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IMPACT ASSESSMENT REPORT

ANNEX VIII-d

Accompanying the

proposal for a Regulation of European Parliament and of the Council

on nature restoration

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Annex VIII-d: STEPPE, HEATH and SCRUB HABITATS

Introduction

This paper provides information derived from the Member States' reports and assessments under Article 17 of the Habitats Directive. It is a background information to help identify possible restoration targets for the 'legal binding instrument' under the EU Biodiversity Strategy to 2030.

The 'steppe, heath and scrub' group include, 21 Annex I habitat types (see Table 1): all heaths and scrubs (except wet heaths[1] and those dependent on agricultural management[2]), and a selection of steppe habitats.

Table 1 – Steppe, heath and scrub Annex I habitat types selected

Salt and gypsum steppes (3 types)		**Sclerophyllous scrub (matorral) (11 types)**	
1430	Halo-nitrophilous scrubs (*Pegano-Salsoletea*)	5110	Stable xerothermophilous formations with *Buxus sempervirens* on rock slopes (*Berberidion* p.p.)
1510	Mediterranean salt steppes (*Limonietalia*)	5120	Mountain *Cytisus purgans* formations
1520	Iberian gypsum vegetation	5140	*Cistus palhinhae* formations on maritime
Temperate heath and scrub (7 types)		5220	Arborescent matorral with *Zyziphus*
4050	Endemic macaronesian heaths	5230	Arborescent matorral with *Laurus nobilis*
4060	Alpine and Boreal heaths	5310	Laurus nobilis thickets
4070	Bushes with *Pinus mugo* and	5320	Low formations of *Euphorbia* close to cliffs
4080	Sub-Arctic *Salix* spp. scrub	5330	Thermo-Mediterranean and pre-desert scrub
40A0	Subcontinental peri-Pannonic scrub	5410	West Mediterranean clifftop phryganas (*Astragalo-Plantaginetum subulatae*)
40B0	Rhodope *Potentilla fruticosa* thickets	5420	*Sarcopoterium spinosum* phryganas
40C0	Ponto-Sarmatic deciduous thickets	5430	Endemic phryganas of the *Euphorbio-Verbascion*

[1] Included in the group 'wetlands'
[2] Included in the group 'agricultural habitats and grasslands'

'Steppe, heath and scrub habitats' coverage in the EU

The 21 habitat types selected cover close to **78 582 km²** (**2 %** of the EU terrestrial area[3]); this excludes areas reported by Romania, which are known to be largely overestimated[4].

The data available from Corine Land Cover[5] and from the Ecosystems Map of Europe[6] do not allow a straightforward comparison between the total area of 'steppe, heath and scrub habitats' in the EU and the area covered by Annex I habitats. This is mainly due to the nomenclatures used and the spatial resolution of the datasets. A comparison between these data sources is given in Table 2 below.

Table 2 – Heath and scrub land (km²) from different sources (EU27)

Corine Land Cover 2018 (level 3)

Scrub and/or herbaceous vegetation associations	**163 270**
322 – Moors and heathland	71 269
323 – Sclerophyllous vegetation	92 001

Ecosystems map (level 3)

F – Heathland, scrub and tundra	**114 777**
F2 – Arctic, alpine and subalpine scrub	21 095
F3 – Temperate and mediterranean-montane scrub	21 331
F4 – Temperate shrub heathland	2 230
F5 – Maquis, arborescent matorral and thermo-Mediterranean brushes	41 459
F6 – Garrigue	10 701
F7 – Spiny Mediterranean heaths (phrygana, hedgehog-heaths and related coastal cliff vegetation)	17 007
F8 – Thermo-Atlantic xerophytic scrub	954

[3] Area of habitats calculated from the area reported by Member States as 'best estimate' or 'average of minimum/maximum'

[4] The average total area of agri-habitats and grasslands habitats reported by Romania is 2 312 km²

[5] https://www.eea.europa.eu/data-and-maps/dashboards/land-cover-and-change-statistics

