

# Natural habitats field surveys — how to deal with observer variation?



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**Eurosite – the European Land Conservation Network**

# E-Bind: Evidence-based Improvements in the Birds and Habitats Directives Implementation: a systematic review (2018-2021)

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**Improving the  
availability of data and  
information on species,  
habitats and sites**

## Focus Area A

Guidance on the application of existing scientific approaches, methods, tools and knowledge for a better implementation of the Birds and Habitat Directives

## Monitoring of natural habitats



### Comparison of national monitoring schemes to assess the conservation status of natural habitats in accordance with Article 11 of the Habitats Directive in EU Member States.

Main results of the analysis:

- **only 8 out of 27** Member States have successfully implemented the independent Art. 11 natural habitat monitoring scheme;
- the existing schemes vary greatly in the number of plots, sampling pattern and approach to assessing the conservation status of habitats, e.g. Favourable Conservation Status (FCS) thresholds, analysis of habitat structure and functions. Moreover, the approaches to analysing habitat changes are quite different in all countries;
- there are **different approaches to syntaxonomy** and various abundance scales are used (Braun-Blanquet, Tansley, percentage);
- **differences in sample size and sampling pattern**, different phytosociological approaches, make it difficult or even **impossible to compare and analyse raw vegetation data** between any of these countries.
- existing monitoring schemes **are not directly linked** to and integrated with the **data from other project and initiatives** (e.g. Life projects, management plans, EIAs, scientific research, Horizon 2020 projects etc.). We were also **unable to recognize any significant data flow between citizen science projects** and initiatives and Art. 11 monitoring schemes.

## Monitoring of natural habitats



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#### CONCLUSIONS:

Possible improvement of the use of Art. 11 detailed monitoring data in the assessment at a level of biogeographical regions can be considered in three directions:

- **improving the use of existing detailed data**, e.g. by the development of a **common European simplified assessment protocol** for a habitat assessment at a locality level. It can only contain very basic information about the structure of habitat and main threats to their conservation status;
- **testing the implementation of common European protocols** in new natural habitat monitoring surveys. Such protocols could be completed together with more detailed, national forms as an additional task for local experts;
- incorporating such forms into **newly developed monitoring schemes**, especially in countries that have recently joined the EU.

## Monitoring of natural habitats



### Comparison of national monitoring schemes to assess the conservation status of natural habitats in accordance with Article 11 of the Habitats Directive in EU Member States.

SAMPLING PATTERN	
Number of test areas / sample plots / relevés (per 6 years)	
AT: Austria	3198 test areas / 12792 sample plots
CZ: Czechia	permanent monitoring plots, number n/a
DE: Germany	63 sample plots per habitat type in each biogeographical region are selected. If less than 63 occurrences are known, the total occurrences are processed in monitoring (total census) (Ellwanger et. al 2018)
DK: Denmark	2807 test areas / 28070 plots
LT: Lithuania	67 test squares / 1816 plots
LV: Latvia	n/a
NL: The Netherlands	There is a vegetation monitoring scheme with permanent plots ('Landelijk Meetnet Flora'). The set of permanent plots contain 10,000 sites which are resampled every four year. Moreover, all Natura 2000 sites are mapped. Vegetation relevés are made in all sites. From the last 10 years about 75,000 relevés were brought together, indicating that more than 7500 relevés are made each year. These plots relate to all vegetation types, not only to habitat types.
PL: Poland	ca. 6000 test areas /18000 relevés
SK: Slovakia	6668 test areas

## Monitoring of natural habitats



### Comparison of national monitoring schemes to assess the conservation status of natural habitats in accordance with Article 11 of the Habitats Directive in EU Member States.

Test areas/plots size and pattern	
AT: Austria	Test areas of 1x1 km size with 4 sample plots each
CZ: Czechia	Permanent monitoring plots (TMP), 5x5 m for non-forest habitats, 20x20 m for forest habitats, standing waters – whole reservoir, running waters – 1 km transect
DE: Germany	n/a
DK: Denmark	Each locality includes 8-12 small plots (5 m circles)
LT: Lithuania	Test squares - 17 km <sup>2</sup> , transect - 200 x 10 m
LV: Latvia	Transects with 3-10 sample plots. Different plot sizes depending on the habitat group (5-2500 m <sup>2</sup> )
NL: The Netherlands	There is no common monitoring scheme for habitats. There is however a scheme for vegetation mapping which is related to receiving subsidies for management (so called 'Subsidie Natuur en Landschapsbeheer'-scheme). These maps are also used as a basis for habitat maps. There is a field protocol for vegetation mapping and there is a protocol to translate vegetation units into habitat types for the terrestrial habitat types. The marine and aquatic habitat types are monitored within the Marine Strategy Framework Directive MSFD and Water Framework Directive (WFD). This is carried out through a set of point sampling.
PL: Poland	Transects, size: 200x10m; 3 relevés in each transect (size 5x5 m or 10x10m)
SK: Slovakia	Permanent monitoring localities (PML). Size: 0,5 ha – 70 ha

# Monitoring of natural habitats



## Comparison of national monitoring schemes to assess the conservation status of natural habitats in accordance with Article 11 of the Habitats Directive in EU Member States.

