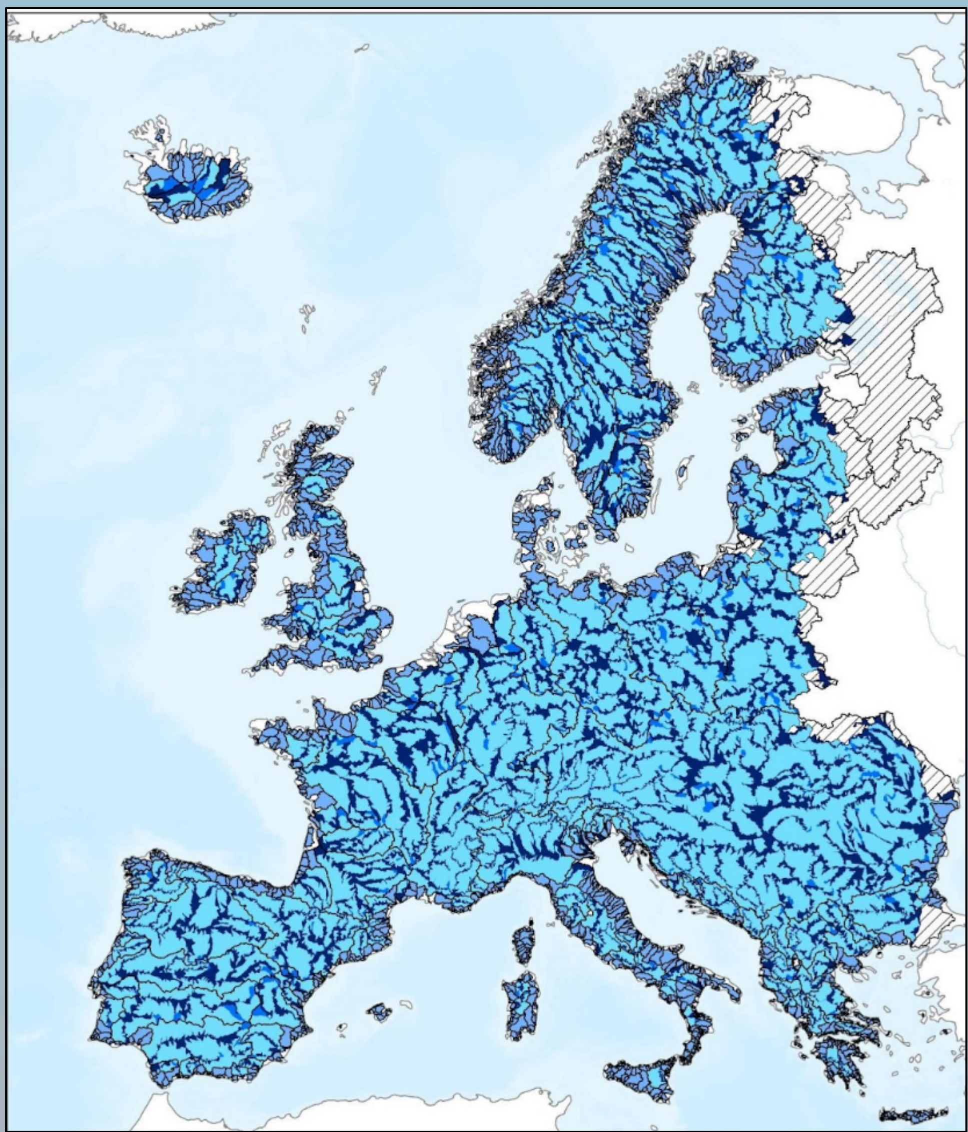

Deliverable D3.1:

Screening maps: Europe-wide maps of the needs and potentials to restore floodplains, rivers, and wetlands with a range of restoration measures

Imprint

The MERLIN project (https://project-merlin.eu) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036337.

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MERLIN Key messages

1. MERLIN produced a mapping exercise using European datasets on the status of freshwater habitats, freshwater-related species, bird species, ecological state and pressures.
2. An innovative spatial aggregation of European river networks was developed to integrate all input data at the same resolution, and discretizing Europe into River Restoration Units (R2Us) for small and large rivers, with wetlands integrated into R2Us.
3. River restoration needs throughout the EU were assessed by identifying R2Us that failed to abide by the Habitats and Water Framework Directives.
4. Ecosystem Services (ES) assessment was made at the R2U level throughout the EU by combining information on the ES delivered by freshwater ecosystems.
5. Limitations to restoration were evaluated at the R2U level using the Human Footprint Index as a proxy to restoration constraints.
6. Areas where restoration actions might be facilitated or passively enabled were determined by identifying the amount of freshwater protected areas (N2000) by R2U.
7. Restoration potential of each R2U was determined as the combination of ES, restoration constraints, and restoration enablers.
8. Restoration needs and restoration potential were integrated to determine the R2Us in need of restoration that had the greater potential to be restored.
9. This identification provides valuable insights for an upscaling analysis of restoration potential across the EU that serves to effectively guide large-scale restoration, management, and conservation plans.

MERLIN Executive Summary

This mapping exercise is based on European-wide available datasets and was carried out at the River Restoration Units (R2U) resolution (average area of approximately 400 km^2). This allowed all data to be integrated, related, and represented at the same resolution for the entire study area. The resulting maps present the current state of European freshwater habitats, related species, and variables that may affect their condition. The maps show where and if the objectives of the Birds, Habitats, and Water Framework Directives are being fulfilled, ultimately determining in which R2U's restoration measures are required.

An assessment of freshwater-related ecosystem services was performed in order to identify the R2Us where the highest potential for restoration occurs. This was then combined with potential constraints to restoration (the Human Footprint Index was used as a proxy for multiple human uses) and restoration enablers (protected areas within or encompassing freshwater habitats).

The maps are divided into core maps presented in the report and auxiliary maps presented in the annexe. These were grouped into categories to provide a clear overview of the different aspects considered in these mapping outputs. The groupings are:

- Mapping restoration needs
- Mapping restoration potential
- Integration of restoration needs and restoration potential

The outcomes of this deliverable should inform restoration managers regarding on the areas in need of restoration while also determining the areas with the highest upside for restoration. Given the resolution and the extent of analysis of the output maps, further analysis is necessary when aiming for specific intra-R2U restoration, conservation and management actions. Nevertheless, these maps offer a unique integrated perspective on freshwater habitats at a continental scale and serve as key guidelines for large-scale planning.

Overall, this exercise highlights the challenges faced by freshwater habitats and related species throughout Europe – challenges that are partially attributable to the pressures presented in this study but may also be exacerbated by future global changes. Urbanized and dry areas, in particular, are struggling to meet the objectives of overall directives, and they will be the most directly and indirectly impacted by the aforemention future changes. While this may seem self-evident, it is rarely presented to this extent. Restoration of freshwater systems has the potential to be transformative, providing critical ecosystem services and delivering extended co-benefits at the landscape level.

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The MERLIN project (https://project-merlin.eu) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036337.

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Introduction

Europe’s environment is currently in a state of alarm, and the threat of global changes (climate and land use) is expected to further exacerbate this already critical situation. The ecological quality of freshwater systems is particularly at risk, as shifts in water availability, stress, and demand have directly impact on these systems. Therefore, the status of species and habitats will be further degraded, despite that many of them being protected under directives that Member States must adhere to. In response, river restoration is gaining momentum as part of the European Green Deal, particularly through the European Biodiversity Strategy and the proposed Restoration Law that aims to set ambitious goals for restoration throughout the EU.

Freshwater restoration has a long tradition and extensive knowledge, making it the ideal demonstrator of the necessary changes required to improve the state of Europe's ecosystems. Currently, a significant portion of these ecosystems are degraded and no longer provide the ecosystem services needed to mitigate these threats. Ecosystem restoration has the potential to benefit biodiversity and mitigate climate change while also benefiting both the economy and society. However, current restoration practices are too often small-scale and piecemeal, failing to respond effectively to the ecological crisis. Additionally, restoration measures are often not "owned" by key sectors such as agriculture, water industry, and energy, making them a niche activity for environmental and conservation regulatory agencies and funds.

This crisis necessitates mainstreaming ecosystem restoration at the landscape scale to address environmental, social, and economic concerns. Large-scale and multi-purpose ecosystem restoration is a centrepiece of a necessary transformative change in society, promoting nature-based solutions as a key and powerful measure to address the evident socio-ecological and climate challenges.

To that end, MERLIN capitalizes on useful European-wide datasets to produce map outputs and respective spatial data informing on the identification of freshwater areas in need of restoration. The River Restoration Units (R2Us) that do not comply with the habitats and species as well as the Water Framework Directives are particularly targeted. Through assessing freshwater-related ecosystem services across the EU, as well as potential constraints and enablers to restoration, MERLIN has determined the overall restoration potential of all R2Us. By confronting the restoration needs and potential, a map was created identifying the areas where restoration is most needed and potential is highest throughout the EU.

This work has allowed for upscaling to the European level, identifying freshwater areas with high potential and priority for transformative restoration. It specifically focuses on essential ecosystem services, biodiversity, and conservation targets. Moreover, the spatialisation of data analysis has made output maps a valuable communication tool that can be easily understood by policymakers, decision-makers, and the public alike.

Freshwater-related environments, such as floodplains, lakes, rivers and wetlands, are critical in delivering on this ambition. Unfortunately, these have been overused and degraded for centuries, leading to a significant decline in the vital services they provide, such as flood attenuation and carbon sequestration. Freshwater-related ecosystems were once hotspots of biodiversity in the landscape, but they have significantly declined over the past few decades and continue to deteriorate. Despite this, these ecosystems remain of high socio-economic importance, from the supply of clean water to the provision of recreation amenities. Large-scale restoration of freshwater-related ecosystems has great potential for restoring biodiversity and ecosystem services, and they are key in connecting land and sea.

The work developed was not tasked with generating new data but rather leveraging the available data to capitalize on the knowledge that has been produced. The objective was to integrate various datasets at a common resolution, enabling the detection of signals at a continental scale. The resulting work represents a comprehensive synthesis of existing data, facilitating a deeper understanding of the environmental state and restoration potential of freshwater ecosystems across Europe.

Study Area

The study area includes all river basins located in EU Member States (MS) and former MS, along with Iceland and other continental enclaves that share borders with multiple European countries (e.g., Switzerland, Norway and the Balkans) given that a substantial amount of data coverage (HFI, Land use characterization datasets, climatic data, among others) goes beyond EU-MS borders and that most countries in these regions have close connections with the EU. Moreover, since the objective is to work at the European scale only basins where the Strahler value is three or higher were considered relevant. Aiming to conduct a Europe-wide assessment of restoration pathways in freshwater-related ecosystems we used a higher resolution than that of the river basin. We created the River Restoration Units (R2Us), a spatial aggregation of river segments that abides by the riverscape concept of river basins' functioning, thus respecting the directional, dendritic and hierarchical nature of river networks while also facilitating the aggregation of data from multiple sources with distinct resolutions. Concerning the R2Us and the study area, on the eastern border of the EU the delineation of the study area abided by the following criteria: a) maintain the R2Us as indivisible units, and; b) retain all the R2Us in which at least 10% of the area overlaps an EU-MS territory.

Figure 1. Study Area delimitation and respective River Restoration Units (R2Us) included. The study area is defined by the area covered by EU Member States, the remaining area of the Balkans, Switzerland, Norway, United Kingdom and Iceland, while truncated to river basins where the strahler value is equal or above three. On the Eastern borders R2Us were retained when at least 10% of the area overlaps an EU-MS territory.

Methodology

Providing a Europe-wide upscaling strategy for restoring freshwater-related ecosystems is the focus of Work Package 3 (WP3) of the MERLIN Project. In doing so, WP3 aims initially to assess Europe-wide restoration needs and potentials in freshwater-related ecosystems. Then, WP3 intends to replicate best-practice restoration measures to restore towards achieving resilient and healthy ecosystems, demonstrating restoration benefits for biodiversity and associated key ecosystem services. Furthermore, WP3 seeks to characterize and exploit investment opportunities showcasing public and private financing mechanisms for implementing these restoration measures in selected areas. To meet the objectives of WP3, eight tasks have been defined: Restoration needs (Task 3.1), Restoration potential (EU-wide) (Task 3.2), Europe-wide screening of areas for restoration (Task 3.3), Modelling workflow for restoration assessment in selected basins identified in EU-wide screening (Task 3.4), Benefits and trade-offs of restoration (Task 3.5), Investment needs and opportunities for upscaling restoration (Task 3.6), Facilitating and leveraging private finance (Task 3.7) and European scalability plan (Task 3.8).

Conducting a Europe-wide screening of restoration needs (Task 3.1) and restoration potential (Task 3.2) leads to the identification of areas in need of restoration and where this has a potential upside in terms of Ecosystem Services (ES). The determination of the *Restoration Needs* corresponds to a representation of areas that do not meet the Water Framework Directive (WFD) objective of Good Ecological Status (GES) of surface waters and of areas that do not abide by the Habitats Directive (HD) objective of having favourable conservation status for every species and habitats of community interest.

The *Restoration Potential*, as defined in this deliverable following the guidelines of the project proposal, identifies areas in need of restoration where ES assessment points towards low ES values, where there are few constraints to restorations and high restoration enablers. This allows the identification of areas where restoration can provide good outcomes with little obstacles to implementing restoration measures, in line with EU action programmes (the Biodiversity Strategy 2030 and the Paris Agreement) and contributing to reaching EU Green Deal objectives. Consequently, areas with higher restoration potential would be areas that when intervened could potentially have higher ES co-benefits. Realizing that although some areas can have a high potential for restoration, they may be unable to be restored, introduced the concept of restoration constraints. In this work, we used the Human Footprint Index (HFI) as a proxy for all constraints to restoration. On the contrary, even though all EU territories must abide by WFD and HD, areas that are specifically protected have an even higher legislative significance, as Member States (MS) are obliged to attain favourable conditions. Considering areas with the same need for restoration but with distinct coverage by Nature 2000 protected areas, those with higher legislative pressure would be more appealing for managers to restore. This led to the inclusion of the restoration enabling areas. We used the percentage of Natura 2000 sites (N2K) within the floodplain and the percentage of wetland areas included in N2K sites that fall outside of the floodplain as enabling areas for restoration. We classified our study area according to "restoration potential" combining the three components: ecosystem services assessment, restoration constraints and restoration enablers. All were integrated into a Restoration Potential Indicator (RPI) whose low values mean a higher potential for co-benefits and easiness of action.

Finally, all R2Us were classified according to their Restoration Needs and Restoration Potential demonstrating the potential for restoration according to each restoration needs category. Therefore, the highest "Potential" would be in areas in full need of restoration (not abiding by both WFD and HD), which have low constraints to restoration, a high percentage of protected areas within the floodplain or encompassing freshwaters and high Ecosystem Services potential (low RPI).

River Units and freshwater-related ecosystems

Data and Methods

MERLIN aims to "identify landscapes with high potential and priority for transformative restoration, particularly focusing on essential ecosystem services, biodiversity targets, and climate change mitigation". Being part of this objective, this mapping exercise intends to establish European-wide restoration needs and potential in freshwater-related ecosystems. Thus, considering the nature of this task, the fact that multiple input sources will be used (having multiple resolutions and data typologies) and the wide extent of the analysis, having a common and coherent unit of analysis for outputs is crucial to have comparable and interpretable outputs. Moreover, given the specificities of freshwater ecosystems' functioning, units should be able to abide by the directional, hierarchical and dendritic nature of river networks (Duarte et al., 2019). Considering this, we aimed to divide each sea outlet basin into a set of river units with no upstream dependencies that aggregate small watercourses (hereafter, small river units), connected by river units encompassing the mainstem watercourses of the basin (hereafter, large river units). To achieve this we used version 2 of the Catchment Characterisation and Modelling (CCM) dataset (Vogt et al., 2007). Moreover, this was the reference dataset for every data analysis and spatial representation of data concerning sea outlet basins, river segments and river segments drainage areas.

