German Centre for
Integrative Biodiversity Research (iDiv)
Halle-Jena-Leipzig

T.5.2: BON in support of the Habitats Directive

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sMon Biodiversitätstrends in Deutschland

Objective

- To demonstrate a workflow to leverage monitoring data on biodiversity and potential drivers for two habitats of the Habitats Directive

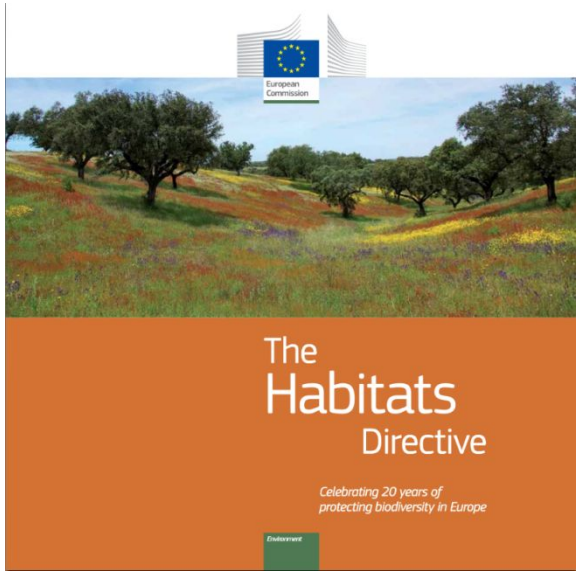


Table 1.1 **Categories of EU population status of birds and EU conservation status of habitats and species**

EU Status	Good	Poor	Bad	Unknown
Categories of EU biogeographical **conservation status of habitats and species** of Community interest	Favourable	Unfavourable- inadequate	Unfavourable-bad	Unknown

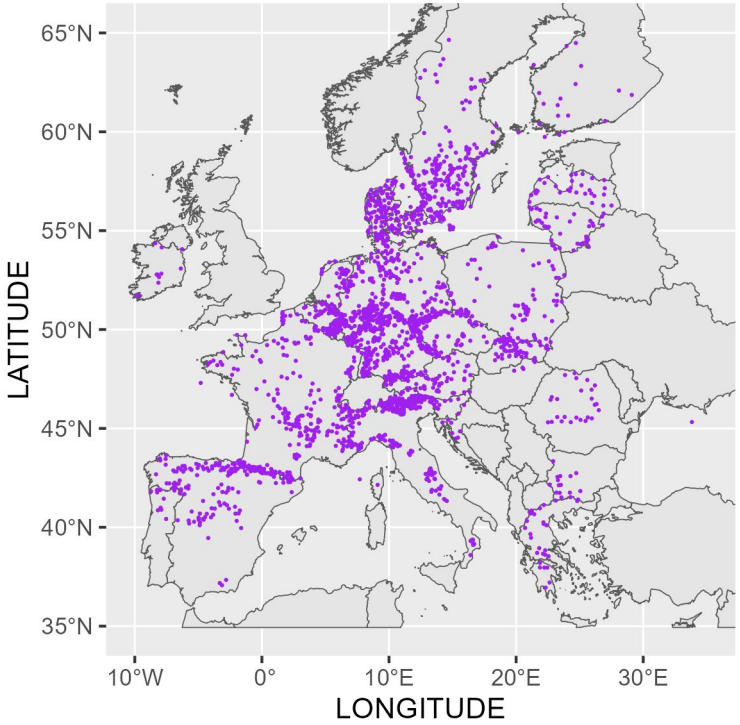
Luzulo-Fagetum beech forest (9110)

Nardus grasslands (6230)

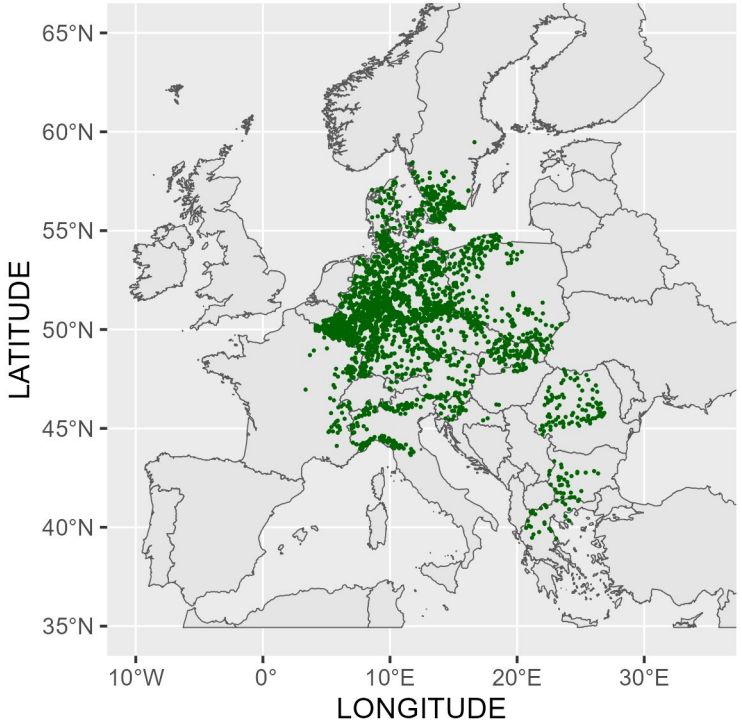
Abb. 45-48

Distribution in Natura2000 db (based on reports)

Nardus grasslands (6230)



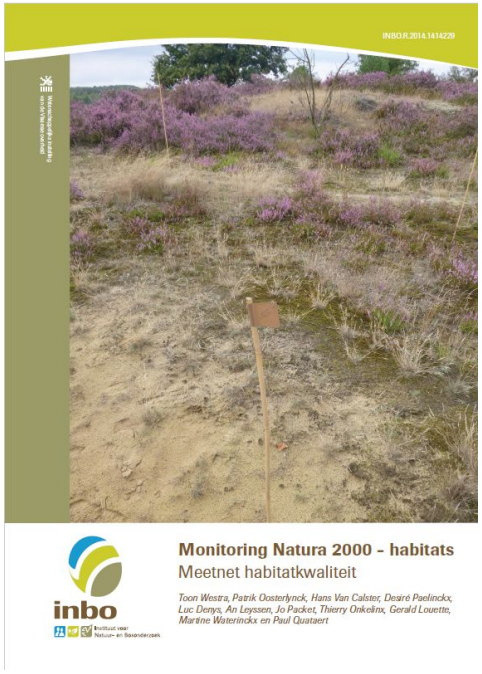
Luzulo-Fagetum beech forest (9110)



