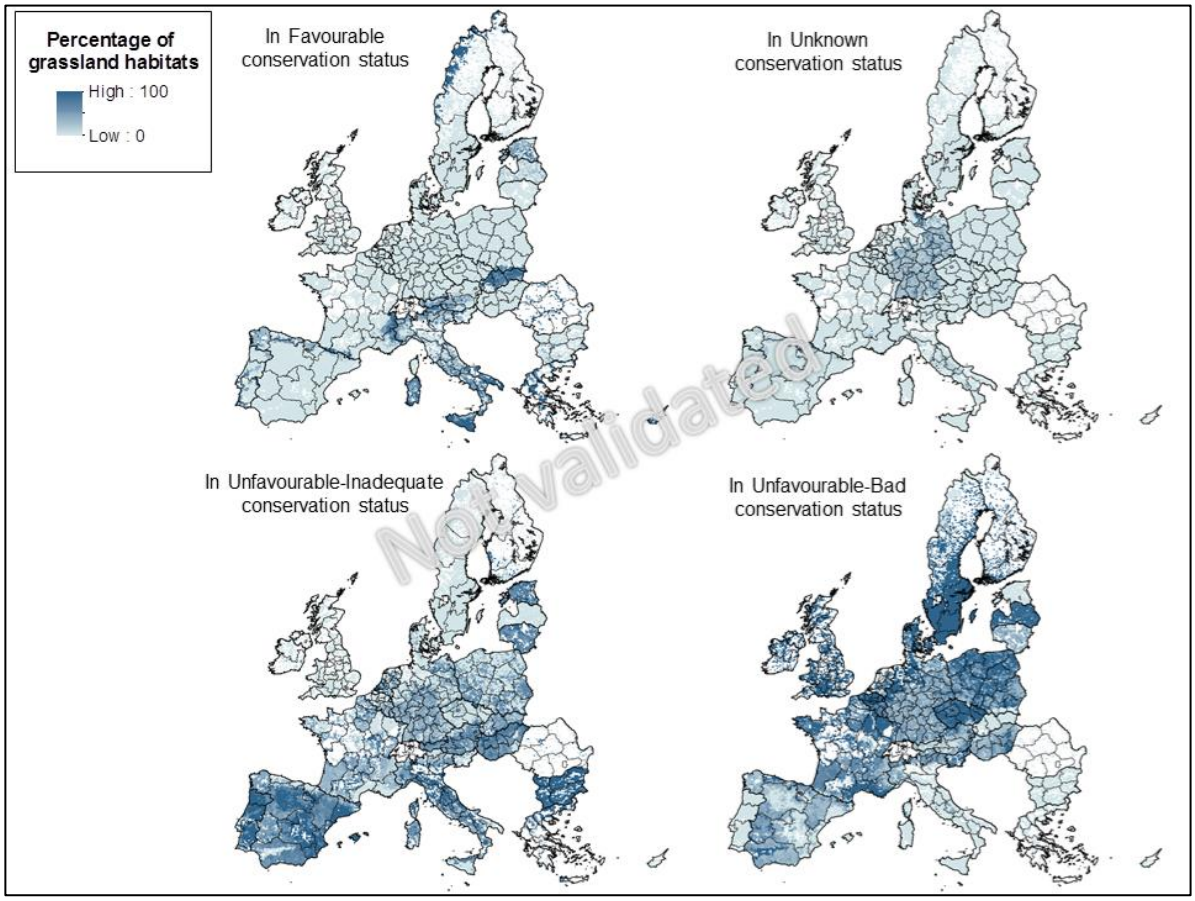
Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. Author: Celia García Feced.

5 Proposal of calculation at the NUTS2 level

It is obvious that the calculation of this indicator at the NUTS2 level would be much more reliable if Member States collected data about conservation status in each NUTS2 and reported their assessments at this scale.

Therefore, although other methods can be proposed, such as the setting of percentage rules (like the one presented in Map 4.4 for example), this chapter shows the results of using a grid-based approach. For each 10x10 km cell, there were calculated the number of assessed habitats and the number of habitats assessed as each of the four conservation status classes. From these two values, it was calculated the percentage of habitats assessed as "favourable", "unfavourable-inadequate", "unfavourable-bad" or "unknown" in each cell (see Map 5.1). This method has also been used by ETC/BD Consortium partner UBA (Austrian Environmental Protection Agency) in an analogous exercise but focusing on the "favourable" conservation status of the habitat types associated to the MAES grassland ecosystem (ETC/BD, 2015). The resulting maps are very similar, which implies that the inclusion of those additional habitat types in the MAES approach does not affect significantly the calculation using this method. This is the particular case for grassland ecosystems but it cannot be extrapolable to other ecosystems until respective tests are performed.