CONSERVATION STATUS ASSESSEMENT	
Assessment of conservation status (biogeographical region, Natura 2000 site, test area)	
AT: Austria	Assessment is done at biogeographical region level.
CZ: Czechia	The assessment is done during the habitat mapping, referring to the patches of habitats but not to the permanent plots. Specific structure and functions are scored on a 3-point scale – favourable, less favourable, unfavourable
DE: Germany	The degree of conservation of each habitat plot is included in the parameter. The degree of conservation of each habitat plot is based on specific assessment schemes of the components ‘habitat structures’, ‘typical species’, and ‘pressures and threats’ (Ellwanger et. al 2018).
DK: Denmark	Assessment is done at biogeographical region level.
LT: Lithuania	Assessment of conservation degree at Natura 2000 site level
LV: Latvia	Each locality is assessed referring to a number of indicators describing structure, typical species and impacts. Every indicator is rated on a 3-point scale. The maximal number of points depends on number of indicators and typical species assessed, e.g. maximal grade for grasslands is 54.
NL: The Netherlands	The main level is national/biogeographical. On site level assessments are made for the purpose of the Natura 2000 Standard DataForm.
PL: Poland	The conservation status of natural habitat is assessed both on a level of field plot and Natura 2000 site. The same scale as on BG level is used: FV-U1-U2
SK: Slovakia	Yes. Evaluation of the conservation status of habitats at locality level is based on the evaluation of partial parameters: a) Quality of the habitat at the locality. b) Perspectives of the habitat at the locality. These parameters are evaluated during a field visit, according to a defined methodology for each habitat separately or by an expert estimate of the mapper. The method usually sets limits for individual conservation status categories (favourable, unfavourable-inadequate, unfavourable-bad).

# What about observer variation (using the same or similar methods)?



- Chmura D. Salachna A, Sierka E. 2016. Comparison of visual estimation of the canopy cover with the canopyscope assessment. Sylwan 160.
  - Traditional visual method is not that based, but it needs experience; using canopyscope much better
- Chmura D., Salachna A. 2016. The Errors in Visual Estimation of Plants Cover in the Context of Education of Phytosociology. Chemistry-Didactics-Ecology-Metrology 21(1-2).

It can be concluded that point-method is not suitable for study of forest floor vegetation. It can be merged with other methods. Due to many repetitive measures, it can be helpful in learning of recognition of species.



Student working with Levy bridge -wooden frame with ten holes designed to estimate plant abundance

# But, do we really need more and more accurate data?



- What if...
  - we focused on evaluation/conservation status assessment, not on detailed data (species abundance etc.)
  - we trusted best expert judgement, his impressions and feelings
  - we used remote sensing and machine learning to extrapolate this evaluation???

# Extrapolating and upscaling solutions...



# **Monitoring of Natural Habitats in Poland**

## **Indicators of Favourable CS – natural habitats**

**1.Parameter: Area - no additional indicators, best expert judgement**

**2.Parameter: Specific structure and functions**

- **Set of indicators specific for each of habitats type (6-13 indicators for a type)**
- **Selected main/crucial indicators or each of habitats, for any of them – automatic degradation of parameter assesment, regardless other indicators assesment**
- **Evaluation table for each indicator-habitat is used by local experts to assess the values of indicators – FV/U1/U2 system for each assesment**

**3.Parameter: Future prospects - no additional indicators, best expert judgement**

**4.General assesment – lowest assesment of 3 parameters**

# Indicator of specific structure and functions on natural habitats

- Indicators detect the **crucial environmental changes** that might affect the maintenance of specific structure and functions of habitats
  - Indicators reflect changes that are possible in next 6 or 12 years
    - Easy and quick measurement or simple expert judgement
      - No expensive equipment
- Enable to differentiate the state of habitat – more or less Gauss distribution
  - repeatability
- We avoid measurement of phenomena with high variation (seasonal or daily) –
  - the feature shall be evaluable during one day field visit