[6] https://www.eea.europa.eu/themes/biodiversity/mapping-europes-ecosystems

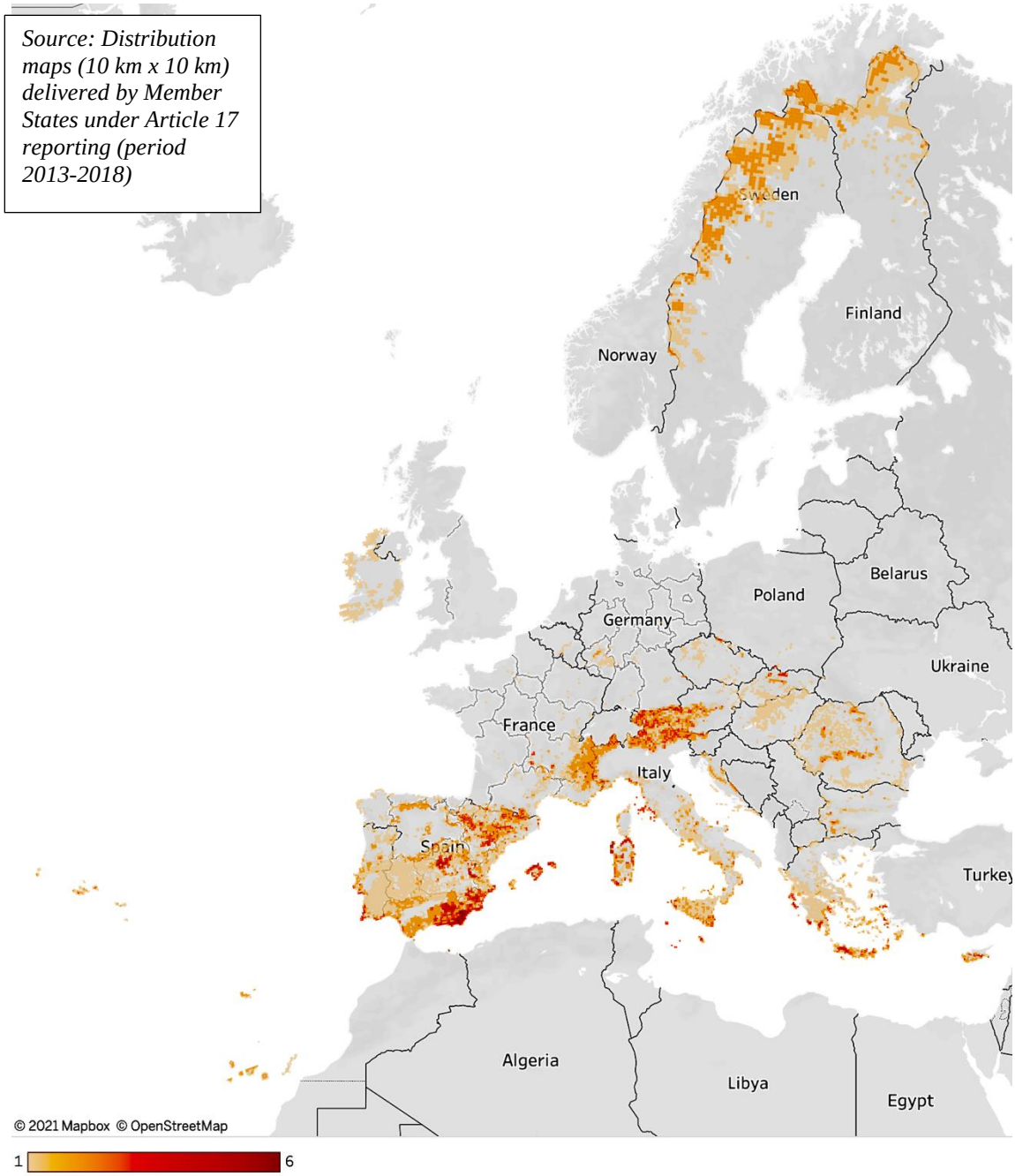
The areas of steppe, heath and scrub habitats are mainly present in the Mediterranean region and most mountain ranges, including those of Fennoscandia (see Map 1). The Member States with the highest proportion of those habitats are Greece (7 %), Malta (6 %), Spain (5 %), Sweden (4 %) and Austria (6 %); sixteen Member States have less than 2 % of their territory covered by steppes, heaths and scrubs; these habitats are absent in five Member States (Denmark, Estonia, Latvia, Lithuania and the Netherlands).

Table 3 gives the areas and proportion of steppe, heath, and scrub habitats for each Member State, including coverage by Natura 2000. Maps illustrating the distribution of different types of these habitats in the EU are available in Annex A.

From the **78 582 km^2** of steppe, heath, and scrub habitats (excluding Romania), about **48 %** is estimated to be inside the Natura 2000 network (about **37 607 km^2**); this may be an underestimation since reports from Member States were not comprehensive on this regard. The coverage by Natura 2000 varies according to the sub-group, **from 49 %** for 'temperate heaths' **to 38 %** for 'salt and gypsum steppes'. The proportion of habitats per sub-group of 'steppe, heath and scrub' habitats and their coverage is detailed in Table 4.

Coverage by Natura 2000 also greatly varies according to the Member State: **from over 90 %** (Bulgaria, Czechia, Luxembourg, Portugal, Slovakia and Slovenia) **to less than 25 %** (France) (Table 3).

Map 1 – Distribution of the 21 Annex I steppe, heath, and scrub habitats in the EU



Note: the shades of brown indicate the number of habitat types per 10 km x 10 km grid cell.

