

Extension of EURISCO for Crop Wild
Relatives (CWR) *in situ* data and
preparation of pilot countries' data sets

Final Report

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Table of Contents

1.1	Progress Made.....	3
1.1.1	Progress at Interim Report.....	3
1.1.2	Progress since Interim Report.....	3
2.	Material and Methods	4
2.1	Population Database Generation.....	4
2.1.1	UK checklist	4
2.1.2	Checklist data cleaning	5
2.1.3	UK Priority Inventory Summary	6
2.2	Data Acquisition	9
2.3	Data Filtering	9
3	<i>In situ</i> Population Database Results.....	11
3.1	Richness Results	11
3.2	Inventory Options	15
3.3	English National Nature Reserves.....	16
3.4	UK National Inventory.....	18
3.4.1	Taxon Level Inventory	18
3.4.2	Population Level Inventory	18
3.5	UK EURISCO Inventory	19
3.5.1	Descriptor breakdown	19
4.	Discussion & Conclusion	19
4.1	Further Prioritisation of records within Protected Areas	19
4.2	Conclusion.....	20
	References	20
	Supplementary Data	22
	Annex 1 Data sources for the <i>in situ</i> populations selected to be uploaded to EURISCO.	22
	Annex 2. Datasets Included In the UK National Inventory.	22
	Annex 3. UK priority CWR Inventory Taxa With Numbers of <i>In Situ</i> Observation Records.	26
	At species and subspecies level.	26
	Annex 4. CWR Inventory Taxa With Numbers of <i>In Situ</i> Observation Records within selected NNRs	36

Datasets in this document can be found at:

<https://drive.google.com/drive/folders/1SjbVHP-cb8SlzIcoEkHuyMdiGad5R3-h?usp=sharing>

1.1 Progress Made

1.1.1 Progress at Interim Report

1. Database structure generated for CWR-NI at taxonomic and population level
2. Evaluated previous UK checklist and prioritised inventory generated in 2015
3. Collated data sources for updating UK priority inventory and updating taxonomy
4. Identified primary data source and data collection strategy: NBN Atlas

1.1.2 Progress since Interim Report

1. Acquired population data
2. Updated taxonomy from 2015 inventory using UK-based Stace 2019 taxonomy, revised taxon inclusion.
3. Nuanced filtering to remove redundant records
4. Collated population data into single database
5. Analysed population data for complementarity and richness – considered four scenarios of datasets to be uploaded
 - a. Entirety of UK *in situ* data
 - b. Populations within protected areas of the UK.
 - c. Populations within selected National Nature Reserves in England
 - d. Populations within actively conserved genetic reserve: The Lizard, Cornwall
6. Overlaid with Land cover data
7. Overlaid with Elevation data
8. Organised data to fit EURISCO requirements

2. Material and Methods

2.1 Population Database Generation

2.1.1 UK checklist

A taxonomic Checklist for UK CWR was imported from a previous study (Fielder *et al.*, 2015). The UK CWR checklist started with 2,109 taxa, extracted from the Crop Wild Relative Catalogue for Europe and the Mediterranean (Kell *et al.*, 2005) and taxonomy was harmonised with the standard British flora (Stace, 2010). The taxa comprising the priority checklist and which have records can be found in Annex 3.

Table 1: Native status of UK CWR checklist (Stace, 2010).

Native Status	Number of taxa
Introduced	313
Introduced: naturalised	322
Native	1473

Table 2: Taxa per family in the UK CWR checklist developed in 2015 (Fielder, 2015).

Family	N. Taxa	Family	N. Taxa	Family	N. Taxa
Acoraceae	1	Euphorbiaceae	19	Paeoniaceae	1
Adoxaceae	1	Fabaceae	118	Papaveraceae	27
Alismataceae	11	Fagaceae	5	Parnassiaceae	1
Alliaceae	21	Gentianaceae	18	Phytolaccaceae	2
Amaranthaceae	31	Geraniaceae	23	Pinaceae	22
Apiaceae	69	Gesneriaceae	23	Pittosporaceae	1
Aponogetonaceae	1	Grossulariaceae	8	Plantaginaceae	6
Aquifoliaceae	1	Gunneraceae	1	Plumbaginaceae	18
Araceae	6	Haloragaceae	4	Poaceae	196
Araliaceae	2	Hippuridaceae	1	Polypodiaceae	3
Araucariaceae	1	Hydrangeaceae	1	Potamogetonaceae	24
Aristolochiaceae	4	Hydrocharitaceae	10	Primulaceae	22
Asparagaceae	26	Hydrocotylaceae	5	Pteridaceae	3
Aspleniaceae	11	Hymenophyllaceae	3	Ranunculaceae	5
Asteraceae	227	Hypericaceae	12	Resedaceae	2
Balsaminaceae	4	Iridaceae	17	Rosaceae	159

Betulaceae	9	Isoetaceae	3	Rubiaceae	17
Blechnaceae	3	Juglandaceae	1	Ruppiaceae	2
Boraginaceae	36	Juncaceae	40	Salicaceae	25
Brassicaceae	99	Juncaginaceae	2	Salviniaceae	1
Bromeliaceae	1	Lamiaceae	58	Santalaceae	2
Butomaceae	1	Lemnaceae	7	Saxifragaceae	25
Cabombaceae	1	Lentibulariaceae	9	Scheuchzeriaceae	1
Campanulaceae	27	Lepidium	2	Scrophulariaceae	2
Cannabaceae	1	Liliaceae	6	Scrophulariaceae	14
Caryophyllaceae	5	Linaceae	3	Selaginellaceae	2
Caryophyllaceae	82	Lycopodiaceae	7	Simaroubaceae	1
Ceratophyllaceae	2	Lythraceae	3	Solanaceae	10
Colchicaceae	1	Malvaceae	11	Solonaceae	3
Cornaceae	4	Marsileaceae	1	Taxaceae	1
Crassulaceae	23	Melanthiaceae	1	Thelypteridaceae	3
Cupressaceae	9	Menyanthaceae	2	Thymelaeaceae	2
Cyperaceae	113	Montiaceae	7	Tofieldiaceae	1
Dennstaedtiaceae	2	Moraceae	2	Typhaceae	9
Diapensiaceae	1	Myricaceae	2	Ulmaceae	7
Dicksoniaceae	1	Nartheciaceae	1	Urticaceae	6
Dioscoreaceae	1	Nothofagaceae	2	Verbenaceae	2
Droseraceae	3	Nymphaeaceae	3	Veronicaceae	7
Dryopteridaceae	20	Oleaceae	3	Woodsiaceae	11
Elatinaceae	2	Onocleaceae	1	Xanthorrhoeaceae	2
Equisetaceae	9	Ophioglossaceae	4	Zosteraceae	2
Ericaceae	25	Orchidaceae	56		
Eriocaulaceae	1	Orobanchaceae	53	Total:	2110
Escalloniaceae	1	Osmundaceae	1		

2.1.2 Checklist data cleaning

Taxonomic nomenclature was updated from Stace 2010 to Stace 2019. In total, 107 / 2111 taxa changed in checklist. 12 taxa changed in inventory from Stace 2010 to Stace 2019

Table 3. Taxa change in checklist from Stace (2010) to Stace (2019).

Change	# Taxa
Became subspecies	3
Family change	2
Genus and species change	30
Genus change	41
Genus change, subspecies became species	2
Removed	4
Species change	12
Species reduced to subspecies	3
Species spelling change	1
Species sunk into other species	2
Subspecies change	2
Subspecies became species	2
Subspecies promoted to species and changed name	2
Sunk into species in other genera	1
Total	107

2.1.3 UK Priority Inventory Summary

A previous prioritised inventory was created in 2015 by Dr Hannah Fielder. Prioritisation criteria were selected by Natural England (NE), Natural Resources Wales (NRW) and Scottish Natural Heritage (SNH), and University of Birmingham, with the aim to balance agricultural value of related crop with requirement for conservation.

The criteria for this were:

1. Use of related crop, according to GRIN Taxonomy for Plants (USDA, ARS, National Genetic Resources Program, 2015).
2. Native Status (exclusion of casuals).
3. Economic value of related crop, based on European and UK production quantities (FAOSTAT, 2013), crop production value at producer prices (Eurostat, 2013), and crop production at market prices (DEFRA, 2010). Any crop assigned a value was considered economically valuable, and CWR within same genus or gene pool were prioritised.
4. Degree of relatedness to crop: prioritisation of CWR within GP1b, GP2, or TG1b-TG3 of related crop according to Vincent *et al.*, 2013.
5. Threat assessment: – prioritisation of any threatened (vulnerable, (VU); endangered, (EN); or critically endangered, (CR)), near threatened (NT), data deficient (DD) or

extinct in the wild (EW) CWR in the IUCN Red List of Threatened Species (IUCN, 2012), European Red List of Vascular Plants (Bilz et al., 2011) or the Vascular Plant Red Data List for Great Britain (Cheffings and Farrell, 2005).

6. Other conservation designations according to the Conservation Designations for UK Taxa database (JNCC, 2011)

This resulted in a prioritised inventory of 223 taxa including both species and subspecies. When subspecies were subsumed into their respective species, 211 species remained in the prioritised inventory.

The taxon nomenclature has been updated to Stace 2019, with the following changes made:

Table 4. Taxa change in prioritised inventory from Stace (2010) to Stace (2019).

Change	Number of Taxa
Genus change	5
Genus and species change	7
Total	12

Table 5. Taxa per family in priority inventory (Fielder 2015).

