Updated crosswalks, formal query routines and indicator species of the revised EUNIS Habitat Classification with the European Vegetation Classification for vegetated man-made habitats and aligning of crosswalks between European Red List habitats and Annex I habitats with crosswalks between EUNIS habitats and Annex I habitats

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1   Introduction

1.1   The context of the Specific Contract

To underpin the EU2020 Biodiversity Strategy adopted in 2011, the European Council has committed itself to a long-term vision and mid-term headline target: "To halt the loss of biodiversity and the degradation of ecosystem services in the European Union by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss". It is impossible to measure progress to this target without reliable and timely information on the status and trends of biodiversity across Europe. Within the European Union indicators on status and trends of species and habitat types (are reported under the Birds Directive (BD), the Habitats Directive (HD), the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD). Additional information is needed, however, to establish a more comprehensive assessment of the state of ecosystems and their trends, covering the whole territory of Europe and the whole range of natural and semi-natural landscapes.

The EUNIS habitat classification, developed by the European Topic Centre for Biodiversity (ETC/BD) for the European Environment Agency (EEA) at the end of the last century (Davies & Moss 1999; see Davies et al. 2004; Moss 2008), is covering both the marine and terrestrial realm. In recent years, this classification has been revised at Level 3 (terrestrial) and 4 (marine), aiming at establishing more hierarchical consistency, remove ambiguity and overlap in definitions of types and extend the typology for the complete European continent and seas. A preliminary, 2014 revised classification has been used in the DG ENV project Red List of European Habitat (Janssen et al. 2016).

One of the main aims of the EEA Framework contract is to support EEA with data and tools for assessment of ecosystem status and trends, including their provided services and functions. Task 1 of the contract focusses on enhancing ecosystem maps, using vegetation data.

Under specific contract 3417/B2018/EEA.57264 implementing the above Framework Contract, EEA received updated crosswalks with the 2016 EuroVegChecklist, formal query routines and indicator species lists for the revised EUNIS habitat groups of forest, heathland, scrub and tundra and grassland. Initial work on these habitat groups was undertaken under four separate contracts between 2013-2016. EEA also received updated crosswalks between the Red List habitats (finalised by the end of 2016) and the current EUNIS terrestrial habitat types of version 2012, Annex I habitats, and the revised EUNIS forests, heaths and grasslands.

Some EUNIS habitat groups (Wetlands; Coastal habitats; Inland habitats with no or little soil and mostly with sparse vegetation; Vegetated man-made habitats; Constructed, industrial and other artificial habitats) were revised in 2018 based on the European Red List of Habitats (published in 2016) and Eionet public consultation, whereas the last habitat groups (Inland waters; Habitat complexes) will be revised at a later stage. Under specific contract 3417/B2019/EEA.57640 implementing the above Framework Contract, EEA received crosswalks with the 2016 EuroVegCheckList, formal query routines and indicator species lists for the wetlands and coastal habitats.

EEA received in 2019 from ETC/BD the crosswalks between the revised EUNIS forests/heaths/grasslands/wetlands/coastal/marine and Annex I habitats. The crosswalks between revised EUNIS to Annex I reveal some significant differences when compared to the crosswalks from the otherwise equal Red List habitats to the Annex I habitats. The two spreadsheets need to be aligned through close cooperation between the Framework Contract and the ETC/BD. Further to this, qualifiers between revised marine EUNIS and Red List habitats are missing.

1.2   Aim and objectives of the Specific Contract

The support to EUNIS habitat classification revision comprises two specific tasks (A and B), of which task A is divided into two subtasks. The work comprises an update of crosswalks of EUNIS with EuroVegCheckList 2016 (task A1), a provision of formal query routines and indicator species lists (task A2) from vegetated man-made habitats, and aligning of crosswalks between European Red List habitats and Annex 1 habitats with crosswalks between revised EUNIS habitats for forests/heaths/grasslands/wetlands/coastal/marine and Annex I habitats, as well as provision of qualifiers between revised marine EUNIS and Red List habitats (Task B).

An updated version of EuroVegChecklist was published in 2016 (Mucina et al. 2016). All EUNIS groups that have been under revision through the European Vegetation Survey (EVS) projects were cross-walked with older versions of EuroVegChecklist. Further to this, the final EUNIS review is based on the public consultation, and some revised habitat types differ from the ones proposed from the European Vegetation Survey (EVS) projects. Therefore, there is a need for an update of the crosswalk with EuroVegChecklist 2016. In an earlier project to support the EUNIS classification revision (Part I, carried out in 2018), the habitat groups that were revised by the end of 2017 (forests, heathlands, grasslands) were considered. In a second project (Part II), the focus was on coastal habitats and wetlands. The present project (Part III) focuses on vegetated man-made habitats. The development of the crosswalks has been done in close communication with ETC/BD. This task was a prerequisite to the following subtask on the identification of indicator species and to the production of maps (the maps will be produced by ETC/BD).

To define indicator species for the individual habitat types, small-scale plot data on plant species composition and cover are applied, in line with the phytosociological tradition, where such *in situ* data are used for 'bottom-up' fine-grained delimitation and characterisation of so-called plant associations (Braun-Blanquet 1928). Estimates suggest that the total number of such plot observations exceeds several millions (e.g. Schaminée et al. 2009) and there is an enormous amount of phytosociological publications describing and classifying vegetation types from many countries in the EU and beyond. Making use of the capacity of *in situ* vegetation recording is part of the on-going review of information relating to habitat types and ecosystems by the EEA, anticipating a revision of the existing scientific basis for the EUNIS Habitat Classification.

Indicator species lists and formal query routines (that define the habitats based on a combination of coverage of species) were developed for the revised habitat groups through the EVS projects. The updated European Vegetation Archive (EVA; Chytrý et al. 2016) database includes an increased number of plot data, including the boreal zone and Macaronesia where data were previously scarce. The updated EVA database has been used to provide the lists of indicator species and the query routines for vegetated man-made habitats, in line with the procedures applied for the habitat groups forests, heathlands, grasslands in the 2018 project and wetlands and coastal habitats in the 2019 project.

2 Update of crosswalks of the revised EUNIS Habitat Classification for vegetated man-made habitats with EuroVeg-Checklist 2016

2.1 Background

The update of crosswalks of EUNIS with *EuroVegChecklist* 2016 will replace earlier crosswalks based on previous versions of both classification systems. The updated version is presented in Appendix C.

The changes in the EUNIS habitat classification over the years were for a long time relatively modest, but more substantial revisions took place as a result of the work carried out through a number of European Vegetation Survey projects for the EEA (Schaminée et al. 2012, 2013, 2014, 2016a, 2016b, 2018, 2019), the DG-ENV analysis of the European Red List of Habitats (Janssen et al. 2016), further meeting and consultation by the EEA and ETC-BD of the vegetation experts involved, and public consultation in the 39 Eionet partnership countries.

The overview of European syntaxa has undergone substantial expert revision after the publication of *The Diversity of European Vegetation* in 2002, which was a first attempt to achieve a respectable level of stability in the classification of European vegetation (Rodwell et al. 2002), based on a list of European vegetation classes by Mucina, published in 1997 in a bundle of case studies by the EVS (Mucina in Rodwell et al. 1997). This major enterprise, an initiative of the EVS, was carried out by a team under the leadership of Ladislav Mucina, resulting in a new overview, the so-called *EuroVegChecklist*, which was published in 2016. Compared to the 2002 overview, *EuroVegChecklist* is geographically more comprehensive, scientifically more robust, and better grounded within current phytosociological understanding and data.

2.2 EuroVegChecklist 2016

The published version of *EuroVegChecklist* provides floristic hierarchical classification systems of vascular plant, bryophyte, lichen, and algal communities. The vascular plant communities include 109 classes, 300 orders, and 1108 alliances. It offers "The first comprehensive and critical account of European syntaxa and synthesizes more than a hundred years of classification effort by European phytosociologists. It aims to document and stabilize the concepts and nomenclature of the syntaxa for practical use, such as calibration of habitat classification used by the European Union, standardization of terminology for environmental assessment, management and conservation of nature areas, landscape planning and education. The presented classification systems provide a baseline for future development and revision of European syntaxonomy", as stated in the summary of the paper (Mucina et al. 2016). The new overview not only gives the lists of syntaxa, but it also briefly

characterizes – in ecological and geographic terms – the accepted syntaxonomic concepts, links available synonyms to the accepted syntaxonomic concepts, and provides lists of diagnostic species for all classes.

The plant communities of the "conspectus of the high ranked syntaxa of the European vegetation dominated by vascular plants" are divided into three main groups (Zonal and intrazonal vegetation, Azonal vegetation and Anthropogenic vegetation), which are further ordered along the main geographic zones. The group of the Zonal and intrazonal vegetation, for instance, comprises seven subgroups of vegetation types for respectively the arctic zone, boreal zone, nemoral forest zone, steppe zone, continental desert zone, Mediterranean zone, and the Canary Islands, Madeira and Azores.

EuroVegChecklist is also published on the web (www.synbiosys.alterra.nl/evc), where the publication can be downloaded, and comments can be posted. Within the EVS a committee has been established and procedures formulated and approved by the EVS Business Meeting in Bilbao on 14 September 2017, to guide and harmonize proposals for future changes to the European vegetation classification.

2.3 Some remarks on the EUNIS Habitat Classification for vegetated man-made habitats

Based on the conclusions from the previous discussions, we divided the habitat type V39 Anthropogenic herb stands into three types corresponding to the phytosociological classes:

V39a   Annual anthropogenic herbaceous vegetation – class Sisymbrietea
V39b   Dry perennial anthropogenic herbaceous vegetation – class Artemisietea
V39c   Mesic perennial anthropogenic herbaceous vegetation – class Epilobietea (without forest-clearing vegetation).

Such a division makes sense ecologically, is understandable to vegetation scientists, and breaks up the extremely broad habitat type V39 into narrower types. The first type includes early successional or frequently disturbed man-man vegetation consisting mainly of annual plants. The second and third types include more advanced stages of secondary succession or less disturbed man-made vegetation with a larger representation of perennial species. The second type represents drier and the third type represents mesic or slightly wet conditions.

We suggest, also in line with our previous discussions, to remove the types V34 Unmanaged xeric grassland and V36 Unmanaged mesic grassland from the classification system, because the content of these two types broadly overlaps with many grassland habitat types classified within group R (these grassland types can be either managed or unmanaged).

In line with the exclusion of these habitat types and the subdivision of V39, we - in consultation with EEA - re-coded the habitat types within the subgroup V3.

It is our understanding that this scheme of habitat classification in group V does not include the habitats of sparsely vegetated walls. As the flora of these walls has similarities with the vegetation of rocks, stones and cliffs, they will be covered by the Sparsely vegetated habitat types of group U.

We were able to link the following vegetated man-made habitat types to syntaxa according to EuroVegChecklist (Mucina et al. 2016). Note that for consistency with the names of the other habitat types, we replaced plurals with singulars in the names of revised habitat types.