Task 1

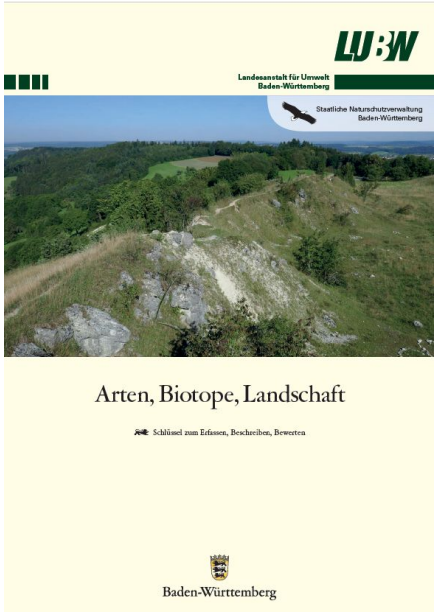
Compile the **national mapping keys** and assess the consistency of the habitat type definitions

Belgium/Flanders

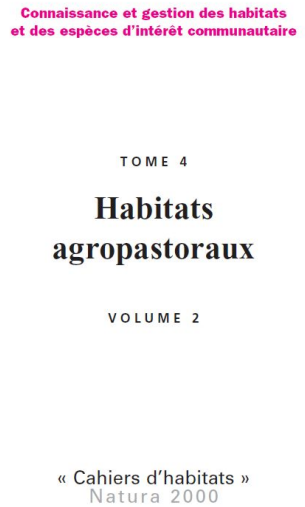


Bosnia-Herzegovina

Germany/Baden-Württemberg



France



Integration across data sources

Occurrence of showcase habitats in member states (and supporting countries)

Country	6230	9110	species list available
Albania	Y	N	N
Austria	Y	Y	Y
Belgium	Y	Y	Y
Bosnia and Herzegowina	Y	Y	Y
Bulgaria	Y	Y	Y
Croatia	Y	Y	Y
Czechia	Y	Y	Y
Denmark	Y	Y	Y
Finland	Y	N	Y
France	Y	Y	Y
Germany	Y	Y	Y
Greece	Y	Y	Y
Hungary	Y	Y	Y
Ireland	Y	N	Y
Italy	Y	Y	Y

Country	6230	9110	species list available
Kososvo	Y	N	N
Latvia	Y	N	Y
Lithuania	Y	N	Y
Luxembourg	Y	Y	Y
Montenegro	Y	Y	Y
Netherlands	Y	Y	Y
Northern Macedonia	Y	N	N
Poland	Y	Y	Y
Portugal	Y	N	Y
Romania	Y	Y	N
Serbia	Y	N	N
Slovakia	Y	Y	Y
Slovenia	Y	Y	N
Spain	Y	N	Y
Sweden	Y	Y	Y
United Kingdom	Y	N	Y