Source: European Environment Agency – April 2021

Table 3 – Area and proportion of steppe, heath, and scrub habitats per Member State

	Member State area (km^2)	In the Member State		Proportion of the Steppe, heath & scrub area (%)	Inside Natura 2000	
		Steppe, heath & scrub area (km^2)	Steppe, heath & scrub area (%)		Steppe, heath & scrub area	% Steppe, heath & scrub area
Austria	83 944	3 584.9	4.3	4.6	989.254	27.6
Belgium	30 683	0.3	0.0	0.0	0.16	61.5
Bulgaria	110 995	671.8	0.6	0.9	653.25651	97.2
Croatia	55 590	1066.1	1.9	1.4	653.25651	61.3
Cyprus	9 249	160.2	1.7	0.2	119.19	74.4
Czechia	78 874	20.3	0.0	0.0	19.92692	98.2
Denmark	44 162					
Estonia	45 382					
Finland	338 004	6 711.0	2.0	8.5	5978	89.1
France	551 881	6 758.1	1.2	8.6	1150.76	17.0
Germany	362 177	155.9	0.0	0.2	96.6678	62.0
Greece	132 014	9 037.6	6.8	11.5	2876.28	31.8
Hungary	93 012	10.0	0.0	0.0	8	80.0
Ireland	70 699	150.7	0.2	0.2	116.25	77.1
Italy	301 321	4628.811	1.5	5.9	2007.47714	43.4
Latvia	64 590					
Lithuania	65 289					
Luxembourg	2 595	0.1	0.0	0.0	0.0531	99.3
Malta	316	19.9	6.3	0.0	13.2143	66.4
Netherlands	39 898					
Poland	312 683	41.5	0.0	0.1	32.4572	78.3
Portugal (#)	92 378	1 185.6	1.3	1.5	1582.16	133.4
Romania (*)	*238 404*	2 312.1	1.0		1697.7612	73.4
Slovakia	49 026	125.4	0.3	0.2	121.8334	97.2
Slovenia	20 274	238.0	1.2	0.3	233	97.9
Spain	506 222	24 100.7	4.8	30.7	10997.062	45.6
Sweden	450 110	19 915.0	4.4	25.3	9959	50.0
Total	4 149 772	**80 893.7**	**1.9**		**39 305.0**	**48.6**
Total (without Romania)	**3 911 772**	**78 581.6**	**2.0**		**37 607.3**	**47.9**

Source: European Environment Agency – April 2021

Notes: Member States with more than 2 % (the EU average) of their terrestrial area covered by 'steppe, heath and scrub' habitats are highlighted; (*) areas reported by Romania are overestimated; (#) Portugal reported areas inside Natura 2000 but not overall for several habitats, which explain the abnormal figure of 133 % coverage by the network.

Source: European Environment Agency – April 2021

Table 4 – Area and proportion of steppe, heath, and scrub habitats per sub-group

		Inside Natura 2000	
EU27 excluding Romania	**Area (km²)**	**Steppe, heath, & scrub area (km²)**	**% Steppe, heath & scrub area**
Salt and gypsum steppe	**2 509**	**965**	**38**
1430	651	256	39
1510	307	85	28
1520	1 551	624	40
Temperate heath	**42 183**	**20 829**	**49**
4050	1 295	501	39
4060	37 481	18 676	50
4070	1 985	920	46
4080	1 385	701	51
40A0	37	31	85
40B0	0.03	0.03	100
40C0	0.03	0.03	100
Sclerophyllous scrub	**33 890**	**15 768**	**47**
5110	2 858	1 782	62
5120	2 674	1 939	73
5140 (*)		45	(100)
5210	7 301	3 575	49
5220	311	119	38
5230	185	27	14
5310	157	1	1
5320	94	40	43
5330	12 418	5 940	48
5410	27	21	76
5420	7 745	2 162	28
5430	3 728	118	98
TOTAL	**78 582**	**37 563**	**48**

Note: (*) total area not reported for this habitat restricted to southwest Portugal, but likely to be fully covered by Natura 2000