Family	Number of taxa
<i>Alliaceae</i>	13
<i>Amaranthaceae</i>	14
<i>Apiaceae</i>	6
<i>Asparagaceae</i>	2
<i>Asteraceae</i>	5
<i>Betulaceae</i>	2
<i>Brassicaceae</i>	15
<i>Ericaceae</i>	6
<i>Fabaceae</i>	67
<i>Fagaceae</i>	1
<i>Geraniaceae</i>	3
<i>Grossulariaceae</i>	8
<i>Juglandaceae</i>	1
<i>Linaceae</i>	3
<i>Moraceae</i>	2
<i>Poaceae</i>	48
<i>Rosaceae</i>	27
Total	223

Table 6. Native status of UK priority inventory (Stace, 2010; 2019)

Native Status	Number of taxa
Archaeophyte	23
Introduced–Naturalised	55
Native	135
Possibly Native	2
Probably Introduced–Naturalised	3
Probably Native	5
Total	223

In total, 9 taxon changed red list since 2014, as shown in Table 7:

Table 7. Great Britain IUCN Red list status of UK priority CWR inventory Taxa in 2015 and 2022 (JNCC, 2015; 2022).

Species Threat Assessment	Number of Taxa (2015)	Number of taxa (2022)
Extinct in the Wild	1	1
Critically Endangered	1	1
Endangered	4	8
Vulnerable	21	20
Near Threatened	5	5
Least Concern	135	133

Data Deficient	2	2
Not Evaluated	54	53
Total	223	223

2.2 Data Acquisition

Data was obtained from the National Biodiversity Network (NBN) (<https://nbnatlas.org/>), a collaborative project that aggregates biodiversity data from 1,036 datasets from 170 data partners. More information on NBN Atlas can be found at: <https://nbnatlas.org/about-nbn-atlas/>

Population data was downloaded for the 223 UK priority CWR taxa. After an initial review of downloaded data, it was decided that population records would be searched at both the species and subspecies level as many records are not recorded to the subspecies level.

The population data records were downloaded using a custom python script implementing NBN's API. This script is available at: <https://github.com/Tamsynnn/cwr-filtering/blob/main/retrieve.py>

The downloaded data was unzipped, collated, and cleaned using the following script: https://github.com/Tamsynnn/cwr-filtering/blob/main/collate_replace.py

5,796,457 records were obtained in this process.

2.3 Data Filtering

A filtering script was written in python to filter the downloaded records as shown in Figure 1. The script can be accessed at: <https://github.com/Tamsynnn/cwr-filtering/blob/main/filter.py>. This filtering process kept the highest possible number of records in a taxon-specific way.

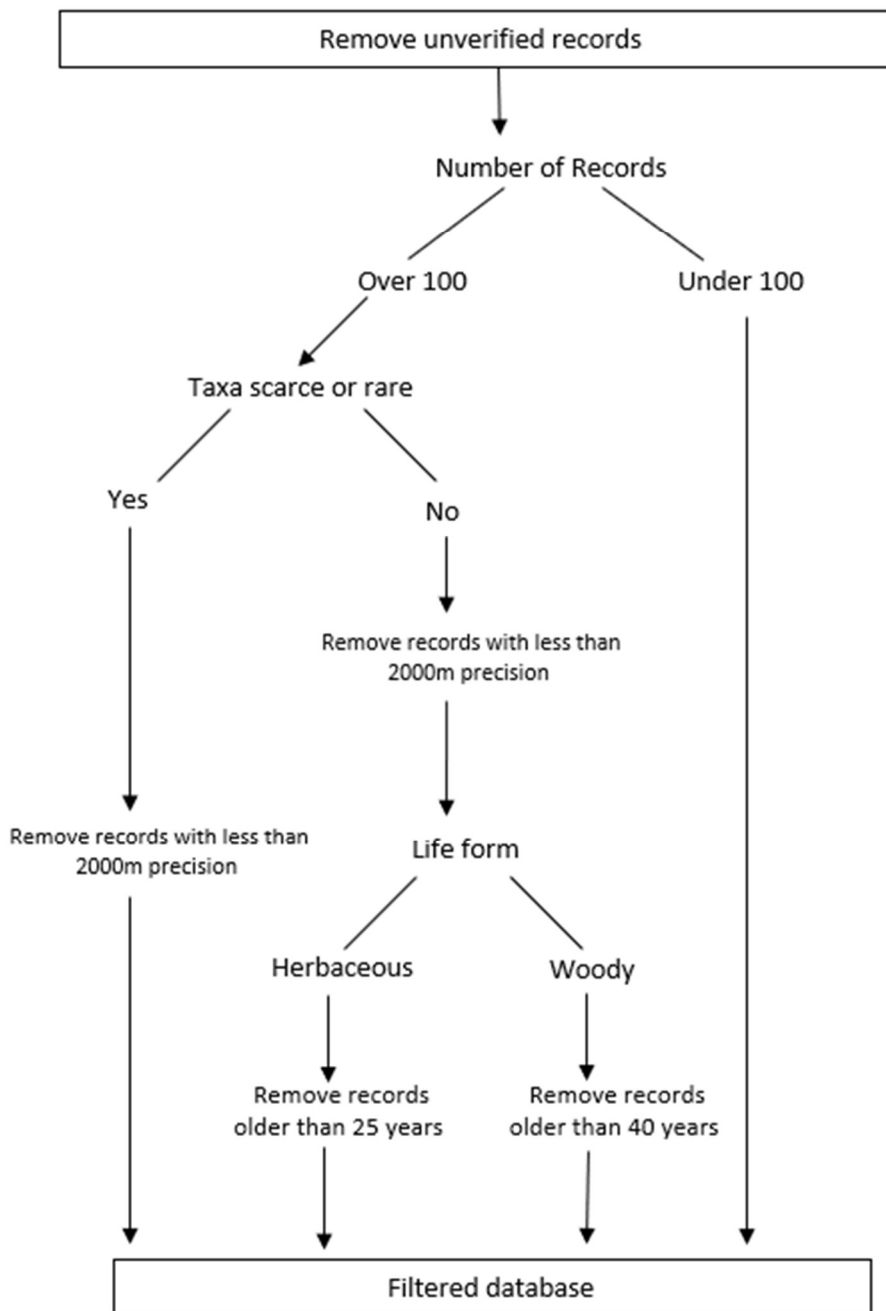


Figure 1. Schematic diagram of data filtering process.

The filtering reduced the number of records from 5,796,457 to 648,764. Records were then geospatially clipped to the UK in ArcMap, leaving the final number of filtered records within the UK at 648,575. A full breakdown of records per taxa can be found in Annex 3.

3 *In situ* Population Database Results

Records have been recorded and analysed at both the species and subspecies level. This is because certain taxa are unlikely to be recorded at the subspecies level, e.g. *Trisetum flavescens subsp. flavescens*, so priority CWR data was also obtained at the species level, e.g. *Trisetum flavescens*, which includes more records but at reduced taxonomic precision. The parallel richness analysis to include and exclude subtaxa aims to reflect this.

3.1 Richness Results

The richness was analysed to exclude (Figure 2) and include (Figure 3) subspecies classifications. These results are further strengthened by their overlap with results presented in a previous study of UK priority CWR richness (Figure 4)(Fielder 2015), particularly in the levels of richness in the Midlands, North East England, South West England, and Eastern Scotland. The main differences between the sets of results (this report and Fielder 2015) can be ascribed to differences between methodologies, which are summarised by Table 8. A more thorough filtering process was undertaken for this report, potentially explaining the apparent lower richness in certain areas in Figure 3 compared to Figure 4.

Table 8. Overview of methodological differences between previous UK CWR population inventory (Fielder 2015) and this report.

	Fielder 2015	This report
Data provider	Botanical Society of Britain and Ireland (BSBI)	National Biodiversity Network (NBN)
Total size of data provider (all <i>Plantae</i> records)	29 million (as of 2020)	33.8 million
Primary data sources	Vascular plant DataBase (40%); MapMate (39%)	
Date of data acquisition	2013	2022
Records before filtering	Not provided	5 million
Filtering parameters	More recent than 1970; precision greater than or equal to 2km; accurate taxonomic classifications; records on land	As with Fielder 2015, plus additional taxon-specific parameters - See Figure 1
Records after filtering	803,755	646,816
Taxa after filtering	213	215