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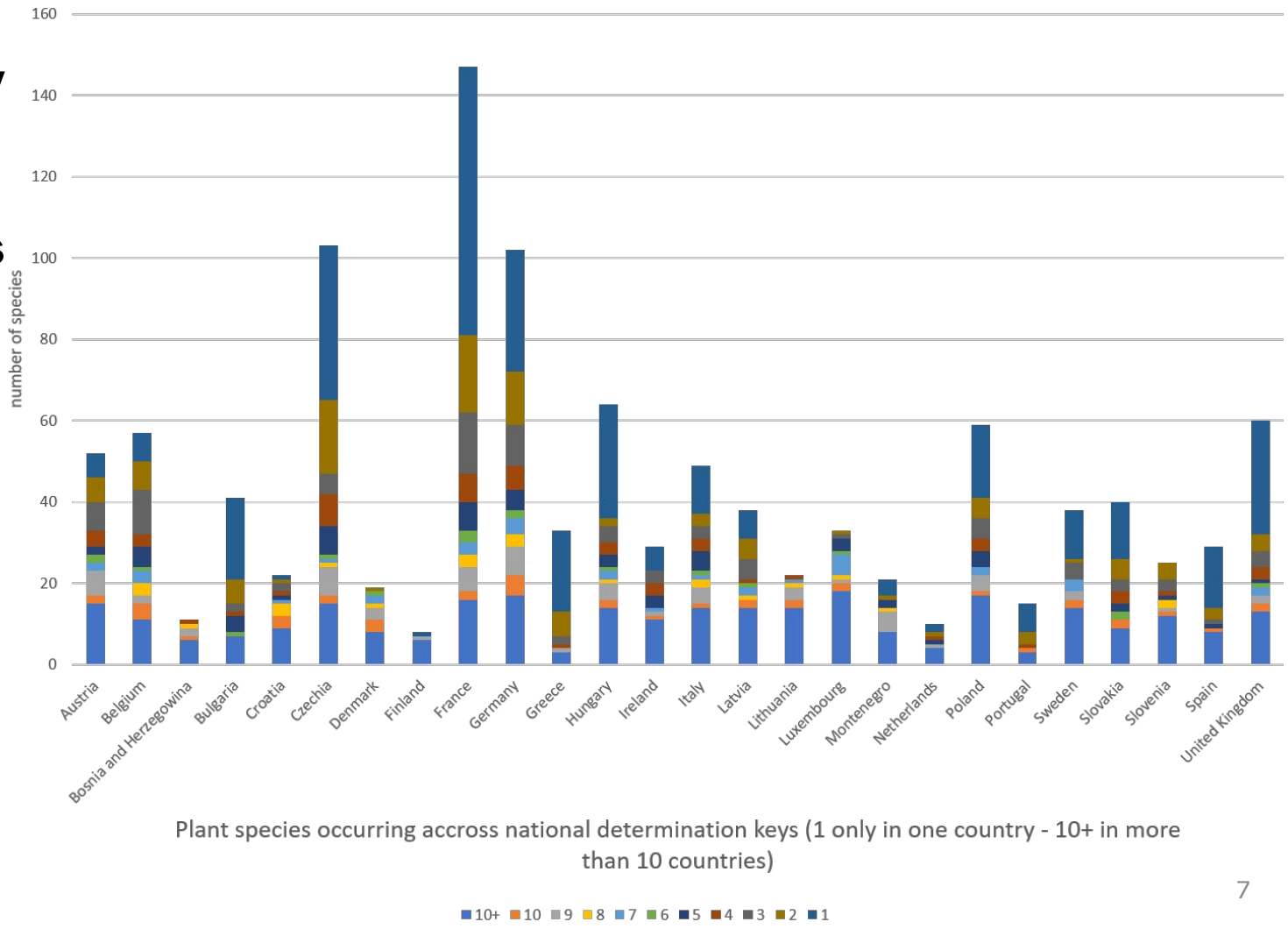
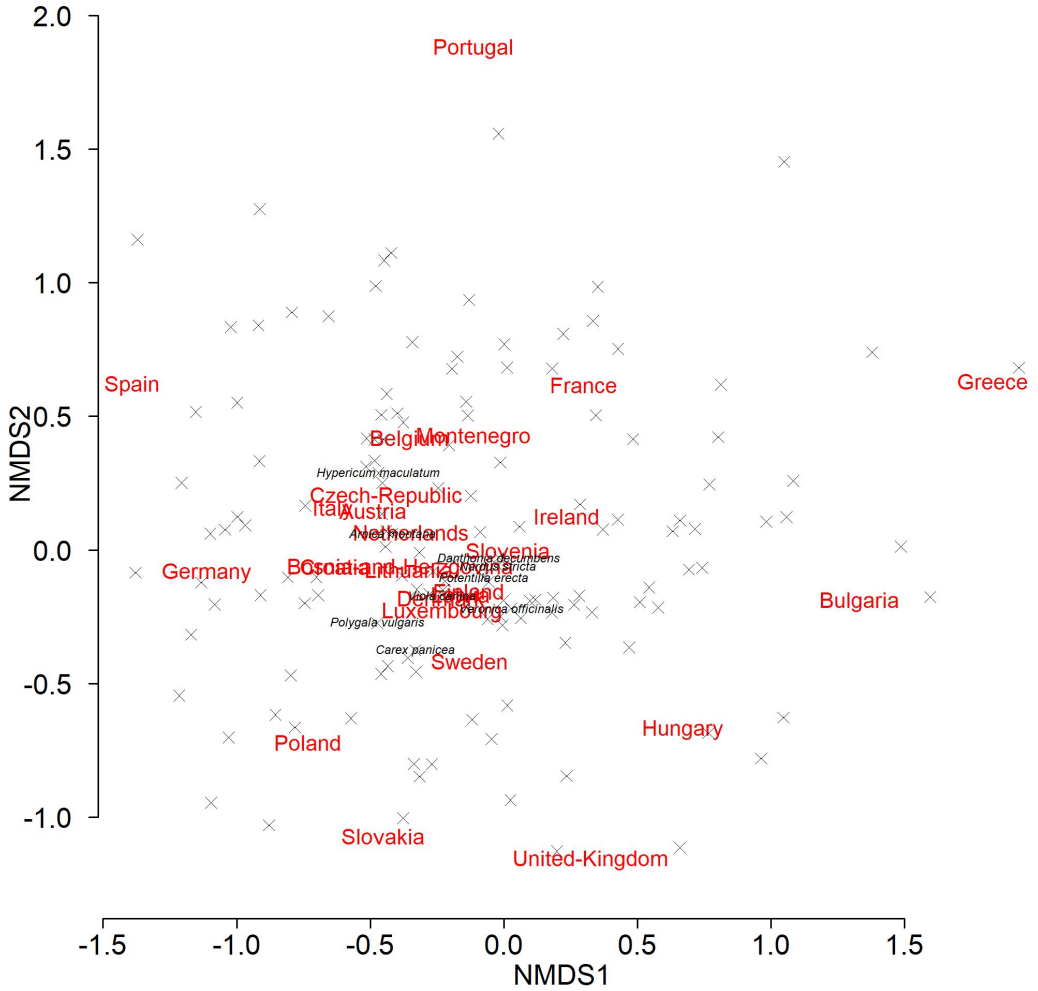
Inconsistency of national mapping keys