New Code	Code prior recoding	Habitat name
V11	V11	Intensive unmixed crops
V12	V12	Mixed crops of market gardens and horticulture
V13	V13	Arable land with unmixed crops grown by low-intensity agricultural methods
V14	V14	Inundated or inundatable cropland, including rice fields
V15	V15	Bare tilled, fallow or recently abandoned arable land
V31	V31	Agriculturally-improved, re-seeded and heavily fertilised grassland, including sports fields and grass lawns
V32	V32	Mediterranean subnitrophilous annual grassland
V33	V33	Dry Mediterranean land with unpalatable non-vernal herbaceous vegetation
V34	V35	Trampled xeric grassland with annuals
V35	V37	Trampled mesophilous grassland with annuals
V36	V38	Alpine and subalpine enriched grassland
V37	V39a	Annual anthropogenic herbaceous vegetation
V38	V39b	Dry perennial anthropogenic herbaceous vegetation
V39	V39c	Mesic perennial anthropogenic herbaceous vegetation

3 Indicator species and distribution maps of the revised EUNIS for vegetated man-made habitat types

3.1 Background

In our previous work (Schaminée et al. 2012, 2013, 2014, 2016a, 2016b, 2018, 2019), we produced lists of indicator species and distribution maps for EUNIS habitat types of grasslands (habitat group R), heathlands, shrubs and tundra (group S), forests (group T), coastal habitats (group N) and wetlands (group Q; codes according to the latest coding system), based on a large set of European vegetation plots. For the identification of EUNIS habitats in the vegetation-plot databases, an electronic expert system was developed, based on the principles and methods developed by Bruelheide (1995, 1997, 2000), Kočí et al. (2003), Chytrý (2007; see also Chytrý & Tichý 2018), Landucci et al. (2015), Mucina et al. (2016) and Tichý et al. (2019), with further modifications.

The expert system was developed as a software tool implemented in the Juice 7 software (Tichý 2002) and, less elaborated, also in the Turboveg 3 software (Hennekens 2015). The software uses formal definitions of particular habitats, which are written as logical formulas in an editable expert system script stored as a TXT file (see Appendix D). Each plot from a vegetation database submitted to the software is checked to test whether or not it meets the conditions of some of the formal definitions of habitats included in this script. If it does, it is assigned to this habitat. For further details on the expert system and the way it operates, we refer to the 2019 report to the EEA (Schaminée et al. 2019).

Vegetation plots (phytosociological relevés) belonging to individual habitat types (henceforth 'habitats') were identified in the databases of the EVA database (Chytrý et al. 2016) and some other databases obtained for this project (see Appendix F).

3.2 Data sources

The primary data source for producing lists of indicators species and maps for the EUNIS habitats were European vegetation plot records. Such plots typically contain a full list of vascular (and often also non-vascular) plant species, estimation of cover-abundance of each species, location and various additional information on vegetation structure and environmental features in the plot (Schaminée et al. 2009, Dengler et al. 2011). These plots were compiled from the EVA database (Chytrý et al. 2016) and several other databases not included in EVA but provided for the purpose of this analysis (see Appendix F). On 28 November 2019, the EVA dataset contained a total of 1,847,463 vegetation plots from Europe, of which 1,612,287 were georeferenced (see Figure 3.1).

The taxon names in this dataset originated from several source databases managed in Turboveg 2 (Hennekens & Schaminée 2001), which use different taxon lists with partly inconsistent taxonomic concepts and nomenclature. Taxon names were unified using the Turboveg 3 program (Hennekens 2015), applying a two-step approach as discussed in the 2019 report to the EEA (Schaminée et al. 2019, pg. 12-13).
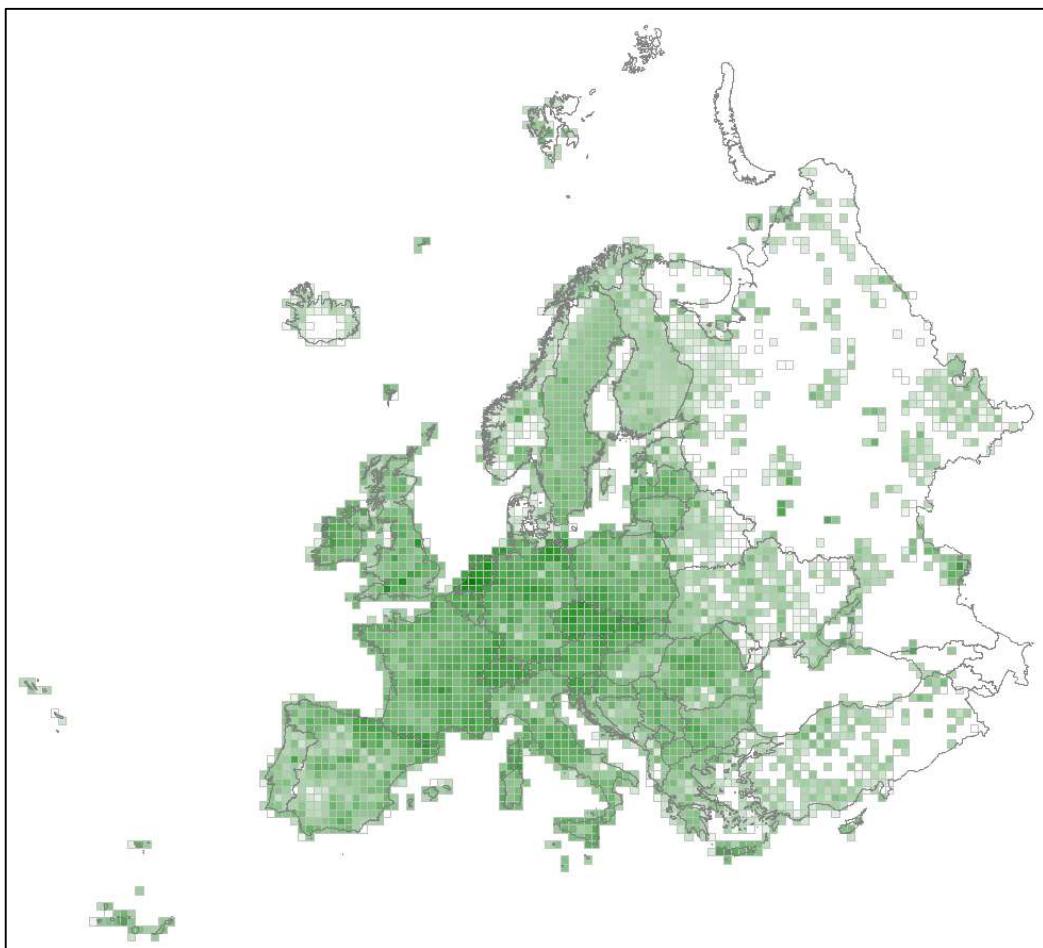
Figure 3.1. Density of 1,612.287 georeferenced plots in EVA and other plots provided for this project in 50 x 50 km grid cells (accessed on 28 November 2019).

3.3 Formal query routines and indicator species lists

We developed the formal query routines using the same methodology as described in our previous work on other habitat types, in which formal definitions of habitat types are based on plant species composition, the dominance of specific plant species, and optionally also geographical criteria (Schaminée et al. 2016, 2018). Using this approach, we were able to define all

of the above types except V31 and V36. In the case of vegetated man-made habitats, geographical criteria were less needed than for other habitat types. We used them only in the definition of the habitat V32, while the other habitats were defined based solely on species composition and dominance of crops or specific spontaneously occurring species.

The habitat types of arable land V11-V15 were defined using the criteria based on the presence and cover of crop species in combination with species groups of weed vegetation. The type V13, including the types of low-intensity agricultural methods, was defined using a group of rare and declining weed species typical of such arable land, including species listed by Storkey et al. (2012) and some others (Figure 3.2).

Adonis aestivalis	Cota altissima	Medicago polymorpha
Adonis annua	Cota austriaca	Misopates orontium
Adonis flammea	Cuscuta epilinum	Myosurus minimus
Adonis microcarpa	Cyanus segetum	Neslia paniculata
Agrostemma githago	Euphorbia exigua	Nigella arvensis
Ajuga chamaepitys	Filago neglecta	Papaver argemone
Allium nigrum	Filago pyramidata	Papaver hybridum
Alopecurus myosuroides	Galium tricornutum	Ranunculus arvensis
Anagallis minima	Galium verrucosum	Raphanus raphanistrum
Androsace maxima	Geranium dissectum	Reseda phyteuma
Anthemis arvensis	Geranium rotundifolium	Rhagadiolus stellatus
Aphanes arvensis	Gladiolus italicus	Roemeria hybrida
Aphanes australis	Glebionis segetum	Scandix pecten-veneris
Arnoseris minima	Hypecoum procumbens	Silene gallica
Asperula arvensis	Hypochaeris glabra	Silene linicola
Bifora radians	Kickxia elatine	Silene noctiflora
Bifora testiculata	Kickxia spuria	Stachys annua
Bromus arvensis	Lathyrus aphaca	Teesdalia nudicaulis
Bromus grossus	Legousia hybrida	Thymelaea passerina
Bromus secalinus	Legousia speculum-veneris	Turgenia latifolia
Buglossoides arvensis	Leopoldia comosa	Vaccaria hispanica
Bupleurum rotundifolium	Linaria arvensis	Valerianella dentata
Camelina alyssum	Lolium remotum	Valerianella rimosa
Caucalis platycarpos	Lolium rigidum	Veronica agrestis
Conringia orientalis	Lolium temulentum	

Figure 3.2. Group of rare and declining weed species typical of low-intensity arable land.