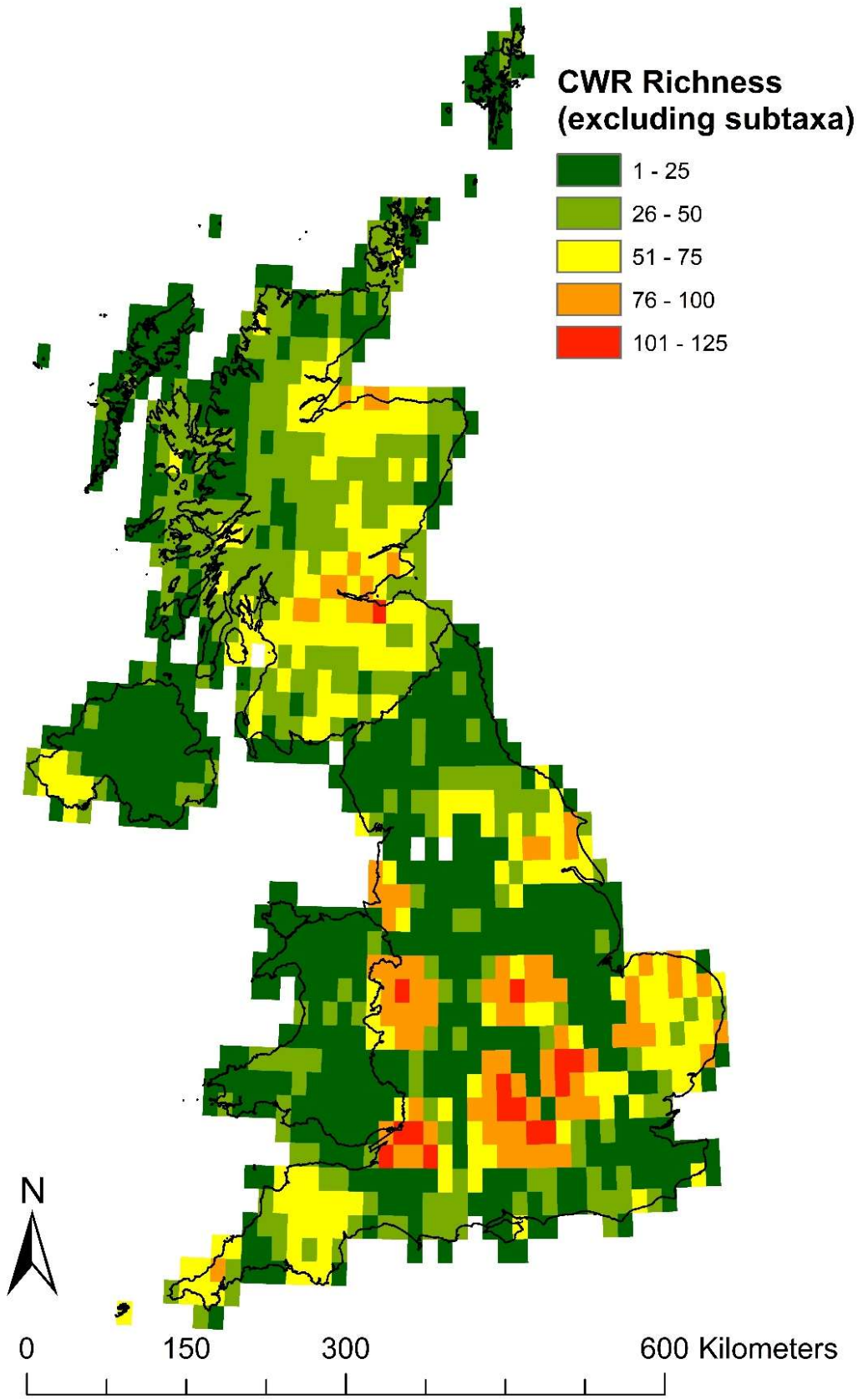


Figure 2. UK priority CWR richness excluding subtaxa

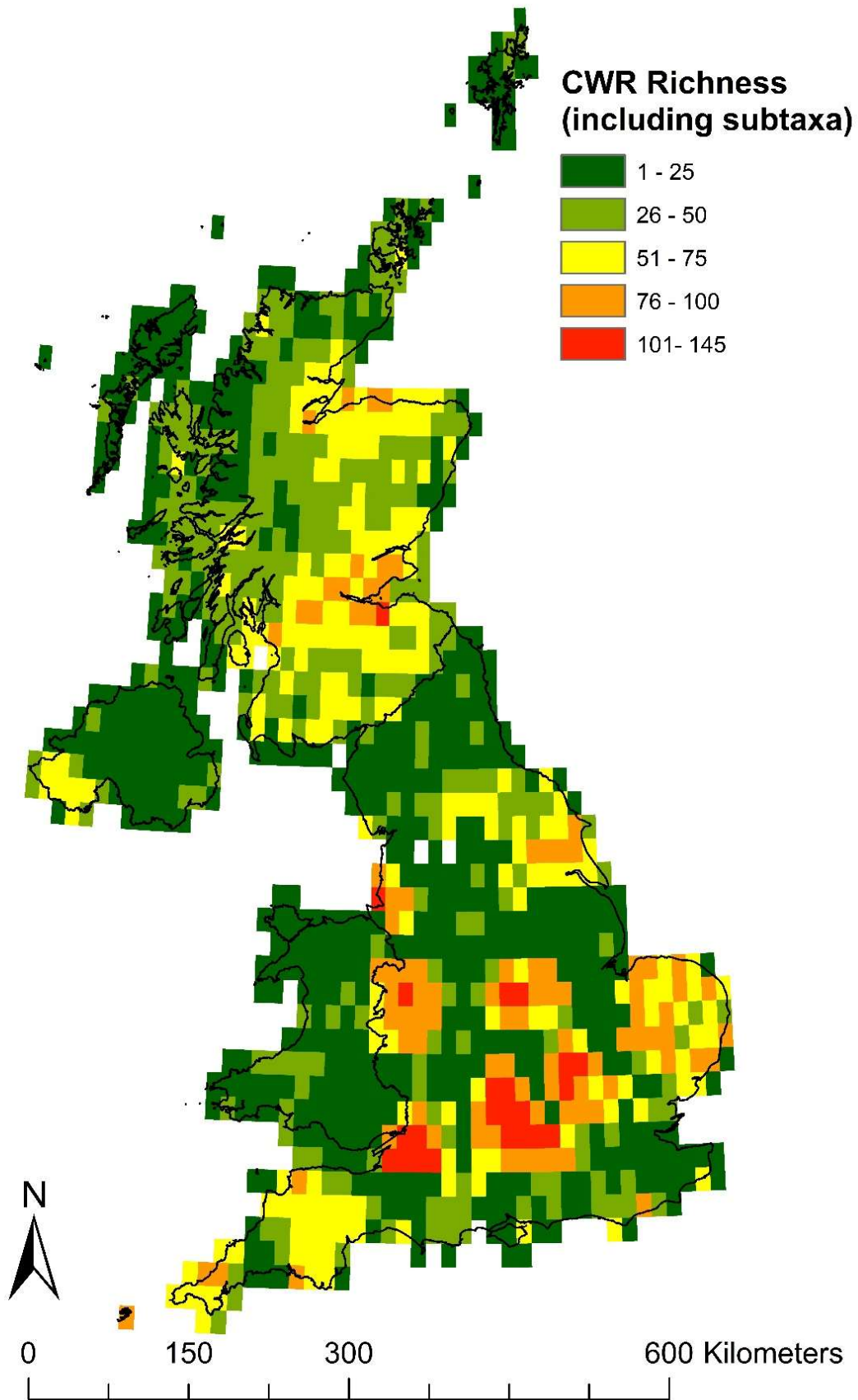


Figure 3. UK priority CWR richness including subtaxa

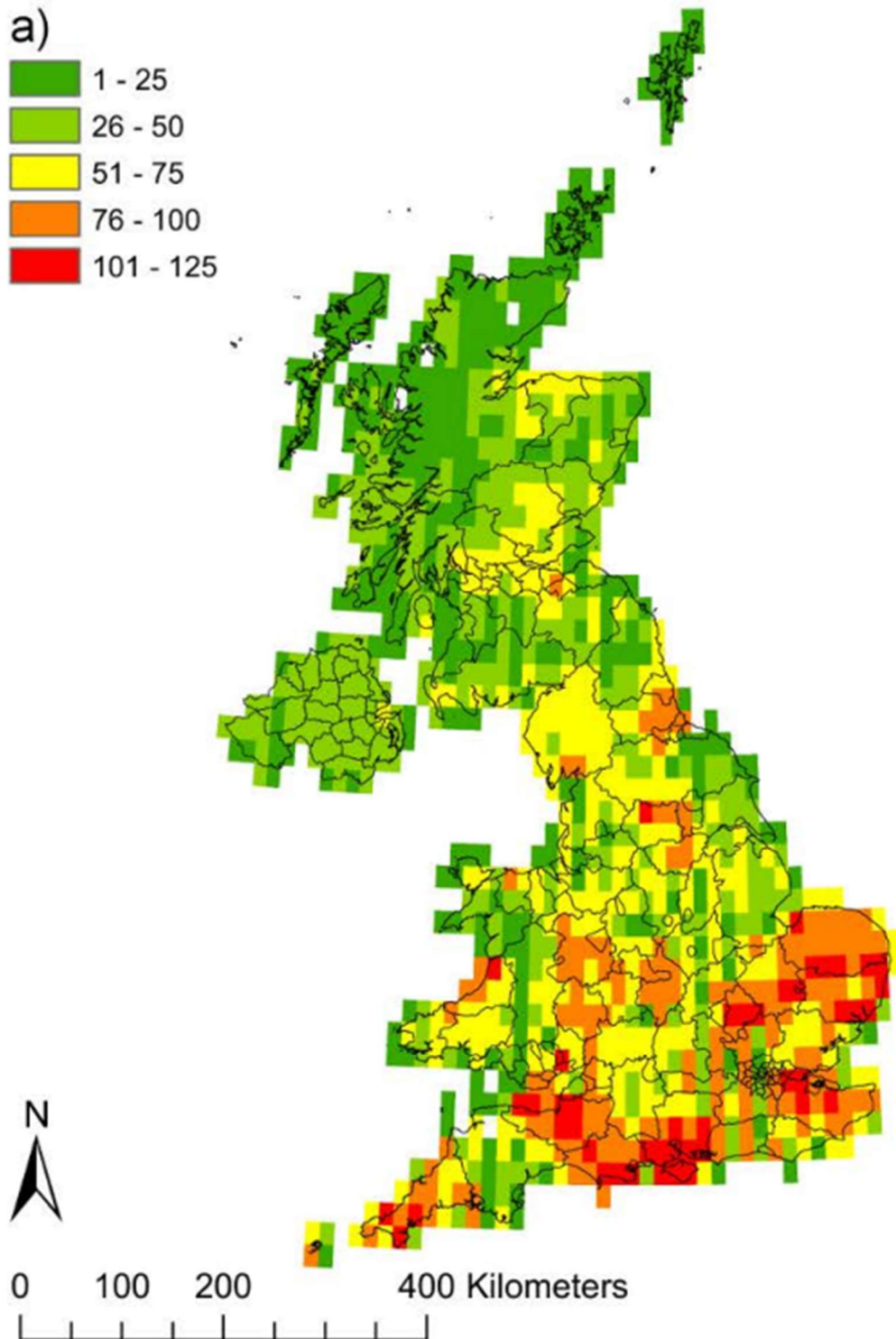


Figure 4. UK priority CWR taxon richness from previous study (Fielder 2015), consisting of 803,755 occurrence records to 2km precision.