# ASSESSMENT

BIOGEO. REGION = NATURA 2000 SITE = TRANSECT/PLOT

THE SAME PARAMETERS AND ASSESSEMENT APPROACH

1. Area
2. Specific structure and functions
3. Future prospects
4. General assessement

**FV** – favourable

**U1** – unfavorable – inadequate

**U2** - unfavorauble – bad

**XX** – unknown

# PARAMETER: SPECIFIC STRUCTURE AND FUNCTION

indicators for 2330 and 6120 habitats

2330 – Inland dunes with open <i>Corynephorus</i> and <i>Agrostis</i> grasslands		6120 – Xeric sand calcareous grasslands
<b>Structure and functions</b>	Characteristic species	Characteristic species
	Alien invasive species	Alien invasive species
	Expansive species	Expansive species
	Expansion of trees and shrub	Expansion of trees and shrub
	Occurrence of eolic processes	Fragmentation
	Area of habitats	Ecotone structure
	Characteristic dry grassland species	
	Other disturbances	

# Monitoring – the answer

<b>NO</b>	<b>REMOVAL 200 EUR</b>	<b>REMOVAL 200 EUR</b>	<b>NO</b>	<b>NO</b>
<b>NO</b>	<b>REMOVAL 200 EUR</b>	<b>REMOVAL 200 EUR</b>	<b>REMOVAL 100 EUR</b>	<b>NO</b>
<b>NO</b>	<b>REMOVAL 100 EUR</b>	<b>REMOVAL ; 200 EUR</b>	<b>REMOVAL 100 EUR</b>	<b>REMOVAL 200 EUR</b>
<b>NO</b>	<b>REMOVAL 100 EUR</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>
<b>NO</b>	<b>NO</b>	<b>REMOVAL 100 EUR</b>	<b>NO</b>	<b>NO</b>

## 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) in Poland

### 6210\* Xerothermic grasslands (*Festuco-Brometea*)



Photo 1 Grassland on gypsum in „Przęślin” nature reserve (© J. Perzanowska)

## 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) in Poland



Photo 2 Grassland on a rock with fescue *Festuca pallens* in the Jura (© J. Perzanowska)



Photo 3 Grassland with wild marjoram *Origanum vulgare* on Podskalnia Skąta in the Pieniny mountains (© J. Perzanowska)