The type V15 was defined through the prevalence of weeds of arable land but without crops or with very low cover of crops. This solution is dependent on data quality: some vegetation plots may have been recorded in crops, but the crop species was not recorded within the list of species. Such plots are classified as V15, because there is no way how to separate them from the fields with crops. However, this has limited influence on diagnostic species and distribution patterns, because they are nearly the same for arable land and recently abandoned arable land.
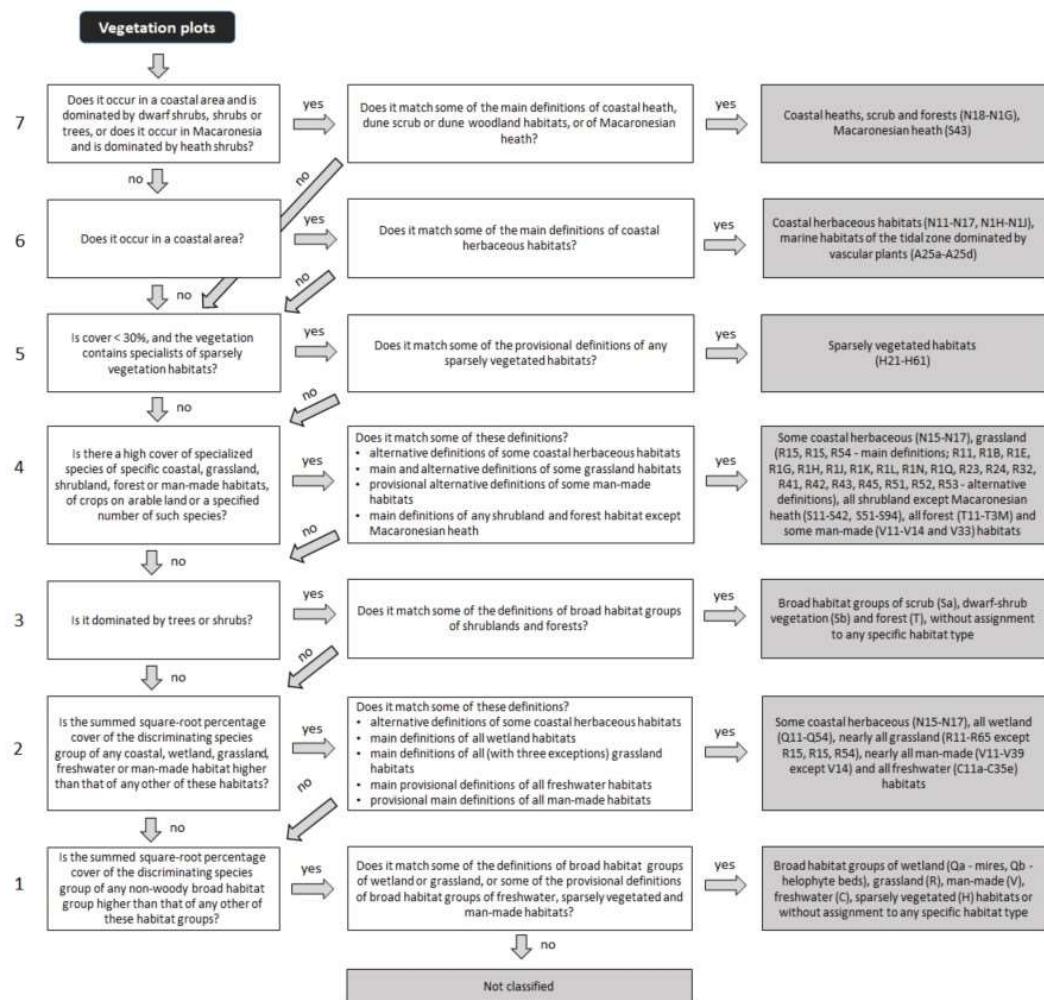
Figure 3.3. Updated structure of the expert system EUNIS-ESy for automatic classification of vegetation plots to EUNIS habitat types, including the newly defined vegetated man-made habitats.

The other types (V32 to V39) were defined in a similar way as grassland habitats in our previous work on the formal definition of EUNIS habitats (Schaminée et al. 2016, 2018). Their definitions included a comparison with other non-forest habitat types, especially grasslands. All the newly developed

habitat definitions (query routines) were included in a classification expert system, which can be run in the programs JUICE 7 and TURBOVEG 3. An updated scheme of the workflow used within the classification expert system EUNIS-ESy is shown in Figure 3.3.

Of a total of 1,847,463 plot observations, 1,252,624 plots have been selected for the analysis of vegetated man-made habitats. Excluded were plot observations that did not meet certain criteria, such as very small and very large plots, certain cover-abundance scales and plots with a location uncertainty of greater than 10 km. Of the resulting set, 86,596 plot obervations were classified as vegetated man-made habitats. Of these, 77,730 were classified to individual habitat types as follows:

V11	Intensive unmixed crops	7255
V12	Mixed crops of market gardens and horticulture	439
V13	Arable land with unmixed crops grown by low-intensity agricultural methods	3398
V14	Inundated or inundatable croplands, including rice fields	136
V15	Bare tilled, fallow or recently abandoned arable land	23746
V32	Mediterranean subnitrophilous annual grassland	7880
V33	Dry Mediterranean land with unpalatable non-vernal herbaceous vegetation	433
V34	Trampled xeric grassland with annuals	1739
V35	Trampled mesophilous grassland with annuals	4412
V37	Annual anthropogenic herbaceous vegetation	11439
V38	Dry perennial anthropogenic herbaceous vegetation	13333
V39	Mesic perennial anthropogenic herbaceous vegetation	3520

As regards crosswalks between European Red List Habitats and revised EUNIS Vegetated man-made habitats, there is only one 'man-made' Red List habitat, i.e. the Red List habitat I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods. It is identical with the revised EUNIS habitat V13 Arable land with unmixed crops grown by low-intensity agricultural methods. For both the Red List habitat and the equivalent revised EUNIS habitat, there are no crosswalks to Annex I habitats.

4   Aligning crosswalks between Red List habitats and Annex I habitats with crosswalks between revised EUNIS habitats and Annex I habitats

4.1 European Red List of Habitats

The European Red List of Habitats project has been carried out during the period 2014-2016 on behalf of the European Commission DG Environment (Gubbay et al. 2016; Janssen et al. 2016). The project aimed at providing a Red List assessment of all natural and semi-natural terrestrial, freshwater and marine habitats in the EU28 and beyond. For the Red List the EUNIS typology was applied, with some adaptations. These adaptations followed the proposed new EUNIS which were published in the same period for forest, scrub and grassland habitats (Schaminée et al. 2014, 2016a), as well as proposals for other habitat groups. The latter formed the basis for the new EUNIS proposals in the following years.

For terrestrial habitats, the Red List of European Habitats was organised in seven expert groups according to EUNIS main types (coastal habitats, freshwater types, mires and bogs, grasslands, heathland and scrub, forests, and sparsely vegetated habitats). The Red List applied the criteria and categories according to the IUCN guidelines (with some slight adaptations) and was based on data sources and expert knowledge of about 300 experts from 33 countries. In total for 235 terrestrial and freshwater habitats and 257 marine habitats a red list assessment was carried out. The information made public through factsheets contains much more information for these habitat type, including crosswalks to other classifications, list of characteristic species, photos, distribution maps, pressures and threats, conservation measures, and data on occurrences in individual countries.

4.2 Aligning of the crosswalks

EEA received in 2019 from ETC/BD the crosswalks between the revised EUNIS forests/heaths/grasslands/wetlands/coastal/marine and Annex I habitats. These crosswalks revealed some significant differences when compared to the crosswalks from the otherwise equal Red List habitats to the Annex I habitats. In general, one expects similar relationships, unless the definition of the EUNIS type has been revised since the Red List project was completed. The two spreadsheets were aligned using expert knowledge. For the marine habitats, there was a close cooperation between Susan Gubbay (from the project team) and Megan Parry (expert from ETC/BD). For the terrestrial habitats, John Janssen (project team) co-operated with Joop Schaminée (ETC/BD).

For marine habitats, in the crosswalks, qualifiers between revised marine EUNIS and Red List habitats have been added. These are needed as a first action before aligning the marine crosslinks to Annex I. Preliminary spreadsheets

showing the potential crosslinks between revised EUNIS habitats and Red List habitats (including qualifiers in both directions) were provided by the EEA to be checked for gaps and inconsistencies. The final outputs were a spreadsheet, with qualifiers, showing crosswalks between Annex 1 and the marine Red List, and a spreadsheet, with qualifiers, showing links between revised marine EUNIS (including saltmarshes) and the marine Red List habitat types.

For terrestrial habitats, this task was limited to forests, heathlands, shrubs and tundra, grasslands, coastal habitats, and wetlands. In case there was doubt or lack of clarity on crosswalks, some comments have been added, explaining the reported crosswalks and qualifiers. Corrected fields were indicated.

In the report, the resulting, updated spreadsheets are included in Annexes G, H, and I.

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Appendix A: List of the revised EUNIS Habitat Classification for vegetated man-made habitats, including an indication of the availability of a distribution map and a EUNIS-syntaxon crosswalk

New code	Code prior recoding	EUNIS 2012 code	Habitat name	Map & Indicators species	EUNIS-Syntaxon crosswalk
V11	V11	I1.1	Intensive unmixed crops	x	x
V12	V12	I1.2	Mixed crops of market gardens and horticulture	x	x
V13	V13	I1.3	Arable land with unmixed crops grown by low-intensity agricultural methods	x	x
V14	V14	I1.4	Inundated or inundatable cropland, including rice fields	x	x
V15	V15	I1.5	Bare tilled, fallow or recently abandoned arable land	x	x
V21	V21	I2.1	Large-scale ornamental garden areas		
V22	V22	I2.2	Small-scale ornamental and domestic garden areas		
V23	V23	I2.3	Recently abandoned garden areas		
V31	V31	E2.6	Agriculturally-improved, re-seeded and heavily fertilised grassland, including sports fields and grass lawns		x
V32	V32	E1.6	Mediterranean subnitrophilous annual grassland	x	x
V33	V33	E1.C	Dry mediterranean lands with unpalatable non-vernal herbaceous vegetation	x	x
V34	V35	E1.E	Trampled xeric grassland with annuals	x	x
V35	V37	E2.8	Trampled mesophilous grassland with annuals	x	x
V36	V38	E4.5	Alpine and subalpine enriched grassland		x
V37	V39a	E5.1	Annual anthropogenic herbaceous vegetation	x	x
V38	V39b		Dry perennial anthropogenic herbaceous vegetation	x	x
V39	v39c		Mesic perennial anthropogenic herbaceous vegetation	x	x

V41	V41	FA.1	Hedgerows of non-native species
V42	V42	FA.2	Highly-managed hedgerows of native species
V43	V43	FA.3	Species-rich hedgerows of native species
V44	V44	FA.4	Species-poor hedgerows of native species
V51	V51	FB.1	Shrub plantations for whole-plant harvesting
V52	V52	FB.2	Shrub plantations for leaf or branch harvest
V53	V53	FB.3	Shrub plantations for ornamental purposes or for fruit, other than vineyards
V54	V54	FB.4	Vineyards
V61	V61	G1.D	Broadleaved fruit and nut tree orchards
V62	V62	G2.9	Evergreen orchards and groves
V63	V63	G5.1	Lines of planted trees
V64	V64	G5.2	Small deciduous broadleaved planted other wooded land
V65	V65	G5.3	Small evergreen broadleaved planted other wooded land
V66	V66	G5.4	Small coniferous planted other wooded land

Appendix B: Descriptions of the revised EUNIS Habitat Classification for vegetated man-made habitats

New code	New name	Description
V11	Intensive unmixed crops	Cereal and other non-woody crops grown on large, unbroken surfaces in open field landscapes
V12	Mixed crops of market gardens and horticulture	Intensive cultivation of vegetables, flowers, small fruits, usually in alternating strips of different crops. Includes allotments and small-scale market gardens
V13	Arable land with unmixed crops grown by low-intensity agricultural methods	Traditionally and extensively cultivated crops, in particular, of cereals, harbouring a rich and threatened flora of field weeds including Agrostemma githago, Centaurea cyanus, Legousia speculum-veneris, Chrysanthemum segetum, Calendula arvensis, Adonis spp, Consolida spp, Nigella spp, Papaver spp
V14	Inundated or inundatable cropland, including rice fields	Inundated or inundatable fields used for the cultivation of rice (*Oryza sativa*) and more rarely for other crops. When not too heavily treated, they may provide substitution habitats for some wetland faunal elements, in particular, birds, including ducks, rails and herons.
V15	Bare tilled, fallow or recently abandoned arable land	Fields abandoned or left to rest, and other interstitial spaces on disturbed ground. Set-aside or abandoned arable land with forbs planted for purposes of soil protection, stabilization, fertilisation or reclamation. Abandoned fields are colonised by numerous pioneering, introduced or nitrophilous plants. They provide habitats that can be used by animals of open spaces
V21	Large-scale ornamental garden areas	Cultivated areas of large-scale recreational gardens. The vegetation, usually composed mainly of introduced species or cultivars, can nevertheless include many native plants and supports a varied fauna when not intensively managed. Large-scale

gardens are treated as habitat complexes (X23)

V22	Small-scale ornamental and domestic garden areas	Cultivated areas of ornamental gardens and small parks beside houses or in city squares. Kitchen gardens in the immediate vicinity of dwelling places. Excludes allotment gardens (V12). Small gardens are treated as habitat complexes (X22, X24, X25)
V23	Recently abandoned garden areas	Abandoned flowerbeds and vegetable plots in gardens are rapidly colonized by abundant weeds (R51, formerly E5.1)
V31	Agriculturally-improved, re-seeded and heavily fertilised grassland, including sports fields and grass lawns	Land occupied by heavily fertilised or reseeded permanent grasslands, sometimes treated by selective herbicides, with very impoverished flora and fauna, used for grazing, soil protection and stabilization, landscaping or recreation.
V32	Mediterranean subnitrophilous annual grassland	Land dominated by annual grasses and herbs, on soils slightly enriched in nitrates, in the meso- and thermo-Mediterranean zones. Characteristic are *Bromus*, *Aegilops*, *Avena*, *Vulpia*, crucifers and leguminous plants. These annuals occur as pioneers of bare soils slightly nitrified by aeration or organic addition, along roads, on land-fills and in interstitial spaces of cultivation. They also replace the oligotrophic annual vegetation of Mediterranean xeric grasslands (R1D, R1F) under the influence of pastoral activities. Subnitrophilous annual grassland is widespread as a successional stage after cultivation. Woody recolonisation may lead to maquis (S5) or garrigues (S6).