Inconsistency of national mapping keys

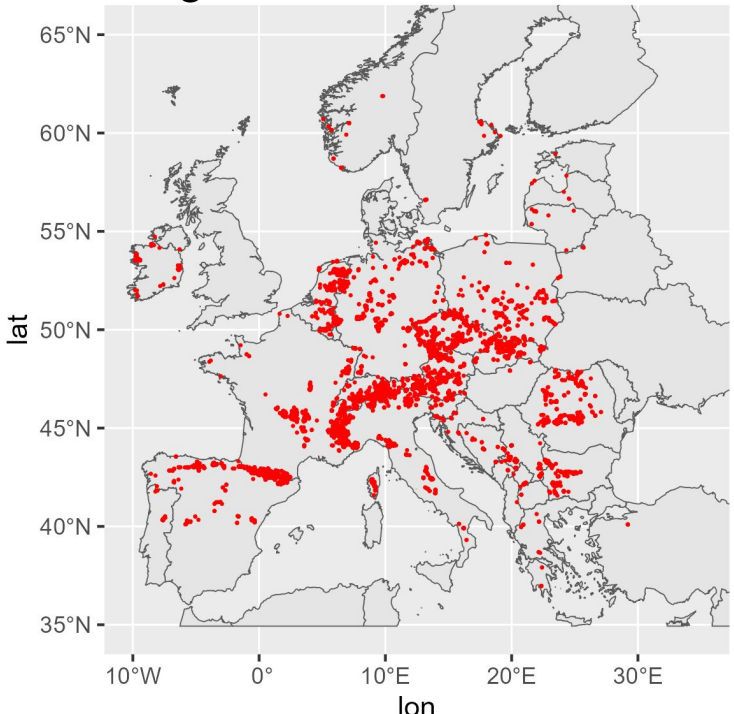


Task 2
Mobilize raw data

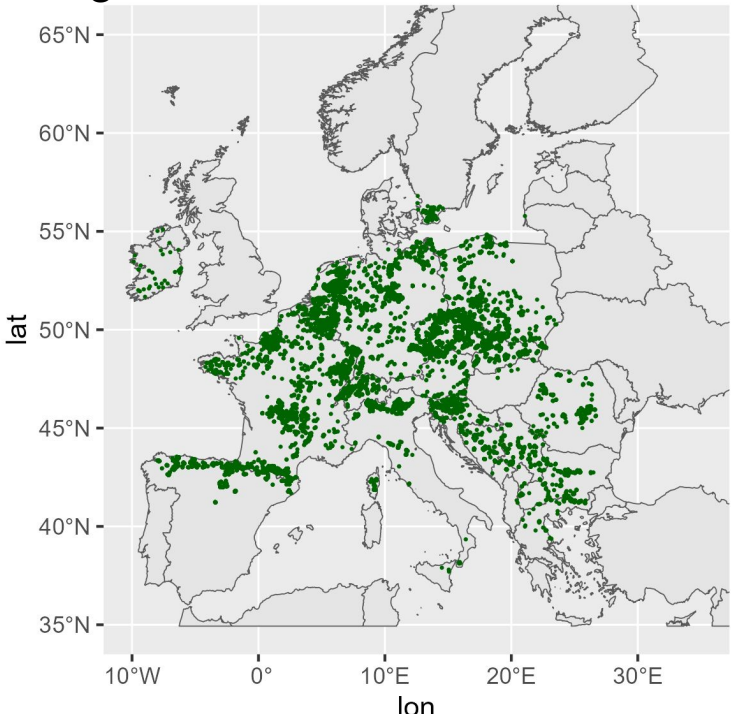
- **EVA database**

- ResurveyEurope (under construction)
- Global Biodiversity Observation Facility
- Asking for target habitat data directly at national agencies

Nardus grassland



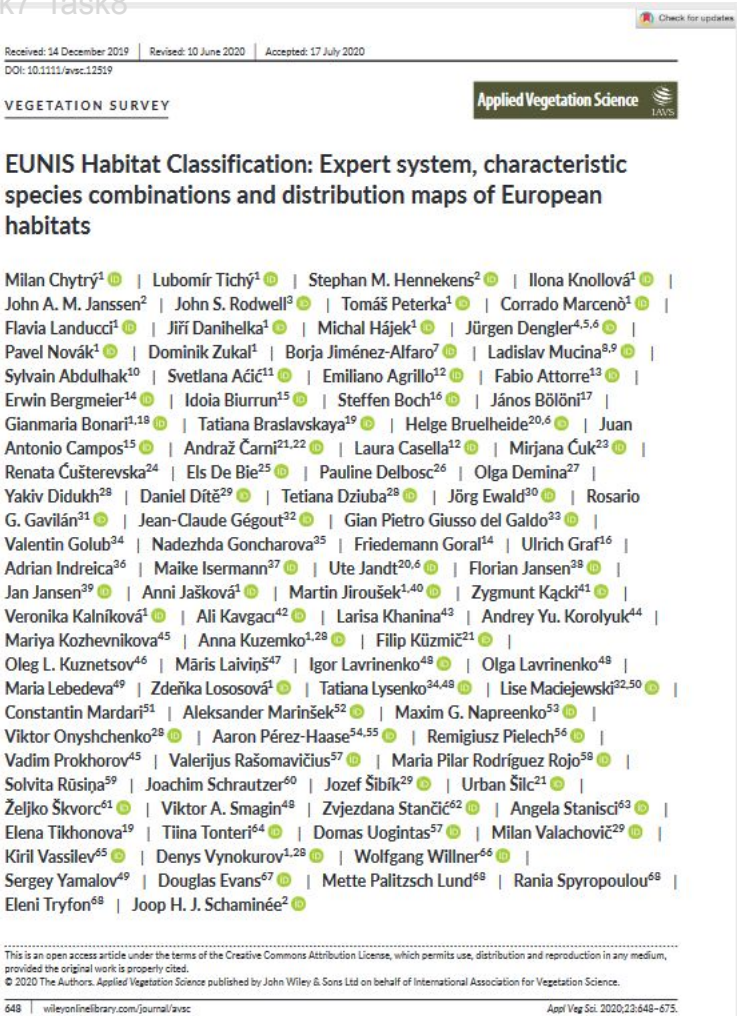
Fagus forest on acid soils



Task 3

Classify raw data using the national mapping keys

Building an unequivocal identification key (Expert System) from national manuals



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VEGETATION SURVEY

Applied Vegetation Science

EUNIS Habitat Classification: Expert system, characteristic species combinations and distribution maps of European habitats

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Building national machine-readable mapping keys with ESy

Būdingos augalų rūšys (tipinės rūšys paryškintos)

Antennaria dioica	***Viola canina***
Botrychium lunaria	*Agrostis capillaris*
Carex pilulifera	*Arnica montana*
Danthonia decumbens	*Carex pallescens*
Gentiana pneumonanthe	*Carex pulicaris*
Hypericum maculatum	*Deschampsia flexuosa*
Nardus stricta	*Festuca ovina*
Polygala vulgaris	*Festuca rubra*
Potentilla erecta	*Hypochaeris maculata*
Scorzonera humilis	*Platanthera bifolia*
Veronica officinalis	*Thymus pulegioides*

Buveinės atpažinimas

Minimalūs buveinės reikalavimai

- Būdingų rūšių skaičius – bent 8, iš jų bent 4 tipinės rūšys, dominuoja *Nardus stricta* arba *Danthonia decumbens*, retai – *Festuca rubra*.
- Augalinės dangos susivėrimas – ne mažiau kaip 70 %.

Neigiami požymiai, dėl kurių buveinė neišskiriama

- Medžiais ir krūmais apaugęs didesnis kaip 40 % plotas.
- Pieviniai mezofitai vyrauja ar nitrofilinės žolės paplitusios didesniame kaip 60 % plote.
- *Calluna vulgaris* vyrauja didesniame kaip 60 % plote.