Source: European Environment Agency – April 2021

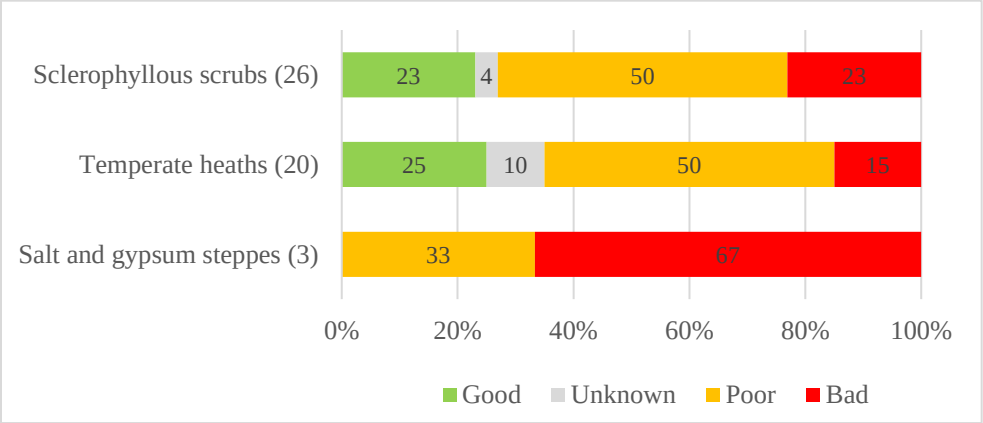
Conservation status and trends

The vast majority (**71 %**) of the assessments of the 21 steppe, heath, and scrub habitats at the EU level have an **unfavourable** conservation status (49 % poor and 22 % bad). **22 %** have a **good** conservation status. There are differences between the different habitat groups (Figure 1): 'temperate heaths' has the highest proportion of good status (25 %) and the 'salt and gypsum steppes' the worst status (100 % unfavourable, but only three habitats in this group).

Among the habitat assessments that do not have a good status, almost one-third have a **deteriorating** trend (**29 %**) while only **3 %** have an improving trend. An additional **39 %** maintain their unfavourable status; the conservation status trend is unknow for **29 %** of the assessments. The group with the worst conservation status trends is '**salt and gypsum steppes**' (**67 % deteriorating**); '**temperate heath**' habitats have the higher proportion of **improving** trends (**7** %) (Figure 2).

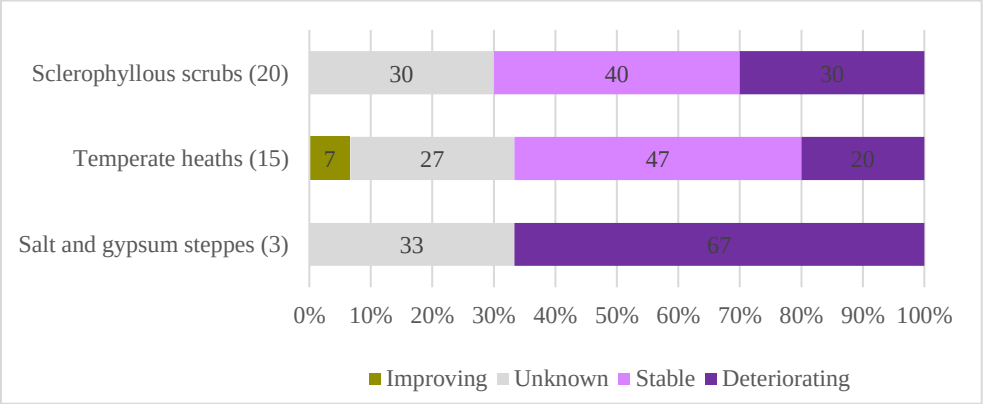
Details on conservation status and conservation status trends for each Member State are given in Table 5.

Figure 1 – Conservation status of steppe, heath, and scrub habitats at the EU level (in percentage)



Note: Number of assessments per group shown in brackets.

Figure 2 – Conservation status trends of steppe, heath, and scrub habitats at the EU level (in percentage)



Note: Number of assessments per group shown in brackets.

Source: European Environment Agency – April 2021

Table 5 – Conservation status and trends of steppe, heath, and scrub habitats in the Member States (in percentage)

Member States	FV	U1-	U1+	U1=	U1x	U2-	U2+	U2=	U2x	XX
AT (4)	75				25					
BE (1)				100						
BG (13)				15	85					
CY (5)	40			40					20	
CZ (5)	60			40						
DE (7)	71	14		14						
DK (0)										
EE (0)										
ES (23)	17	4		26	13	4		9	13	13
FI (4)	50	50								
FR (20)	45	15		25		10				5
GR (9)	56		22	11			11			
HR (5)	100									
HU (1)				100						
IE (1)							100			
IT (24)	29	8		33		21		4		4
LT (0)										
LU (1)				100						
LV (0)										
MT (5)	40			20				40		
NL (0)										
PL (7)	29			14				57		
PT (15)	33	27		13		27				
RO (8)	38			63						
SE (4)	100									
SI (2)	100									
SK (5)	80			20						

Source: European Environment Agency – April 2021

Notes: FV = good, U1 = poor, U2 = bad, XX = unknown conservation status '-' = deteriorating, '+' = improving, '=' = stable, 'x' = unknown conservation status trend; number of assessments per Member State shown in brackets.