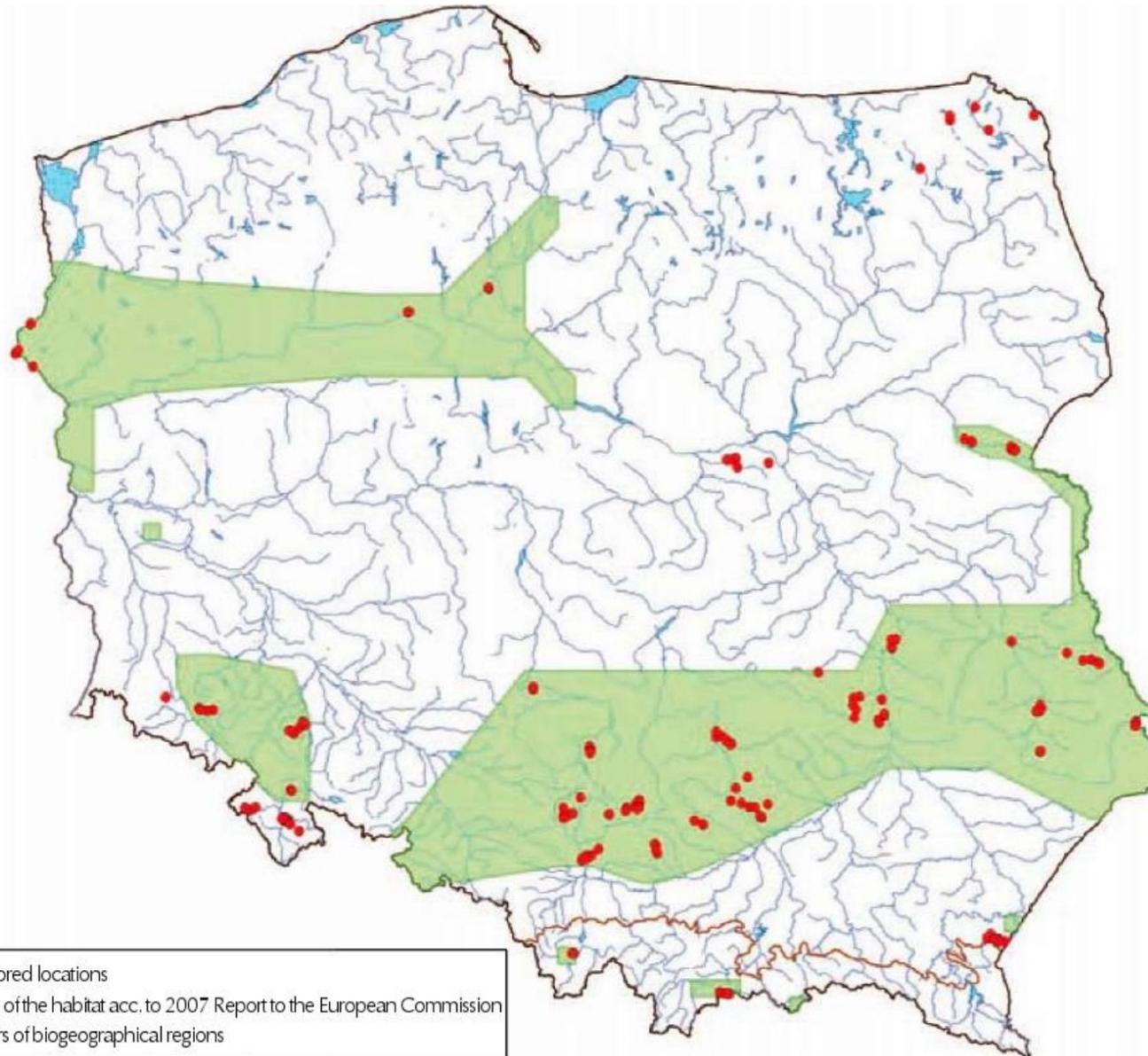


Photo 4 Grassland with feathergrass *Stipa joannis* in Skorocice reserve (© J. Perzanowska)



Photo 5 Grassland with capillary needlegrass *Stipa capillata* in Gartatowice (Niecka Nidziańska) (© J.

# 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) in Poland



# 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) in Poland

Table 2 Evaluation of selected status parameters and indicators of the specific structure and functions of natural habitat 6210 - xerothermic grasslands (*Festuco-Brometea*)

Parameter/ indicator	Appropriate FV	Unsatisfactory U1	Bad U2
Surface area of the habitat on the monitored location	Does not change or increases	Other combinations	An evident decrease in the habitat area in comparison with previous studies or cited in references
Specific structure and functions			
Characteristic species	There are at least five species of vascular plants among the characteristic species listed	There are 2-5 species of vascular plants among the characteristic species listed	There is one species of vascular plant among the characteristic species listed or these species are absent
Alien Invasive Species	None	Invasive species occur singly and they occupy no more than 5% of the area (up to 2 species)	Invasive species are numerous, occupying more than 5% of the area (more than 2 species)
Native expansive species of herbs	None or possibly one species occurring singly	Present, 1-2 species with scattered occurrence	More than 2 species forming dense patches
Expansion of shrubs and underwood	None or a small coverage by shrubs and undergrowth below 10% of the area, sporadic occurrence	Coverage by shrubs or trees from 10 to 25% of the area (shrubs do not form dense bushes), with scattered occurrence	Coverage by trees and shrubs in more than 25% of the area (they form compact shrub), occur in dense groups
Number of orchid species	Occurs when there are more than 3 species	1-2 species	None
Maintenance of the ecotonal zone	Grasslands transform gradually into other natural and seminatural plant communities	Grasslands border partially with anthropogenic communities or there is not a gradual transition into other natural or seminatural habitats	Clear boundary between grasslands and anthropogenic communities (mainly arable land), delineated by the range of human activity (e.g. ploughing)

# 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) in Poland

General structure and functions	All cardinal indices evaluated as FV, other evaluated at least as U1	All cardinal indices evaluated at least as U1	One or more cardinal indices evaluated as U2
Conservation prospects	Prospects for the maintenance of the habitat good or excellent, no impact of threatening factors is predicted	Other combinations	Conservation prospects for the habitat are bad, strong impact of threatening factors observed, no survival of the habitat can be guaranteed in longer time perspective
Overall assessment	All parameters evaluated as FV	One or more parameters evaluated as U1, no U2 assessments	One or more parameters evaluated as U2

## Cardinal indices

- Characteristic species
- Expansive native species of herbs
- Expansion of shrubs and underwood