Skiriamieji buveinės požymiai

Charakteristische Pflanzenarten (wertbestimmende/LRT-kennzeichnende Arten):
Trockene Ausprägung: Agrostis capillaris, Antennaria dioica, Carex leporina, Danthonia decumbens, Dianthus deltoides, Festuca ovina s. str., Hieracium pilosella, Hypericum perforatum, Luzula campestris, L. multiflora, L. pallidula, Nardus stricta, Polygala vulgaris, Veronica officinalis, Viola canina
Feuchte Ausprägung: Arnica montana, Carex nigra, C. ovalis, C. pallescens, C. panicea, C. pilulifera, Dactylorhiza maculata, Erica tetralix, Juncus squarrosus, Galium saxatile, Gentiana pneumonanthe, Hydrocotyle vulgaris, Hypericum maculatum, Lotus uliginosus, Luzula campestris, Molinia caerulea, Nardus stricta, Pedicularis sylvatica, Polygala serpyllifolia, Potentilla erecta, Salix repens, Succisa pratensis, Viola canina, V. palustris

Fran- und Blütenpflanzen:	Mindestens 6 charakteristische Arten, darunter *Nardus stricta* bestandsbildend und mindestens 2 weitere LRT-kennzeichnende Arten	Mindestens 4 charakteristische Arten, darunter *Nardus stricta* bestandsbildend und mindestens 1 weitere LRT-kennzeichnende Art	Mindestens 2 charakteristische Arten, darunter *Nardus stricta* bestandsbildend, mindestens 1 weitere LRT-kennzeichnende Art

Abb. 57-58

```
9          F6230 Species-rich Nardus grasslands
(<#20 Constant-species-6230> AND <#10 Typical-species-6230>) NOT <#TC dwarf-shrubs-6230 GR 25>
```

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Building national machine-readable mapping keys with ESy

Natura2000-ESy: **Expert system for automatic classification of European vegetation plots to Natura 2000 habitats**

ESy is based on formal definitions of habitats written as logical formulas in an editable script stored as a TXT file. ESy files have three sections:

SECTION 1: Species aggregation

harmonize between national versions of interpretation manual
adapt for compatibility with EVA data

SECTION 1: End

SECTION 2: Species groups

groups of significantly co-occurring species in target habitats

SECTION 2: End

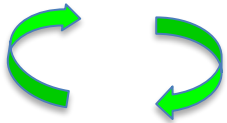
SECTION 3: Group definitions

combine species groups with logical operators to harmonize definitions from national manuals

SECTION 3: End

SECTION 4: Similarity

SECTION 4: End



Check and adapt using national natura2000 data

Task 4

Crosswise application of national mapping keys

Example EUNIS R1M Lowland to montane, dry to mesic grassland usually dominated by Nardus stricta, 3 species

Country	AT 3	BE 3	BIH 3	BG 3	HR 3	CZ3+1	FR 3	DE 3+1	IE 3	IT 3	LV 3	NL 3	PT 3	SK 3	SI 3	ES 3	SE 3
AT	100	100	79.17	93.75	95.83	97.92	100	93.75	93.75	100	64.58	8.33	37.5	100	95.83	93.75	100
BE	97.44	100	71.79	71.79	94.87	89.71	100	94.87	82.05	100	82.05	48.72	51.28	94.87	97.44	89.74	100
BIH	100	100	100	100	100	100	100	100	100	100	0	0	100	100	100	100	100
BG	88.89	92.3	66.67	96.3	59.26	55.56	100	25.93	62.96	77.78	22.22	0	48.15	88.89	81.48	62.96	77.78
HR	88.89	100	100	77.78	88.89	77.78	100	77.78	88.89	100	44.44	11.11	11.11	100	100	0	100
CZ	99.61	98.83	72.66	90.63	78.52	87.5	100	89.06	91.02	99.61	61.72	6.25	23.83	100	97.66	72.66	97.66
FR	96.57	97.2	44.24	63.86	85.05	78.19	100	89.1	77.88	97.82	61.99	25.23	23.46	81.93	92.21	59.81	96.57
DE	98.35	99.67	67.99	84.16	97.36	87.46	100	91.75	86.14	98.68	74.92	36.63	48.84	95.05	99.01	87.13	99.34
IE	98.57	100	78.57	85.71	90	87.14	100	94.29	97.14	98.57	70	35.71	74.29	80	97.14	87.14	98.57
IT	87.5	91.67	25	91.67	66.67	70.83	100	58.33	54.17	87.5	50	0	0	87.5	83.33	75	70.83
LV	100	100	100	100	100	100	100	75	100	100	75	0	100	100	100	100	100
NL	96.79	100	24.31	42.2	88.07	64.22	100	90.37	71.56	99.54	87.16	5.5	9.17	73.39	92.66	72.48	99.54
PT	80	100	60	20	40	20	100	60	60	80	0	0	20	60	80	80	80
SK	100	95.83	95.83	98.61	91.67	95.83	100	97.22	88.89	100	79.17	2.78	33.33	100	100	77.78	98.61
SI	100	100	0	0	100	0	100	100	0	100	100	0	0	0	100	0	100
ES	94.14	98.28	40	68.28	75.52	76.55	100	61.72	87.93	96.55	43.79	15.17	33.45	65.17	93.45	68.62	96.9
SE	100	100	53.85	92.31	100	84.62	100	84.62	76.92	100	84.62	11.54	26.92	92.31	100	80.77	100

Task 4

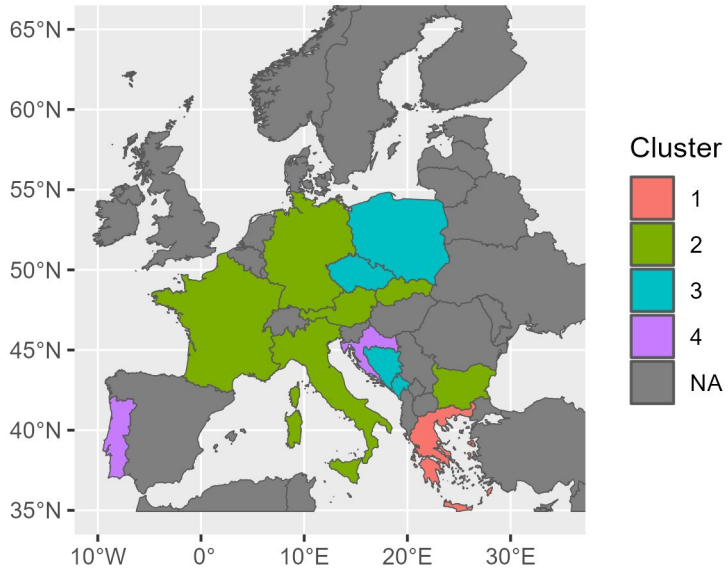
Crosswise application of national mapping keys