Segments are river stretches between confluences and for each confluence, one of the segments is considered a river mouth of a given drainage area. The Hack stream order values allow us to express the nestedness of the multiple river mouths that sea outlet basins encompass (Rigon et al., 1996). For each mouth segment, at the multiple levels expressed by Hack stream order values, we had to define when it should become part of a distinct unit than the one of the next downstream contiguous segment. For this to occur a mouth segment had only to have a Strahler stream order (Strahler, 1957) equal to or above 3 (becoming a small river unit), but to become part of a large river unit, those connected to multiple small river units, it must abide by all the following rules:

- → Strahler value is superior or equal to 4;
- → Upstream drainage area is superior or equal to 1000 km^2;
- → Upstream river length is superior or equal to 1000 km.

Sea outlet basins below Strahler 3 were discarded from the analysis and those where the maximum Strahler is 3 are analysed as a whole and identified as small river sea outlet basins. Finally, those small units draining directly the most upstream large river units present in a basin though having the same characteristics as the small river units, are identified as large river head units.

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Figure 2. Map detailing the river restoration units per typology.

Figure 3. Map detailing the overlay of the areas of the freshwater-related ecosystem and the River Restoration Units.

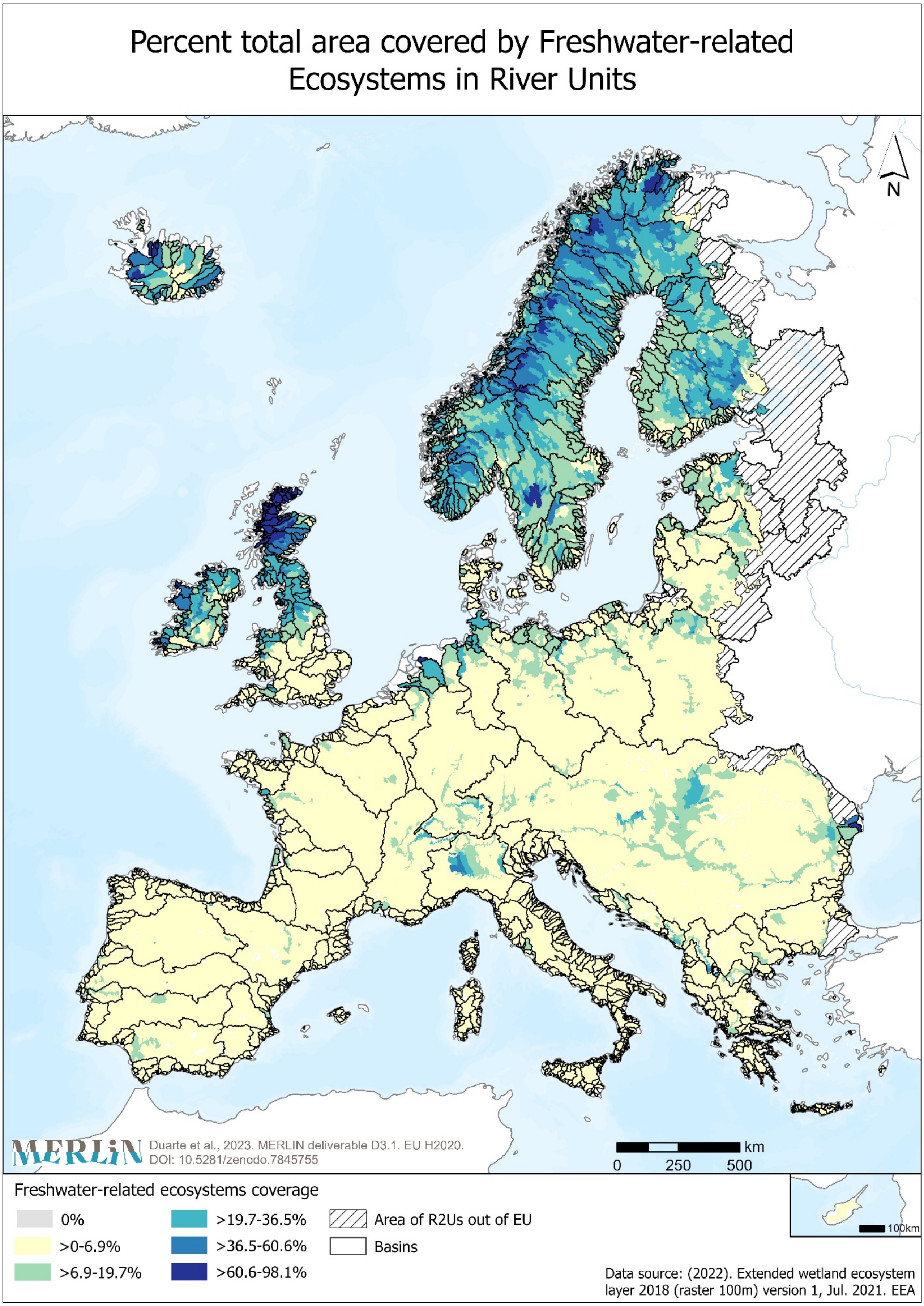

Figure 4. Map detailing the percentage of area covered by freshwater-related ecosystems in each River Restoration Unit.

Part I – Mapping restoration needs

Habitats Directive

Data and Methods

The Habitats Directive (HD) has established the target of maintaining or restoring towards achieving a favourable conservation status for all species and habitats of community interest, i.e., those included in the annexes of the directive. Considering this, the concept of Conservation Status (CS) is paramount in European nature conservation policy and laws (Bijlsma et al., 2019). Each species and habitat is periodically evaluated and the CS is termed in four categories, one indicating favourable CS (Favourable – Fv), two indicating unfavourable CS (Unfavourable Inadequate – U1 and Unfavourable Bad – U2) and one expressing insufficient information (Unknown – XX) (Bijlsma et al., 2019). Within this framework, there is a need for conservation or restoration action when species or habitats do not meet the target of having favourable status.

For this document, the HD assessment made for the period between 2013 and 2018 was used to establish the restoration needs (data obtained via the Article 17 web tool: https://nature-art17.eionet.europa.eu/article17/). The Annex 1 of the proposal for a Regulation of the European Parliament and of the Council on nature restoration (Procedure number: 2022/0195/COD; European Commission, Directorate-General for Environment; Date: 22/26/2022) served as a guide to select the HD habitats related to freshwater ecosystems. Excluding the habitats related to transition waters and marine ecosystems, all of those present in groups 1, 2 and 3 of the annex were included in the analysis. For the species, the selection procedure followed the one used in Carrao et al. (2020a), where the International Union for Conservation of Nature's Red List database is used to assess which species are related to freshwater environments. Besides the study area previously established, in the case of the HD, data availability is established by the 10 by 10 km reference grid from the INSPIRE geographical grid systems. Only the R2Us from the study area having 50% or more of their area covered by this reference grid were considered to have data availability (conversely, the other R2Us will be classified as "No Data"). R2Us within the area of data coverage but where no species and/or habitat occur will be classified as "no species" and/or "no habitat".

To determine the CS at the R2U resolution, the Composite Indicator of Conservation Status (ciCS) methodology developed by Carrao et al. (2020b) was followed. The ciCS aggregates the individual conservation status of multiple elements coexisting in the same unit into one categorical value of conservation status (Carrao et al., 2020b). The method establishes 15 possible categorical values (detailed option) nested into three 3 groups (aggregated option) – Very Low, Low and High – that in general express the dominant CS from U2 to U1 to Fv, respectively. Whenever the "Unknow" CS class is dominant in an R2U, the overall result of the ciCS was termed as "Unclassified".

To account for topological inaccuracies and georeferencing imprecisions when intersecting the reference grid with the R2Us additional safeguards were adopted. Except for species/habitats with overall restricted spatial occurrence (less than 1000 km^2 or occurring in less than two R2Us), if the distribution covered less than 5% of the respective R2U and this represented less than 20 km^2, this presence was excluded from that specific R2U. This rule prevents species from being counted due to topological errors while accounting for R2U size heterogeneity. The CS classes of species and habitats reported per member state and biogeographical region were used to compute the ciCS. This means that for transnational and/or trans-regional R2Us it was necessary to account for species duplication. To avoid this while maintaining method consistency and coherence, the aggregated option of the ciCS procedure was used to determine the dominant CS class in these specific R2Us. Finally, for each R2U, the ciCS was calculated taking into consideration different grouping settings (e.g., species, habitats, species from the group "Amphibian", habitats from the group "Forests"), enabling general and specific mapping approaches. In the end, the results of the ciCS procedures conducted for both the protected freshwater-related habitats and species under the Habitats Directive were integrated by constructing a bivariate choropleth map. This allowed several outcomes to be expressed and the R2Us to be classified accordingly.

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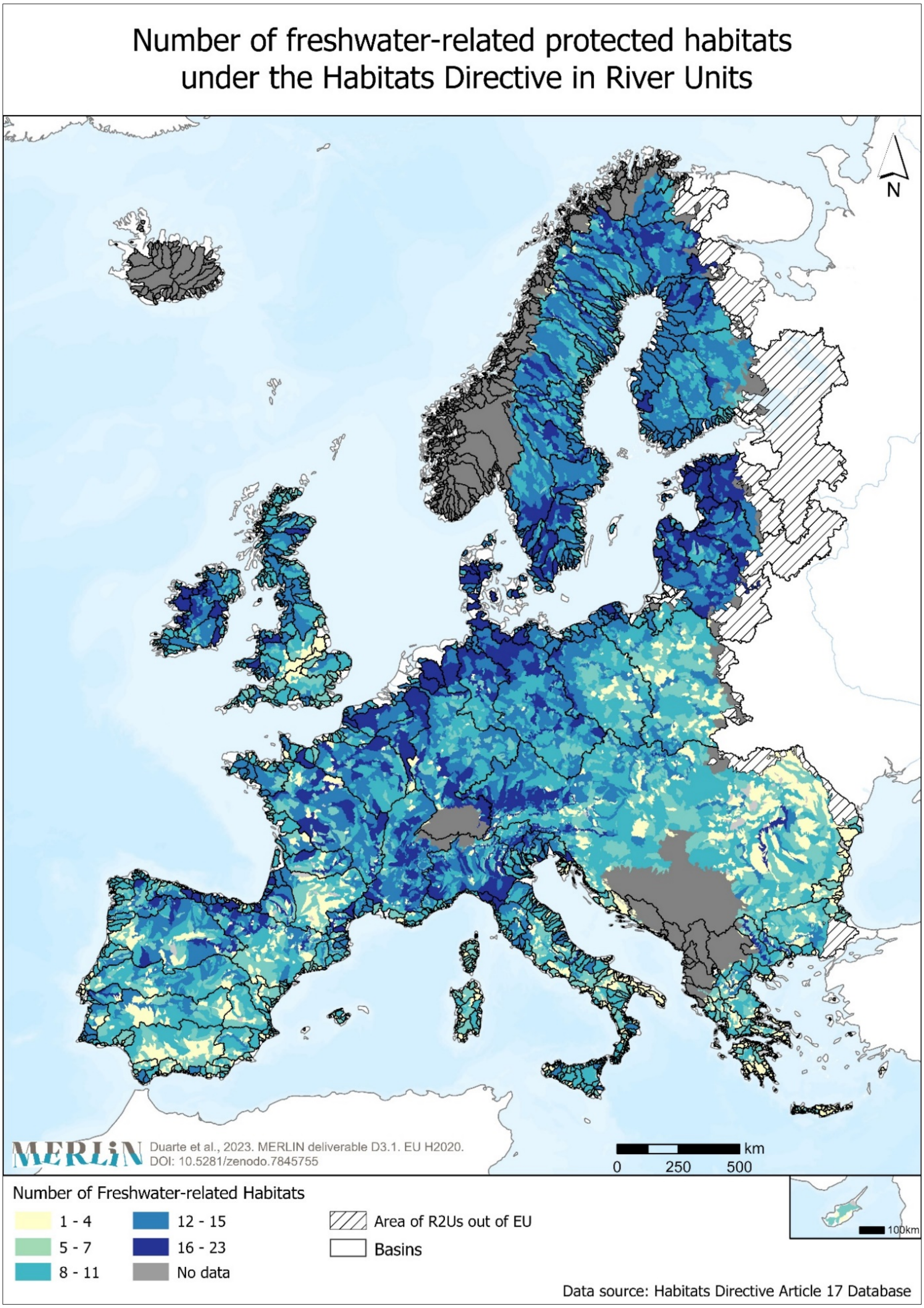

Figure 5. Map detailing the number of protected freshwater-related habitats for each river restoration unit.

Number of freshwater-related protected species under the Habitats Directive in River Units

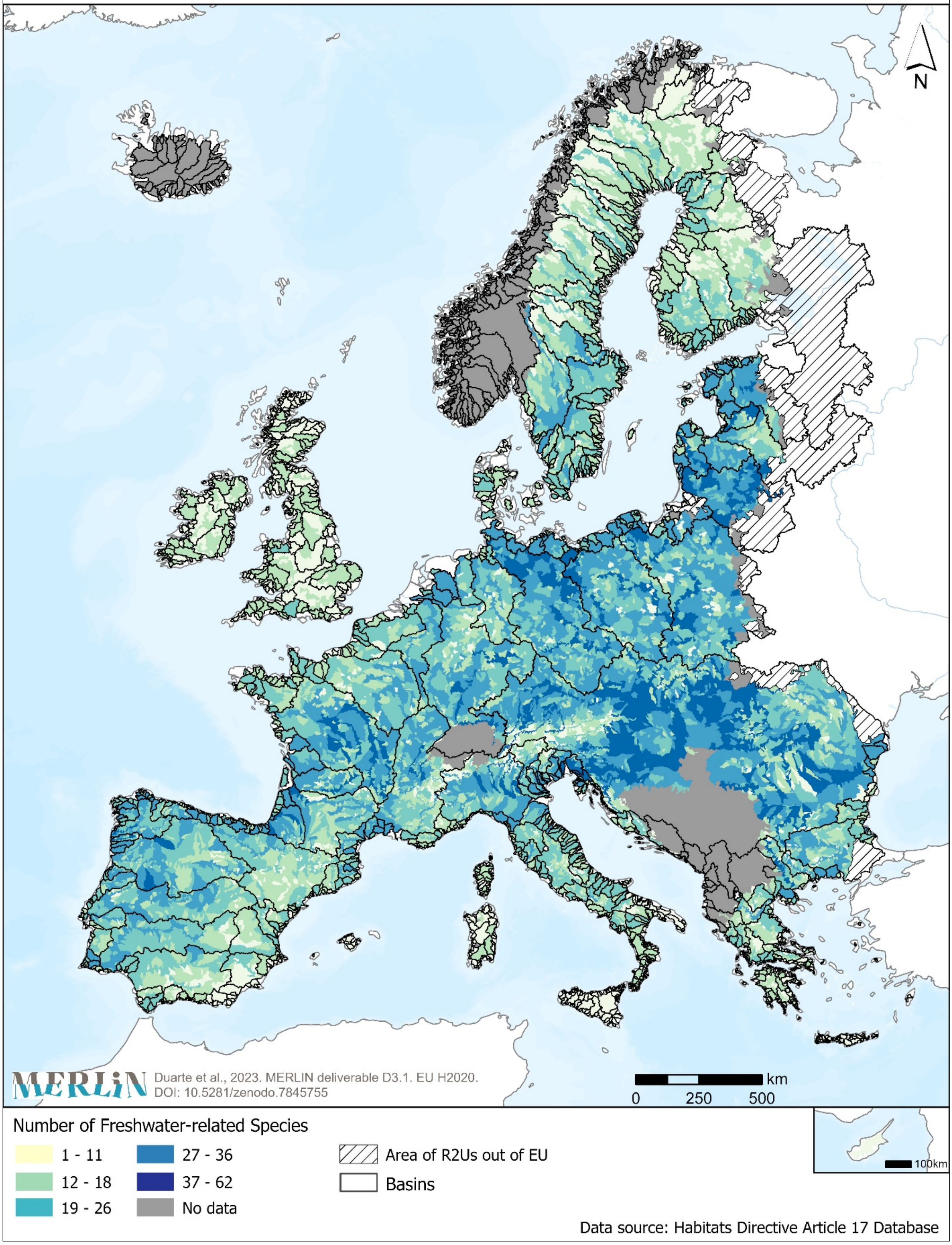

Figure 6. Map detailing the number of protected freshwater-related species for each river restoration unit.