3.2 Inventory Options

The large volume of data available in the UK (646,816 records) presents multiple options for the formation of an *in situ* National Inventory as well as contribution to the EURISCO *in situ* inventory. Using all available records, while comprehensive, risks bloating the database and would include populations that are not under any form of conservation, even passive protected areas. The next option is to only include population records found within protected areas. This reduces the number of records to 155,823.

The third option is to only include records within sites that *may* be candidates for active monitoring and conservation. In the UK, this process has begun in the Lizard Peninsula, where active conservation is in place for selected CWR taxa. An analysis of the most complementary National Nature Reserves (NNRs) was run and the results will be sent to Natural England, who manage the sites. In total there are 5,496 records within the top 15 complementary NNR sites (with two sets of two sites grouped together due to their proximity). The richness and unique taxa per site are shown in Table 11. Finally, there is the option to only include records from The Lizard NNR. However, with fewer records available, fewer taxa are covered in the dataset. The comparison of datasets is shown below.

Table 10 Number of Priority UK CWR taxa and records present in each dataset type.

Database	# Taxa (at species level)	# Taxa (including subspecies)	# Records
All UK Records	199	215	646,816
Records within Protected Areas	196	210	155,396
Top 15 NNRs	117	118	5496
The Lizard	43	43	1070

The first two options would be too large for upload to EURISCO but the other two options provide a high level of species diversity coverage without too many records.

The UK National Inventory will include all verified and clean records in the UK, regardless of conservation status. For upload to EURISCO, the records within the top 15 NNRs will be used. Four of the records had no valid population URL so were not to be included in the final set of records to be uploaded to EURISCO, leaving the final number of records at 5492.

3.3 English National Nature Reserves

In two instances, two NNRs were within the same 0.2 degree grid square for complementarity results so have been included together. The distribution of these sites is shown in Figure 5.

Table 11. Top 13 NNRs for CWR complementarity and richness

Rank	National Nature Reserve	Unique Species covered	Cumulative CWR (at species level)	Richness (at species level) (Taxa)
1	Hatfield Forest	50	50	50
2	The Lizard	21	71	43
3	North Walney & Sandscale Haws	12	83	12 and 41 respectively
4	Wicken Fen	7	90	45
5	Blakeney	6	96	15
6	Ingleborough	4	100	26
7	Benacre & Suffolk coast	3	103	5 and 9 respectively
8	Ribble Estuary	3	106	24
9	Purbeck Heaths	3	109	32
10	Charnwood Lodge	3	112	36
11	Barton Hills	2	114	23
12	Thetford Heath	2	116	5
13	Ainsdale Sand Dunes	1	117	34



Figure 5. Top 13 England NNRs for priority CWR richness and complementarity

3.4 UK National Inventory

An important note is that the liaison code for now is IBERS - Genetic Resources Unit, Institute of Biological, Environmental & Rural Sciences, Aberystwyth University, however it is likely that liaison institutions in the UK will change, with different institutions being responsible for their respective crop remit.

3.4.1 Taxon Level Inventory

Table 12. Descriptors of note in the National *in situ* taxonomic inventory

Descriptor	Comments
TAXONID	Used NBN taxon IDs. Taxonomy used was Stace 2019
Genepool	Used both Genepool and Taxon Group concepts
NATIONAL_CAT	Used the 2019 UK Red List assessment
Dist_status	Taken from Kew Plants of the World Online

3.4.2 Population Level Inventory

No herbarium records were used in compiling the inventory. Instead, all records can be accessed using the URL.

Table 13. Descriptors of note in the National *in situ* population inventory

Descriptor	Comments
MNGINSTCODE	Due to size of dataset, will not be available for all records.
MNGINSTNAME	Due to size of dataset, will not be available for all records.
HERBCODE	Not included – data collected from online source.
HERBNAME	Not included – data collected from online source.
SPECNUMB	Not included – data collected from online source.
CONSACTION	Dataset was too large to investigate each record so descriptor kept at 0 for all records.
MLSSTAT	Dataset was too large to investigate each record so descriptor kept at 0 for all records.
OCCURSITE	It is worth noting that UK Ordnance Survey Grid cell references are often used, e.g. “TM406467”. A GeoPackage containing the OS Grids is available to download at: https://github.com/OrdnanceSurvey/OS-British-National-Grids/
ELEVATION	Elevation provided by joining with LiDAR DSM data provided by the Environment agency, covering 93% of England at 2m spatial resolution. However, the data is for the highest object / structure detected on the ground (such as trees, buildings) so data may be slightly higher than real elevation.
POPSRC	Used UK CEH Land Cover Class, data sourced from Marston <i>et al.</i> 2021

Record_In_PA	Either “YES” or “NO” depending on if the record is found within a protected area
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3.5 UK EURISCO Inventory

3.5.1 Descriptor breakdown

Table 14. Descriptors of note in the EURISCO inventory

Descriptor	Comments for Inventory
PUID	Kept blank to be filled in by official method at a later date
INSTCODE	All records are for Natural England
INSTNAME	All records are for Natural England
LIAISONCODE	Preliminarily set to IBERS
LIAISONNAME	Preliminarily set to IBERS
COLLSITE	It is worth noting that UK Ordnance Survey Grid cell references are often used, e.g. “TM406467”. A GeoPackage containing the OS Grids is available to download at: https://github.com/OrdnanceSurvey/OS-British-National-Grids/
SITEPROT	Elaborated NNR name in remarks field
ELEVATION	Elevation provided by joining with LiDAR DSM data provided by the Environment agency, covering 93% of England at 2m spatial resolution. However, the data is for the highest object / structure detected on the ground (such as trees, buildings) so data may be slightly higher than real elevation.
OTHERNUMB	Occurrence ID from NBN
POPSRC	Land cover data obtained from Marston <i>et al.</i> 2021 and joined using the Join by Attributes tool in QGIS
MLSSTAT	Remaining blank
REMARKS	Some accession remarks may apply to COLLSITE descriptor.

4. Discussion & Conclusion

4.1 Further Prioritisation of records within Protected Areas

While the selected NNRs provide one option for records to upload to EURISCO, further prioritisation of the UK CWR records would be advantageous in order to conserve a greater number of priority UK CWR taxa. Suggestions for prioritisation options are below:

Ecogeographic prioritisation

1. climate change analysis, through CAPFITOGEN tools, in order to predict distribution based on projected climate models. Prioritise records OR protected areas that are likely to remain as present in the next 20-50 years.
2. number of habitats where each taxon is recorded to show target number of habitats to conserve (e.g. within protected areas, *Allium olceraceum* is recorded in X habitats, therefore should aim for records across habitat range) .

Data / results based prioritisation

1. Southerly bias – prioritise PAs or recods in the South of England where richness is highest.
2. Use results of this report to inform areas of highest richness, e.g. PAs with high richness.
3. Evaluate *ex situ* UK CWR conservation gaps.

Administrative prioritisation:

1. Aim for same PA type and align to management goals e.g. area of outstanding national beauty vs SSSI. Consider which type of PA will have priorities that overlap with CWR conservation.
2. Consider investigating landowners and prioritise protected area sites managed by the same organisation to streamline liaison activity.

4.2 Conclusion

The 13 NNR groups provide an option for EURISCO that balance species coverage and practicality. Additionally, their shared land manager of Natural England will make liaison and potential use much easier than disparate sites managed by many landowners or organisations. These sites and any management action would of course need to be agreed with Natural England, but this report provides a springboard for this process.

The results presented in this report are in agreement by those presented in a previous study (Fielder 2015), with greater levels of richness in southern England, particularly in sites such as The Lizard and Purbeck Heath. This report brings the UK CWR inventory up to date, with a more advanced filtering system and more recent records, along with an intersection with elevation and land cover.

In addition, the land cover value for each record may provide an interesting avenue for further research into CWR distribution in the UK.

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Supplementary Data

Annex 1 Data sources for the *in situ* populations selected to be uploaded to EURISCO.

Data Provider	Dataset	Number of records
Botanical Society of Britain & Ireland	BSBI data from several English counties, up to 2018	762
Leicestershire and Rutland Environmental Records Centre	Leicestershire and Rutland Environmental Records Centre records 2000-2009	221
	Leicestershire and Rutland Environmental Records Centre records 2010-2014	422
	Leicestershire and Rutland Environmental Records Centre records 2015-2019	15
	Leicestershire and Rutland Environmental Records Centre records pre 2000	67
Merseyside BioBank	Merseyside BioBank (verified)	216
	Merseyside BioBank Active Naturalists (verified)	47
National Trust	National Trust Species Records	2051
Natural England	Long-Term Monitoring Network Vegetation Quadrats	1669
Yorkshire Wildlife Trust	Yorkshire Wildlife Trust - Non-sensitive records from all taxonomic groups	26
Total		5496

Annex 2. Datasets Included In the UK National Inventory.