V33	Dry mediterranean lands with unpalatable non-vernal herbaceous vegetation	Dry lands with shrub cover < 10%, and with a large component of non-vernal unpalatable plants, including geophytes (*Asphodelus*, *Urginea*), thistles (*Carthamus*, *Carlina*, *Centaurea*, *Onopordum*), *Ferula* and *Phlomis*, especially characteristic of the drier parts of the Mediterranean basin but occuring elsewhere with suitable conditions such as the dry continental valleys of Switzerland. These habitats usually result from over-grazing of garrigue, which eliminates the shrubs.
V34	Trampled xeric grassland with annuals	Low annuals on dry and warm trampled localities, for example the community of *Matricario matricarioidis-Polygonion arenastri* recorded in Hungary and Serbia with *Coronopus squamatus*, *Cynodon dactylon*, *Eragrostis minor*, *Herniaria glabra*, *Herniaria hirsuta*, *Juncus tenuis*, *Lepidium ruderale*, *Lolium perenne*, *Matricaria discoidea*, *Plantago lanceolata*, *Plantago major*, *Poa annua* agg. and *Polygonum arenastrum*.
V35	Trampled mesophilous grassland with annuals	Low annuals on mesophilous trampled localities, for example the community *Saginion procumbentis* with *Sagina procumbens*, *Sagina apetala*, *Spergularia rubra*, *Juncus bufonius*, *Poa supina*, *Veronica serpyllifolia*; in sub-mountain and mountain locations the vegetation may consist of *Alchemillo-Poion supinae*.
V36	Alpine and subalpine enriched grassland	Enriched pastures of the subalpine and lower alpine levels of mountains with species such as *Phleum alpinum* and *Crepis aurea*. Enriched hay meadows are listed under R23.
V37	Annual anthropogenic herbaceous vegetation	Stands dominated by annual herbaceous plants developing on recently abandoned urban or agricultural land, on land that has been reclaimed, on transport networks, or on land used for waste disposal, typically in places that are frequently disturbed or were affected by recent severe disturbance event.

V38	Dry perennial anthropogenic herbaceous vegetation	Stands dominated by perennial herbaceous plants, frequently ruderals, developing on dry abandoned urban or agricultural land, on land that has been reclaimed, on transport networks, or on land used for waste disposal. These stands often replace annual anthropogenic herbaceous vegetation in the course of secondary succession.
V39	Mesic perennial anthropogenic herbaceous vegetation	Stands dominated by perennial herbaceous plants, frequently ruderals, developing on mesic to slightly wet abandoned urban or agricultural land, on land that has been reclaimed, on transport networks, or on land used for waste disposal. These stands often replace annual anthropogenic herbaceous vegetation in the course of secondary succession.

Appendix C: Crosswalk between the revised EUNIS Habitat Classification for vegetated man-made habitats and *EuroVegChecklist* 2016

V11 - Intensive unmixed crops
- <> PAR-01A - Scleranthion annui (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946
- <> PAR-01B - Oxalidion europeae Passarge 1978
- <> PAR-01C - Galeopsion bifidae Abramova in Mirkin et al. 1985
- <> PAR-02A - Caucalidion lappulae von Rochow 1951
- <> PAR-02C - Veronico-Euphorbion Sissingh in Passarge 1964
- <> ART-03E - Trifolio-Medicaginion sativae Balázs 1944
- <> PAR-02E - Anthemido ruthenicae-Sisymbrion orientalis V. Solomakha 1990
- <> PAR-02G - Chenopodio albi-Descurainion sophiae V. Solomakha et al. in V. Solomakha 1988
- <> PAR-02H - Erysimo repandi-Lycopsion orientalis V. Solomakha 1996
- <> PAR-02I - Lactucion tataricae Rudakov in Mirkin et al. 1985
- <> DIG-01A - Spergulo arvensis-Erodion cicutariae J.Tx. in Passarge 1964
- <> DIG-01B - Eragrostion Tx. in Oberd. 1954

V12 - Mixed crops of market gardens and horticulture
- <> PAR-01A - Scleranthion annui (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946
- <> PAR-01B - Oxalidion europeae Passarge 1978
- <> PAR-01C - Galeopsion bifidae Abramova in Mirkin et al. 1985
- <> PAR-02C - Veronico-Euphorbion Sissingh in Passarge 1964
- <> PAR-02D - Matricario chamomillae-Chenopodion albi Timár 1954
- <> PAR-03A - Ridolfion segeti Nègre ex Rivas-Mart. et al. 1999
- <> PAR-03B - Roemerion hybridae Rivas-Mart., Fernández-González et Loidi in Loidi et al. 1997
- <> PAR-03C - Rumicion bucephalophori Nezadal 1989
- <> PAR-03D - Fumarion wirtgenii-agrariae S. Brullo in S. Brullo et Marcenò 1985
- <> DIG-01A - Spergulo arvensis-Erodion cicutariae J.Tx. in Passarge 1964
- <> DIG-01B - Eragrostion Tx. in Oberd. 1954

V13 - Arable land with unmixed crops grown by low-intensity agricultural methods
- <> PAR-01A - Scleranthion annui (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946
- <> PAR-01B - Oxalidion europeae Passarge 1978

<> PAR-01C - Galeopsion bifidae Abramova in Mirkin et al. 1985

<> PAR-02A - Caucalidion lappulae von Rochow 1951

<> PAR-02B - Linion Rothmaler 1944

<> PAR-02C - Veronico-Euphorbion Sissingh in Passarge 1964

<> PAR-02D - Matricario chamomillae-Chenopodion albi Timár 1954

<> PAR-02E - Anthemido ruthenicae-Sisymbrion orientalis V. Solomakha 1990

<> PAR-02F - Lamio amplexicaule-Calepinion irregularis Bagrikova 1996

<> PAR-02G - Chenopodio albi-Descurainion sophiae V. Solomakha et al. in V. Solomakha 1988

<> PAR-02H - Erysimo repandi-Lycopsion orientalis V. Solomakha 1996

<> PAR-02I - Lactucion tataricae Rudakov in Mirkin et al. 1985

<> PAR-03A - Ridolfion segeti Nègre ex Rivas-Mart. et al. 1999

<> PAR-03B - Roemerion hybridae Rivas-Mart., Fernández-González et Loidi in Loidi et al. 1997

<> PAR-03C - Rumicion bucephalophori Nezadal 1989

<> PAR-03D - Fumarion wirtgenii-agrariae S. Brullo in S. Brullo et Marcenò 1985

<> DIG-01A - Spergulo arvensis-Erodion cicutariae J.Tx. in Passarge 1964

<> DIG-01B - Eragrostion Tx. in Oberd. 1954

<> DIG-01C - Consolido-Eragrostion pooidis Soó et Timár in Timár 1957

<> DIG-01D - Diplotaxidion erucoidis Br.-Bl. in Br.-Bl. et al. 1936

<> DIG-01E - Chenopodion botryos S. Brullo et Marcenò 1980

<> ART-03E - Trifolio-Medicaginion sativae Balázs 1944

<> ART-03F - Achilleion millefolii Abramova et Rudakov in Mirkin et al. 1985

V14 - Inundated or inundatable cropland, including rice fields

= ORY-01A - Oryzo sativae-Echinochloion oryzoidis O. de Bolòs et Masclans 1955

V15 - Bare tilled, fallow or recently abandoned arable land

<> PAR-01A - Scleranthion annui (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946

<> PAR-01B - Oxalidion europeae Passarge 1978

<> PAR-01C - Galeopsion bifidae Abramova in Mirkin et al. 1985

<> PAR-02C - Veronico-Euphorbion Sissingh in Passarge 1964

<> PAR-02D - Matricario chamomillae-Chenopodion albi Timár 1954

<> PAR-02F - Lamio amplexicaule-Calepinion irregularis Bagrikova 1996

<> SIS-01A - Atriplicion Passarge 1978 nom. conserv. propos.

<> SIS-01B - Cannabidion sativae Golub et al. 2012

<> SIS-01D - Sisymbrion officinalis Tx. et al. ex von Rochow 1951

V31 - Agriculturally-improved, re-seeded and heavily fertilised grassland, including sports fields and grass lawns

  <>   MOL-01C - Cynosurion cristati Tx. 1947

  <>   MOL-10A - Potentillion anserinae Tx. 1947

V32 - Mediterranean subnitrophilous annual grassland

  >   CHE-01F - Hordeion murini Br.-Bl. in Br.-Bl. et al. 1936

  >   CHE-01H - Laguro ovati-Bromion rigidi Géhu et Géhu-Franck 1985

  >   CHE-01I - Linario polygalifoliae-Vulpion alopecuri Br.-Bl., Rozeira et Silva in Br.-Bl. et al. 1972

  >   CHE-01J - Taeniathero-Aegilopion geniculatae Rivas-Mart. et Izco 1977

  >   CHE-01K - Laguro ovati-Vulpion fasciculatae Géhu et Biondi 1994

V33 - Mediterranean subnitrophilous annual grassland

  <>   CHE-01A - Alysso granatensis-Brassicion barrelieri Rivas-Mart. et Izco 1977

  <>   CHE-01B - Resedo lanceolatae-Moricandion Fernández Casas et M.E. Sánchez 1972

  <>   CHE-01C - Cerintho majoris-Fedion cornucopiae Rivas-Mart. et Izco ex Peinado et al. 1986

  <>   CHE-01D - Echio-Galactition tomentosae O. de Bolòs et Molinier 1969

  <>   CHE-01E - Fedio-Convolvulion cupaniani S. Brullo et Spampinato 1986

  <>   CHE-01L - Securigero securidacae-Dasypyrion villosi Cano-Ortiz, Biondi et Cano in Cano-Ortiz et al. ex Di Pietro in Di Pietro et al. 2015