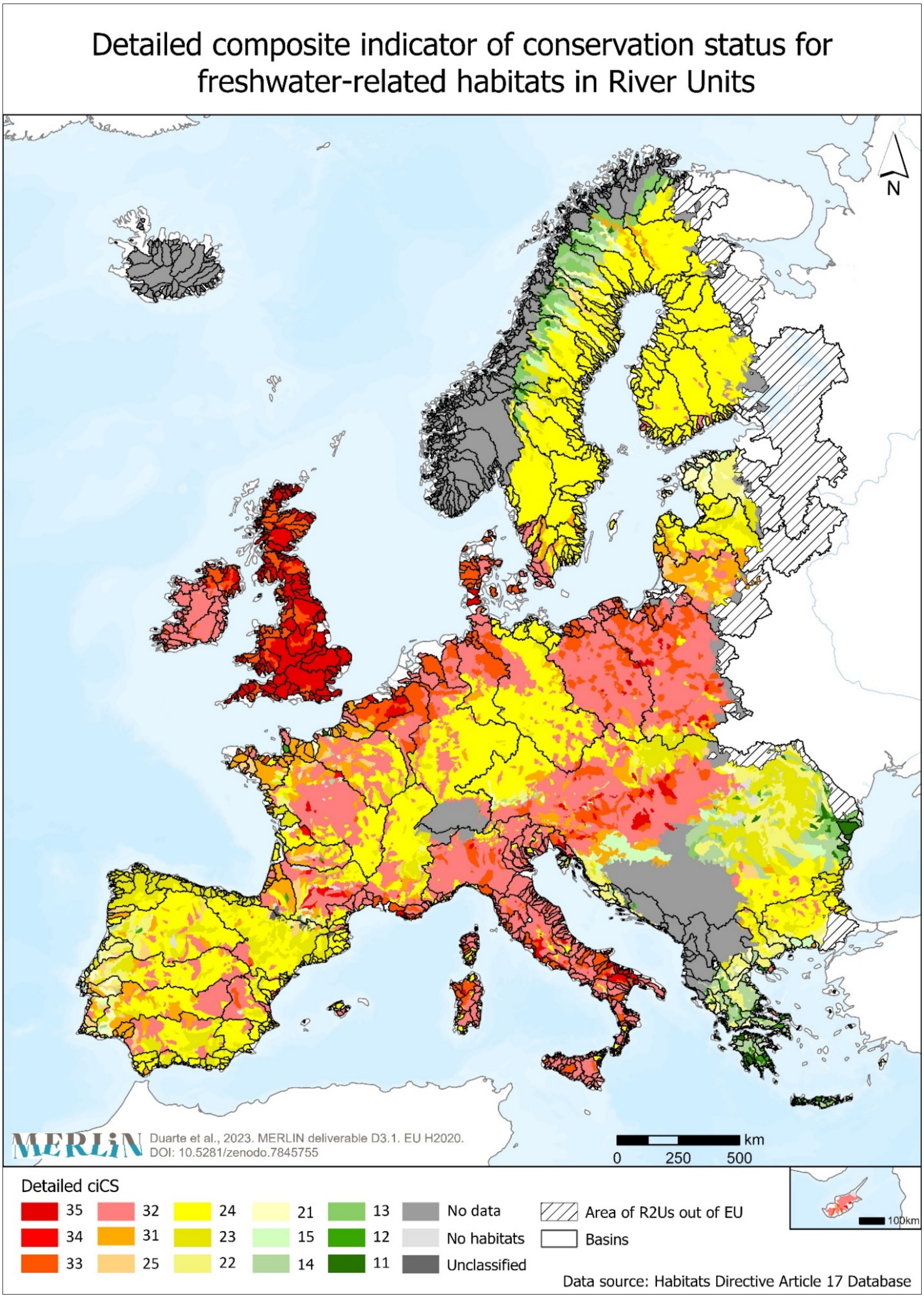

Figure 7. Map showing the detailed composite indicator of Conservation Status class for the protected freshwater-related habitats calculated for each river restoration unit.

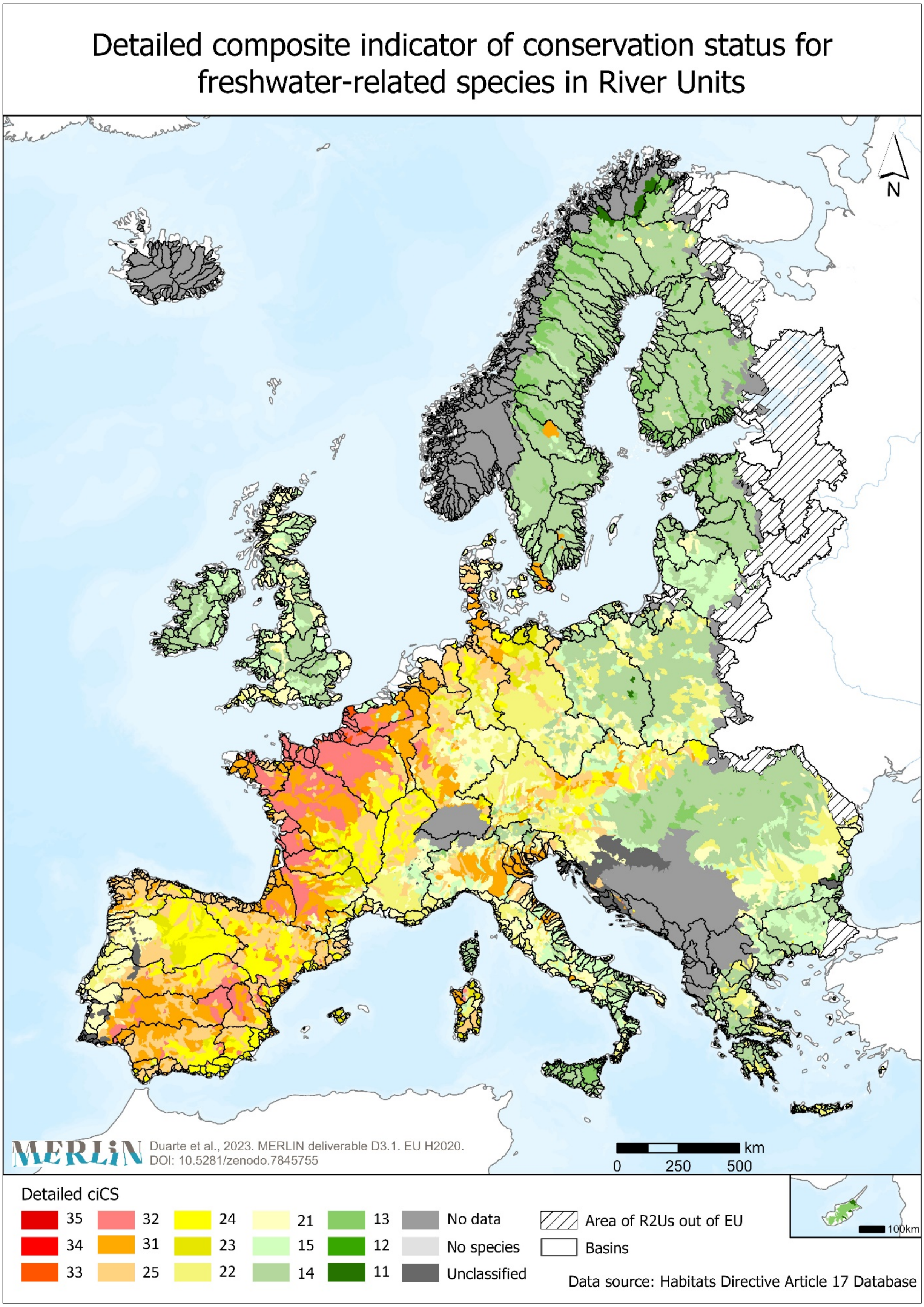

Figure 8. Map showing the detailed composite indicator of Conservation Status class for the protected freshwater-related species calculated for each river restoration unit.

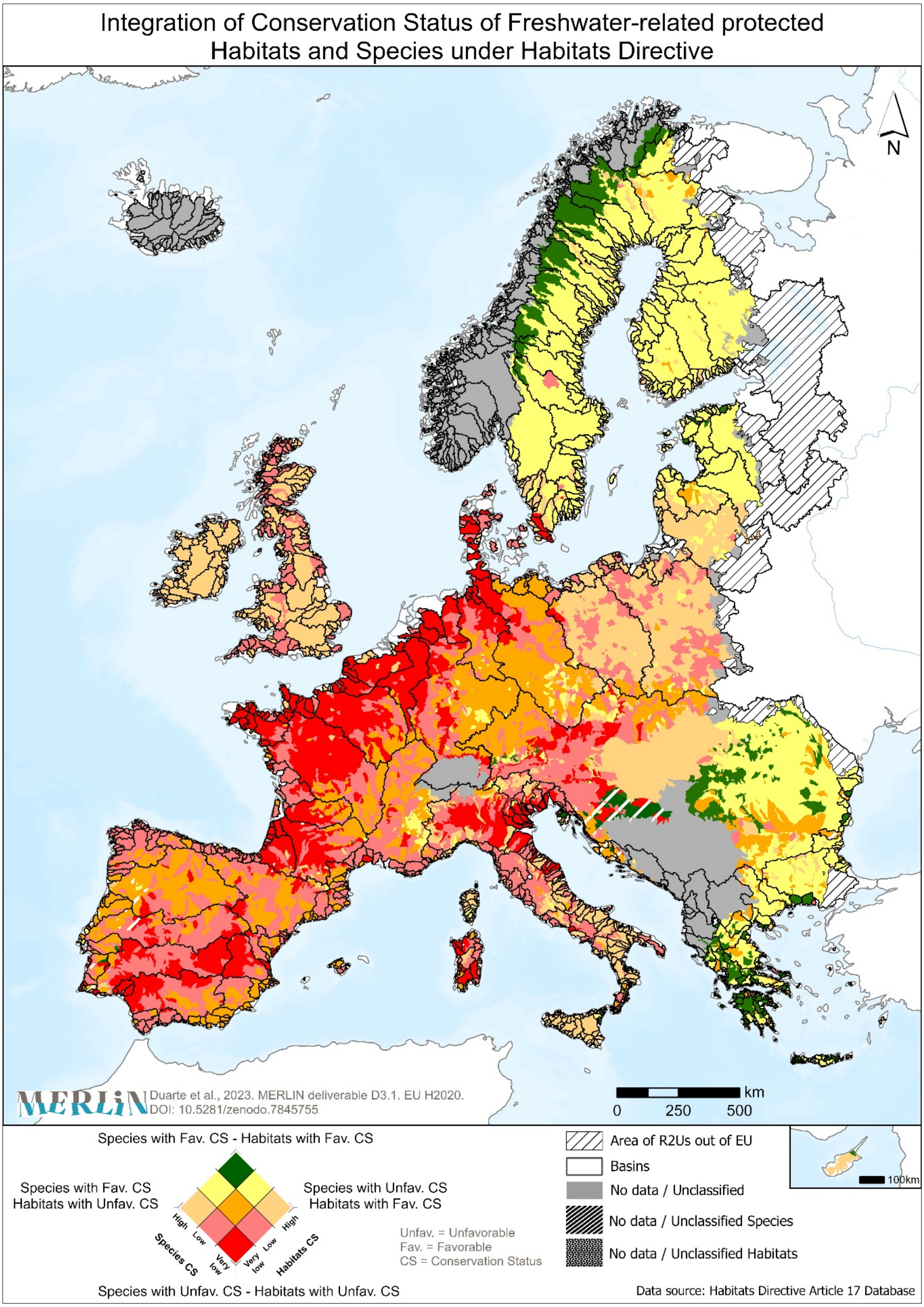

Figure 9. Map detailing for each river restoration unit the integration outcome of the aggregated composite indicator for the protected freshwater-related habitats and species using a bivariate choropleth map.

Birds Directive

Data and Methods

The Birds Directive (BD) expresses the same target as the HD and, although it expresses distinct CS classes, they are colour coded similarly to those of the HD. As such, the methods used here follow those indicated previously for the HD with necessary adjustments. For BD, the data obtained via the Article 12 web tool (https://nature-art12.eionet.europa.eu/article12/) covers the 2013 to 2018 period but only provides an evaluation for each species at the European scale. As such, no trans-national, nor trans-regional adjustments have to be made, but it also means that the reporting resolution is coarser than that of the HD (made per Member State and biogeographic region). This being said, mapping outputs are equitable to those of the HD but do not express the same detail and input resolution.

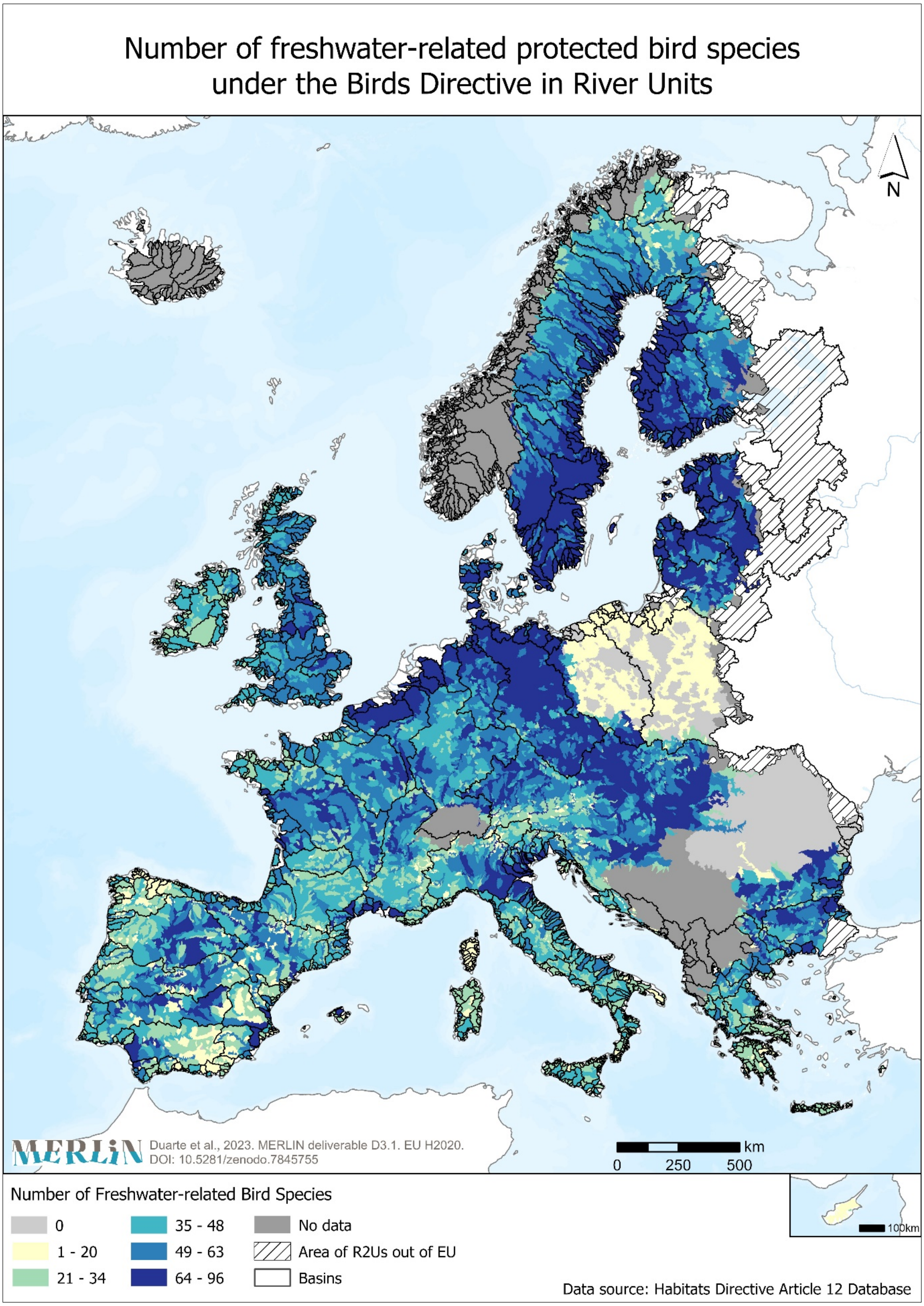

Figure 10. Map detailing the number of protected freshwater-related bird species for each river restoration unit.