Argyll Biological Records Centre	Argyll Biological Records Dataset	7860
BIS for Powys & Brecon Beacons National Park	INNS records held by BIS in Powys and Brecon Beacons National Park	151

	Natural Resources Wales Regional Data : Mid-Wales	498
Botanical Society of Britain & Ireland	BSBI data from several English counties, up to 2018	164027
	Other BSBI Scottish data up to 2016	137285
	Scottish SNH-funded BSBI records	15182
		102670
Bristol Regional Environmental Records Centre	BRERC Notable Species records within the last 10 years	905
	BRERC species records from all years at full resolution excluding Notable Species within the last 10 years	101765
Central Scotland Green Network Trust	South Lanarkshire peatland records 2013	17
Centre for Environmental Data and Recording	Collated IRTU Freshwater Surveys	568
	Fermanagh Flora	8715
	iNaturalist records from Northern Ireland	8
	Invasive Species and Pests	2349
	Northern Ireland Environment Agency (NIEA) Collated Species Records	1837
	Ulster Wildlife ShoreNI iNaturalist records	2
Cofnod â€œ North Wales Environmental Information Service	Miscellaneous records held on the Cofnod database	1
	NRW Regional Data: North Wales	520
	Records of Invasive Non Native Species held on the Cofnod database	70
Environment Agency	Protected and Invasive Species Records Collected Through Environment Agency Survey 1995 - 2021	21
Fife Nature Records Centre	Fife Nature Records Centre combined dataset	837
	St Andrews BioBlitz 2014	16
	St Andrews BioBlitz 2015	21
	St Andrews BioBlitz 2016	20
Greenspace Information for Greater London CIC	Greater London Habitat Survey tree data	12927
Highland Biological Recording Group	HBRG Invasive Non-native Plants Dataset	31

Joint Nature Conservation Committee	River Macrophytes Database	484
Leicestershire and Rutland Environmental Records Centre	Leicestershire and Rutland Environmental Records Centre records 2000-2009	16723
	Leicestershire and Rutland Environmental Records Centre records 2010-2014	16580
	Leicestershire and Rutland Environmental Records Centre records 2015-2019	13421
	Leicestershire and Rutland Environmental Records Centre records pre 2000	1945
Marine Biological Association	2017 North Devon Area of Outstanding Natural Beauty (AONB) Combe Martin Devon Bioblitz	19
Merseyside BioBank	Merseyside BioBank (verified)	13995
	Merseyside BioBank Active Naturalists (verified)	2254
National Trust	National Trust Species Records	23758
	National Trust for Scotland	4932
	National Trust for Scotland Species Records	4932
Natural England	Long-Term Monitoring Network Vegetation Quadrats	10260
Natural History Museum, London	Collection Specimens	48
Natural Resources Wales	Freshwater Macrophyte Survey Data	24
	Freshwater Site Visits and Ad-hoc Sightings	2
	KiEco Freshwater Ecology: River Macrophytes	728
	Rare Flowering Plant and Fern Data	12
	Ty Canol National Nature Reserve (NNR) Species Inventory	50
	Welsh Invertebrate Database (WID)	108
NatureScot	Site Condition Monitoring of river habitats, 2013: River Tweed LEAFPACS vegetation data	71
	Site Condition Monitoring of river habitats, 2017: LEAFPACS aquatic plant survey	3
	Standing Waters Database - Scotland	51
	Survey of giant hogweed, Japanese knotweed and Himalayan balsam on 5 major Lothian rivers, 2003/04	2
	Vegetation surveys on Peatland Action sites across Scotland in 2014, 2015 and 2021	864
Norfolk Biodiversity Information Service	NBIS Records to December 2016	2
Nottingham Urban Wildlife Scheme	Nottingham Urban Wildlife Scheme iRecord download 2014 - 2017	1

Outer Hebrides Biological Recording	Invasive Non-Native Species, Outer Hebrides	3
Plantlife International	Flora guardian survey records 2004 - 2013 for Scotland	14
Record	RECORD Vascular Plant Data	16
Rotherham Biological Records Centre	Rotherham Biological Records Centre - Non-sensitive Records from all taxonomic groups	1
Royal Horticultural Society	RHS monitoring of native and naturalised plants and animals at its gardens and surrounding areas	1027
Royal Society for the Protection of Birds	2017 Onwards Muirkirk & North Lowther Uplands SPA species records	32
Scottish Wildlife Trust	Casual records for Scottish Wildlife Trust reserves - Verified data	153
	Commissioned surveys and staff surveys and reports for Scottish Wildlife Trust reserves - Verified data	8393
	Survey and monitoring records for Scottish Wildlife Trust reserves from reserve convenors and Trust volunteers - Verified data	202
Shropshire Ecological Data Network	Shropshire Ecological Data Network database	55005
South East Wales Biodiversity Records Centre	INNS Data: All Taxa (South East Wales)	380
	R.H.Wardell - Cardiff Nature Conservation Strategy - 1991 - 1998	10
	SEWBReC Vascular Plants (South East Wales)	6
Sussex Biodiversity Record Centre	Patrick Roper's Notebooks	2096
Thames Valley Environmental Records Centre	TVERC Historical Churchyard Records	1612
The Conservation Volunteers Scotland	BTCV wildlife counts recording workshops	7
The Wildlife Information Centre	City of Edinburgh Natural Heritage Service - Historical Records	16
	City of Edinburgh Natural Heritage Service - Natural Heritage Service Data	79
	City of Edinburgh Natural Heritage Service - Ranger Ad-hoc records and sightings	16
	City of Edinburgh Natural Heritage Service - Ranger Patrol Records	270
	East Lothian Council - Biodiversity Surveys	358

	East Lothian Council - Woodland Plants Survey 2011 (public)	34
	East Lothian Council Ranger Service Records	103
	Lothian Wildlife Information Centre - General Records (1900-1989)	12
	Lothian Wildlife Information Centre surveys (Invertebrates - general)	17
	Natalie Harmsworth's Records (2010-2019)	876
	R. Manning's Records	79
	TWIC - Identification Workshops dataset	80
	TWIC Biodiversity Field Trip Data (1995-present)	3629
	TWIC General Records (2015 - present)	1
	TWIC Site Surveys (2010 - present)	957
	TWIC West Lothian Council - Local Biodiversity Site Surveys	933
	West Lothian Council - Consultancy Data	110
	West Lothian Council - Phase 1 survey	175
	West Lothian Council - Ranger recording	24
The Woodland Trust	Glen Finglas Species Records	1
West Wales Biodiversity Information Centre	INNS Data: All Taxa (West Wales)	479
	NRW Regional Data: all taxa (excluding sensitive species), West Wales	2497
Woodmeadow Trust	Woodmeadow Botanical Survey 2018	21
Yorkshire Wildlife Trust	Yorkshire Wildlife Trust - Non-sensitive records from all taxonomic groups	5122
	Total	646816

Annex 3. UK priority CWR Inventory Taxa With Numbers of *In Situ* Observation Records.
At species and subspecies level.

<i>Agrostis capillaris</i> L.	14463
<i>Agrostis gigantea</i> Roth	682
<i>Allium ampeloprasum</i> L.	450
<i>Allium carinatum</i> L.	138
<i>Allium oleraceum</i> L.	82
<i>Allium paradoxum</i> (M. Bieb.) G. Don	349
<i>Allium roseum</i> L.	56

<i>Allium schoenoprasum</i> L.	274
<i>Allium scorodoprasum</i> L.	39
<i>Allium sphaerocephalon</i> L.	6
<i>Allium triquetrum</i> L.	497
<i>Allium ursinum</i> L.	3211
<i>Allium vineale</i> L.	1312
<i>Alopecurus bulbosus</i> Gouan	138
<i>Alopecurus myosuroides</i> Huds.	989
<i>Alopecurus pratensis</i> L.	5917
<i>Anthoxanthum odoratum</i> L.	15484
<i>Apium graveolens</i> L.	98
<i>Arrhenatherum elatius</i> (L.) J. Presl & C. Presl	16110
<i>Asparagus officinalis</i> L.	141
<i>Asparagus prostratus</i> Dumort.	70
<i>Astragalus danicus</i> Retz.	375
<i>Atriplex longipes</i> Drejer	51
<i>Atriplex praecox</i> Hülph.	92
<i>Avena barbata</i> Link	1
<i>Avena fatua</i> L.	1203
<i>Avena strigosa</i> Schreb.	9
<i>Beta vulgaris</i> L.	474
<i>Beta vulgaris</i> subsp. <i>maritima</i> (L.) Arcang.	341
<i>Blitum bonus-henricus</i> (L.) Rchb.	30
<i>Brassica nigra</i> (L.) W.D.J. Koch	293
<i>Brassica oleracea</i> L.	317
<i>Brassica oleracea</i> var. <i>oleracea</i>	59
<i>Brassica rapa</i> L.	351
<i>Brassica rapa</i> subsp. <i>campestris</i> (L.) A.R. Clapham	130
<i>Bromus hordeaceus</i> L.	13462
<i>Bromus hordeaceus</i> subsp. <i>ferronii</i> (Mabille) P.M. Sm.	75
<i>Bromus hordeaceus</i> subsp. <i>thominei</i> (Hardouin) Braun-Blanq.	32
<i>Bromus interruptus</i> (Hack.) Druce	1
<i>Calamagrostis epigejos</i> (L.) Roth	532
<i>Calamagrostis purpurea</i> (Trin.) Trin.	114
<i>Calamagrostis purpurea</i> subsp. <i>phragmitoides</i> (Hartm.) Tzvelev.	8
<i>Calamagrostis scotica</i> Druce	29
<i>Calamagrostis stricta</i> (Timm) Koeler	221
<i>Capsella bursa-pastoris</i> (L.) Medik.	6262
<i>Castanea sativa</i> Mill.	5625
<i>Chenopodium murale</i> (L.) S.Fuentes, Uotila & Borsch	6
<i>Chenopodium album</i> L.	2909
<i>Chenopodium ficifolium</i> Sm.	223
<i>Chenopodium suecicum</i> Murr	39