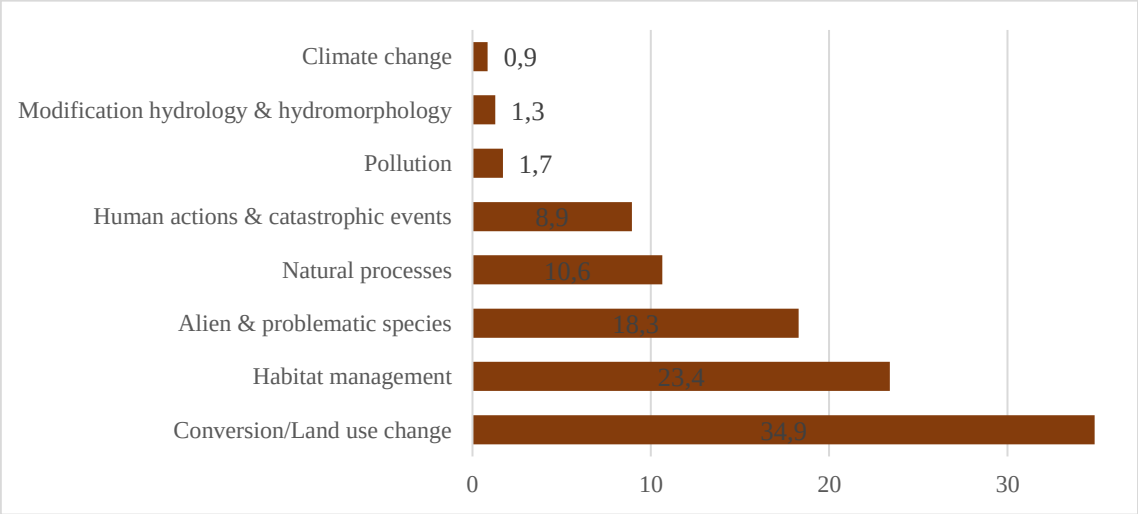
Pressures

Steppe, heath, and scrub habitats are subject to a wide diversity of pressures resulting in their degradation and extirpation. According to Member States reports under Article 17 of the Habitats Directive, the top three groups of pressures (in percentage of the total) are:

- **Conversion and land use change** amounts to near **35 %**; from these, over half (52 %) is due to development of urban, industrial and leisure sites, 26 % from agriculture intensification, 12 % from afforestation, and 9 % from building of roads and railroads
- **Habitat management** with over **23 %** of all pressures; these include inadequate agricultural practices like intensive grazing and ceasing management (73 %), forestry like burning and plantations with non-native species (20 %)
- **Alien and problematic species**, with over **18 %**; this is mainly due to invasive alien species, many of them of EU concern

Equally important are **natural processes** with near **11 %**, mainly originating from natural succession, which is often related to the lack of management of the concerned habitats.

Figure 3 – Pressures reported for steppe, heath and scrub habitats (in percentage)



Note: based on pressures reported as 'high-ranking'.

Source: European Environment Agency – April 2021

Condition of habitats

Member States reported on the condition of habitat types under Article 17 of the Habitats Directive. This data can be used to estimate the area of steppe, heath, and scrub habitats assessed as degraded (condition not-good) therefore, requiring restoration.

The area of steppe, heath, and scrub habitats that would need to be restored, i.e., improved condition, is **at least 6 586 km^2**, representing **8 %** of the total area reported for this group of habitats (the values exclude Romania). However, the condition of habitats reported as 'unknown' (or not reported) is almost 28 600 km^2 (36 % of the total area). This means that the area requiring restoration is bigger than 6 586 km^2; for example, assuming that half of the 'unknown' area is in a not-good condition, the area to be restored would be over 20 000 km^2 or 35 000 km^2 if all the 'unknown' is assumed to be in a 'not-good' condition (36 % of the total area). Table 6 gives information for each of the 21 steppe, heath, and scrub habitats (excluding Romania) and Table 7 the condition areas and percentage for each of the Member States.

In addition to the habitat condition, Member States also reported on the 'favourable reference areas'[7]. Comparing this area with the actual habitat area allows to estimate how much area of the habitat would need to be re-created to achieve a good distribution and area of the habitat. Based on this data, it is estimated that a **strict minimum** of **400 km^2** would need to be **re-created** to achieve a 'favourable area':

- 11 km^2 for salt and gypsum steppe habitats
- 1 km^2 for temperate heath habitats
- 393 km^2 for sclerophyllous scrub habitats

However, these values are much higher since several Member States did not provide enough information in their reports to allow a more realistic estimation.