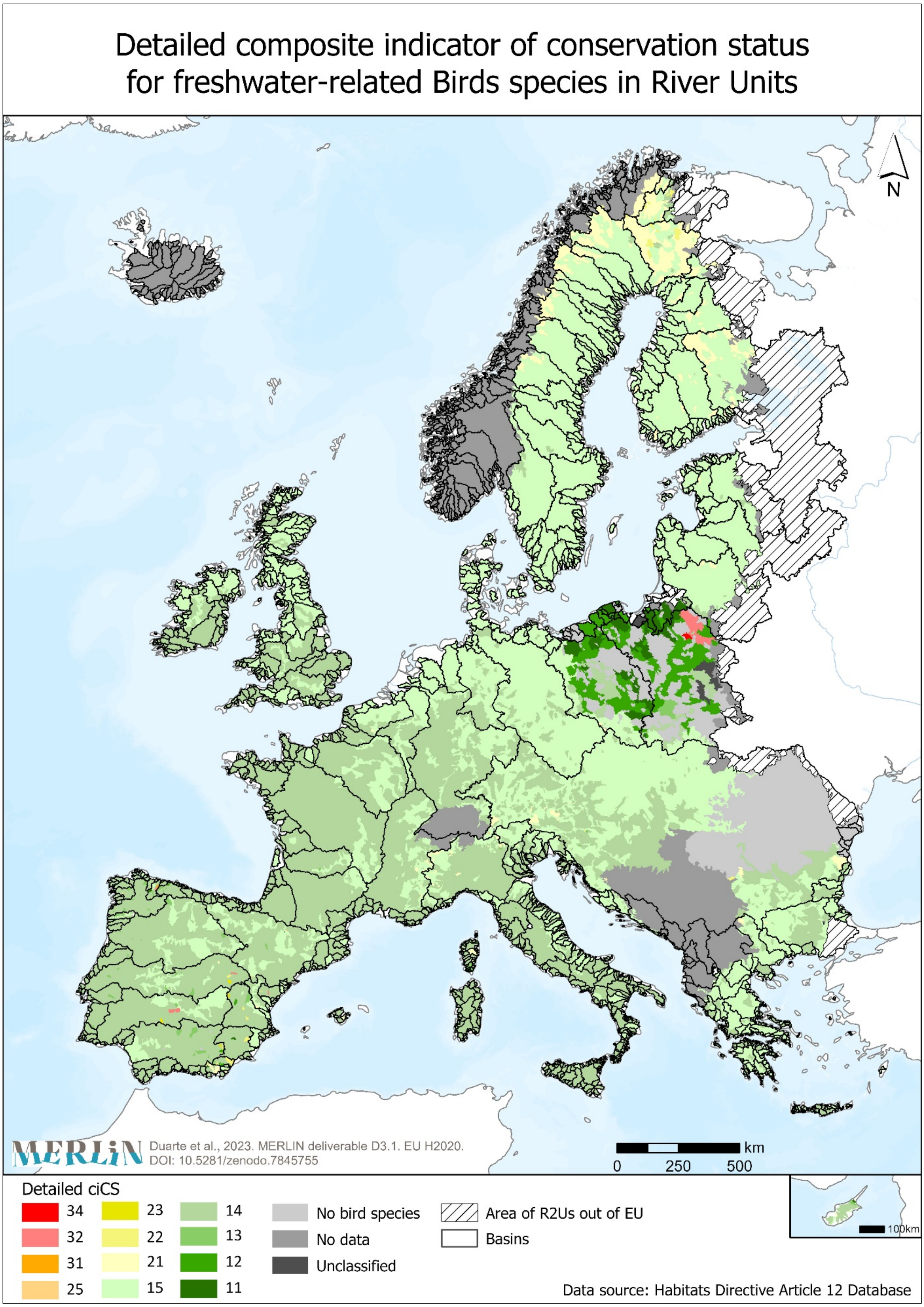

Figure 11. Map showing the detailed composite indicator of Conservation Status class for the protected freshwater-related bird species calculated for each river restoration unit.

Water Framework Directive

Data and Methods

The Water Framework Directive (WFD) reference spatial data sets derived from the first and second River Basin Management Plans (RBMP) were used to create the map with the surface water bodies (SWB). These datasets are part of the Water Information System for Europe (WISE) and compile information reported by the EU Member States, Norway, Iceland and the United Kingdom to the European Commission (EC) and the European Environment Agency (EEA) since 2010. For the UK we used the "WFD River Water Bodies Cycle 1", a polyline Shapefile dataset collated as defined for the implementation of the Water Framework Directive (WFD). The river polylines were defined using the Environment Agency—General Quality Assessment (GQA) River Stretches dataset, which was copied directly from the UK Centre for Ecology & Hydrology (UKCEH) 1:50 000 River Network with some additional stretches added in by the Environment Agency. The resultant WFD river water body dataset is a subset of the Centre for Ecology & Hydrology (CEH) network, including only stretches that meet any of the criteria for the WFD (Environmental Agency).

The spatial analyses were performed using the data produced by Vigiak et al. (2021), which portrays the probability of River Restoration Units having: (i) good ecological status, (ii) nutrient pollution, (iii) organic pollution, (iv) chemical pollution, (v) altered hydrology, (vi) altered morphology and (vii) a lack of impacts. These probabilities were estimated using multiple logistic regressions based on the available European databases, particularly river conditions as reported by Member States for the second reporting round of River Basin Management Plans of the Water Framework Directive (conditions in 2010-2015), and European water pressure indicators derived from data and models (Vigiak et al., 2021). The probabilities express the likelihood of the respective condition. The presence of two clear peaks in the range of probabilities indicates that the explanatory variables can easily identify regions of low or high probability (below 40% and above 60%), relatable with the absence or presence of the condition (Vigiak et al., 2021). The probability region from 40 to 60% is thus considered an "uncertainty zone" because one minor change in an explanatory variable can alter the result towards the absence or presence of a condition (Vigiak et al., 2021). As such, a high number of cases in the 40–60% region or a limited range of probabilities suggest that the model is probably missing some key information to clearly identify the presence of the condition (Vigiak et al., 2021). This allowed establishing three classes expressing river condition: segments with values below 40% were considered to be part of the "abiding"/"unaltered" class (the later class term was adopted for the altered morphology and altered hydrology datasets), those above 60% as part of the "non-abiding"/"altered" class (the later class term used as the opposite of "unaltered" for the same datasets), and those in the uncertainty zone as part of the "uncertain" class.

Probabilities in this dataset have been identified for each segment; a unit expressing higher resolution than the unit of analysis (R2U). However, segments are nested in R2Us which generally contain multiple segments, making it possible to maintain methodological consistency and coherence by applying the ciCS methodology as previously described for the HD with minor methodological adjustments but with an important distinction in ciCS output class interpretation. Analogously, only R2Us where the respectively nested segments correspond to data covering 50% or more of its drainage area were considered as having data availability. No transnational or regional incongruences occur. In this case, of the 3 output ciCS classes, only one illustrates the need for restoration actions ("non-abiding"/ "altered" class). The other two classes express, in one case, abidance to the respective WFD condition (e.g., Good Ecological Status (GES) target or a non-polluted/unaltered status); and in the other, uncertainty about the current status. This has relevant implications for the mapping analysis, the integration procedures and the overall definition of the restoration needs. The aforementioned 3 classes correspond to the aggregated ciCS classes, but as previously explained the methodology also enables having the detailed ciCS classes.

References

Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2

Figure 12. Map showing the overlay between the Surface Water Bodies (SWB) and the River Restoration Units.

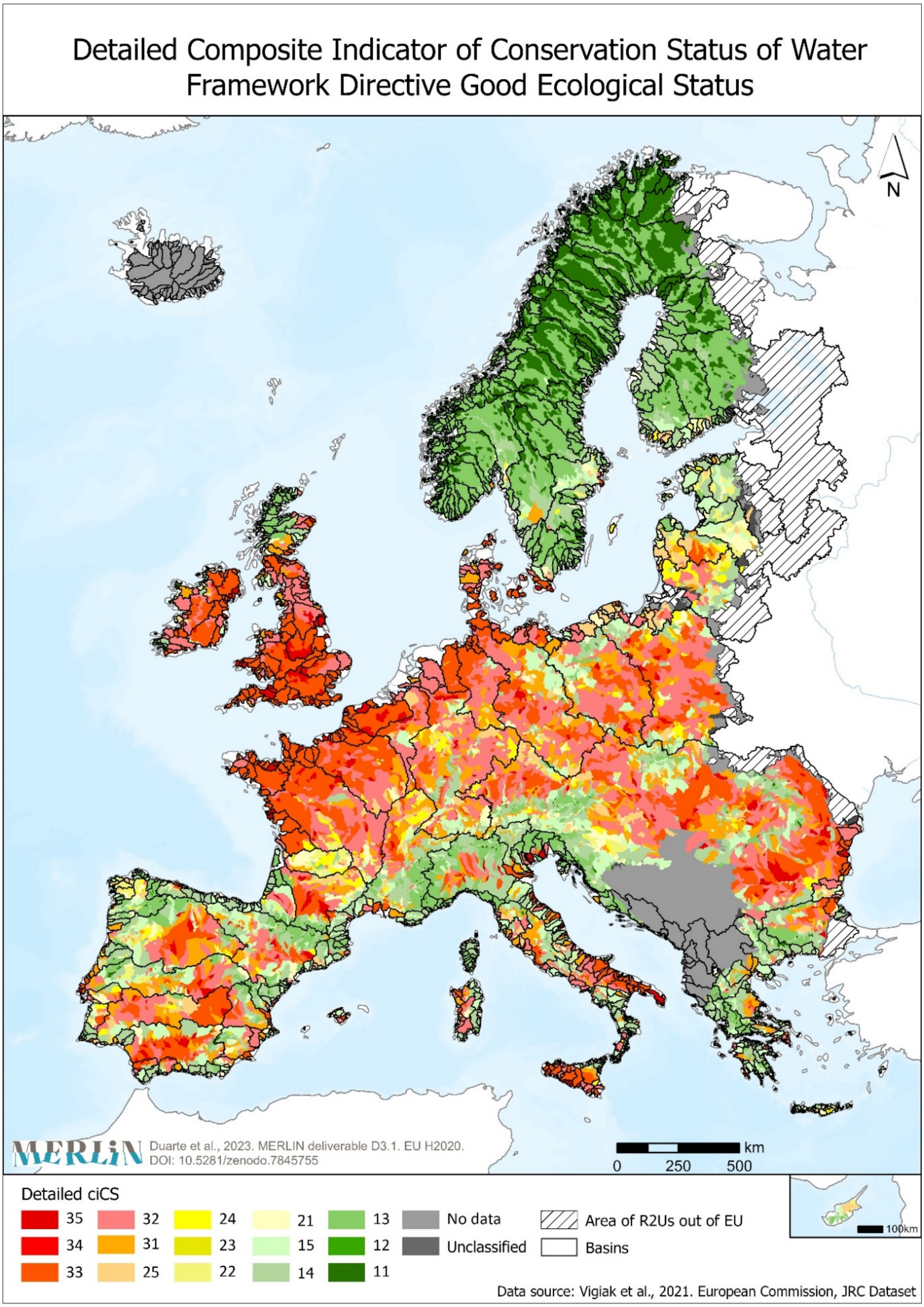

Figure 13. Map showing for each River Restoration Unit the class of the detailed composite indicator of Conservation Status using the modelled probability of achieving a Good Ecological Status, sensu Water Framework Directive.

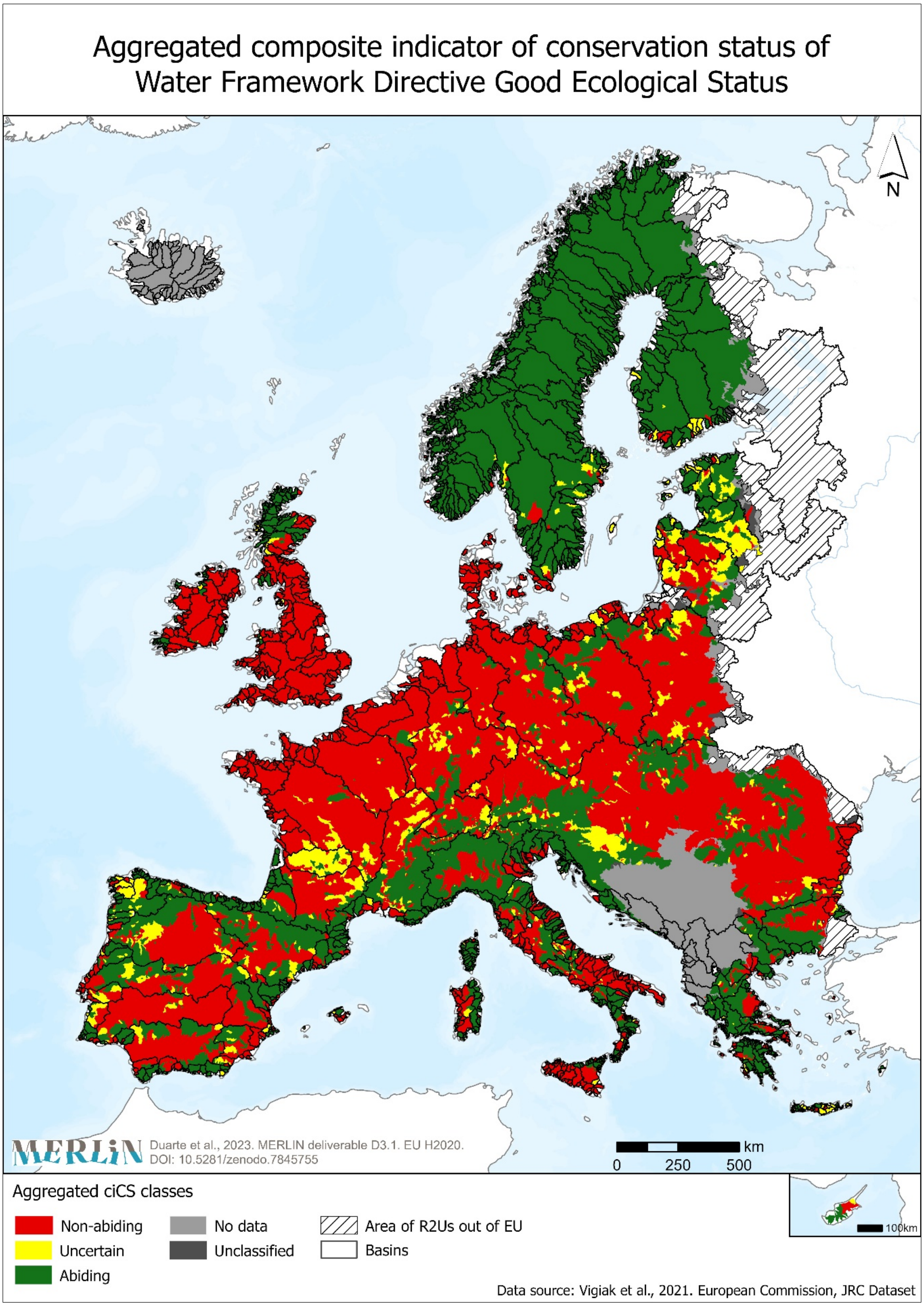

Figure 14. Map showing for each River Restoration Unit the class of the aggregated composite indicator of Conservation Status using the modelled probability of achieving a Good Ecological Status, sensu Water Framework Directive.