<i>Chenopodium vulvaria</i> L.	22
<i>Cichorium intybus</i> L.	314
<i>Corylus avellana</i> L.	35029
<i>Corylus maxima</i> Mill.	19
<i>Crambe maritima</i> L.	70
<i>Cynodon dactylon</i> (L.) Pers.	13
<i>Cynosurus cristatus</i> L.	9433
<i>Dactylis glomerata</i> L.	21505
<i>Daucus carota</i> L.	2799
<i>Daucus carota</i> subsp. <i>carota</i>	449
<i>Daucus carota</i> subsp. <i>gummifer</i> (Syme) Hook. f.	116
<i>Diplotaxis muralis</i> (L.) DC.	161
<i>Diplotaxis tenuifolia</i> (L.) DC.	106
<i>Erodium cicutarium</i> (L.) L'Hér.	1300
<i>Erodium maritimum</i> (L.) L'Hér.	68
<i>Erodium moschatum</i> (L.) L'Hér.	93
<i>Ervilla hirsuta</i> (L.) Opiz	900
<i>Ervilla sylvatica</i> (L.) Schur	84
<i>Ervum gracile</i> DC.	1966
<i>Ervum tetraspermum</i> L.	868
<i>Festuca arenaria</i> Osbeck	132
<i>Festuca arenaria</i> subsp. <i>arenaria</i>	1
<i>Festuca arenaria</i> subsp. <i>oraria</i> (Dumort.) Dengler	3
<i>Festuca longifolia</i> Thuill.	131
<i>Festuca rubra</i> subsp. <i>scotica</i> S. Cunn. Ex Al-Bermani	4
<i>Ficus carica</i> L.	353
<i>Fragaria moschata</i> Weston	10
<i>Fragaria vesca</i> L.	4058
<i>Helosciadium repens</i> (Jacq.) W.D.J.Koch	47534
<i>Holcus lanatus</i> L.	21506
<i>Hordeum marinum</i> Huds.	128
<i>Hordeum murinum</i> L.	2123
<i>Hordeum murinum</i> subsp. <i>murinum</i>	96
<i>Hordeum secalinum</i> Schreb.	1011
<i>Juglans regia</i> L.	1052
<i>Koeleria macrantha</i> (Ledeb.) Schult.	881
<i>Koeleria vallesiana</i> (Honck.) Gaudin	66
<i>Lactuca saligna</i> L.	2
<i>Lactuca serriola</i> L.	1833
<i>Lactuca tatarica</i> (L.) C. A. Mey.	6
<i>Lactuca virosa</i> L.	568
<i>Lathyrus aphaca</i> L.	119
<i>Lathyrus grandiflorus</i> Sibth. & Sm.	16
<i>Lathyrus heterophyllus</i> L.	3
<i>Lathyrus hirsutus</i> L.	42

<i>Lathyrus japonicus subsp. maritimus (L.) P. W. Ball</i>	2
<i>Lathyrus japonicus Willd.</i>	144
<i>Lathyrus latifolius L.</i>	217
<i>Lathyrus palustris L.</i>	278
<i>Lathyrus sylvestris L.</i>	95
<i>Lathyrus tuberosus L.</i>	7
<i>Lepidium campestre (L.) W. T. Aiton</i>	83
<i>Lepidium coronopus (L.) Al-Shehbaz</i>	976
<i>Lepidium latifolium L.</i>	303
<i>Linum bienne Mill.</i>	68
<i>Linum catharticum L.</i>	4372
<i>Linum perenne L.</i>	53
<i>Linum perenne subsp. anglicum (Mill.) Ockendon</i>	2
<i>Lipandra polysperma (L.) S.Fuentes, Uotila & Borsch</i>	19
<i>Lolium multiflorum Lam.</i>	559
<i>Lolium perenne L.</i>	14234
<i>Lotus angustissimus L.</i>	85
<i>Lotus corniculatus L.</i>	15084
<i>Lotus pedunculatus Cav.</i>	5016
<i>Lotus subbiflorus Lag.</i>	307
<i>Lotus tenuis Willd.</i>	109
<i>Malus sylvestris (L.) Mill.</i>	5277
<i>Medicago arabica (L.) Huds.</i>	714
<i>Medicago lupulina L.</i>	6274
<i>Medicago minima (L.) L.</i>	282
<i>Medicago polymorpha L.</i>	355
<i>Medicago sativa L.</i>	209
<i>Medicago sativa nothosubsp. varia (Martyn) Arcang.</i>	9
<i>Medicago sativa subsp. falcata (L.) Arcang.</i>	363
<i>Medicago sativa subsp. sativa</i>	107
<i>Medicago truncatula Gaertn.</i>	37
<i>Melilotus albus Medik.</i>	142
<i>Melilotus altissimus Thuill.</i>	401
<i>Melilotus officinalis (L.) Lam.</i>	415
<i>Morus nigra L.</i>	99
not found not found not found not found	109597
<i>Ornithopus pinnatus (Mill.) Druce</i>	38
<i>Ornithopus sativus Brot.</i>	3
<i>Oxybasis chenopoioides (L.) S.Fuentes, Uotila & Borsch</i>	175
<i>Oxybasis glauca (L.) S.Fuentes, Uotila & Borsch</i>	498
<i>Oxybasis rubra (L.) S.Fuentes, Uotila & Borsch</i>	21062
<i>Oxybasis urbica (L.) S.Fuentes, Uotila & Borsch</i>	175
<i>Pastinaca sativa L.</i>	780
<i>Pastinaca sativa subsp. sylvestris (Mill.) Rouy & E. G.</i>	780
Camus	

<i>Pastinaca sativa</i> subsp. <i>urens</i> (Req. ex Godr.) Čelak.	1
<i>Phalaris arundinacea</i> L.	7416
<i>Phleum alpinum</i> L.	182
<i>Phleum bertolonii</i> DC.	1354
<i>Phleum phleoides</i> (L.) H. Karst.	283
<i>Phleum pratense</i> L.	4173
<i>Poa alpina</i> L.	417
<i>Poa bulbosa</i> L.	120
<i>Poa flexuosa</i> Sm.	47
<i>Poa glauca</i> Vahl	322
<i>Poa infirma</i> Kunth	143
<i>Poa pratensis</i> L.	3211
<i>Prunus avium</i> (L.) L.	11886
<i>Prunus cerasifera</i> Ehrh.	2467
<i>Prunus cerasus</i> L.	261
<i>Prunus domestica</i> L.	4030
<i>Prunus incisa</i> Thunb.	5
<i>Prunus laurocerasus</i> L.	6859
<i>Prunus lusitanica</i> L.	691
<i>Prunus mahaleb</i> L.	3
<i>Prunus padus</i> L.	3064
<i>Prunus serotina</i> Ehrh.	58
<i>Prunus spinosa</i> L.	36225
<i>Pyrus cordata</i> Desv.	44
<i>Raphanus raphanistrum</i> L.	1797
<i>Raphanus raphanistrum</i> subsp. <i>raphanistrum</i>	407
<i>Ribes alpinum</i> L.	191
<i>Ribes divaricatum</i> Douglas	5
<i>Ribes nigrum</i> L.	1930
<i>Ribes odoratum</i> H. L. Wendl.	13
<i>Ribes rubrum</i> L.	4046
<i>Ribes sanguineum</i> Pursh	1210
<i>Ribes spicatum</i> E. Robson	220
<i>Ribes uva-crispa</i> L.	5444
<i>Rorippa islandica</i> (Oeder ex Gunnerus) Borbás	311
<i>Rubus caesius</i> L.	3243
<i>Rubus chamaemorus</i> L.	1001
<i>Rubus cockburnianus</i> Hemsl.	42
<i>Rubus idaeus</i> L.	11924
<i>Rubus odoratus</i> L.	11
<i>Rubus parviflorus</i> Nutt.	35
<i>Rubus phoenicolasius</i> Maxim.	26
<i>Rubus saxatilis</i> L.	1326
<i>Rubus spectabilis</i> Pursh	1107
<i>Rubus tricolor</i> Prain & al.	60

<i>Sinapis alba</i> L.	118
<i>Sinapis alba</i> subsp. <i>alba</i>	4
<i>Sinapis arvensis</i> L.	2047
<i>Trifolium arvense</i> L.	429
<i>Trifolium bocconeii</i> Savi	74
<i>Trifolium fragiferum</i> L.	253
<i>Trifolium glomeratum</i> L.	215
<i>Trifolium hybridum</i> L.	511
<i>Trifolium incarnatum</i> L.	43
<i>Trifolium incarnatum</i> subsp. <i>incarnatum</i>	12
<i>Trifolium incarnatum</i> subsp. <i>molinerii</i> (Hornem.) Syme	44
<i>Trifolium medium</i> L.	1272
<i>Trifolium micranthum</i> Viv.	400
<i>Trifolium occidentale</i> Coombe	256
<i>Trifolium ochroleucon</i> Huds.	548
<i>Trifolium ornithopodioides</i> L.	41
<i>Trifolium pratense</i> L.	13230
<i>Trifolium repens</i> L.	20937
<i>Trifolium resupinatum</i> L.	7
<i>Trifolium scabrum</i> L.	60
<i>Trifolium squamosum</i> L.	140
<i>Trifolium stellatum</i> L.	6
<i>Trifolium striatum</i> L.	203
<i>Trifolium strictum</i> L.	71
<i>Trifolium subterraneum</i> L.	75
<i>Trifolium suffocatum</i> L.	180
<i>Trisetum flavescens</i> (L.) P. Beauv.	2224
<i>Trisetum flavescens</i> subsp. <i>flavescens</i>	5
<i>Trisetum flavescens</i> subsp. <i>purpurascens</i> (DC.) Arcang.	2
<i>Vaccinium macrocarpon</i> Aiton	8
<i>Vaccinium microcarpum</i> (Rupr.) Schmalh.	497
<i>Vaccinium myrtillus</i> L.	14889
<i>Vaccinium oxycoccus</i> L.	1633
<i>Vaccinium uliginosum</i> L.	702
<i>Vaccinium vitis-idaea</i> L.	4510
<i>Vicia bithynica</i> (L.) L.	125
<i>Vicia cracca</i> L.	6873
<i>Vicia lathyroides</i> L.	183
<i>Vicia lutea</i> L.	155
<i>Vicia orobus</i> DC.	387
<i>Vicia pannonica</i> Crantz	12
<i>Vicia sativa</i> L.	5831
<i>Vicia sativa</i> subsp. <i>nigra</i> (L.) Ehrh.	961
<i>Vicia sativa</i> subsp. <i>segetalis</i> (Thuill.) Gaudin	1346
<i>Vicia sepium</i> L.	7105