[7] The surface area in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the habitat type; this should include necessary areas for restoration or development for those habitat types for which the present coverage is not sufficient to ensure long-term viability

Table 6 – Condition of steppes, heaths, and scrubs per Annex I habitat type

		Condition (area in km2)			Condition (in percentage)		
	Habitat area	**Good**	**Not-good**	**Unknown**	**Good**	**Not-good**	**Unknown**
Total	**78 582**	**43 423**	**6 586**	**28 573**	**55**	**8**	**36**
Salt and gypsum steppe	**2 509**	**373**	**319**	**1 816**	**15**	**13**	**72**
1430	651	55	218	377	8	34	58
1510	307	50	73	184	16	24	60
1520	1 551	267	28	1 256	17	2	81
Temperate heath	**42 183**	**24 591**	**2 951**	**14 640**	**58**	**7**	**35**
4050	1 295	481	753	62	37	58	5
4060	37 481	22 116	2 143	13 222	59	6	35
4070	1 985	901	51	1 033	45	3	52
4080	1 385	1 083	1	300	78		22
40A0	37	11	3	23	29	7	63
40B0	0.03			0.03			100
40C0	0.03			0.03			100
Sclerophyllous scrub	**115 616**	**50 530**	**26 218**	**38 867**	**44**	**23**	**34**
5110	987	425	84	478	43	9	48
5120	124	24	65	36	19	52	29
5140	17	11	1	5	64	7	29
5210	1 106			1 106			100
5220	10 776	8 360	73	2 343	78	1	22
5230	413	212	45	156	51	11	38
5310	9 009	3 747	322	4 940	42	4	55
5320	180	30	130	20	17	72	11
5330	41	13	3	24	33	8	59
5410	11 255	4 176	1 066	6 013	37	9	53
5420	30 441	9 350	3 403	17 688	31	11	58
5430	3 728	1 865	587	1 276	50	16	34

Notes: Areas reported by Romania excluded from the table.

Source: European Environment Agency – April 2021

Table 7 – Condition of Annex I steppes, heaths, and scrubs per Member State

	Habitats area (km^2)				Percentage		
Member State	**Total**	**Good**	**Not-good**	**Unknown**	**Good**	**Not-good**	**Unknown**
AT	3 585	3 573	12		100		
BE	0				111	18	62
BG	672			653			97
CY	160	135	26		84	16	
CZ	20	19		1	94	2	4
DE	156	140	16	97	90	10	62
DK							
EE							
ES	24 101	8 685	3 476	11 939	36	14	50
FI	6 711	1 668	1 980	3 063	25	30	46
FR	6 758	341	77	6 341	5	1	94
GR	9 038	7 966	39	1 033	88		11
HR	1 066	1 066			100		
HU	10	7	2	2	65	15	20
IE	151	97	54		64	36	
IT	4 629	1 278	136	3 215	28	3	69
LT							
LU	0.05	0.05			93		7
LV							
MT	20	13	7		66	34	
NL							
PL	41	27	15		65	35	
PT	1 186	242	739	205	20	62	17
RO (*)	2 312	1 629		683	70		30
SE	19 915	17 924		1 992	90		10
SI	238	232	7		97	3	
SK	125	11	3	111	9	2	89

Notes: (*) areas reported by Romania largely overestimated.

Source: European Environment Agency – April 2021

Carbon stock and sequestration

Carbon sequestration rates in steppe, heath and scrub habitats are estimated to be rather low (<1,5 Mg C ha^{-1} yr^{-1}). As mineralisation rates in the soils seems to be high carbon stocks also only reach relatively low values (up to 150 Mg C ha^{-1}). Temperate heaths seem to reach slightly higher values than steppe and scrub habitats. Due to their coverage of about 1,7% of EU-27, temperate heaths and sclerophyllous scrubs provide significant contributions to sequestration and stocks of European land ecosystems, compared to salt and gypsum steppes which cover only less than 0,06% of the EU-27 area. Overall, the contribution of these habitats to the carbon sequestration capacity reaches 5,9 Mio tons of carbon equivalent or almost 22 Mio tons of CO_2 if habitats are in good condition. Potential to store carbon is estimated between 0,4 to 1,2 Gt equivalent to 1,4 to 4,3 Gt of CO_2.

Table 8 – Carbon stock and sequestration of Annex I steppe, heath, and scrub habitats

EU27 excluding Romania	Area (km^2)	Total Carbon Stock (Mt)		Potential carbon sequestration rate (Mt y^{-1})
		min	max	mean
Salt and gypsum steppes	**2 508.53**	**0.00**	**37.63**	**0.19**
1430	650.61	0.00	9.76	0.05
1510	307.36	0.00	4.61	0.02
1520	1 550.56	0.00	23.26	0.12
Temperate heaths	**42 182.88**	**316.37**	**632.74**	**3.16**
4050	1 295.17	9.71	19.43	0.10
4060	37 480.68	281.11	562.21	2.81
4070	1 985.01	14.89	29.78	0.15
4080	1 384.95	10.39	20.77	0.10
40A0	37.01	0.28	0.56	0.00
40B0	0.03	0.00	0.00	0.00
40C0	0.03	0.00	0.00	0.00
Sclerophyllous scrub	**33 890.22**	**78.76**	**508.35**	**2.54**
5110	2 857.76	21.43	42.87	0.21
5120	2 673.76	0.00	40.11	0.20
5140*		n.a	n.a	n.a
5210	7 300.89	54.76	109.51	0.55
5220	311.06	0.00	4.67	0.02
5230	185.21	1.39	2.78	0.01
5310	156.99	1.18	2.35	0.01
5320	93.55	0.00	1.40	0.01
5330	12 417.78	0.00	186.27	0.93
5410	27.14	0.00	0.41	0.00
5420	7 745.21	0.00	116.18	0.58
5430	120.88	0.00	1.81	0.01
TOTAL	**78**	**395.13**	**1 178.72**	**5.89**