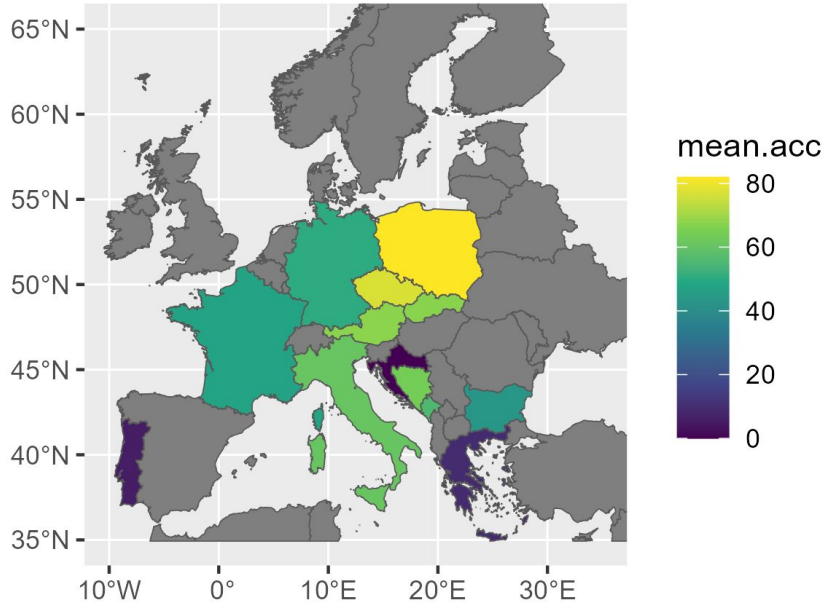
Example EUNIS R43 Temperate acidophilous alpine grassland, 3 species

Country	AT 3	BIH 3	BG3	HR3	CZ3+1	FR3	DE3+1	EL3	IT3	MK3	PL3	PT3	SK3
AT	70.96	9.19	54.15	9.93	43.33	81.51	32.35	10.14	59.93	52.78	70.8	0.11	63.45
BIH	76	8	81.33	14.67	62.67	82.67	29.33	16	70.67	66.67	81.33	0	52
BG	25.12	2.93	88.15	2	17.96	70.31	12.32	41.67	35.45	36.15	50	0.23	62.23
HR	0	0	0	0	0	16.67	0	0	0	0	0	0	0
CZ	82.22	18.89	50.56	10.56	42.22	81.67	68.33	0	76.11	66.11	97.22	0	71.67
FR	52.03	10.16	42.72	9.67	22.26	87.9	27.48	19.31	45.07	39.52	40.45	1.28	42.86
DE	71.43	7.14	42.56	7.14	50	64.29	14.29	7.14	21.43	64.29	64.29	0	28.57
EL	9.09	0	31.82	0	4.55	72.73	0	100	13.63	9.09	9.09	0	9.09
IT	65	11.36	50.9	16.21	34.55	85.45	29.39	21.67	58.18	46.82	54.55	0.3	56.82
MK	66.67	0	72.22	5.56	55.56	100	16.67	38.89	94.44	66.67	77.78	0	44.44
PL	76.47	7.84	84.31	3.92	74.51	96.08	50.98	1.96	70.59	70.59	92.16	0	88.24
PT	10.53	0	0	0	0	47.37	10.53	0	5.26	0	15.79	15.79	0
SK	53.64	5.86	54.3	2.08	49.53	68.31	28.3	0.27	47.24	46.85	80.68	0	80.95

Comparison of national mapping keys. Minimum 3 species, 4 clusters

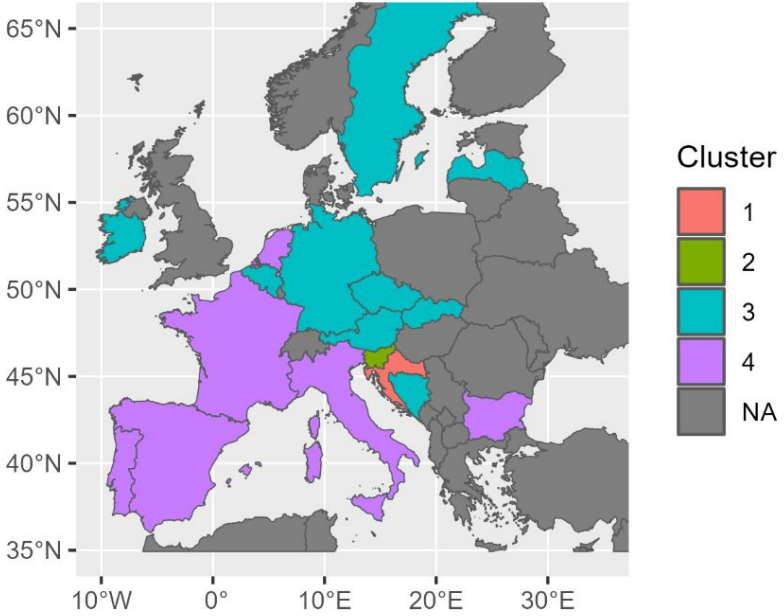
EUNIS R1M Lowland to montane, dry to mesic grassland usually dominated by Nardus stricta