<i>Vicia tenuifolia</i> Roth	4
<i>Vicia villosa</i> Roth	9
Total	646,816

At species level (with subspecies
subsumed into their respective species)

<i>Agrostis capillaris</i> L.	14463
<i>Agrostis gigantea</i> Roth	682
<i>Allium ampeloprasum</i> L.	450
<i>Allium carinatum</i> L.	138
<i>Allium oleraceum</i> L.	82
<i>Allium paradoxum</i> (M. Bieb.) G. Don	349
<i>Allium roseum</i> L.	56
<i>Allium schoenoprasum</i> L.	274
<i>Allium scorodoprasum</i> L.	39
<i>Allium sphaerocephalon</i> L.	6
<i>Allium triquetrum</i> L.	497
<i>Allium ursinum</i> L.	3211
<i>Allium vineale</i> L.	1312
<i>Alopecurus bulbosus</i> Gouan	138
<i>Alopecurus myosuroides</i> Huds.	989
<i>Alopecurus pratensis</i> L.	5917
<i>Anthoxanthum odoratum</i> L.	15484
<i>Apium graveolens</i> L.	98
<i>Arrhenatherum elatius</i> (L.) J. Presl & C. Presl	16110
<i>Asparagus officinalis</i> L.	141
<i>Asparagus prostratus</i> Dumort.	70
<i>Astragalus danicus</i> Retz.	375
<i>Atriplex longipes</i> Drejer	51
<i>Atriplex praecox</i> Hülph.	92
<i>Avena barbata</i> Link	1
<i>Avena fatua</i> L.	1203
<i>Avena strigosa</i> Schreb.	9
<i>Beta vulgaris</i> L.	815
<i>Blitum bonus-henricus</i> (L.) Rchb.	30
<i>Brassica nigra</i> (L.) W.D.J. Koch	293
<i>Brassica oleracea</i> L.	376
<i>Brassica rapa</i> L.	481
<i>Bromus hordeaceus</i> L.	13569
<i>Bromus interruptus</i> (Hack.) Druce	1
<i>Calamagrostis epigejos</i> (L.) Roth	532
<i>Calamagrostis purpurea</i> (Trin.) Trin.	122

<i>Calamagrostis scotica</i> Druce	29
<i>Calamagrostis stricta</i> (Timm) Koeler	221
<i>Capsella bursa-pastoris</i> (L.) Medik.	6262
<i>Castanea sativa</i> Mill.	5625
<i>Chenopodium murale</i> (L.) S.Fuentes, Uotila & Borsch	6
<i>Chenopodium album</i> L.	2909
<i>Chenopodium ficifolium</i> Sm.	223
<i>Chenopodium suecicum</i> Murr	39
<i>Chenopodium vulvaria</i> L.	22
<i>Cichorium intybus</i> L.	314
<i>Corylus avellana</i> L.	35029
<i>Corylus maxima</i> Mill.	19
<i>Crambe maritima</i> L.	70
<i>Cynodon dactylon</i> (L.) Pers.	13
<i>Cynosurus cristatus</i> L.	9433
<i>Dactylis glomerata</i> L.	21505
<i>Daucus carota</i> L.	3364
<i>Diplotaxis muralis</i> (L.) DC.	161
<i>Diplotaxis tenuifolia</i> (L.) DC.	106
<i>Erodium cicutarium</i> (L.) L'Hér.	1300
<i>Erodium maritimum</i> (L.) L'Hér.	68
<i>Erodium moschatum</i> (L.) L'Hér.	93
<i>Ervilla hirsuta</i> (L.) Opiz	900
<i>Ervilla sylvatica</i> (L.) Schur	84
<i>Ervum gracile</i> DC.	1966
<i>Ervum tetraspermum</i> L.	868
<i>Festuca arenaria</i> Osbeck	136
<i>Festuca longifolia</i> Thuill.	131
<i>Festuca rubra</i> L.	4
<i>Ficus carica</i> L.	353
<i>Fragaria moschata</i> Weston	10
<i>Fragaria vesca</i> L.	4058
<i>Helosciadium repens</i> (Jacq.) W.D.J.Koch	47534
<i>Holcus lanatus</i> L.	21506
<i>Hordeum marinum</i> Huds.	128
<i>Hordeum murinum</i> L.	2219
<i>Hordeum secalinum</i> Schreb.	1011
<i>Juglans regia</i> L.	1052
<i>Koeleria macrantha</i> (Ledeb.) Schult.	881
<i>Koeleria vallesiana</i> (Honck.) Gaudin	66
<i>Lactuca saligna</i> L.	2
<i>Lactuca serriola</i> L.	1833
<i>Lactuca tatarica</i> (L.) C. A. Mey.	6
<i>Lactuca virosa</i> L.	568

<i>Lathyrus aphaca</i> L.	119
<i>Lathyrus grandiflorus</i> Sibth. & Sm.	16
<i>Lathyrus heterophyllus</i> L.	3
<i>Lathyrus hirsutus</i> L.	42
<i>Lathyrus japonicus</i> Willd.	146
<i>Lathyrus latifolius</i> L.	217
<i>Lathyrus palustris</i> L.	278
<i>Lathyrus sylvestris</i> L.	95
<i>Lathyrus tuberosus</i> L.	7
<i>Lepidium campestre</i> (L.) W. T. Aiton	83
<i>Lepidium coronopus</i> (L.) Al-Shehbaz	976
<i>Lepidium latifolium</i> L.	303
<i>Linum bienne</i> Mill.	68
<i>Linum catharticum</i> L.	4372
<i>Linum perenne</i> L.	55
<i>Lipandra polysperma</i> (L.) S.Fuentes, Uotila & Borsch	19
<i>Lolium multiflorum</i> Lam.	559
<i>Lolium perenne</i> L.	14234
<i>Lotus angustissimus</i> L.	85
<i>Lotus corniculatus</i> L.	15084
<i>Lotus pedunculatus</i> Cav.	5016
<i>Lotus subbiflorus</i> Lag.	307
<i>Lotus tenuis</i> Willd.	109
<i>Malus sylvestris</i> (L.) Mill.	5277
<i>Medicago arabica</i> (L.) Huds.	714
<i>Medicago lupulina</i> L.	6274
<i>Medicago minima</i> (L.) L.	282
<i>Medicago polymorpha</i> L.	355
<i>Medicago sativa</i> L.	688
<i>Medicago truncatula</i> Gaertn.	37
<i>Melilotus albus</i> Medik.	142
<i>Melilotus altissimus</i> Thuill.	401
<i>Melilotus officinalis</i> (L.) Lam.	415
<i>Morus nigra</i> L.	99
not found not found not found	109597
<i>Ornithopus pinnatus</i> (Mill.) Druce	38
<i>Ornithopus sativus</i> Brot.	3
<i>Oxybasis chenopoioides</i> (L.) S.Fuentes, Uotila & Borsch	175
<i>Oxybasis glauca</i> (L.) S.Fuentes, Uotila & Borsch	498
<i>Oxybasis rubra</i> (L.) S.Fuentes, Uotila & Borsch	21062
<i>Oxybasis urbica</i> (L.) S.Fuentes, Uotila & Borsch	175
<i>Pastinaca sativa</i> L.	1561
<i>Phalaris arundinacea</i> L.	7416
<i>Phleum alpinum</i> L.	182

<i>Phleum bertolonii</i> DC.	1354
<i>Phleum phleoides</i> (L.) H. Karst.	283
<i>Phleum pratense</i> L.	4173
<i>Poa alpina</i> L.	417
<i>Poa bulbosa</i> L.	120
<i>Poa flexuosa</i> Sm.	47
<i>Poa glauca</i> Vahl	322
<i>Poa infirma</i> Kunth	143
<i>Poa pratensis</i> L.	3211
<i>Prunus avium</i> (L.) L.	11886
<i>Prunus cerasifera</i> Ehrh.	2467
<i>Prunus cerasus</i> L.	261
<i>Prunus domestica</i> L.	4030
<i>Prunus incisa</i> Thunb.	5
<i>Prunus laurocerasus</i> L.	6859
<i>Prunus lusitanica</i> L.	691
<i>Prunus mahaleb</i> L.	3
<i>Prunus padus</i> L.	3064
<i>Prunus serotina</i> Ehrh.	58
<i>Prunus spinosa</i> L.	36225
<i>Pyrus cordata</i> Desv.	44
<i>Raphanus raphanistrum</i> L.	2204
<i>Ribes alpinum</i> L.	191
<i>Ribes divaricatum</i> Douglas	5
<i>Ribes nigrum</i> L.	1930
<i>Ribes odoratum</i> H. L. Wendl.	13
<i>Ribes rubrum</i> L.	4046
<i>Ribes sanguineum</i> Pursh	1210
<i>Ribes spicatum</i> E. Robson	220
<i>Ribes uva-crispa</i> L.	5444
<i>Rorippa islandica</i> (Oeder ex Gunnerus) Borbás	311
<i>Rubus caesius</i> L.	3243
<i>Rubus chamaemorus</i> L.	1001
<i>Rubus cockburnianus</i> Hemsl.	42
<i>Rubus idaeus</i> L.	11924
<i>Rubus odoratus</i> L.	11
<i>Rubus parviflorus</i> Nutt.	35
<i>Rubus phoenicolasius</i> Maxim.	26
<i>Rubus saxatilis</i> L.	1326
<i>Rubus spectabilis</i> Pursh	1107
<i>Rubus tricolor</i> Prain & al.	60
<i>Sinapis alba</i> L.	122
<i>Sinapis arvensis</i> L.	2047
<i>Trifolium arvense</i> L.	429
<i>Trifolium bocconeii</i> Savi	74