Climate change projections

Data and Methods

Bioclimatic variables from WorldClim (version 2.1; spatial resolution: 2.5 minutes) have been used to project climatic change scenarios in River Restoration Units. In this section, we display firstly the predicted mean annual air temperature calculated as the mean annual daily mean air temperatures in °C averaged over 1 year (BIO1). Secondly, the bioclimatic variable shown is the predicted accumulated precipitation amount in mm over 1 year (BIO12). The bioclimatic data are CMIP6 downscaled future climate projections in two Shared Socio-economic Pathways (SSP3-7.0 and SSP5-8.5) for the time period 2021-2040. The SSP3-7.0 scenario represents the medium to high end of plausible future forcing pathways indicating a forcing level common to several (unmitigated) SSP baseline pathways. The SSP5-8.5 scenario represents the high end of plausible future forcing pathways. Values of the bioclimatic variables have been attributed to River Restoration Units using the geoprocessing tool zonal statistics, obtaining all statistic types, and using the average value per R2U for the mapping representation.

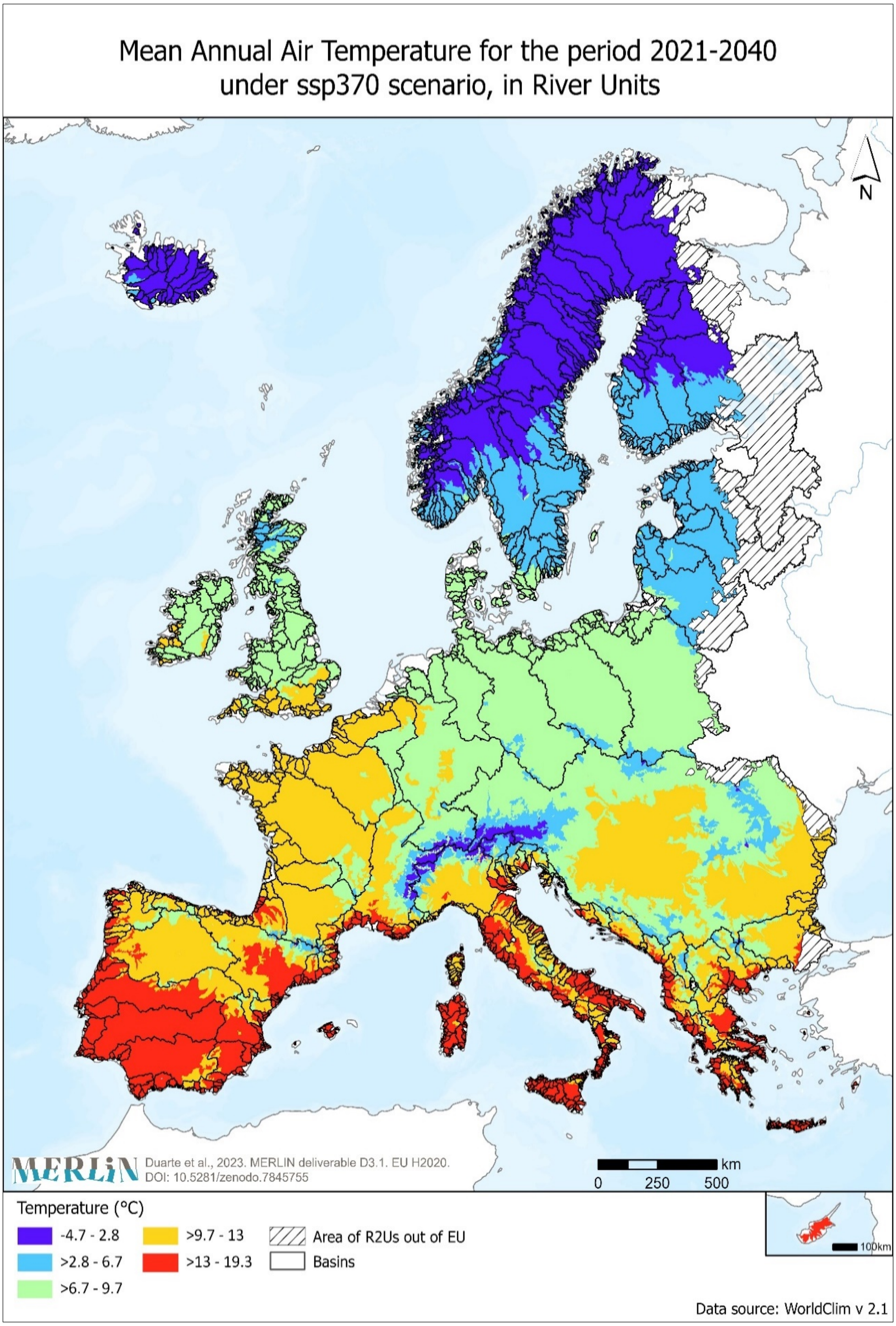

Figure 15. Map showing the average annual air temperature (BIO1) for each River Restoration Unit in the period 2021-2040 under the business-as-usual scenario (ssp370).

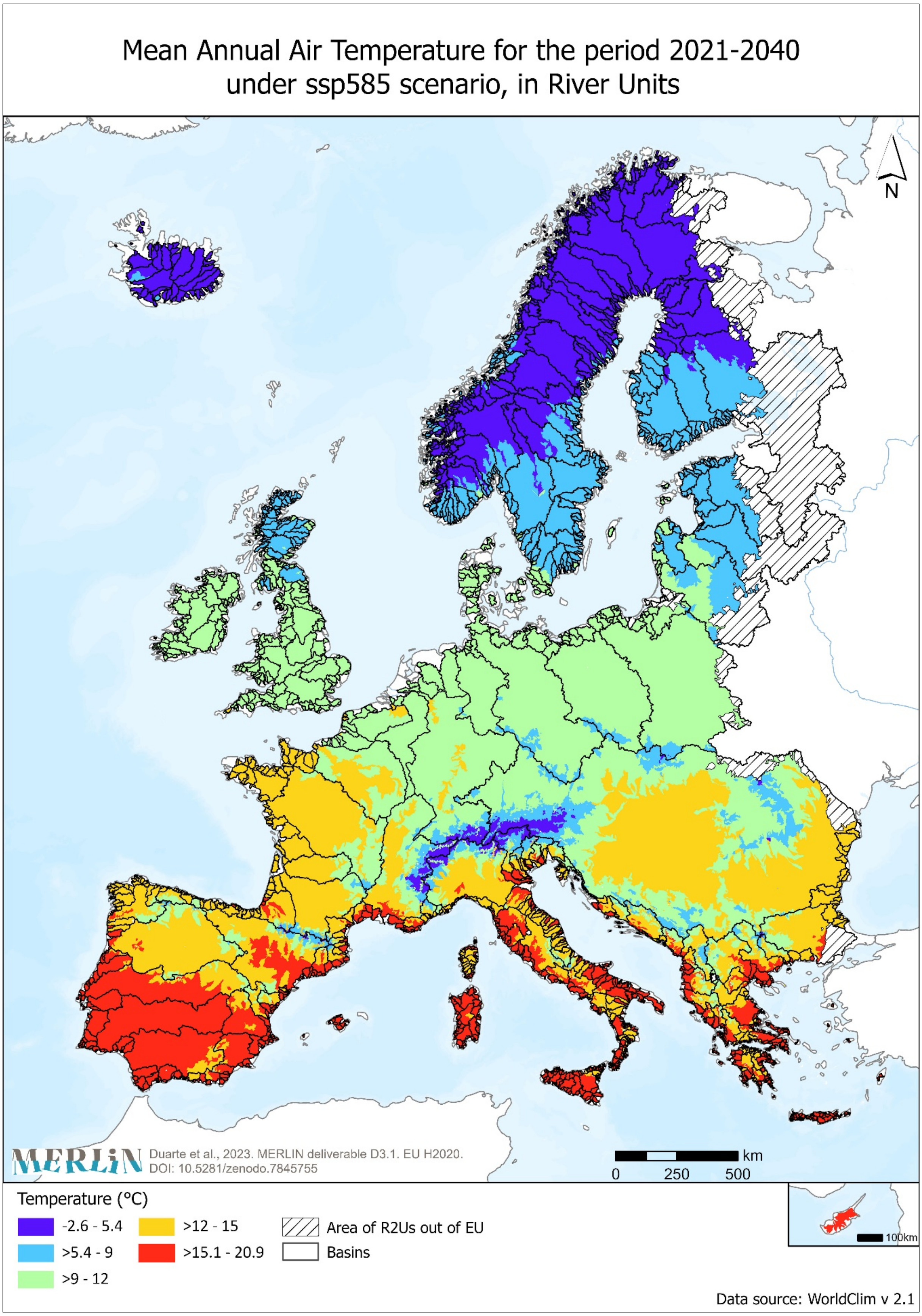

Figure 16. Map showing the average annual air temperature (BIO1) for each River Restoration Unit in the period 2021-2040 under the worst-case scenario (ssp585 scenario).

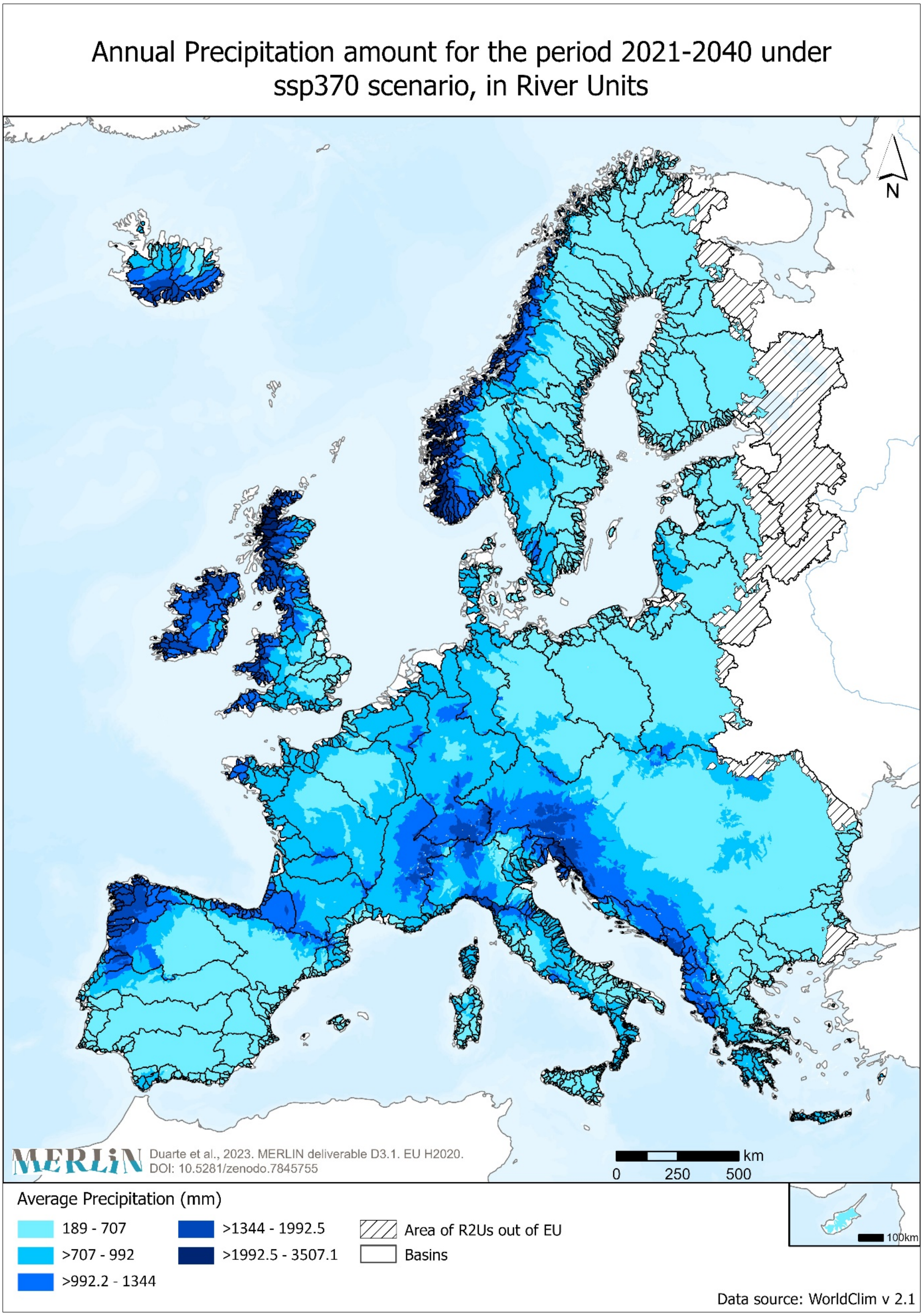

Figure 17. Map showing the average yearly accumulated precipitation (BIO12) for each River Restoration Unit in the period 2021-2040 under the business-as-usual scenario (ssp370).

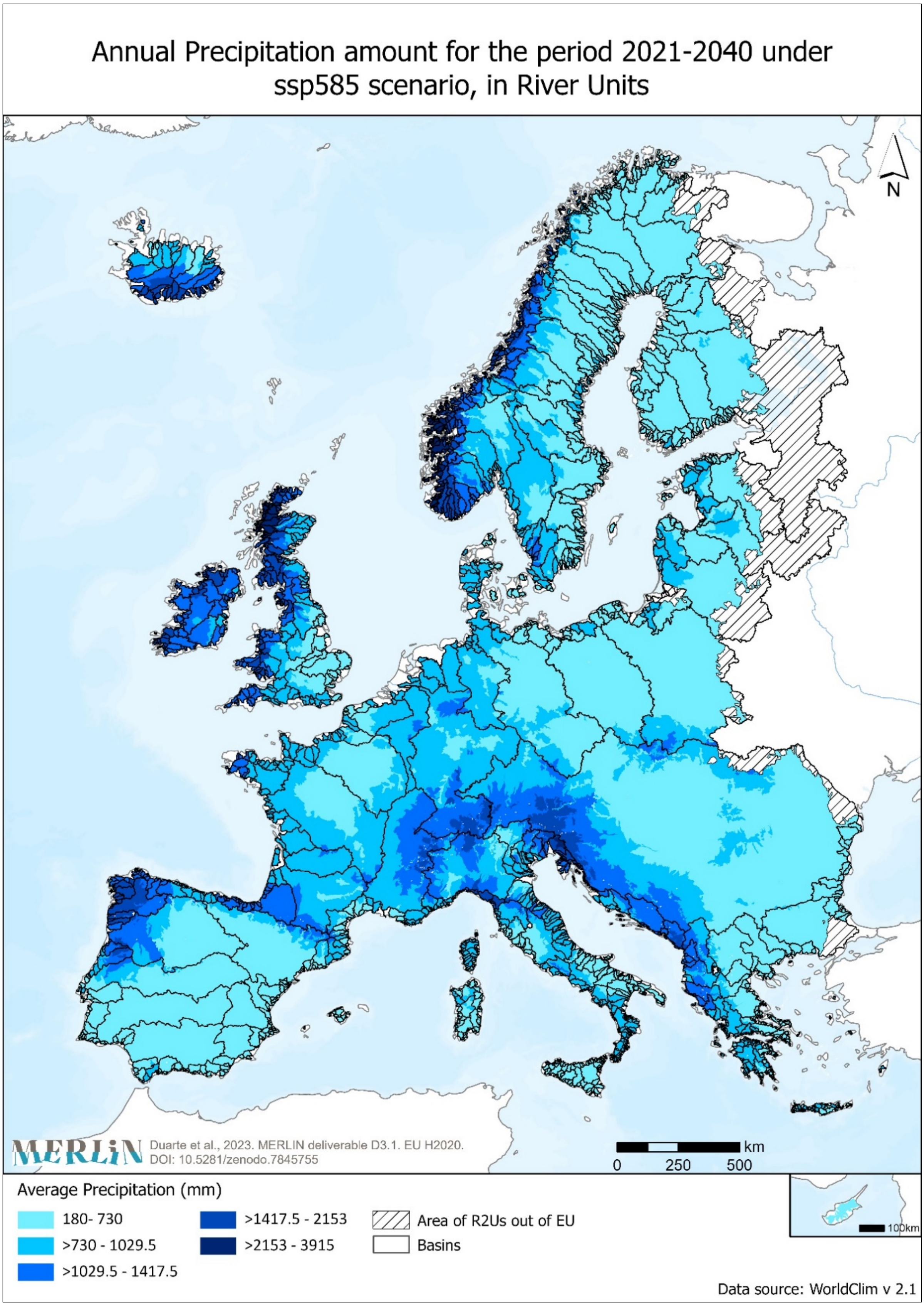

Figure 18. Map showing the average yearly accumulated precipitation (BIO12) for each River Restoration Unit in the period 2021-2040 under the worst-case scenario (ssp585 scenario).