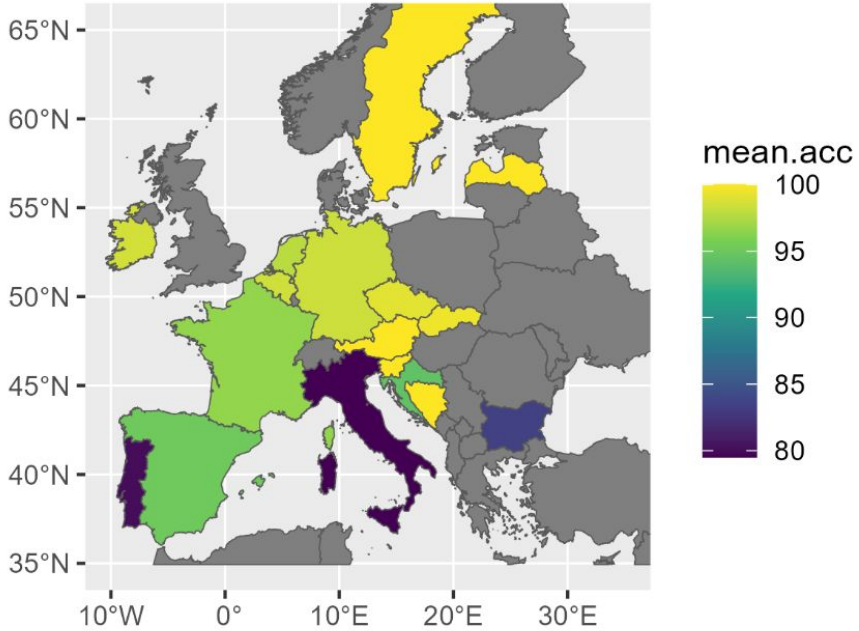




Comparison of national mapping keys. Minimum 3 species, 4 clusters

EUNIS R43 Temperate acidophilous alpine grassland





Task 5

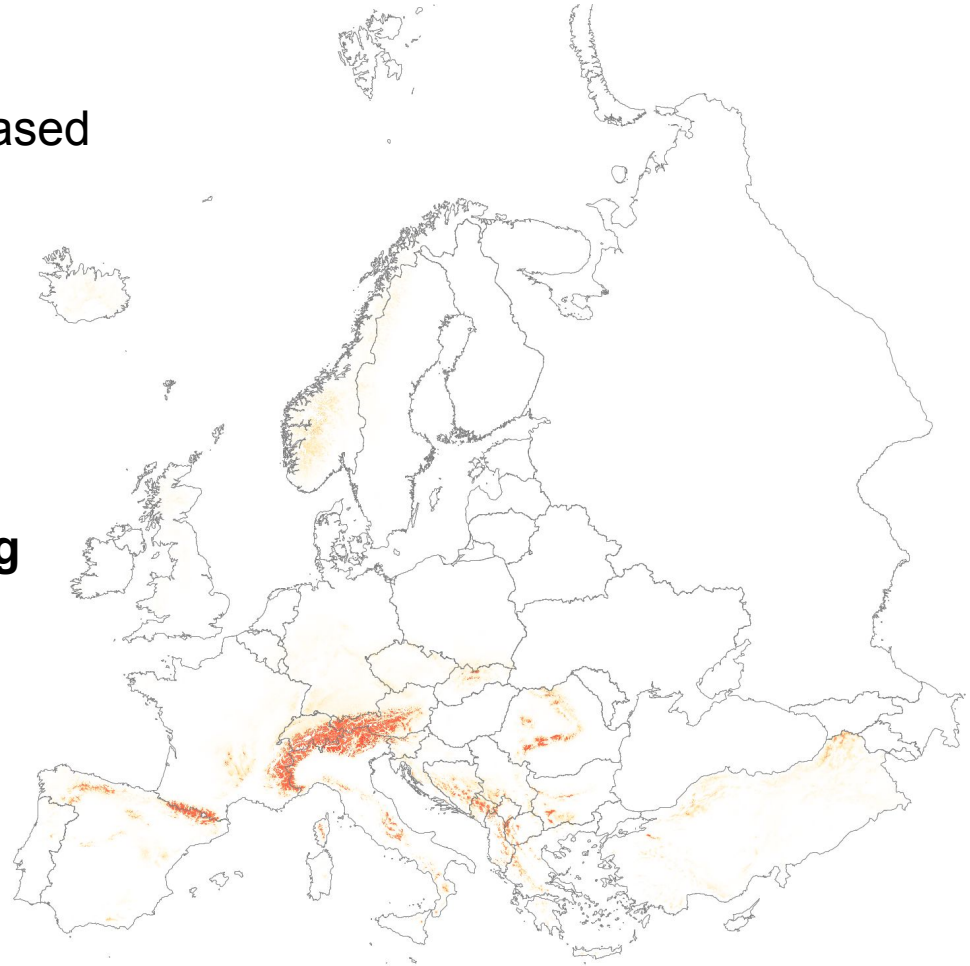
Unify mapping keys across countries that use similar keys

-> consistent definitions of ecosystem composition

Task 6 (outlook)

Produce habitat suitability maps based on unified mapping keys
-> ecosystem extent

Distribution and habitat suitability maps of revised EUNIS grassland types
R43
Temperate-acidophilous-alpine-grassland
EEA project, Stephan Hennekens, Wageningen



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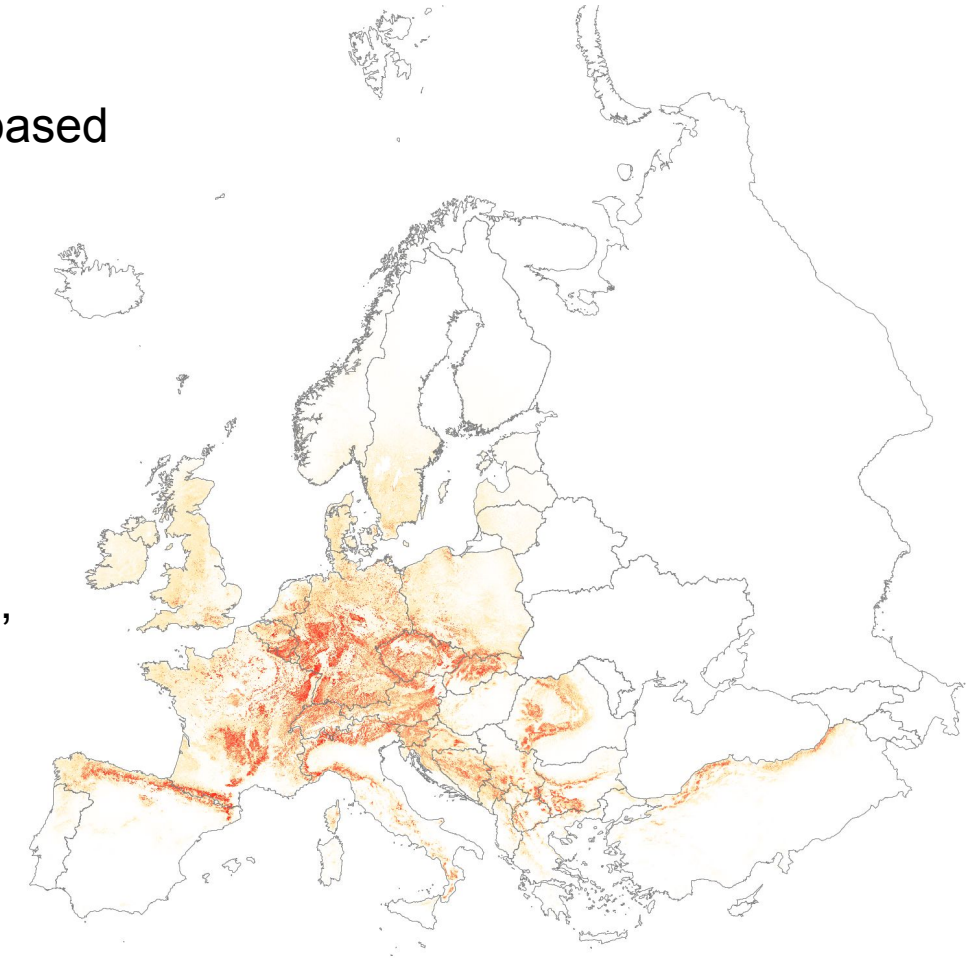
Task 6 (outlook)