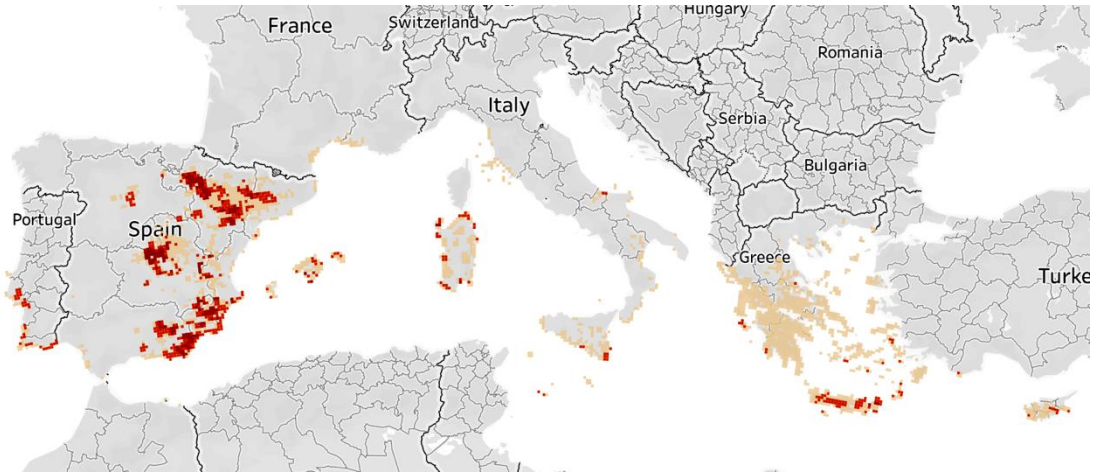
Source: European Environment Agency – April 2021

EU27 excluding Romania	Area (km^2)	Total Carbon Stock (Mt)	Potential carbon sequestration rate (Mt y^{-1})
		min - max	mean
	581.63		

Note: areas reported by Romania note included; * area not reported

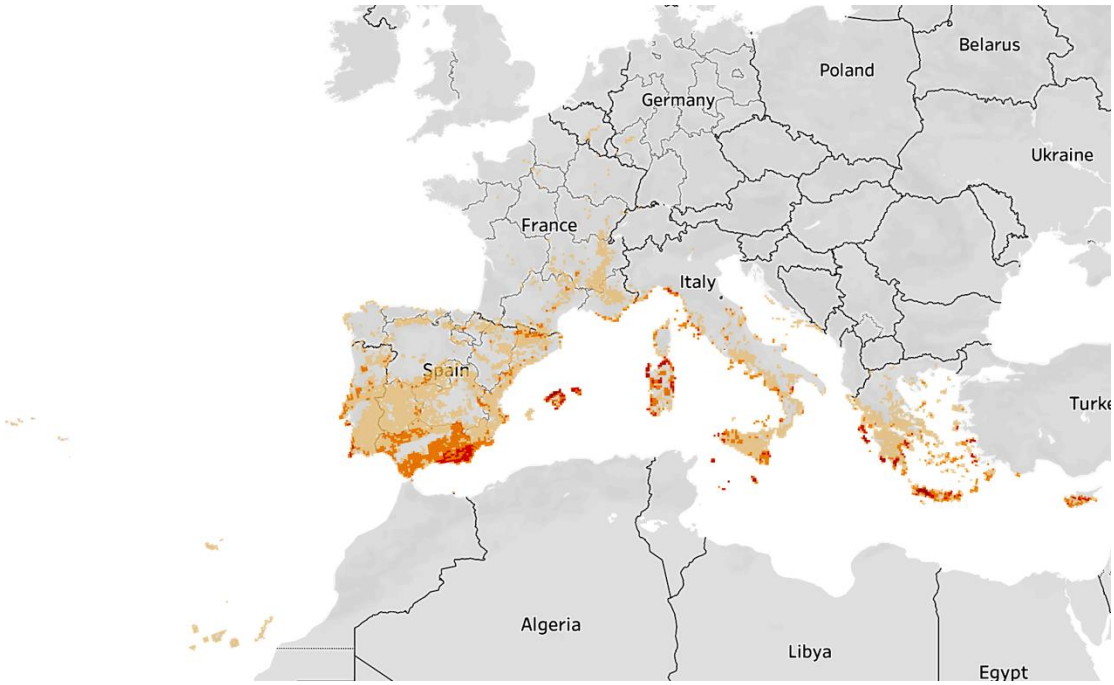
Annex A

Map 2 – Distribution of Annex I salt and gypsum steppes (1430, 1510, 1520)



Note: the shades of brown indicate the number of habitat types per 10 km x 10 km grid cell. Macaronesian islands not shown in the map.