  <>   CHE-01L - Securigero securidacae-Dasypyrion villosi Cano-Ortiz, Biondi et Cano in Cano-Ortiz et al. ex Di Pietro in Di Pietro et al. 2015

  <>   CHE-01A - Alysso granatensis-Brassicion barrelieri Rivas-Mart. et Izco 1977

  <>   CHE-01B - Resedo lanceolatae-Moricandion Fernández Casas et M.E. Sánchez 1972

  <>   CHE-01C - Cerintho majoris-Fedion cornucopiae Rivas-Mart. et Izco ex Peinado et al. 1986

  <>   CHE-01D - Echio-Galactition tomentosae O. de Bolòs et Molinier 1969

  <>   CHE-01E - Fedio-Convolvulion cupaniani S. Brullo et Spampinato 1986

  <>   CHE-01L - Securigero securidacae-Dasypyrion villosi Cano-Ortiz, Biondi et Cano in Cano-Ortiz et al. ex Di Pietro in Di Pietro et al. 2015

  <>   ART-04A - Silybo mariani-Urticion piluliferae Sissingh ex Br.-Bl. et O. de Bolòs 1958

  <>   ART-04B - Onopordion castellani Br.-Bl. et O. de Bolòs 1958 corr. Rivas-Mart. et al. 2001

  <>   ART-04C - Onopordion illyrici Oberd. 1954

  <>   ART-04D - Scolymion hispanici Morariu 1967

  <>   ART-05A - Inulo viscosae-Agropyrion repentis Biondi et Allegrezza 1996

  <>   ART-05B - Arundion collinae S. Brullo, Giusso, Guarino et Sciandello in S. Brullo et al. 2010

  <>   ART-05C - Bromo-Oryzopsion miliaceae O. de Bolòs 1970

<> ART-05D - Hyperico perforati-Ferulion communis Vicente Orellana et
Galán de Mera 2008

V34 - Trampled xeric grassland with annuals
> POL-01A - Polygono-Coronopodion Sissingh 1969
> POL-01B - Polycarpion tetraphylli Rivas-Mart. 1975
> DIG-02A - Euphorbion prostratae Rivas-Mart. 1976
> DIG-02B - Polycarpo-Eleusinion indicae Čarni et Mucina 1998
> DIG-02C - Eragrostio-Polygonion arenastri Couderc et Izco ex Čarni et Mucina 1998

V35 - Trampled mesophilous grassland with annuals
> MOL-01D - Alchemillo-Ranunculion repentis Passarge 1979
> POL-01C - Saginion procumbentis Tx. et Ohba in Géhu et al. 1972

V36 - Alpine and subalpine enriched grassland
<> MOL-03A - Triseto flavescentis-Polygonion bistortae Br.-Bl. et Tx. ex Marschall 1947
<> MOL-03B - Poion alpinae Gams ex Oberd. 1950
<> MOL-03C - Poion supinae Rivas-Mart. et Géhu 1978
<> MOL-03D - Violion cornutae Nègre 1972
<> MOL-03E - Pancicion serbicae Lakušić 1966
<> MOL-03F - Helictotricho compressi-Bistortion officinalis Didukh et Kuzemko 2009
<> MOL-03G - Astrantion maximae Korotkov 2013

V37 - Annual anthropogenic herbaceous vegetation
> SIS-02A - Erysimo wittmannii-Hackelion Bernátová 1986
<> DIG-01B - Eragrostion Tx. in Oberd. 1954
<> DIG-01C - Consolido-Eragrostion pooidis Soó et Timár in Timár 1957
<> DIG-01D - Diplotaxidion erucoidis Br.-Bl. in Br.-Bl. et al. 1936
<> DIG-01F - Salsolion ruthenicae Philippi ex Oberd. 1983
> DIG-01G - Tamarici ramosissimae-Salsolion australis Golub 1994
<> SIS-01A - Atriplicion Passarge 1978 nom. conserv. propos.
<> SIS-01B - Cannabidion sativae Golub et al. 2012
<> SIS-01C - Malvion neglectae (Gutte 1972) Hejný 1978
<> SIS-01D - Sisymbrion officinalis Tx. et al. ex von Rochow 1951

V38 - Dry perennial anthropogenic herbaceous vegetation
<> ART-01A - Onopordion acanthii Br.-Bl. et al. 1936
<> ART-01B - Dauco-Melilotion Görs ex Rostański et Gutte 1971

<> ART-01C - Cirsion richterano-chodati (Rivas-Mart. in Rivas-Mart. et al. 1984) Rivas-Mart. et al. 1991

<> ART-01D - Carduo carpetani-Cirsion odontolepidis Rivas-Mart. et al. 1986

<> ART-01E - Medicagini falcatae-Diplotaxidion tenuifoliae Levon 1997

> ART-02A - Bassio-Artemision austriacae Solomeshch in A. Ishbirdin et al. 1988

> ART-03A - Convolvulo arvensis-Agropyrion repentis Görs 1967

> ART-03B - Artemisio absinthii-Agropyrion intermedii T. Müller et Görs 1969

> ART-03C - Artemisio marschallianae-Elytrigion intermedii Korotchenko et Didukh 1997

> ART-03D - Rorippo austriacae-Falcarion vulgaris Levon 1997

<> ART-04A - Silybo mariani-Urticion piluliferae Sissingh ex Br.-Bl. et O. de Bolòs 1958

<> ART-04B - Onopordion castellani Br.-Bl. et O. de Bolòs 1958 corr. Rivas-Mart. et al. 2001

<> ART-04C - Onopordion illyrici Oberd. 1954

<> ART-04D - Scolymion hispanici Morariu 1967

<> ART-05A - Inulo viscosae-Agropyrion repentis Biondi et Allegrezza 1996

<> ART-05B - Arundion collinae S. Brullo, Giusso, Guarino et Sciandello in S. Brullo et al. 2010

<> ART-05C - Bromo-Oryzopsion miliaceae O. de Bolòs 1970

<> ART-05D - Hyperico perforati-Ferulion communis Vicente Orellana et Galán de Mera 2008

V39 - Mesic perennial anthropogenic herbaceous vegetation

> EPI-02C - Aegopodion podagrariae Tx. 1967 nom. conserv. propos.

> EPI-03A - Arction lappae Tx. 1937

> EPI-03B - Balloto-Conion maculati S. Brullo et Marcenò 1985

> EPI-04A - Geo urbani-Alliarion officinalis Lohmeyer et Oberd. in Görs et T. Müller 1969

> EPI-04B - Anthriscion nemorosae S. Brullo in S. Brullo et Marcenò 1985

Appendix E: Lists of indicator species of the revised EUNIS Habitat Classification for vegetated man-made habitats

V11 - Intensive unmixed crops

*Diagnostic species (phi coefficient * 100)*

Fallopia convolvulus	28.1	Triticum aestivum	27.0
Secale cereale	25.1	Cyanus segetum	23.8
Chenopodium album aggr.	23.4	Myosotis arvensis	23.2
Spergula arvensis	22.1	Solanum tuberosum	21.8
Apera spica-venti	21.7	Hordeum vulgare	21.3
Tripleurospermum maritimum aggr.	21.1	Veronica persica	20.0
Thlaspi arvense	19.9	Stellaria media	19.9
Avena sativa	17.9	Capsella bursa-pastoris	17.8
Cirsium arvense	17.4	Brassica napus	17.0
Scleranthus annuus	16.4	Vicia hirsuta	16.1
Equisetum arvense	16.1	Sinapis arvensis	15.8
Polygonum aviculare aggr.	15.7	Lamium purpureum	15.6
Persicaria lapathifolia	15.5		

Constant species (occurrence frequencies)

Chenopodium album aggr.	54.0	Fallopia convolvulus	51.0
Viola arvensis	50.0	Stellaria media	47.0
Elytrigia repens aggr.	46.0	Cirsium arvense	46.0
Tripleurospermum maritimum aggr.	41.0	Polygonum aviculare aggr.	40.0
Equisetum arvense	36.0	Capsella bursa-pastoris	36.0
Myosotis arvensis	32.0	Convolvulus arvensis	32.0
Cyanus segetum	30.0	Apera spica-venti	29.0
Persicaria lapathifolia	27.0	Galium aparine	26.0
Veronica persica	24.0	Spergula arvensis	24.0
Achillea millefolium aggr.	24.0	Secale cereale	23.0
Vicia hirsuta	22.0	Vicia sativa	21.0
Triticum aestivum	21.0	Taraxacum sect. Taraxacum	21.0
Anagallis arvensis	21.0	Veronica arvensis	20.0
Solanum tuberosum	20.0	Scleranthus annuus	20.0
Thlaspi arvense	19.0	Sonchus arvensis	19.0
Rumex acetosella	19.0	Galeopsis tetrahit	19.0
Persicaria maculosa	18.0	Sinapis arvensis	17.0

Plantago major	17.0	Lamium purpureum	17.0
Echinochloa crus-galli	17.0	Raphanus raphanistrum	15.0
Papaver rhoeas	15.0	Mentha arvensis	15.0
Euphorbia helioscopia	15.0	Stachys palustris	14.0
Galinsoga parviflora	14.0	Artemisia vulgaris	14.0
Ranunculus repens	13.0	Ochlopoa annua	13.0
Lapsana communis	13.0	Trifolium repens	12.0
Setaria pumila	12.0	Hordeum vulgare	12.0
Gnaphalium uliginosum	12.0	Erodium cicutarium	12.0
Avena sativa	12.0	Vicia tetrasperma	11.0

Dominant species (percentage frequencies of occurrences with cover > 25%)

Secale cereale	18.0	Triticum aestivum	17.0
Solanum tuberosum	15.0	Hordeum vulgare	8.0
Avena sativa	7.0	Beta vulgaris subsp. vulgaris	5.0

V12 - Mixed crops of market gardens and horticulture

*Diagnostic species (phi coefficient * 100)*

Solanum tuberosum	51.3	Galinsoga parviflora	34.9
Zea mays	34.6	Beta vulgaris subsp. vulgaris	34.3
Chenopodium album aggr.	33.0	Galinsoga quadriradiata	31.5
Armoracia rusticana	30.3	Veronica persica	29.2
Fallopia convolvulus	26.2	Papaver somniferum	25.6
Lamium purpureum	25.1	Euphorbia helioscopia	24.9
Brassica rapa	24.9	Persicaria maculosa	24.7
Cucurbita pepo	24.1	Persicaria lapathifolia	24.0
Stellaria media	23.3	Brassica oleracea	22.4
Anethum graveolens	21.6	Capsella bursa-pastoris	21.5
Viola arvensis	20.7	Sinapis arvensis	20.4
Myosotis arvensis	20.4	Echinochloa crus-galli	20.3
Thlaspi arvense	20.1	Sonchus arvensis	20.0
Setaria pumila	19.5	Tripleurospermum maritimum aggr.	19.4
Cirsium arvense	19.1	Raphanus sativus	19.0
Mentha arvensis	17.5	Erysimum cheiranthoides	17.3
Sonchus asper	16.7	Phaseolus vulgaris	16.5
Helianthus annuus	16.5	Pisum sativum	16.4
Equisetum arvense	16.4	Setaria viridis	16.0
Spergula arvensis	15.6	Lactuca sativa	15.5