Produce habitat suitability maps based on unified mapping keys

Distribution and habitat suitability maps of revised EUNIS grassland types
T18 **Fagus-forest-on-acid-soil**

EEA project, Stephan Hennekens, Wageningen



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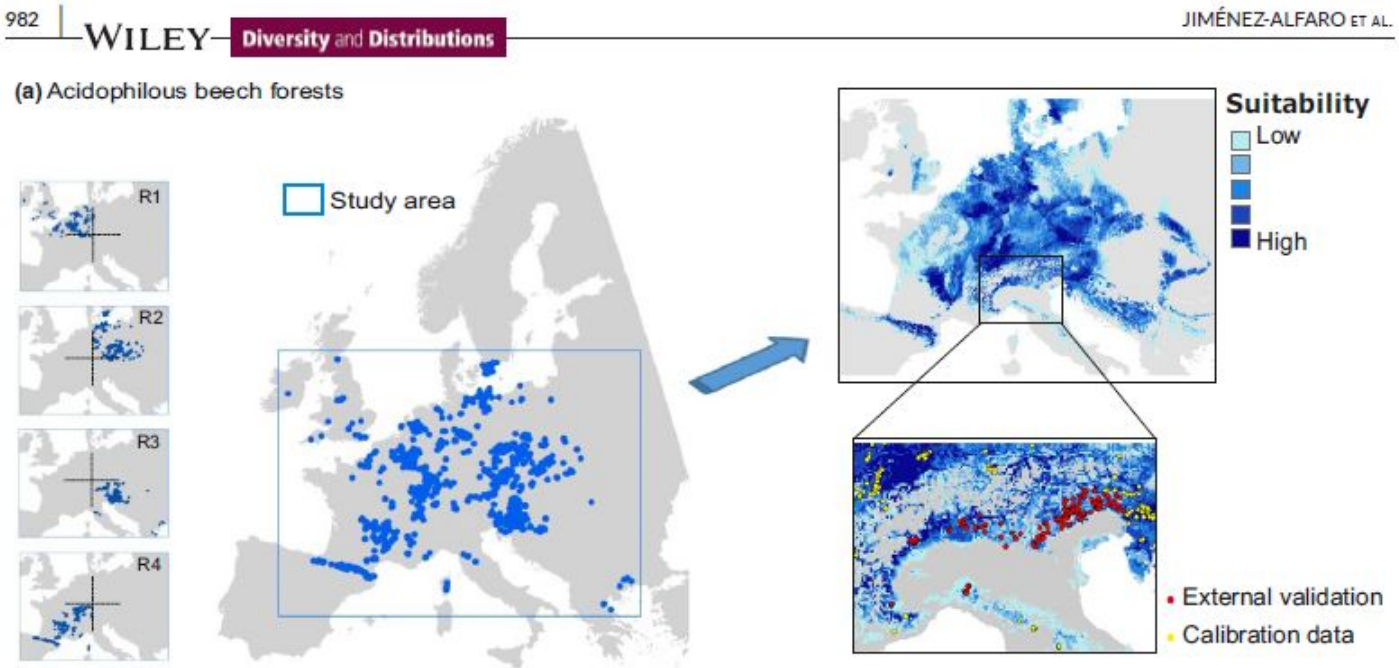
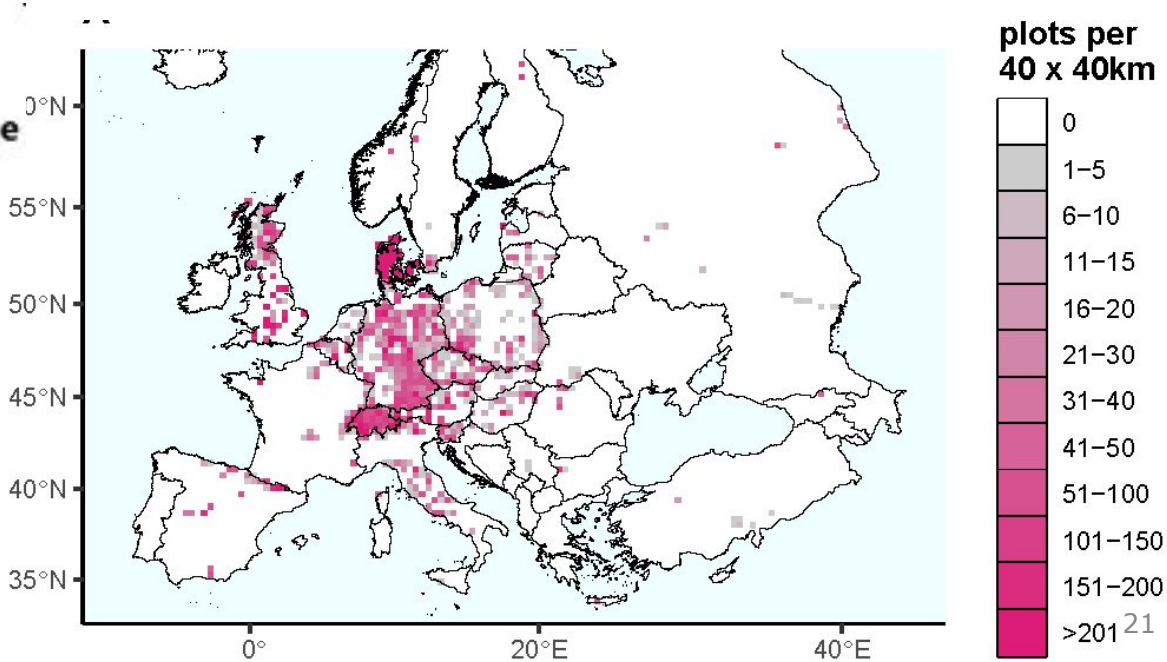
Task 7 (outlook)

Turn habitat suitability maps into maps of actual occurrence of habitat types (see presentation of VITO) (EBV Ecosystem distribution of EUNIS habitats)



Task 8 (outlook)

Use vegetation plot time series to combine spatial extent with qualtity information



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