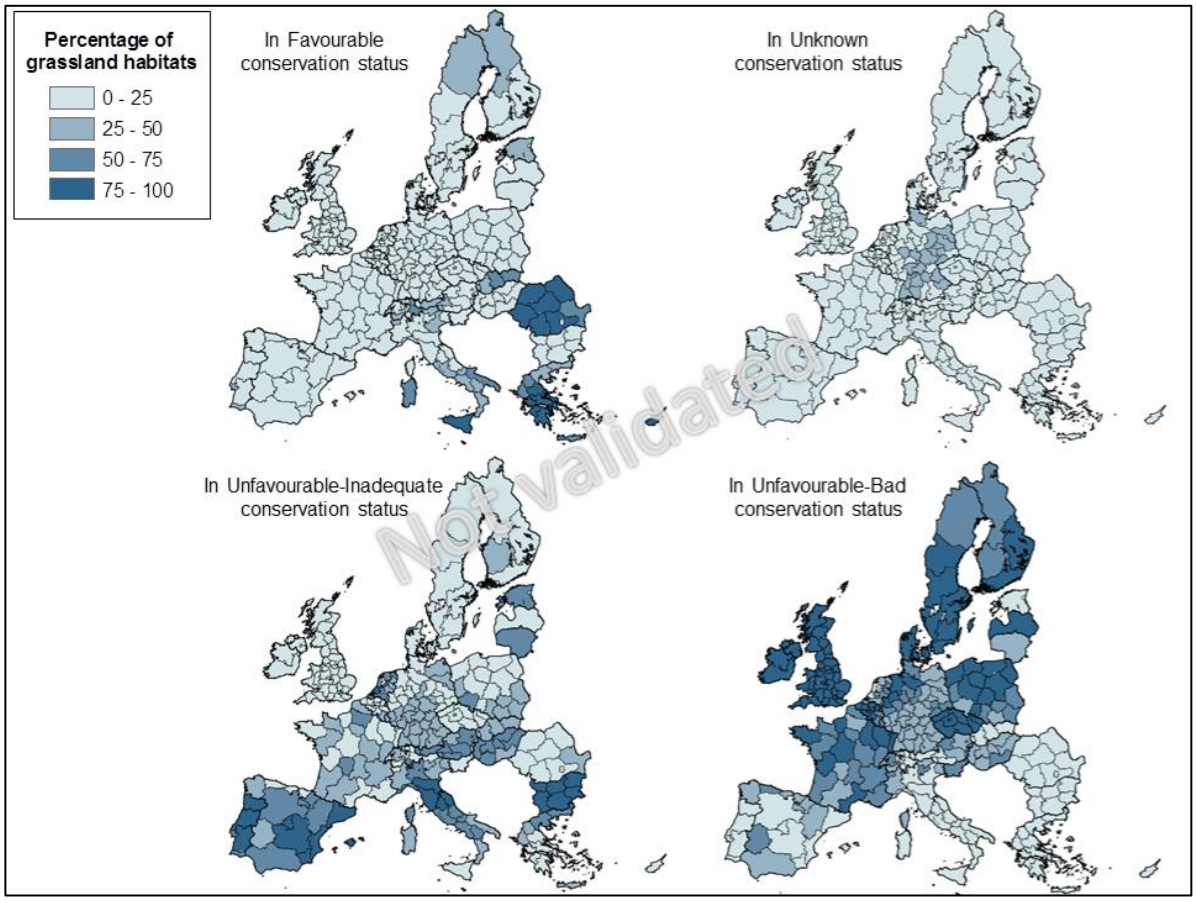
Map 5.1 Share of grassland habitats in the different conservation status classes by grid



Sources: NUTS2 (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. The information on conservation status of the grassland habitats was extracted from the Article 17 dataset (available from http://www.eea.europa.eu/data-and-maps/data/article-17-database-habitats-directive-92-43-eec-1#tab-european-data, , last accessed 12th October 2015). Author: Celia García Feced. Note: These maps have not been verified by any validation body.

The grid-based values were later upscaled to NUTS2 by summing-up the percentages and dividing them by the number of cells contained in each NUTS2 (see Map 5.2). The resulting maps can be considered as a representation of the indicator C.36 at this level. Tables and graphs can also be easily derived.

Map 5.2 Share of grassland habitats in the different conservation status by NUTS2



Sources: NUTS2 (EEA, 2012); Biogeographical regions (EEA, 2012); Habitats distribution (EEA, 2015); see Table 4.1 for more details on source layers. The information on conservation status of the grassland habitats was extracted from the Article 17 dataset (available from http://www.eea.europa.eu/data-and-maps/data/article-17-database-habitats-directive-92-43-eec-1#tab-european-data, last accessed 12th October 2015). Author: Celia García Feced. Note: These maps have not been verified by any validation body. The percentage is first calculated by grid and then the grid values are used to calculate the percentage by NUTS2 (note that this is done only considering presence grids).