Geranium pusillum	15.5	Amaranthus retroflexus	15.5
Polygonum aviculare aggr.	15.4	Atriplex patula	15.4
Lipandra polysperma	15.3		

Constant species (occurrence frequencies)

Chenopodium album aggr.	75.0	Stellaria media	54.0
Cirsium arvense	51.0	Fallopia convolvulus	48.0
Solanum tuberosum	46.0	Elytrigia repens aggr.	46.0
Capsella bursa-pastoris	43.0	Daucus carota	42.0
Persicaria lapathifolia	41.0	Polygonum aviculare aggr.	39.0
Convolvulus arvensis	39.0	Tripleurospermum maritimum aggr.	37.0
Equisetum arvense	37.0	Echinochloa crus-galli	37.0
Viola arvensis	35.0	Veronica persica	35.0
Persicaria maculosa	33.0	Galinsoga parviflora	33.0
Sonchus arvensis	29.0	Myosotis arvensis	29.0
Euphorbia helioscopia	28.0	Lamium purpureum	27.0
Taraxacum sect. Taraxacum	26.0	Galeopsis tetrahit	26.0
Plantago major	25.0	Achillea millefolium aggr.	25.0
Beta vulgaris subsp. vulgaris	24.0	Mentha arvensis	23.0
Galium aparine	23.0	Sonchus oleraceus	22.0
Sonchus asper	22.0	Sinapis arvensis	22.0
Setaria pumila	21.0	Galinsoga quadriradiata	21.0
Ranunculus repens	20.0	Anagallis arvensis	20.0
Vicia hirsuta	19.0	Thlaspi arvense	19.0
Stachys palustris	19.0	Ochlopoa annua	18.0
Spergula arvensis	17.0	Setaria viridis	17.0
Cyanus segetum	17.0	Amaranthus retroflexus	17.0
Zea mays	16.0	Raphanus raphanistrum	16.0
Artemisia vulgaris	16.0	Trifolium repens	15.0
Gnaphalium uliginosum	15.0	Armoracia rusticana	15.0
Rumex crispus	14.0	Lapsana communis	14.0
Erysimum cheiranthoides	14.0	Atriplex patula	14.0
Argentina anserina	14.0	Vicia sativa	13.0
Silene latifolia	13.0	Lipandra polysperma	13.0
Geranium pusillum	13.0	Veronica arvensis	12.0
Erodium cicutarium	12.0	Rumex acetosella	11.0
Plantago lanceolata	11.0	Persicaria hydropiper	11.0
Papaver rhoeas	11.0	Lamium amplexicaule	11.0
Brassica oleracea	11.0		

Dominant species (percentage frequencies of occurrences with cover > 25%)

Solanum tuberosum	26.0	Beta vulgaris subsp. vulgaris	16.0
Zea mays	14.0	Galinsoga parviflora	6.0

V13 - Arable land with unmixed crops grown by low-intensity agricultural methods

*Diagnostic species (phi coefficient * 100)*

Cyanus segetum	56.2	Secale cereale	52.9
Viola arvensis	39.4	Scleranthus annuus	36.4
Papaver argemone	34.9	Apera spica-venti	33.7
Fallopia convolvulus	31.9	Agrostemma githago	31.2
Anthemis arvensis	31.0	Raphanus raphanistrum	30.3
Triticum aestivum	29.3	Buglossoides arvensis	28.0
Papaver rhoeas	27.5	Aphanes arvensis	27.0
Vicia hirsuta	26.5	Myosotis arvensis	26.5
Vicia sativa	25.2	Spergula arvensis	24.1
Avena sativa	22.6	Ranunculus arvensis	22.5
Hordeum vulgare	21.6	Arnoseris minima	19.8
Neslia paniculata	19.1	Veronica arvensis	19.0
Capsella bursa-pastoris	19.0	Veronica triphyllos	18.9
Galium tricornutum	18.8	Veronica hederifolia	18.7
Convolvulus arvensis	18.7	Consolida regalis	18.7
Thlaspi arvense	18.6	Stellaria media	18.3
Cirsium arvense	17.6	Vicia villosa	17.4
Chenopodium album aggr.	17.4	Vicia tetrasperma	17.3
Polygonum aviculare aggr.	17.2	Equisetum arvense	17.2
Sinapis arvensis	17.0	Arabidopsis thaliana	16.7
Silene noctiflora	16.2	Valerianella dentata	15.9
Adonis aestivalis	15.9	Veronica persica	15.8
Cota austriaca	15.6	Bromus secalinus	15.0

Constant species (occurrence frequencies)

Cyanus segetum	69.0	Viola arvensis	66.0
Fallopia convolvulus	58.0	Secale cereale	49.0
Convolvulus arvensis	48.0	Cirsium arvense	47.0
Scleranthus annuus	44.0	Apera spica-venti	44.0
Stellaria media	43.0	Polygonum aviculare aggr.	43.0
Vicia sativa	42.0	Chenopodium album aggr.	41.0
Anthemis arvensis	41.0	Elytrigia repens aggr.	39.0

Equisetum arvense	38.0	Capsella bursa-pastoris	38.0
Myosotis arvensis	37.0	Vicia hirsuta	36.0
Raphanus raphanistrum	36.0	Papaver rhoeas	35.0
Veronica arvensis	33.0	Rumex acetosella	31.0
Anagallis arvensis	31.0	Tripleurospermum maritimum aggr.	29.0
Buglossoides arvensis	29.0	Achillea millefolium aggr.	29.0
Spergula arvensis	26.0	Galium aparine	25.0
Aphanes arvensis	25.0	Triticum aestivum	22.0
Papaver argemone	22.0	Arenaria serpyllifolia	21.0
Arabidopsis thaliana	20.0	Veronica persica	19.0
Agrostemma githago	19.0	Veronica hederifolia	18.0
Thlaspi arvense	18.0	Sinapis arvensis	18.0
Mentha arvensis	18.0	Lamium amplexicaule	18.0
Galeopsis tetrahit	18.0	Consolida regalis	18.0
Vicia villosa	17.0	Sonchus arvensis	17.0
Vicia tetrasperma	16.0	Taraxacum sect. Taraxacum	16.0
Persicaria lapathifolia	16.0	Veronica triphyllos	15.0
Rumex crispus	15.0	Avena sativa	15.0
Arnoseris minima	15.0	Persicaria maculosa	14.0
Myosotis stricta	14.0	Medicago lupulina	14.0
Euphorbia helioscopia	14.0	Erodium cicutarium	14.0
Ranunculus repens	13.0	Ranunculus arvensis	13.0
Hordeum vulgare	13.0	Artemisia vulgaris	13.0
Plantago major	12.0	Lamium purpureum	12.0
Trifolium repens	11.0	Stachys palustris	11.0
Sonchus asper	11.0	Lolium rigidum	11.0

Dominant species (percentage frequencies of occurrences with cover > 25%)

Secale cereale	40.0	Triticum aestivum	17.0
Hordeum vulgare	7.0	Avena sativa	7.0
Solanum tuberosum	6.0	Apera spica-venti	5.0

V14 - Inundated or inundatable cropland, including rice fields

*Diagnostic species (phi coefficient * 100)*

Oryza sativa	99.7	Schoenoplectus mucronatus	69.6
Cyperus difformis	57.1	Lindernia dubia	56.0
Echinochloa oryzoides	53.7	Limnophila indica	48.4
Echinochloa crus-galli	48.4	Elatine triandra	46.1

Schoenoplectus supinus	43.2	Alisma lanceolatum	41.7
Typha angustifolia	40.4	Elatine hungarica	40.1
Najas minor	37.7	Chara braunii	36.5
Elatine alsinastrum	33.5	Lindernia procumbens	31.5
Alisma plantago-aquatica	27.6	Marsilea quadrifolia	26.7
Chara globularis	26.0	Cladophora fracta	24.2
Typha latifolia	23.6	Alisma gramineum	22.6
Paspalum distichum	22.3	Lemna minor	22.3
Utricularia vulgaris	21.0	Ammannia auriculata	21.0
Bolboschoenus maritimus	20.2	Typha laxmannii	18.4
Eleocharis acicularis	18.4	Zannichellia pedunculata	17.7
Nitella mucronata	17.7	Ammannia robusta	17.1
Butomus umbellatus	16.0	Cyperus glomeratus	15.8

Constant species (occurrence frequencies)

Oryza sativa	100.0	Echinochloa crus-galli	86.0
Schoenoplectus mucronatus	51.0	Typha angustifolia	47.0
Alisma plantago-aquatica	43.0	Lemna minor	42.0
Bolboschoenus maritimus	38.0	Lindernia dubia	35.0
Cyperus difformis	34.0	Najas minor	32.0
Elatine triandra	32.0	Echinochloa oryzoides	31.0
Alisma lanceolatum	31.0	Typha latifolia	27.0
Limnophila indica	24.0	Schoenoplectus supinus	23.0
Eleocharis palustris	23.0	Utricularia vulgaris	21.0
Chara globularis	19.0	Elatine hungarica	19.0
Spirodela polyrhiza	18.0	Paspalum distichum	17.0
Eleocharis acicularis	17.0	Chara braunii	16.0
Phragmites australis	15.0	Lindernia procumbens	15.0
Elatine alsinastrum	15.0	Butomus umbellatus	14.0
Alisma gramineum	14.0	Cladophora fracta	11.0

Dominant species (percentage frequencies of occurrences with cover > 25%)

Oryza sativa	96.0	Limnophila indica	18.0
Najas minor	9.0	Echinochloa crus-galli	8.0

V15 - Bare tilled, fallow or recently abandoned arable land

*Diagnostic species (phi coefficient * 100)*

Viola arvensis	27.0	Fallopia convolvulus	26.6
Veronica persica	24.8	Capsella bursa-pastoris	23.4

Stellaria media	22.8	Chenopodium album aggr.	22.0
Myosotis arvensis	20.6	Papaver rhoeas	19.7
Veronica hederifolia	19.1	Polygonum aviculare aggr.	18.8
Cyanus segetum	18.5	Lamium purpureum	18.0
Apera spica-venti	17.8	Sinapis arvensis	17.7
Euphorbia helioscopia	17.2	Cirsium arvense	16.9
Aphanes arvensis	16.7	Thlaspi arvense	16.5
Tripleurospermum maritimum aggr.	16.4	Convolvulus arvensis	16.4
Lamium amplexicaule	15.7	Veronica polita	15.6

Constant species (occurrence frequencies)