River connectivity and hydrological alterations

Data and Methods

To examine the river connectivity and the hydrological alterations within River Restoration Units, barrier data, data regarding both the probability of altered morphology and hydrology produced by Vigiak et al. (2021), and the Aqueduct 3.0 Water Risk Projections have been used.

Information on barriers over 5 m in height was compiled from several sources. The information about their location was mainly obtained from AMBER Barrier Atlas (AMBER Consortium, 2020), the Georeferenced Global Dams And Reservoirs (GeoDAR v1.1; Wang et al., 2021), and the GlObal geOreferenced Database of Dams (GOODD V1) (Mulligan et al., 2020). The geographic location of the dams was integrated automatically with the basin and R2U, and georeferencing inaccuracies/discrepancies were verified manually. This allows for a high confidence on the connectivity fragmentation promoted by these barriers. Smaller barriers are undoubtly important, but there is no available dataset at the study area extent that has validated barrier location, meaning that placement errors are prone to exist wich inferms the dataset with a high uncertainly level. Furthermore, many small barreirs are, at the CCM2, resolution off network not affecting river network connectivity at that resolution. Our approach to producing the artificial barriers database consisted of compiling available data from the above-mentioned global databases. First, we began by accessing the AMBER Barrier Atlas (AMBER Consortium, 2020). This inventory of barriers within European rivers is available online and, from these records, we selected barriers higher than 5 metres, which resulted in the collection of 9,835 georeferenced barriers in European basins (AMB). The Georeferenced Global Dams And Reservoirs (GeoDAR v1.1; Wang et al., 2021) holds 24,978 dam points worldwide. After selecting European barriers, we overlapped AMB and GeoDAR (GEO) data points. To clean the database, we began by setting a buffer distance between the previous AMB data points and the additional GEO data points, ranging from 250 m to 1500 m, guaranteeing unique dam locations and removing duplicate records at each distance interval of 250 m. GeoDAR points over the buffer distance of 1500 m were verified and confirmed to be new barrier records. This process resulted in a total increment of 2,262 GeoDAR barriers. The recently published GlObal geOreferenced Database of Dams (GOODD V1) (Mulligan et al., 2020), contains 38,667 dam points (2,760 in Europe) digitised from Google Earth imagery and their associated catchments delineated from digital elevation models (DEMs) (GDD). The following step was to select European barriers, check the overlap between previous data (AMB and GEO) with GDD data, and clean the database by removing duplicate records repeating the same process as before (the buffer threshold distance of 1500 m between AMB_GEO points and GDD points). GDD duplicated points under the buffer limit were removed, and points within a 1500 to 3000 m range distance were verified manually, at each distance interval of 250 m, eliminating duplicates. Points above the 3000 m buffer limit were confirmed to be unique barriers. Through this selective process, we were able to add a total of 481 GOODD barriers to the dataset. Other supporting sources, such as Google Earth imagery, were used to visually verify and validate the spatial location of the dams, and respective river network segments. After quality checking, we harmonised records reaching a total of 12 578 compiled barriers, which affect 8 524 segments of the European river network.

The methodology to examine the hydrological alterations within the River Restoration follows the applied methodology for the modelled Water Framework Directive data. To examine the hydromorphological alterations using the Vigiak et al. (2021) datasets, the method used was similar to the one used previously on the WFD GES data. This was followed independently using the probability of having hydrological alterations and the probability of altered morphology, leading to the establishment of three classes; “unaltered”, when the probability was lower than 40%; “altered”, when the probability was above 60%; and “uncertain” for the intermediate values. Afterwards, integration was made using a bivariate choropleth map, which allows crossing the classes from both datasets and providing an output for the hydromorphological changes in R2Us.

The used Aqueduct 3.0 Water Risk Projections include indicators of change in water supply, water demand, water stress, and seasonal variability, projected for the year 2040 under the CMIP5 climate scenarios RCP4.5 and RCP8.5, and the shared socioeconomic pathways SSP2 and SSP3. The SSP2 RCP8.5 scenario represents the business-as-usual scenario indicating stable economic development and a stable rise of global carbon emissions, with concentrations of CO_2 to reach approximately 1370 ppm by 2100 and the global mean temperatures to increase by 2.6–4.8°C relative to 1986–2005 levels. The SSP3 RCP8.5 scenario represents the pessimistic scenario indicating a worldwide uneven economic development, with increased population growth, decreased GDP growth, and a lower rate of urbanization, all of which potentially affect water usage; and steadily rising global carbon emissions, with concentrations of CO_2 to reach approximately 1370 ppm by 2100 and the global mean temperatures to increase by 2.6–4.8°C relative to 1986–2005 levels. Values of the Water Risk Indicators have been attributed to River Restoration Units using the geoprocessing tool zonal statistics, obtaining all statistic types, and using the average value per R2U for the mapping representation.

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Wang, J., Walter, B. A., Yao, F., Song, C., Ding, M., Maroof, A. S., Zhu, J., Fan, C., Xin, A., McAlister, J. M., Sikder, S., Sheng, Y., Allen, G. H., Crétaux, J.-F., and Wada, Y. (2021). GeoDAR: Georeferenced global dam and reservoir dataset for bridging attributes and geolocations, Earth System Science Data Discussions, 1-52. https://doi.org/10.5194/essd-2021-58

https://www.wri.org/data/aqueduct-global-maps-30-data

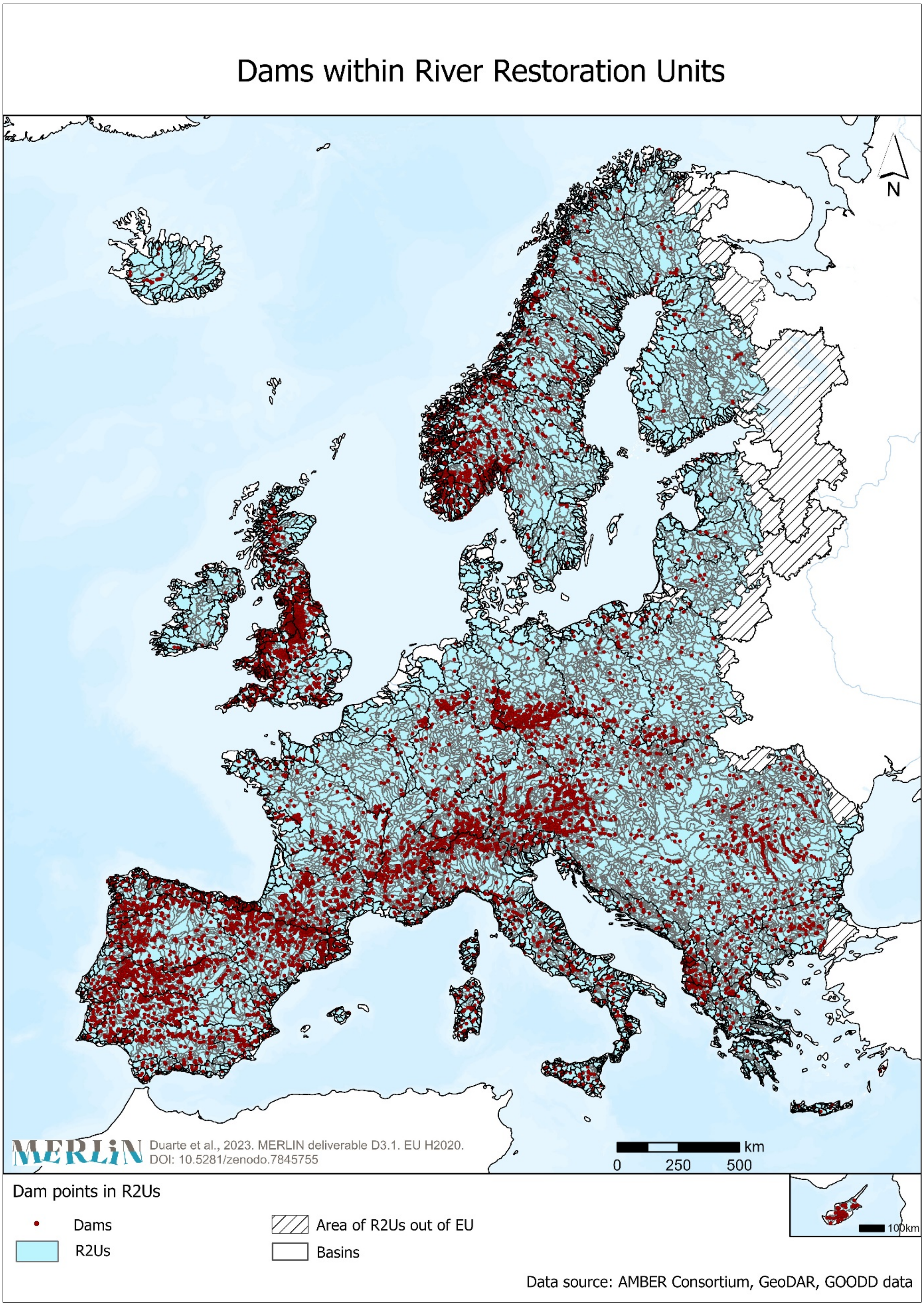

Figure 19. Map showing the overlay between the dataset of compiled barriers and the River Restoration Units.

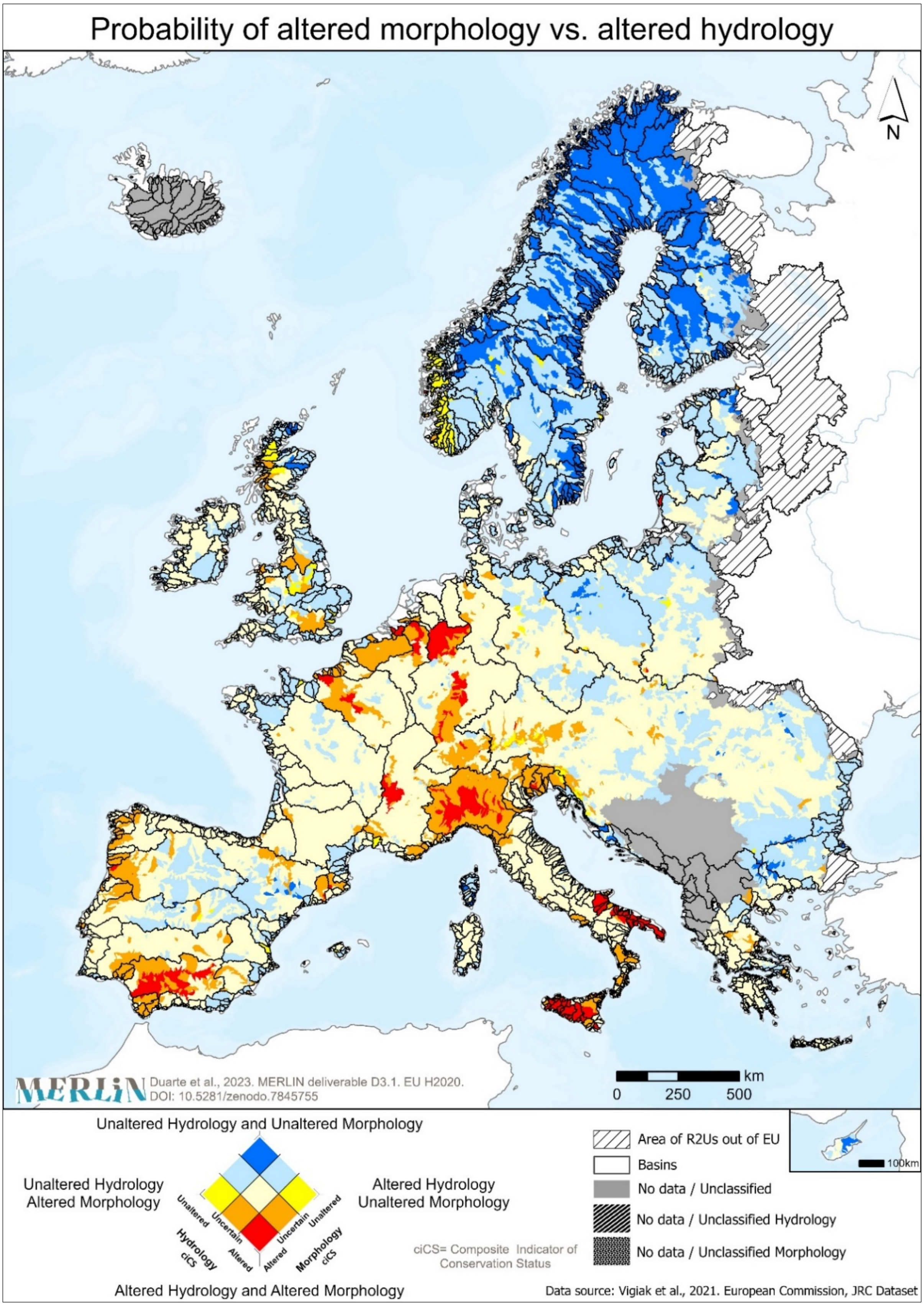

Figure 20. Map detailing for each river restoration unit the integration outcome of the aggregated composite indicator for the probability of altered hydrology and altered morphology using a bivariate choropleth map.

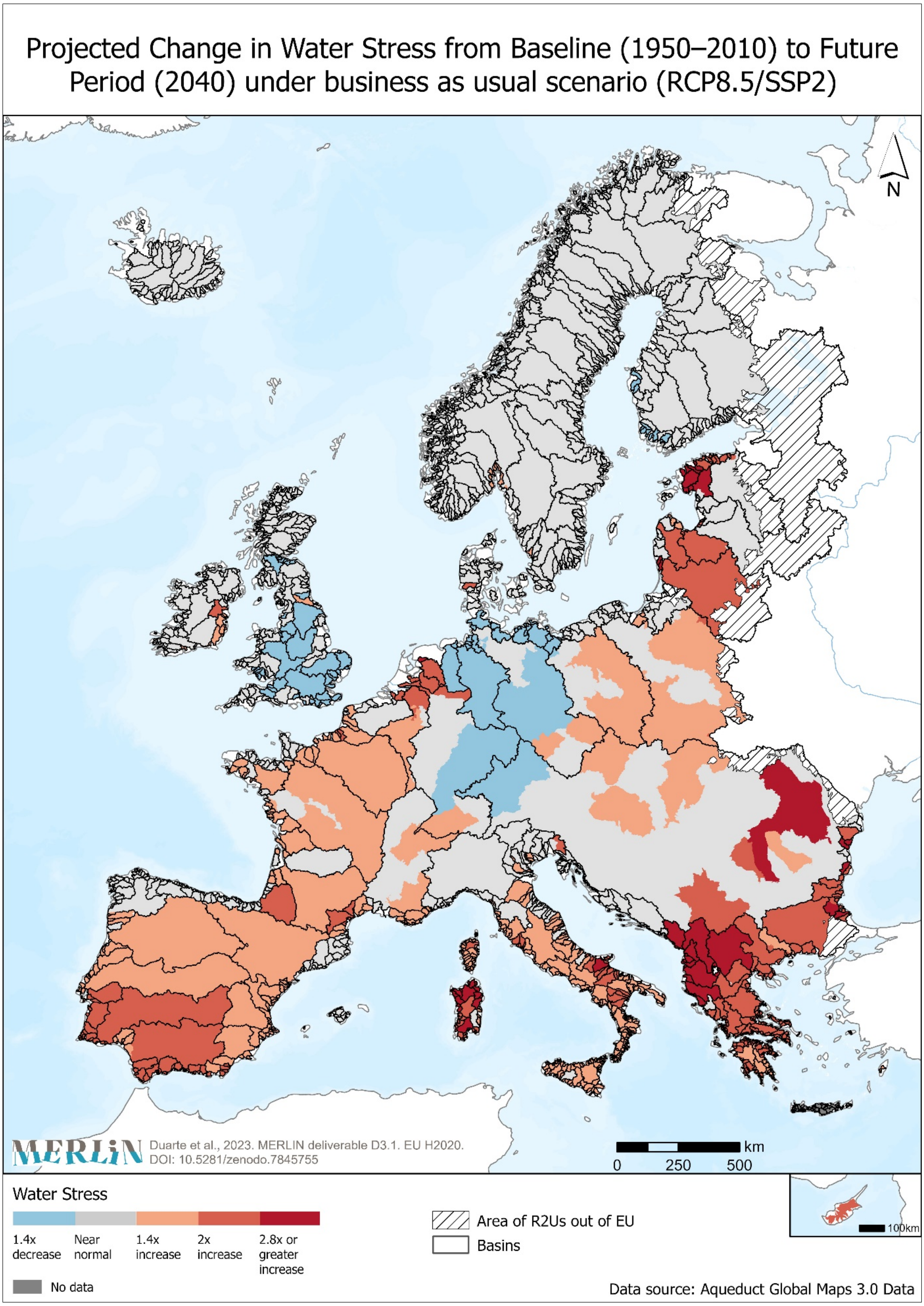

Figure 21. Map illustrating for each River Restoration Unit the projected change in Water Stress under business-as-usual scenario (RCP8.5/SSP2) for the year 2040.