<i>Trifolium fragiferum</i> L.	253
<i>Trifolium glomeratum</i> L.	215
<i>Trifolium hybridum</i> L.	511
<i>Trifolium incarnatum</i> L.	99
<i>Trifolium medium</i> L.	1272
<i>Trifolium micranthum</i> Viv.	400
<i>Trifolium occidentale</i> Coombe	256
<i>Trifolium ochroleucon</i> Huds.	548
<i>Trifolium ornithopodioides</i> L.	41
<i>Trifolium pratense</i> L.	13230
<i>Trifolium repens</i> L.	20937
<i>Trifolium resupinatum</i> L.	7
<i>Trifolium scabrum</i> L.	60
<i>Trifolium squamosum</i> L.	140
<i>Trifolium stellatum</i> L.	6
<i>Trifolium striatum</i> L.	203
<i>Trifolium strictum</i> L.	71
<i>Trifolium subterraneum</i> L.	75
<i>Trifolium suffocatum</i> L.	180
<i>Trisetum flavescens</i> (L.) P. Beauv.	2231
<i>Vaccinium macrocarpon</i> Aiton	8
<i>Vaccinium microcarpum</i> (Rupr.) Schmalh.	497
<i>Vaccinium myrtillus</i> L.	14889
<i>Vaccinium oxycoccus</i> L.	1633
<i>Vaccinium uliginosum</i> L.	702
<i>Vaccinium vitis-idaea</i> L.	4510
<i>Vicia bithynica</i> (L.) L.	125
<i>Vicia cracca</i> L.	6873
<i>Vicia lathyroides</i> L.	183
<i>Vicia lutea</i> L.	155
<i>Vicia orobus</i> DC.	387
<i>Vicia pannonica</i> Crantz	12
<i>Vicia sativa</i> L.	8138
<i>Vicia sepium</i> L.	7105
<i>Vicia tenuifolia</i> Roth	4
<i>Vicia villosa</i> Roth	9
Total	646816

Annex 4. CWR Inventory Taxa With Numbers of *In Situ* Observation Records within selected NNRs

<i>Agrostis capillaris</i> L.	216
<i>Agrostis gigantea</i> Roth	4
<i>Allium ampeloprasum</i> L.	3

<i>Allium schoenoprasum</i> L.	94
<i>Allium triquetrum</i> L.	2
<i>Allium ursinum</i> L.	1
<i>Allium vineale</i> L.	3
<i>Alopecurus myosuroides</i> Huds.	2
<i>Alopecurus pratensis</i> L.	27
<i>Anthoxanthum odoratum</i> L.	271
<i>Apium graveolens</i> L.	1
<i>Arrhenatherum elatius</i> (L.) J. Presl & C. Presl	123
<i>Asparagus officinalis</i> L.	4
<i>Asparagus prostratus</i> Dumort.	33
<i>Avena fatua</i> L.	1
<i>Beta vulgaris</i> L.	8
<i>Beta vulgaris</i> subsp. <i>maritima</i> (L.) Arcang.	8
<i>Brassica nigra</i> (L.) W.D.J. Koch	2
<i>Brassica oleracea</i> L.	2
<i>Brassica oleracea</i> var. <i>oleracea</i>	2
<i>Bromus hordeaceus</i> L.	75
<i>Bromus hordeaceus</i> subsp. <i>ferronii</i> (Mabille) P.M. Sm.	19
<i>Bromus hordeaceus</i> subsp. <i>thominei</i> (Hardouin) Braun-Blanq.	2
<i>Calamagrostis epigejos</i> (L.) Roth	74
<i>Capsella bursa-pastoris</i> (L.) Medik.	4
<i>Castanea sativa</i> Mill.	16
<i>Chenopodium album</i> L.	3
<i>Corylus avellana</i> L.	66
<i>Crambe maritima</i> L.	1
<i>Cynosurus cristatus</i> L.	135
<i>Dactylis glomerata</i> L.	176
<i>Daucus carota</i> L.	35
<i>Erodium cicutarium</i> (L.) L'Hér.	18
<i>Erodium maritimum</i> (L.) L'Hér.	4
<i>Ervilla hirsuta</i> (L.) Opiz	4
<i>Ervum tetraspermum</i> DC.	3
<i>Ervum tetraspermum</i> L.	5
<i>Festuca arenaria</i> Osbeck	3
<i>Festuca rubra</i> (L.) S.Fuentes, Uotila & Borsch	284
<i>Fragaria vesca</i> L.	38
<i>Holcus lanatus</i> L.	358
<i>Hordeum marinum</i> Huds.	1
<i>Hordeum murinum</i> L.	6

<i>Hordeum secalinum</i> Schreb.	11
<i>Koeleria macrantha</i> (Ledeb.) Schult.	72
<i>Lactuca saligna</i> L.	1
<i>Lactuca serriola</i> L.	3
<i>Lactuca virosa</i> L.	5
<i>Lathyrus aphaca</i> L.	1
<i>Lathyrus japonicus</i> Willd.	2
<i>Lathyrus palustris</i> L.	108
<i>Lathyrus tuberosus</i> L.	1
<i>Lepidium coronopus</i> (L.) Al-Shehbaz	2
<i>Linum bienne</i> Mill.	1
<i>Linum catharticum</i> L.	110
<i>Lolium multiflorum</i> Lam.	5
<i>Lolium perenne</i> L.	79
<i>Lotus angustissimus</i> L.	2
<i>Lotus corniculatus</i> L.	287
<i>Lotus pedunculatus</i> Cav.	83
<i>Lotus subbiflorus</i> Lag.	23
<i>Lotus tenuis</i> Willd.	2
<i>Malus sylvestris</i> (L.) Mill.	24
<i>Medicago arabica</i> (L.) Huds.	1
<i>Medicago lupulina</i> L.	25
<i>Medicago minima</i> (L.) L.	1
<i>Medicago polymorpha</i> L.	1
<i>Medicago sativa</i> subsp. <i>falcata</i> (L.) Arcang.	3
<i>Melilotus officinalis</i> (L.) Lam.	2
<i>Pastinaca sativa</i> L.	8
<i>Pastinaca sativa</i> subsp. <i>sylvestris</i> (Mill.) Rouy & E. G. Camus	8
<i>Phalaris arundinacea</i> L.	94
<i>Phleum bertolonii</i> DC.	16
<i>Phleum phleoides</i> (L.) H. Karst.	2
<i>Phleum pratense</i> L.	19
<i>Poa bulbosa</i> L.	4
<i>Poa infirma</i> Kunth	6
<i>Poa pratensis</i> L.	16
<i>Prunus avium</i> (L.) L.	4
<i>Prunus cerasifera</i> Ehrh.	3
<i>Prunus domestica</i> L.	3
<i>Prunus laurocerasus</i> L.	5
<i>Prunus padus</i> L.	5
<i>Prunus spinosa</i> L.	134
<i>Raphanus raphanistrum</i> L.	9
<i>Ribes nigrum</i> L.	11

<i>Ribes rubrum</i> L.	13
<i>Ribes sanguineum</i> Pursh	2
<i>Ribes uva-crispa</i> L.	12
<i>Rubus caesius</i> agg.	126
<i>Rubus caesius</i> L.	126
<i>Rubus chamaemorus</i> agg.	3
<i>Rubus chamaemorus</i> L.	3
<i>Rubus fruticosus</i> agg.	4
<i>Rubus fruticosus</i> agg. L.	642
<i>Rubus fruticosus</i> not found not found	2
<i>Rubus idaeus</i> agg.	15
<i>Rubus idaeus</i> L.	15
<i>Rubus saxatilis</i> agg.	1
<i>Rubus saxatilis</i> L.	1
<i>Sinapis alba</i> L.	1
<i>Sinapis arvensis</i> L.	11
<i>Trifolium arvense</i> L.	10
<i>Trifolium bocconeii</i> Savi	46
<i>Trifolium fragiferum</i> L.	15
<i>Trifolium glomeratum</i> L.	6
<i>Trifolium hybridum</i> L.	1
<i>Trifolium incarnatum</i> L.	5
<i>Trifolium incarnatum</i> subsp. <i>molinerii</i> (Hornem.) Syme	16
<i>Trifolium medium</i> L.	1
<i>Trifolium micranthum</i> Viv.	5
<i>Trifolium occidentale</i> Coombe	51
<i>Trifolium ochroleucon</i> Huds.	4
<i>Trifolium ornithopodioides</i> L.	2
<i>Trifolium pratense</i> L.	113
<i>Trifolium repens</i> (Jacq.) W.D.J.Koch	401
<i>Trifolium repens</i> L.	236
<i>Trifolium scabrum</i> L.	4
<i>Trifolium striatum</i> L.	7
<i>Trifolium strictum</i> L.	50
<i>Trifolium subterraneum</i> L.	3
<i>Trifolium suffocatum</i> L.	4
<i>Trisetum flavescens</i> (L.) P. Beauv.	17
<i>Vaccinium myrtillus</i> L.	59
<i>Vaccinium oxycoccos</i> L.	7
<i>Vaccinium vitis-idaea</i> L.	4
<i>Vicia cracca</i> L.	50
<i>Vicia lathyroides</i> L.	20
<i>Vicia lutea</i> L.	6
<i>Vicia sativa</i> L.	29

<i>Vicia sativa</i> subsp. <i>nigra</i> (L.) Ehrh.	2
<i>Vicia sepium</i> L.	6
Total	5497