Stellaria media	53.0	Chenopodium album aggr.	51.0
Fallopia convolvulus	49.0	Polygonum aviculare aggr.	47.0
Capsella bursa-pastoris	47.0	Viola arvensis	46.0
Cirsium arvense	45.0	Convolvulus arvensis	43.0
Elytrigia repens aggr.	36.0	Tripleurospermum maritimum aggr.	32.0
Veronica persica	29.0	Myosotis arvensis	29.0
Anagallis arvensis	28.0	Papaver rhoeas	26.0
Ochlopoa annua	26.0	Galium aparine	25.0
Apera spica-venti	24.0	Cyanus segetum	23.0
Veronica arvensis	21.0	Vicia sativa	20.0
Plantago major	20.0	Taraxacum sect. Taraxacum	19.0
Sinapis arvensis	19.0	Persicaria lapathifolia	19.0
Lamium purpureum	19.0	Lamium amplexicaule	19.0
Euphorbia helioscopia	19.0	Equisetum arvense	19.0
Veronica hederifolia	18.0	Sonchus arvensis	17.0
Persicaria maculosa	17.0	Vicia hirsuta	16.0
Thlaspi arvense	16.0	Sonchus oleraceus	16.0
Aphanes arvensis	16.0	Sonchus asper	15.0
Senecio vulgaris	15.0	Echinochloa crus-galli	15.0
Consolida regalis	15.0	Scleranthus annuus	14.0
Raphanus raphanistrum	14.0	Spergula arvensis	13.0
Setaria pumila	13.0	Arenaria serpyllifolia	13.0
Anthemis arvensis	13.0	Rumex acetosella	12.0
Mentha arvensis	12.0	Matricaria chamomilla	12.0
Galinsoga parviflora	12.0	Erodium cicutarium	12.0
Setaria viridis	11.0	Ranunculus repens	11.0
Fumaria officinalis	11.0	Erigeron canadensis	11.0
Arabidopsis thaliana	11.0	Amaranthus retroflexus	11.0

Achillea millefolium aggr.   11.0

Dominant species (percentage frequencies of occurrences with cover > 25%)
  Stellaria media   6.0

V32 - Mediterranean subnitrophilous annual grassland

*Diagnostic species (phi coefficient * 100)*

Hordeum murinum	22.4	Anacyclus clavatus	20.2
Lolium rigidum	20.0	Biscutella auriculata	18.0
Calendula arvensis	17.7	Medicago polymorpha aggr.	16.6
Fumaria parviflora	16.6	Anisantha madritensis	16.6
Hypecoum imberbe	16.1	Glebionis coronaria	15.9
Avena barbata	15.7	Roemeria hybrida	15.5
Malva multiflora	15.1		

Constant species (occurrence frequencies)

Hordeum murinum	31.0	Avena barbata	26.0
Convolvulus arvensis	22.0	Lolium rigidum	21.0
Sonchus oleraceus	20.0	Papaver rhoeas	19.0
Anisantha madritensis	19.0	Dactylis glomerata	18.0
Anagallis arvensis	18.0	Trifolium campestre	17.0
Plantago lanceolata	16.0	Medicago polymorpha aggr.	16.0
Bromus hordeaceus	16.0	Vicia sativa	15.0
Sherardia arvensis	15.0	Geranium molle	15.0
Calendula arvensis	14.0	Rostraria cristata	13.0
Galactites tomentosus	13.0	Eryngium campestre	13.0
Catapodium rigidum	13.0	Hedypnois rhagadioloides	12.0
Daucus carota	12.0	Anacyclus clavatus	12.0
Plantago lagopus	11.0	Erodium cicutarium	11.0
Cynodon dactylon	11.0	Avena sterilis	11.0

Dominant species (percentage frequencies of occurrences with cover > 25%)
  Hordeum murinum   7.0

V33 - Dry mediterranean lands with unpalatable non-vernal herbaceous vegetation

*Diagnostic species (phi coefficient * 100)*

Silybum marianum	44.0	Galactites tomentosus	28.1
Cynara cardunculus	25.4	Onopordum illyricum	21.3
Avena sterilis	20.1	Centaurea calcitrapa	19.3
Foeniculum vulgare	19.2	Echium plantagineum	18.5
Hordeum murinum	18.2	Cynoglossum creticum	18.0
Coleostephus myconis	17.8	Carduus pycnocephalus	17.6
Malva sylvestris	16.5	Rumex pulcher	16.4
Avena barbata	16.3	Carduus tenuiflorus	16.1
Marrubium vulgare	15.8	Carthamus lanatus	15.1
Borago officinalis	15.1		

Constant species (occurrence frequencies)

Dactylis glomerata	31.0	Galactites tomentosus	30.0
Silybum marianum	28.0	Avena barbata	27.0
Hordeum murinum	25.0	Daucus carota	22.0
Foeniculum vulgare	21.0	Plantago lanceolata	18.0
Convolvulus arvensis	18.0	Asphodelus ramosus	18.0
Carduus pycnocephalus	16.0	Avena sterilis	16.0
Eryngium campestre	15.0	Carlina corymbosa aggr.	15.0
Sonchus oleraceus	14.0	Sherardia arvensis	14.0
Malva sylvestris	14.0	Anisantha madritensis	14.0
Trifolium campestre	13.0	Galium aparine	13.0
Rumex pulcher	12.0	Reichardia picroides	12.0
Pallenis spinosa	12.0	Medicago polymorpha aggr.	12.0
Lolium rigidum	12.0	Echium plantagineum	12.0
Dittrichia viscosa	12.0	Dasypyrum villosum	12.0
Anagallis arvensis	12.0	Lolium perenne	11.0
Hypochaeris achyrophorus	11.0	Carthamus lanatus	11.0
Anisantha sterilis	11.0		

Dominant species (percentage frequencies of occurrences with cover > 25%)

Silybum marianum	22.0	Galactites tomentosus	16.0
Asphodelus ramosus	11.0	Foeniculum vulgare	7.0
Cynara cardunculus	5.0		

V34 - Trampled xeric grassland with annuals

*Diagnostic species (phi coefficient * 100)*

| Digitaria sanguinalis | 38.6 | Eragrostis minor | 37.1 |
| Portulaca oleracea | 34.0 | Sclerochloa dura | 28.6 |

Setaria verticillata	26.8	Euphorbia maculata	23.2
Polygonum aviculare aggr.	22.1	Cynodon dactylon	20.9
Eleusine indica	19.9	Euphorbia prostrata	18.6
Heliotropium europaeum	18.1	Eragrostis cilianensis	17.3
Amaranthus retroflexus	16.6	Setaria viridis	16.5
Tribulus terrestris	15.9	Amaranthus blitoides	15.5
Amaranthus deflexus	15.1		

Constant species (occurrence frequencies)

Polygonum aviculare aggr.	55.0	Cynodon dactylon	46.0
Digitaria sanguinalis	34.0	Portulaca oleracea	30.0
Chenopodium album aggr.	28.0	Eragrostis minor	26.0
Ochlopoa annua	21.0	Convolvulus arvensis	21.0
Erigeron canadensis	20.0	Setaria viridis	18.0
Plantago major	18.0	Amaranthus retroflexus	18.0
Taraxacum sect. Taraxacum	17.0	Plantago coronopus aggr.	17.0
Lolium perenne	17.0	Capsella bursa-pastoris	15.0
Setaria verticillata	14.0	Setaria pumila	14.0
Plantago lanceolata	14.0	Echinochloa crus-galli	13.0
Sclerochloa dura	12.0	Hordeum murinum	12.0

Dominant species (percentage frequencies of occurrences with cover > 25%)

Cynodon dactylon	13.0	Polygonum aviculare aggr.	8.0
Digitaria sanguinalis	8.0	Sclerochloa dura	7.0

V35 - Trampled mesophilous grassland with annuals

*Diagnostic species (phi coefficient * 100)*

Matricaria discoidea	46.7	Ochlopoa annua	40.8
Polygonum aviculare aggr.	31.4	Plantago major	29.4
Lolium perenne	20.7	Bryum argenteum	19.2
Lepidium coronopus	18.8	Sagina procumbens	17.3
Capsella bursa-pastoris	16.9	Lepidium ruderale	15.4

Constant species (occurrence frequencies)

Ochlopoa annua	84.0	Polygonum aviculare aggr.	77.0
Plantago major	72.0	Matricaria discoidea	46.0
Lolium perenne	44.0	Taraxacum sect. Taraxacum	35.0
Capsella bursa-pastoris	34.0	Trifolium repens	29.0
Bryum argenteum	17.0	Sagina procumbens	15.0

Plantago lanceolata	14.0	Chenopodium album aggr.	12.0
Erigeron canadensis	12.0	Tripleurospermum maritimum aggr.	11.0
Lepidium ruderale	11.0		

Dominant species (percentage frequencies of occurrences with cover > 25%)

Polygonum aviculare aggr.	25.0	Ochlopoa annua	21.0
Plantago major	8.0	Matricaria discoidea	7.0

V37 - Annual anthropogenic herbaceous vegetation

*Diagnostic species (phi coefficient * 100)*

Amaranthus retroflexus	24.8	Chenopodium album aggr.	22.7
Malva neglecta	18.8	Sisymbrium officinale	15.9
Solanum nigrum	15.6	Capsella bursa-pastoris	15.0

Constant species (occurrence frequencies)

Chenopodium album aggr.	52.0	Convolvulus arvensis	37.0
Polygonum aviculare aggr.	34.0	Capsella bursa-pastoris	30.0
Amaranthus retroflexus	26.0	Cirsium arvense	23.0
Erigeron canadensis	22.0	Taraxacum sect. Taraxacum	21.0
Lactuca serriola	21.0	Elytrigia repens aggr.	21.0
Stellaria media	20.0	Tripleurospermum maritimum aggr.	19.0
Hordeum murinum	19.0	Sonchus oleraceus	18.0
Ochlopoa annua	18.0	Lolium perenne	18.0
Artemisia vulgaris	17.0	Echinochloa crus-galli	16.0
Solanum nigrum	15.0	Plantago major	15.0
Anisantha sterilis	15.0	Sisymbrium officinale	14.0
Urtica dioica	12.0	Senecio vulgaris	12.0
Malva neglecta	12.0	Setaria viridis	11.0
Descurainia sophia	11.0	Cynodon dactylon	11.0
Atriplex patula	11.0	Anisantha tectorum	11.0

Dominant species (percentage frequencies of occurrences with cover > 25%)

Chenopodium album aggr.	7.0	Hordeum murinum	7.0

V38 - Dry perennial anthropogenic herbaceous vegetation

*Diagnostic species (phi coefficient * 100)*

Artemisia vulgaris	23.4	Tanacetum vulgare	15.5

Constant species (occurrence frequencies)

Elytrigia repens aggr.	42.0	Artemisia vulgaris	40.0
Convolvulus arvensis	29.0	Achillea millefolium aggr.	28.0
Cirsium arvense	27.0	Dactylis glomerata	22.0
Urtica dioica	21.0	Taraxacum sect. Taraxacum	21.0
Poa pratensis aggr.	21.0	Daucus carota	21.0
Erigeron canadensis	20.0	Tanacetum vulgare	18.0
Plantago lanceolata	18.0	Calamagrostis epigejos	18.0
Medicago lupulina	17.0	Tripleurospermum maritimum aggr.	16.0
Echium vulgare	16.0	Cichorium intybus	15.0
Silene latifolia	14.0	Lactuca serriola	14.0
Chenopodium album aggr.	14.0	Tussilago farfara	13.0
Bromopsis inermis	13.0	Polygonum aviculare aggr.	12.0
Plantago major	12.0	Melilotus albus	12.0
Lolium perenne	12.0	Hypericum perforatum	12.0
Cirsium vulgare	12.0	Carduus acanthoides	12.0
Ballota nigra	12.0	Arrhenatherum elatius	12.0
Poa compressa	11.0	Picris hieracioides	11.0
Melilotus officinalis	11.0	Linaria vulgaris	11.0
Artemisia absinthium	11.0		