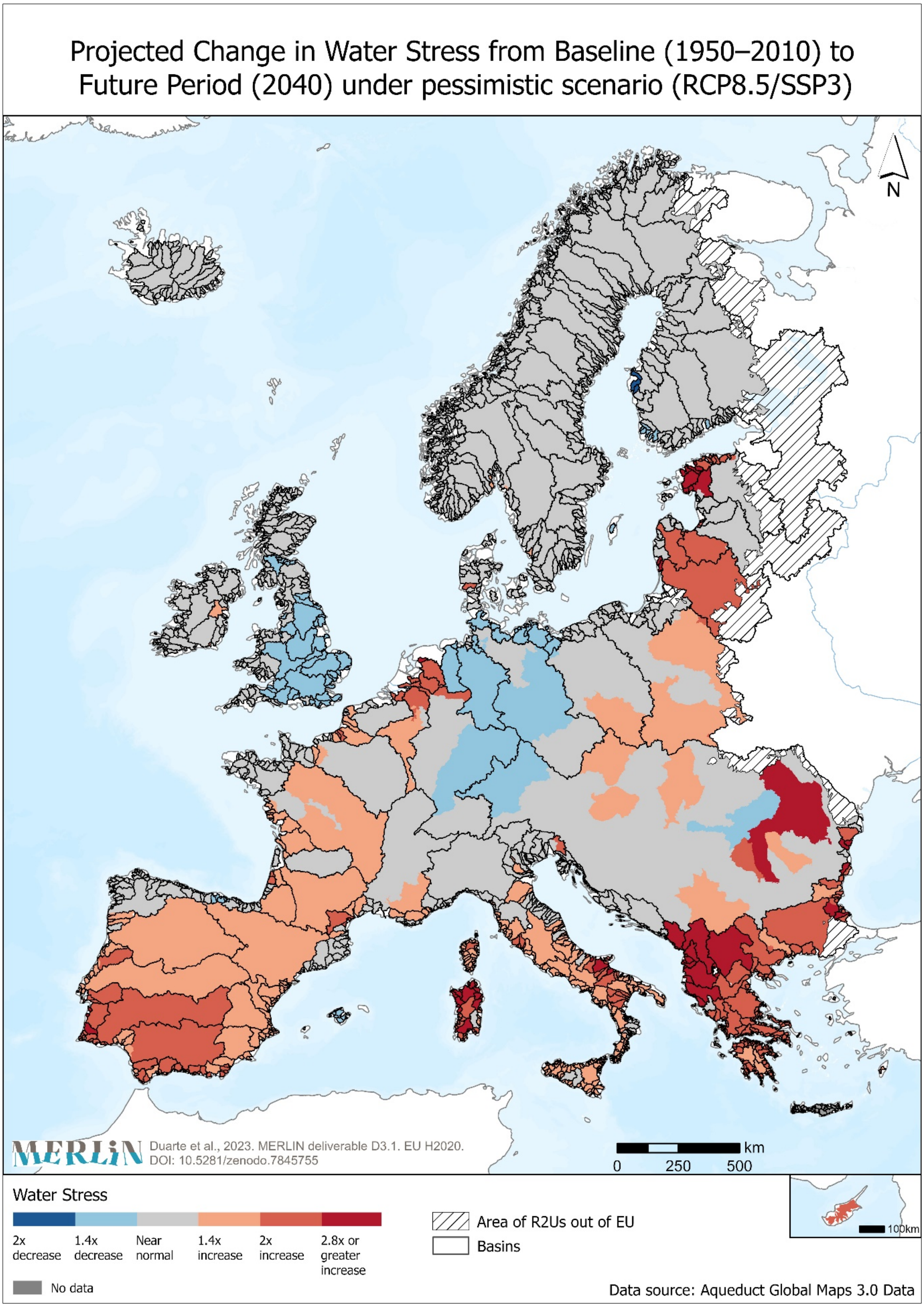

Figure 22. Map illustrating for each River Restoration Unit the projected change in Water Stress under the pessimistic scenario (RCP8.5/SSP) for the year 2040.

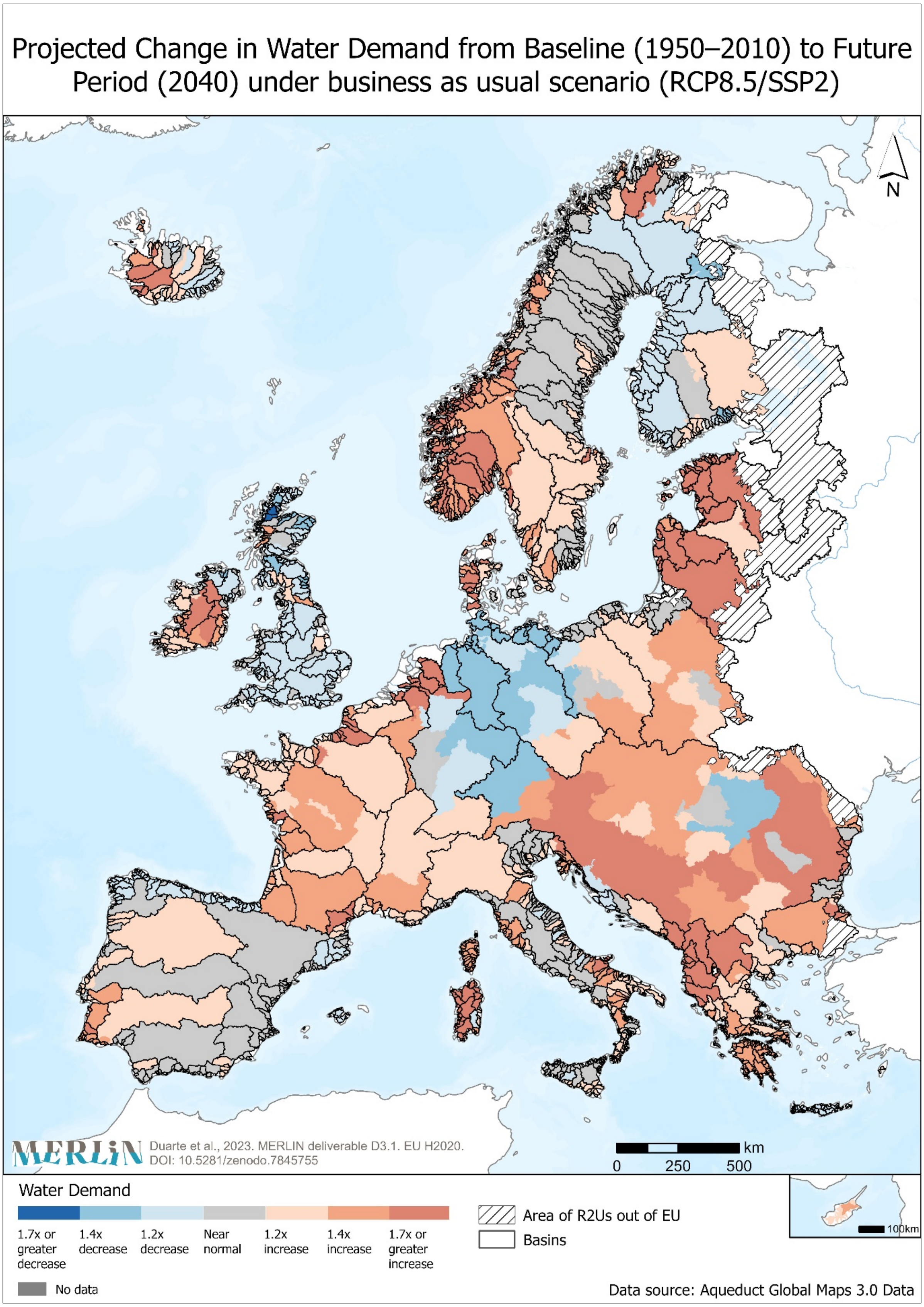

Figure 23. Map illustrating for each River Restoration Unit the projected change in Water Demand under business-as-usual scenario (RCP8.5/SSP2) for the year 2040.

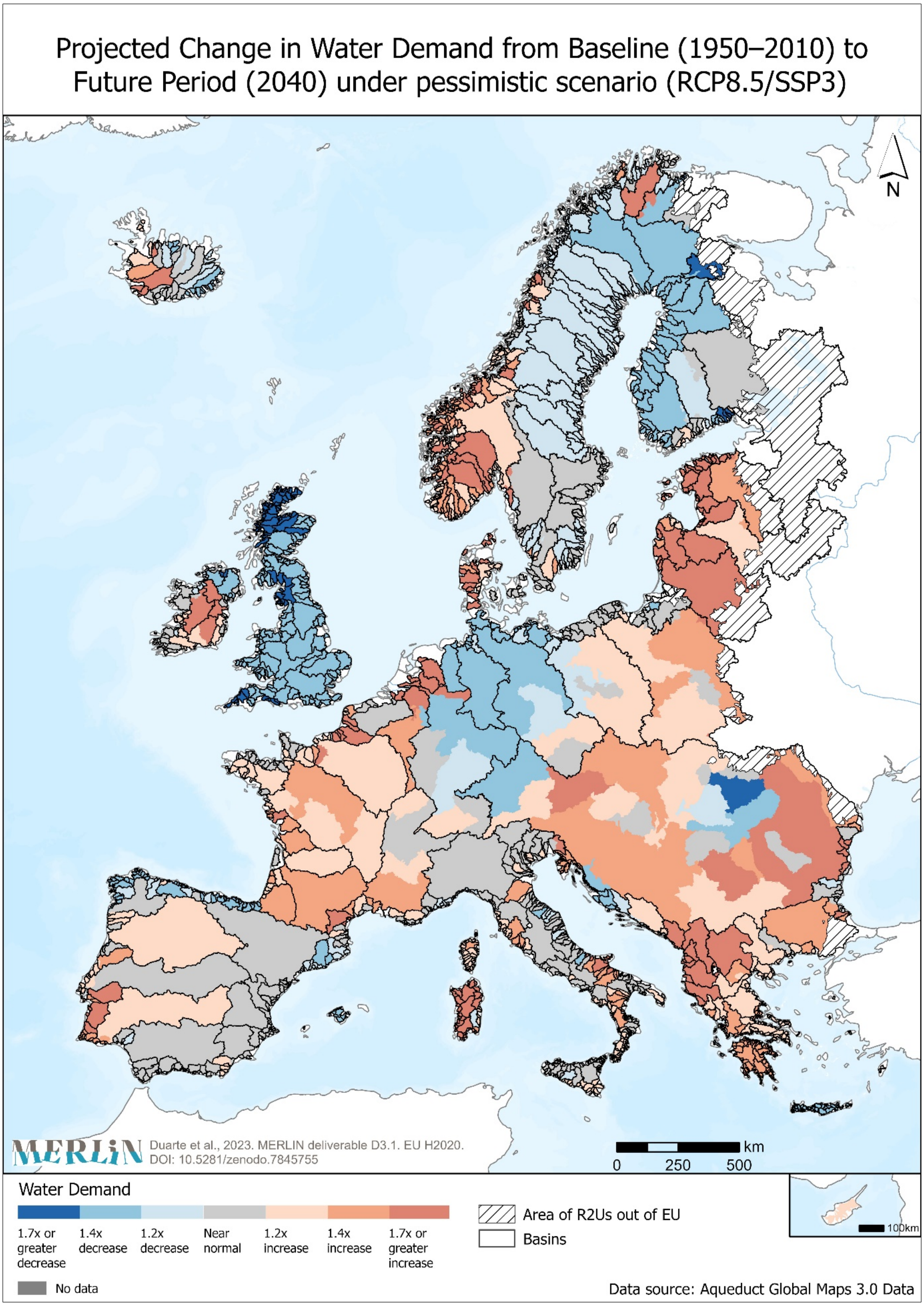

Figure 24. Map illustrating for each River Restoration Unit the projected change in Water Demand under pessimistic scenario (RCP8.5/SSP3) for the year 2040.

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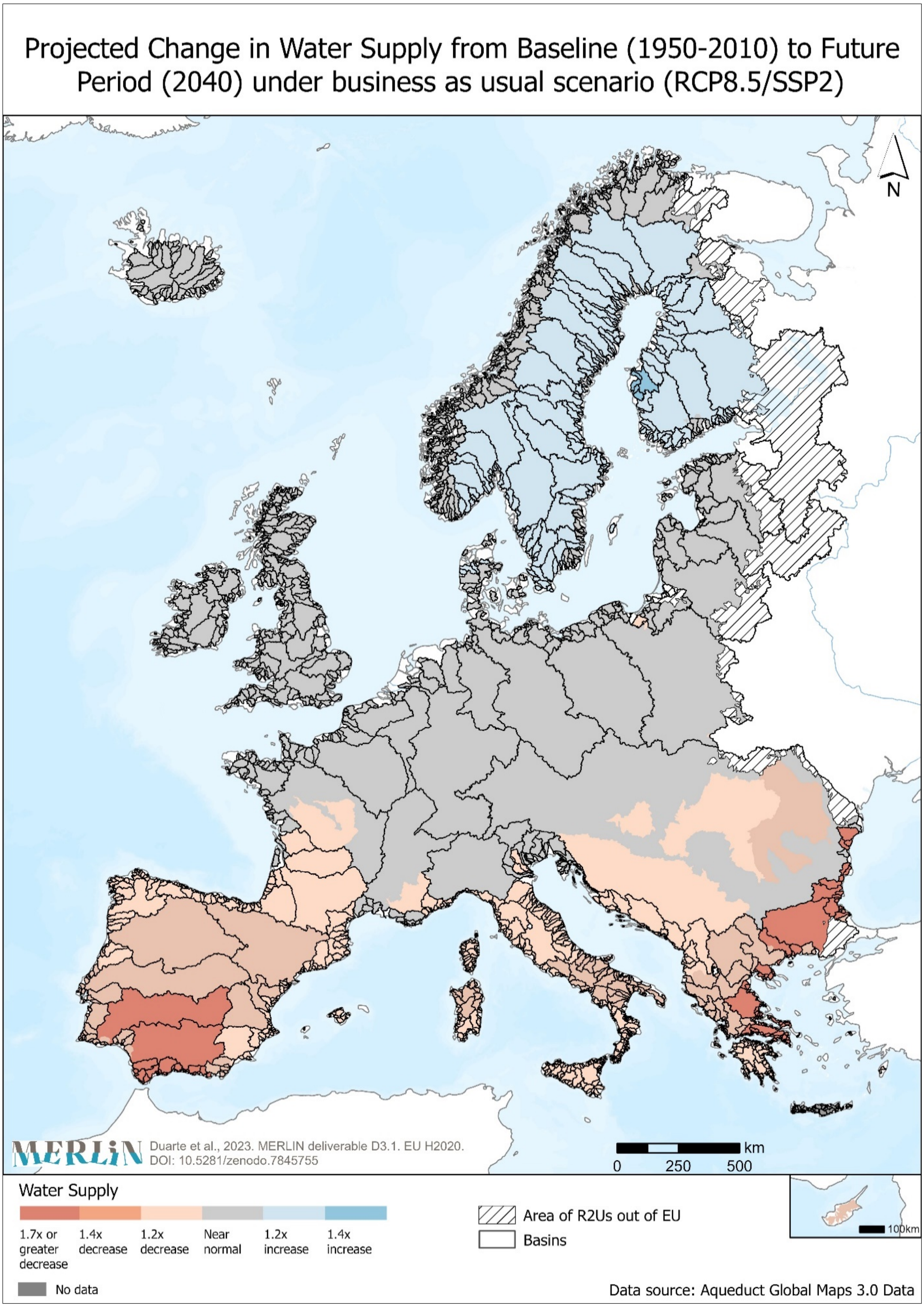


Figure 25. Map illustrating for each River Restoration Unit the projected change in Water Supply under pessimistic business-as-usual scenario (RCP8.5/SSP2) for the year 2040.