# 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) in Poland

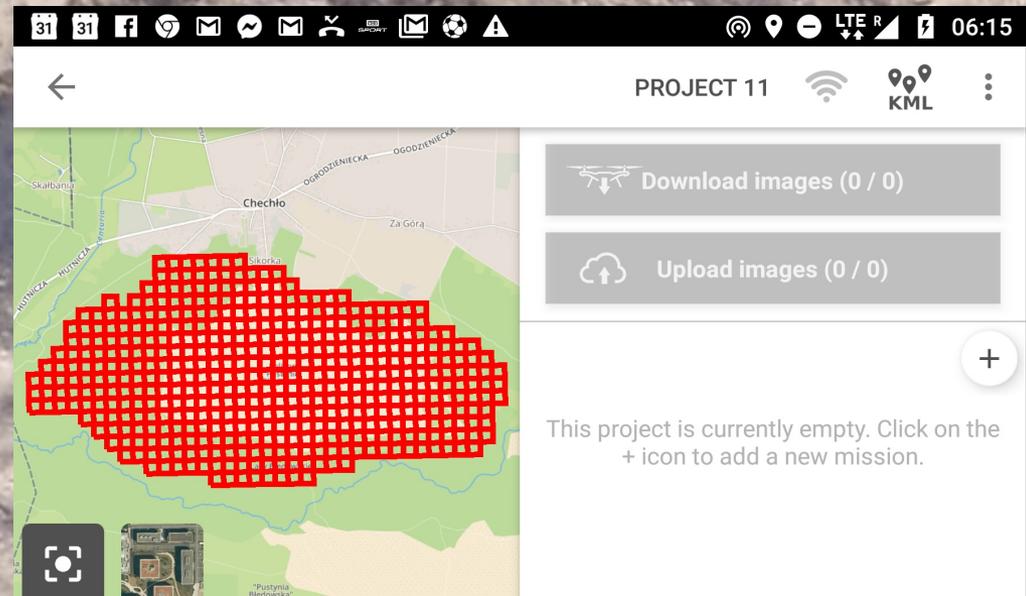
TRANSECT			
Indicators	Description	Value of the indicator	Assessment of indicator
Surface area of the habitat	Estimated total area of the habitat within the Natura 2000 site is ca 20,000 square metres; 2,000 square metres were evaluated (one monitoring location). The area of the habitat at the monitoring location tends to decrease due to increasing coverage by trees and shrubs. The change rate is not too fast. Current density of layers is ca 10% and there are still characteristic as well as rare and protected species in the habitat.		U1
Specific structures and functions			U1
Percentage proportion of the habitat in the transect	Percentage of the area occupied by the habitat in the transect (with accuracy of up to 10%)	Habitat occupies 100% of the monitored area	FV
Characteristic species	List of characteristic species (Latin names); cite the percentage share of area occupied by every species in the transect (with accuracy of up to 10%)	<i>Greater knapweed</i> <i>Centaurea scabiosa</i> 25%, <i>tor-grass</i> <i>Brachypodium pinnatum</i> 15%, <i>carnation grass</i> <i>Carex flacca</i> 5%, <i>carline thistle</i> <i>Carlina acaulis</i> 5%, <i>cross gentian</i> <i>Gentiana cruciata</i> 5%	FV
Alien invasive species	List of invasive species alien in terms of geographical location (Latin names); cite the percentage share of area occupied by every species in the transect (with accuracy of up to 10%)	<i>Canadian goldenrod</i> <i>Solidago canadensis</i> 3%	U1
Native expansive species of herbs	List of species (Latin names); cite the percentage share of area occupied by every species in the transect (with accuracy of up to 10%)	Tall oat grass <i>Arrhenatherum elatius</i> 3%	U1

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Expansion of bushes and underwood	List of species (Latin names); cite the percentage share of the area occupied by all expansive species of shrubs and trees in the transect (with accuracy of up to 10%)	Density of shrub layers 10% perry <i>Pyrus communis</i> below 2% dog rose <i>Rosa canina</i> 5% blackthorn <i>Prunus spinosa</i> 2% whitehorn <i>Crataegus monogyna</i> 2%	U1
Number of orchid species	Number and list of species	2 species: common twayblade <i>Listera ovata</i> , broad-leaved helleborine <i>Epipactis helleborine</i>	U1
Maintenance of ecotonal zone	Gradual transformation of grasslands into other natural and seminatural plant communities is an optimal status	Poorly developed ecotonal zone, created mainly by blackthorn <i>Prunus spinosa</i> (b)	U1
Conservation prospects	Prospects for protecting the natural habitats are very good provided that appropriate measures are taken (extensive grazing, removing shrub layer)		FV
Overall assessment		FV	U1
Proportion of the habitat area representing different conservation status within the monitoring location		U1	
		U2	

Human activity				
Code	Name of activity	Intensity	Impact	Description
141	Abandoned pasturing	A	-	Extensive grazing which maintains correct habitat structure is not applied in the monitoring location

# and how to combine the assesement of indicators with remote sensing – we will discuss tomorrow...





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