The aim of this document is not to interpret these results but it must be emphasized that they have not been validated and should be used with caution. No policy implication should be extracted from these representations.

6 Conclusions

- Given the methodology for reporting under Article 17 of the Habitats Directive, the spatial information on conservation status is originally available at the combination of habitat type, biogeographical region and Member State.

- Although the calculation of the Context Indicator 36, "Conservation status of agricultural habitats (grasslands)", at the NUTS2 level is technically feasible using GIS tools, the spatial analysis at different scales (Member State, biogeographical region, NUTS2, habitat and the combination of habitat and biogeographical region) has shown that the results are not reliable. The reliability decreases as the number of assessments within the NUTS2 increases.

- To be used as a proxy, a grid-based approach has been proposed for the calculation of the indicator at the NUTS2 level. The results, which have not been verified by any validation body, need to be used with a lot of caution, understanding how the conservation status is actually assessed and taking into account the limitations of the methodology. It is not advisable to derive policy implications from these results.

- Unless the Member States systematically collect the data on conservation status at the NUTS2 level, the upscaling of the information from the assessments will lead to a distortion of the reality.

- This analysis has been purely spatial so conclusions may be extrapolable to other indicators that focus on the calculation of the conservation status of other habitat types.

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Appendix 1 Grassland habitat types of Annex I of the Habitats Directive

Habitat Code	Name
6110	Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi
6120	Xeric sand calcareous grasslands
6130	Calaminarian grasslands of the Violetalia calaminariae
6140	Siliceous Pyrenean Festuca eskia grasslands
6150	Siliceous alpine and boreal grasslands
6160	Oro-Iberian Festuca indigesta grasslands
6170	Alpine and subalpine calcareous grasslands
6180	Macaronesian mesophile grasslands
6190	Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis)
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
6220	Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)
6240	Sub-Pannonic steppic grasslands
6250	Pannonic loess steppic grasslands
6260	Pannonic sand steppes
6270	Fennoscandian lowland species-rich dry to mesic grasslands
6280	Nordic alvar and precambrian calcareous flatrocks
62A0	Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae)
62B0	Serpentinophilous grassland of Cyprus
62C0	Ponto-Sarmatic steppes
62D0	Oro-Moesian acidophilous grasslands
6310	Dehesas with evergreen Quercus spp.
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
6420	Mediterranean tall humid grasslands of the Molinio-Holoschoenion
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
6440	Alluvial meadows of river valleys of the Cnidion dubii
6450	Northern boreal alluvial meadows
6460	Peat grasslands of Troodos
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
6520	Mountain hay meadows
6530	Fennoscandian wooded meadows

Source: EC, 2013

Appendix 2 Annex I habitat types associated with MAES grassland ecosystem

Habitat Code	Name
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
1340	Inland salt meadows
1410	Mediterranean salt meadows (Juncetalia maritimi)
1510	Mediterranean salt steppes (Limonietalia)
1530	Pannonic salt steppes and salt marshes
1630	Boreal Baltic coastal meadows
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")
21A0	Machairs (* in Ireland)
2220	Dunes with Euphorbia terracina
2230	Malcolmietalia dune grasslands
2240	Brachypodietalia dune grasslands with annuals
2330	Inland dunes with open Corynephorus and Agrostis grasslands
6110	Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi
6120	Xeric sand calcareous grasslands
6130	Calaminarian grasslands of the Violetalia calaminariae
6140	Siliceous Pyrenean Festuca eskia grasslands
6150	Siliceous alpine and boreal grasslands
6160	Oro-Iberian Festuca indigesta grasslands
6170	Alpine and subalpine calcareous grasslands
6180	Macaronesian mesophile grasslands
6190	Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis)
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
6220	Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea
6230	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
6240	Sub-Pannonic steppic grasslands
6250	Pannonic loess steppic grasslands
6260	Pannonic sand steppes
6270	Fennoscandian lowland species-rich dry to mesic grasslands
6280	Nordic alvar and precambrian calcareous flatrocks
62A0	Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae)
62B0	Serpentinophilous grasslands of Cyprus
62C0	Ponto-Sarmatic steppes
62D0	Oro-Moesian acidophilous grasslands
6310	Dehesas with evergreen Quercus spp.
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
6420	Mediterranean tall humid grasslands of the Molinio-Holoschoenion
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
6440	Alluvial meadows of river valleys of the Cnidion dubii
6450	Northern boreal alluvial meadows
6460	Peat grasslands of Troodos
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)
6520	Mountain hay meadows
6530	Fennoscandian wooded meadows
9070	Fennoscandian wooded pastures

Source: Roscher et al. (2015). Note: in red, grassland habitat types of Annex I of the Habitats Directive (see Appendix 1).