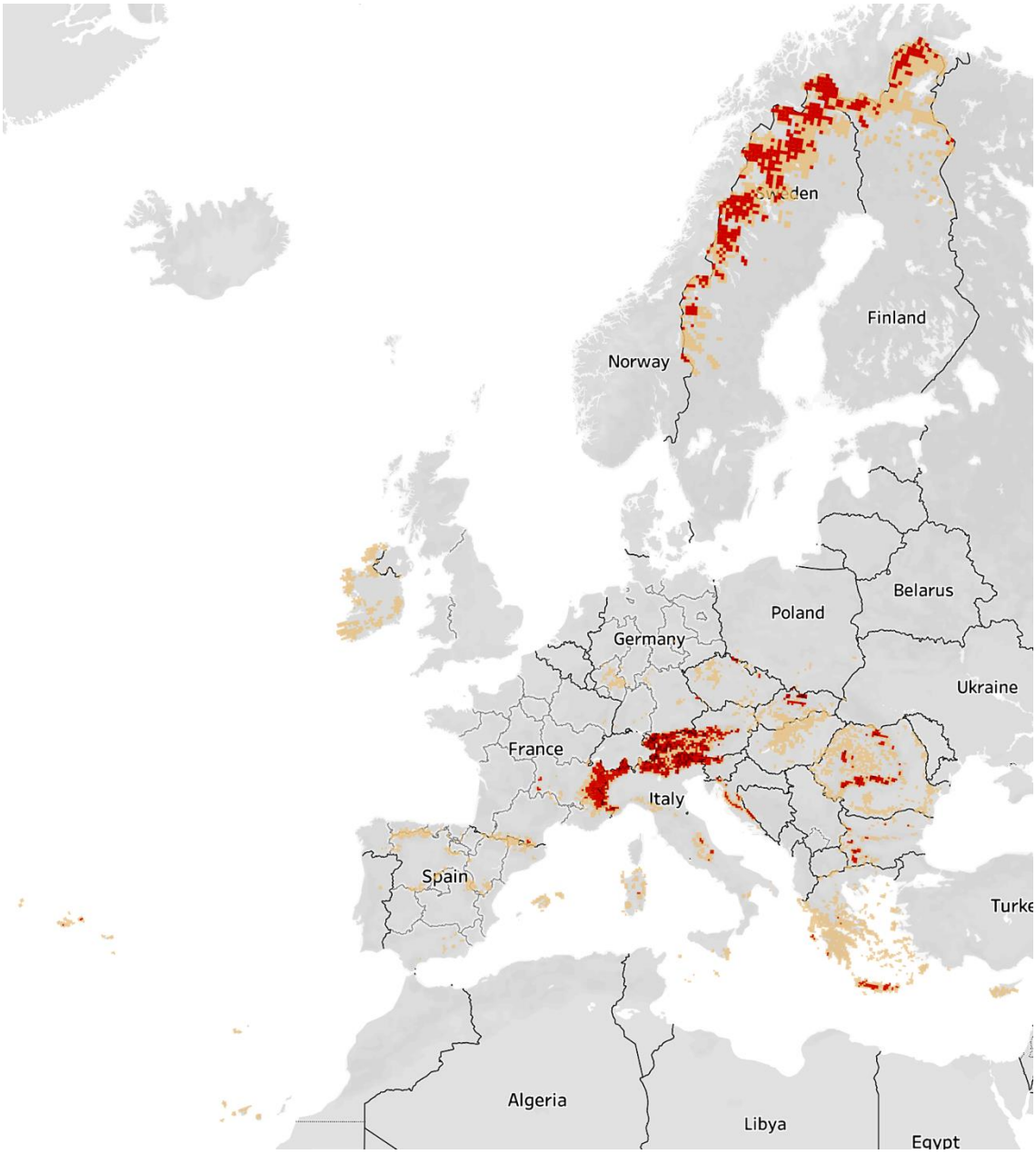
Map 3 – Distribution of Annex I sclerophyllous scrub (matorral) (4050, 4060, 4070, 4080, 40A0, 40B0, 40C0)



Note: the shades of brown indicate the number of habitat types per 10 km x 10 km grid cell.

Source: European Environment Agency – April 2021

Map 4 – Distribution of Annex I temperate heath habitats (5110, 5120, 5140, 5220, 5230, 5310, 5320, 5330, 5410, 5420, 5430)



Note: the shades of brown indicate the number of habitat types per 10 km x 10 km grid cell.

Source: European Environment Agency – April 2021