Dominant species (percentage frequencies of occurrences with cover > 25%)

Elytrigia repens aggr.	8.0	Artemisia vulgaris	7.0
Calamagrostis epigejos	6.0		

V39 - Mesic perennial anthropogenic herbaceous vegetation

*Diagnostic species (phi coefficient * 100)*

Ballota nigra	22.7	Lamium album	20.8
Urtica dioica	19.5	Reynoutria japonica	19.5
Chelidonium majus	19.0	Artemisia vulgaris	16.0
Chaerophyllum bulbosum	15.8	Helianthus tuberosus	15.3

Constant species (occurrence frequencies)

Urtica dioica	72.0	Galium aparine	43.0
Dactylis glomerata	30.0	Artemisia vulgaris	28.0
Elytrigia repens aggr.	26.0	Aegopodium podagraria	26.0
Ballota nigra	23.0	Taraxacum sect. Taraxacum	21.0
Geum urbanum	21.0	Anthriscus sylvestris	21.0
Chelidonium majus	20.0	Cirsium arvense	20.0
Calystegia sepium	20.0	Poa trivialis	19.0
Heracleum sphondylium	18.0	Glechoma hederacea	17.0
Arrhenatherum elatius	15.0	Rumex obtusifolius	14.0
Lamium album	14.0	Alliaria petiolata	14.0
Rubus caesius	13.0	Ranunculus repens	13.0
Lamium maculatum	12.0	Stellaria media	11.0
Silene latifolia	11.0	Lapsana communis	11.0
Galium mollugo aggr.	11.0	Achillea millefolium aggr.	11.0

Dominant species (percentage frequencies of occurrences with cover > 25%)

Urtica dioica	19.0	Reynoutria japonica	7.0
Chaerophyllum aureum	6.0	Aegopodium podagraria	6.0

Appendix F: List of databases and data providers

GIVD code	GIVD database name	Custodian	Deputy custodian	# of plots
00-RU-006	Database of non-forest vegetation of the Southern Urals	Sergey Yamalov	Mariya Lebedeva	311
00-TR-001	Forest Vegetation Database of Turkey - FVDT	Ali Kavgacı		431
AS-TR-001	Vegetation Database of the Grassland Communities in Anatolia	Deniz Işık Gürsoy	Didem Ambarlı	745
AS-TR-002	Vegetation Database of Oak Communities in Turkey	Emin Uğurlu		9
EU-00-002	Nordic-Baltic Grassland Vegetation Database (NBGVD)	Jürgen Dengler	Łukasz Kozub	101
EU-00-004	Iberian and Macaronesian Vegetation Information System (SIVIM)	Xavier Font		359
EU-00-004	Iberian and Macaronesian Vegetation Information System (SIVIM) - Alpine	Borja Jiménez-Alfaro	Xavier Font	12
EU-00-004	Iberian and Macaronesian Vegetation Information System (SIVIM) - Grasslands	Maria Pilar Rodríguez-Rojo	Xavier Font	441
EU-00-004	Iberian and Macaronesian Vegetation Information System (SIVIM) - Macaronesia	Borja Jiménez-Alfaro	Xavier Font	448
EU-00-004	Iberian and Macaronesian Vegetation Information System (SIVIM)- Sclerophyllous Pinus	Federico Fernández-González	Xavier Font	27
EU-00-004	Iberian and Macaronesian Vegetation Information System (SIVIM) - Scrubs	Rosario G Gavilán	Xavier Font	116
EU-00-011	Vegetation-Plot Database of the University of the Basque Country (BIOVEG)	Idoia Biurrun	Itziar García-Mijangos	1921
EU-00-013	Balkan Dry Grasslands Database	Kiril Vassilev	Armin Macanović	548
EU-00-016	Mediterranean Ammophiletea database	Corrado Marcenò	Borja Jiménez-Alfaro	277
EU-00-017	European Coastal Vegetation Database	John Janssen		106
EU-00-018	The Nordic Vegetation Database	Jonathan Lenoir	Jens-Christian Svenning	54
EU-00-019	Balkan Vegetation Database	Kiril Vassilev	Hristo Pedashenko	776
EU-00-022	European Mire Vegetation Database	Tomáš Peterka	Martin Jiroušek	3
EU-00-022	European Mire Vegetation Database	Tomáš Peterka	Martin Jiroušek	1
EU-00-023	Iberian and Macaronesian Vegetation Information System (SIVIM) – Deciduous Forests	Juan Antonio Campos	Xavier Font	3
EU-00-024	Iberian and Macaronesian Vegetation Information System (SIVIM) – Floodplain Forests	Idoia Biurrun	Xavier Font	3
EU-00-025	Gravel bar vegetation database	Veronika Kalníková	Helmut Kudrnovsky	45
EU-00-027	European Boreal Forest Vegetation Database	Anni Kanerva Jašková		2
EU-00-028	European Weed Vegetation Database	Filip Küzmič	Urban Šilc	20974

EU-00-029	High Mediterranean Mountains Database	Gianpietro Giusso del Galdo	Corrado Marcenò	10
EU-AL-001	Vegetation Database of Albania	Michele De Sanctis	Giuliano Fanelli	21
EU-AT-001	Austrian Vegetation Database	Wolfgang Willner		783
EU-BE-002	INBOVEG	Els De Bie		78
EU-BG-001	Bulgarian Vegetation Database	Iva Apostolova	Desislava Sopotlieva	88
EU-CH-011	Monitoring Effectiveness of Habitat Conservation in Switzerland	Ariel Bergamini	Steffen Boch	36
EU-CZ-001	Czech National Phytosociological Database	Milan Chytrý	Ilona Knollová	10501
EU-DE-001	VegMV	Florian Jansen	Christian Berg	5753
EU-DE-013	VegetWeb Germany	Florian Jansen	Jörg Ewald	349
EU-DE-014	German Vegetation Reference Database (GVRD)	Ute Jandt	Helge Bruelheide	344
EU-DE-020	German Grassland Vegetation Database (GrassVeg.DE)	Jürgen Dengler	Ricarda Pätsch	428
EU-DE-035	Coastal Vegetation Germany	Maike Isermann	Florian Jansen	5
EU-DE-040	Database Schleswig-Holstein (Northern Germany)	Joachim Schrautzer		4
EU-ES-001	Iberian and Macaronesian Vegetation Information System (SIVIM) – Wetlands	Aaron Pérez-Haase	Xavier Font	17
EU-FR-003	SOPHY	Henry Brisse	Patrice de Ruffray	4701
EU-FR-004	VEGFRANCE	Jan-Bernard Bouzillé	Pauline Delbosc	43
EU-GB-001	UK National Vegetation Classification Database	John S. Rodwell		860
EU-GR-001	KRITI	Erwin Bergmeier		1178
EU-GR-005	Hellenic Natura 2000 Vegetation Database (HelNatVeg)	Panayotis Dimopoulos	Ioannis Tsiripidis	43
EU-HR-001	Phytosociological Database of Non-Forest Vegetation in Croatia	Zvjezdana Stančić		75
EU-HR-002	Croatian Vegetation Database	Željko Škvorc	Daniel Krstonošić	1497
EU-HU-003	CoenoDat Hungarian Phytosociological Database	János Csiky	Zoltán Botta-Dukát	606
EU-IE-001	Irish Vegetation Database	Úna FitzPatrick	Lynda Weekes	257
EU-IT-001	VegItaly	Roberto Venanzoni	Flavia Landucci	420
EU-IT-001	VegItaly	Roberto Venanzoni	Flavia Landucci	488
EU-IT-010	Vegetation database of Habitats in the Italian Alps - HabItAlp	Laura Casella	Pierangela Angelini	44
EU-IT-011	Vegetation Plot Database - Sapienza University of Rome	Emiliano Agrillo	Fabio Attorre	2437
EU-IT-019	VIOLA	Angela Stanisci	Maria Laura Carranza	2
EU-IT-020	RanVegDunes	Alicia Acosta		48
EU-LT-001	Lithuanian vegetation Database	Valerius Rašomavičius	Domas Uogintas	554
EU-LV-001	Semi-natural Grassland Vegetation Database of Latvia	Solvita Rūsiņa		164
EU-MK-001	Vegetation Database of the Republic of Macedonia	Renata Ćušterevska		28

EU-NL-001	Dutch National Vegetation Database	Stephan Hennekens	Joop Schaminée	2049
EU-NL-003	Dutch Military Ranges Vegetation Database (DUMIRA)	Iris de Ronde	Rense Haveman	151
EU-PL-001	Polish Vegetation Database	Zygmunt Kącki	Grzegorz Swacha	9904
EU-RO-007	Romanian Forest Database	Adrian Indreica	Pavel Dan Turtureanu	9
EU-RO-008	Romanian Grassland Database	Eszter Ruprecht	Kiril Vassilev	2963
EU-RS-002	Vegetation Database Grassland Vegetation of Serbia	Svetlana Aćić	Zora Dajić Stevanović	77
EU-RU-002	Lower Volga Valley Phytosociological Database	Valentin Golub	Andrei Chuvashov	1876
EU-RU-003	Vegetation Database of the Volga and the Ural Rivers Basins	Tatiana Lysenko		125
EU-RU-011	Vegetation Database of Tatarstan	Vadim Prokhorov		520
EU-RU-014	Temperate Forests of European Russia	Larisa Khanina	Maxim Bobrovsky	189
EU-SI-001	Vegetation Database of Slovenia	Urban Šilc	Filip Küzmič	1737
EU-SK-001	Slovak Vegetation Database	Milan Valachovič	Jozef Šibík	1966
EU-UA-001	Ukrainian Grassland Database	Anna Kuzemko	Yulia Vashenyak	715
EU-UA-005	Halophytic and coastal vegetation database of Ukraine	Tetiana Dziuba	Dmytro Dubyna	191
EU-UA-006	Vegetation Database of Ukraine and Adjacent Parts of Russia	Viktor Onyshchenko	Vitaliy Kolomiychuk	257
	French National Forest Inventory	https://inventaire-forestier.ign.fr/spip.php?rubrique149		1
	Grasslands GVRD	Ute Jandt		3933
	Gravel Bar Database_Caucasus	Veronika Kalníková	Helmut Kudrnovsky	12
	ICP Forest database	http://icp-forests.net/		9
	Portugal_Estrela	Jan Jansen		30
	Private data Anna Kuzemko	Anna Kuzemko		29
	Private data European heaths	Corrado Marcenò		1
	Private data Lukas Kozub	Lukas Kozub		1
	Private data of Alicia Acosta	Alicia Acosta		37
	Private data of Andraž Čarni	Andraž Čarni		88
	Private data of Andrey Korolyuk	Andrey Korolyuk		10
	Private data of Borja Jiménez-Alfaro	Borja Jiménez-Alfaro		9
	Private data of Corrado Marcenò	Corrado Marcenò		56
	Private data of Daniel Dítě	Daniel Dítě		34
	Private data of Thomas Michl	Thomas Michl		7
	Steppe vegetation Rostov Region Database	Olga Demina		6
	Swedish National Forest Inventory	https://www.slu.se/nfi		4
	Teberda - Caucasus Database	Vladimir Onipchenko	Alexei Egorov	20
	UK Floodplain Meadows Database	Irina Tatarenko		5
	Total			**86596**