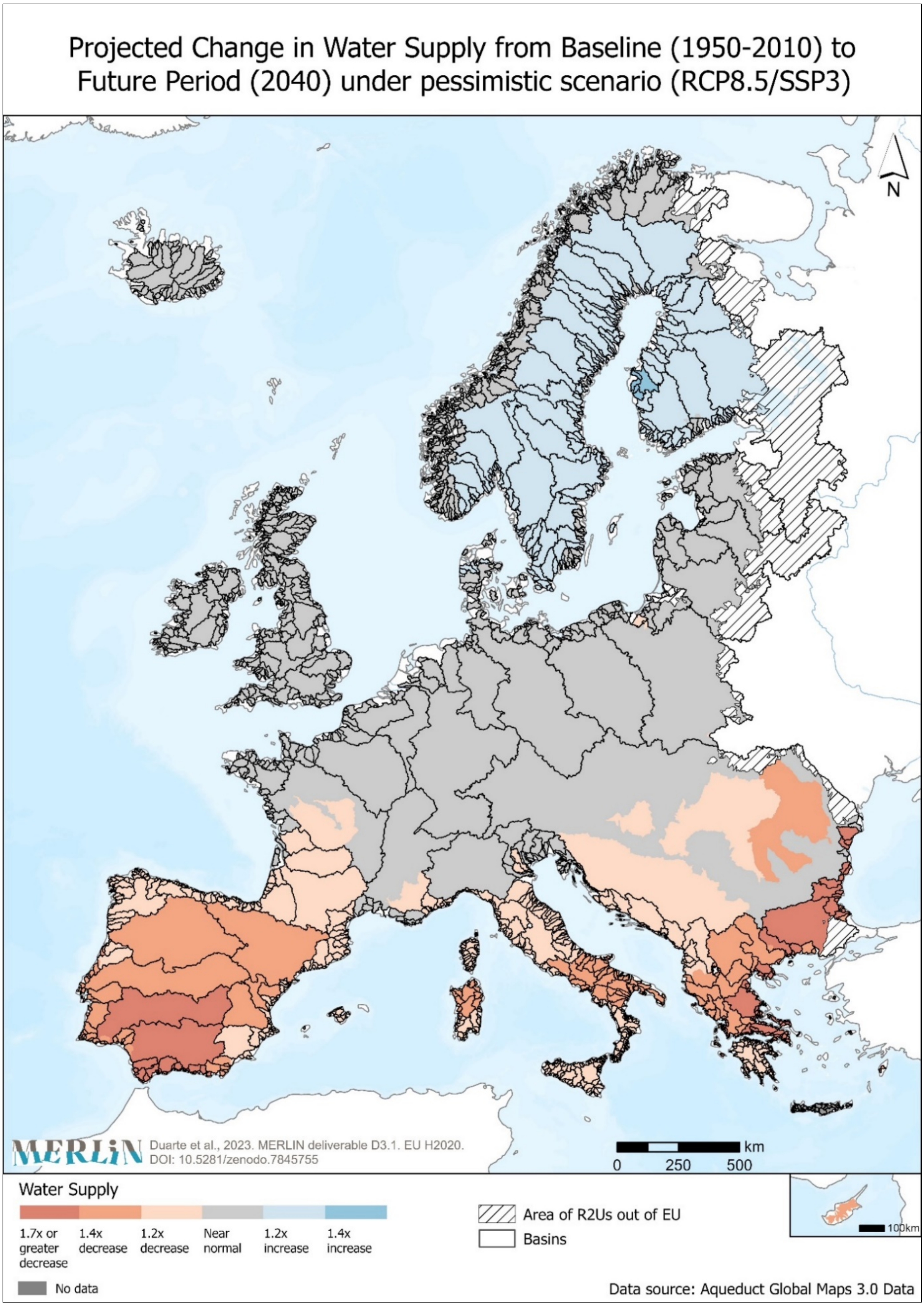


Figure 26. Map illustrating for each River Restoration Unit the projected change in Water Supply under pessimistic (RCP8.5/SSP3) for the year 2040.

Restoration Needs

Data and Methods

Restoration needs correspond to the non-abidance by one or both the Habitats and Water Framework Directives at the R2U level. To achieve this, we used the previously obtained R2Us classification concerning the "integrated composite indicator of conservation status of freshwater related protected habitats and species under Habitats Directive" (see Figure 9) and the "Composite indicator of conservation status of Water Framework Directive good ecological status prediction" (see Figure 13). The integration was accomplished through a bivariate choropleth map, which then resulted in a simplified reclassification into "Compliance" (abiding by both directives), "Partial compliance" (abiding by one directive) "Partial needs" (not abiding by one directive), "Needs" (not abiding by both directives) and "Unknown". Whenever restoration needs existed, non-abidance by at least one directive, “Partial needs” became the prevailing term used. The “Partial” terminology is derived also from having R2Us without data for one of the directives.

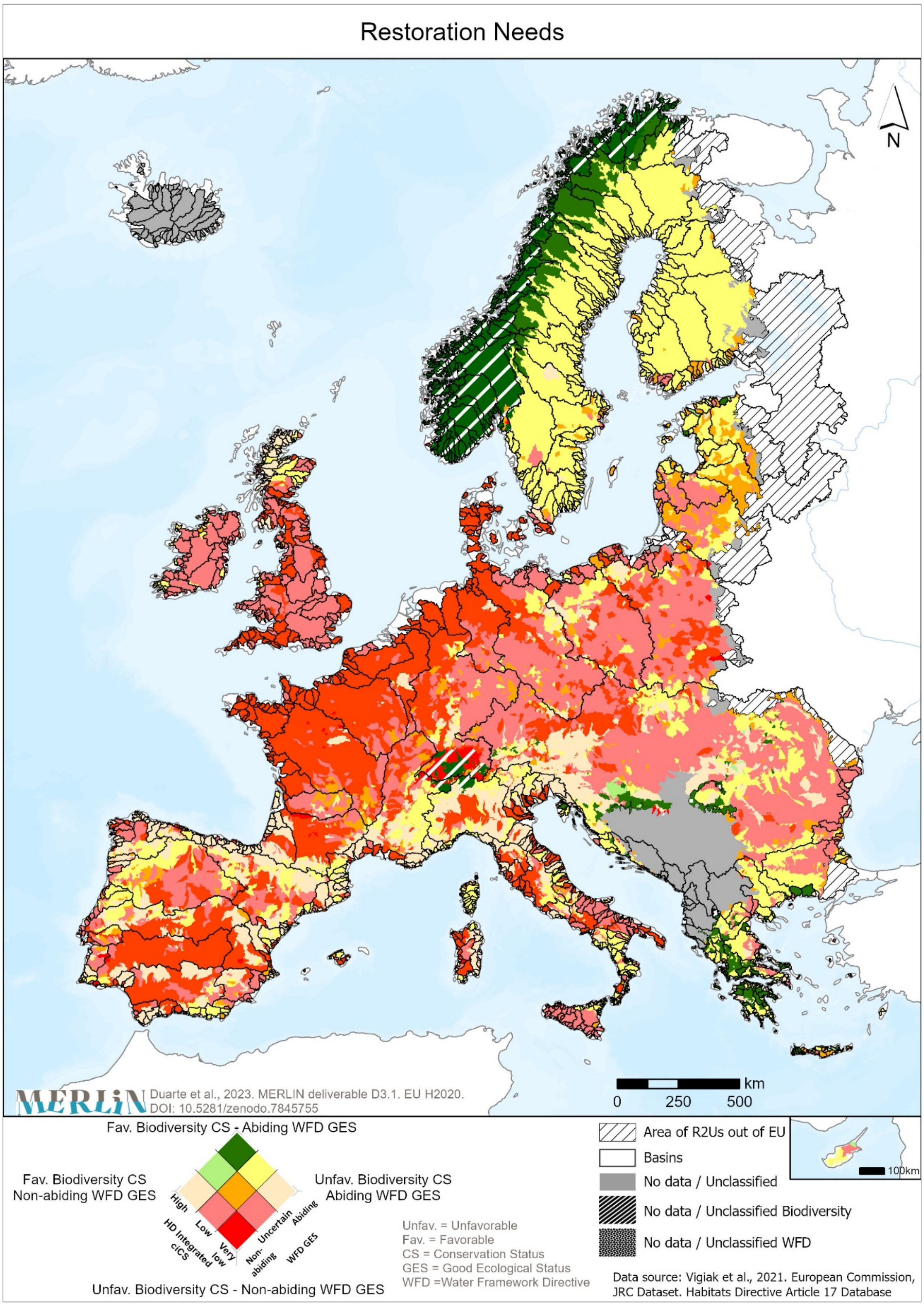


Figure 27. Map detailing for each river restoration unit the integration outcome based on the integration output of the Habitats Directive (achieved by combining the aggregated composite indicator for both the protected freshwater-related habitats and species) and the aggregated composite indicator of the Water Framework Directive Good Ecological Status using a bivariate choropleth map.

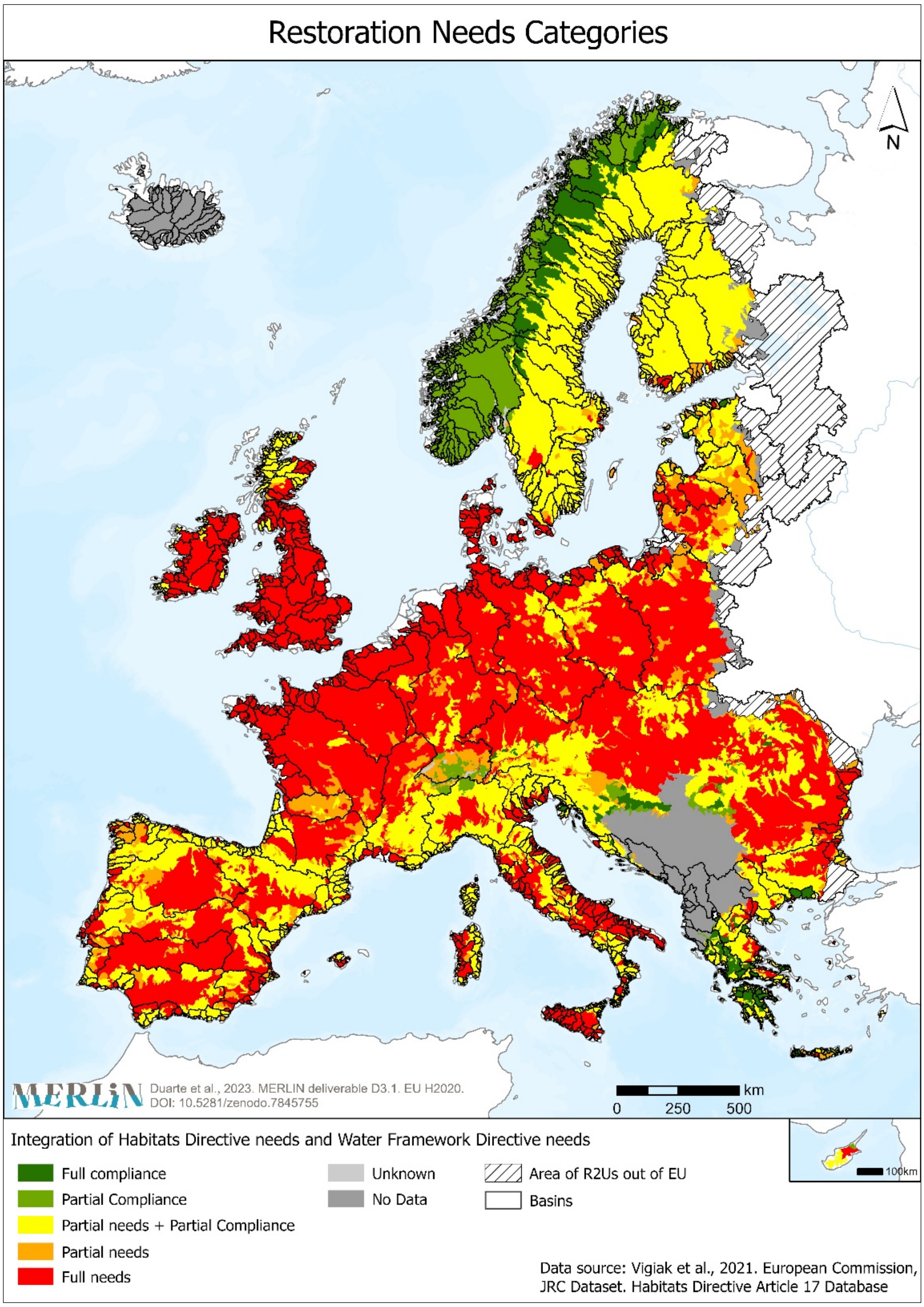


Figure 28. Map showing for each river restoration unit a simplified reclassification of the integration outcome based on the integration output of the Habitats Directive (achieved by combining the aggregated composite indicator for both the protected freshwater-related habitats and species) and the aggregated composite indicator of the Water Framework Directive Good Ecological Status. "Full Compliance" means abiding by both directives; "Partial compliance" means abiding by only one directive; "Partial Needs + Partial Compliance" means abiding by one directive and not abiding by the other, "Partial needs" means not abiding by only one directive; "Full Needs" means not abiding by both directive,) and "Unknown" refers to units with unclassified Habitats Directive status and/or uncertain status concerning the Water Framework Directive.

Part II – Mapping restoration potential

Ecosystem Services Assessment Indicator

Data and Methods

To create the Ecosystem Services Assessment Indicator, we used data from the ecosystem accounting framework of the Integrated Natural Capital Accounting (INCA) project and the European Soil Data Centre (ESDAC) and a Multi-Criteria Decision Analysis (MCDA) approach in GIS. According to the INCA approach, the ecosystem services (ES) are valued and assessed based on the:

→ **Ecosystem services demand,** defined as "*the need for specific ecosystem services by society, particular stakeholder groups or individuals*".
→ **Ecosystem services potential,** representing what ecosystems can provide, independently of whether there is an ES demand or not. It measures and maps the supply from the ecosystem side that eventually becomes actual flow/use once it interacts with the ES demand.
→ **Ecosystem services use/ actual flow** when the ES potential spatially coincides with the ES demand.
→ When there is a mismatch between ES potential and ES demand, three types of mismatch are generated based on the ES type: **the ES missed flow,** indicating the gap between what could be currently provided and what is effectively provided (the gap between the ES potential and the ES actual flow); **the ES overuse,** occurring where the use of ES exceeds its regeneration or absorption rates; and **the ES unmet demand,** taking place where there are no ecosystems to provide the ES that are needed by the ES demand.

MCDA is a process that allocates areas based on a variety of criteria that the selected areas should possess. In other words, MCDA permits the assessment of an area based on multiple objectives and criteria supporting decision-making. In this work the ecosystem services (criteria) to be used, their spatial extent, and their weights as follows:

→ The Crop Pollination Potential in floodplains area for the maximum return period (500 years). "*The assessment of pollination potential is based on an indicator of the environmental suitability to support wild insect pollinators. The environmental suitability is, then, used to delineate service-providing areas (SPA) showing a different level of pollination potential: high, medium, low, and none.*"
→ The Water Purification Demand in R2Us. The water purification demand is measured as the total nitrogen input from diffuse and point sources in the catchment in tonnes per hectare. Lower values indicate less demand for purification.
→ The Flood Control unmet demand in floodplains for the maximum return period (500 years). "*The unmet demand quantifies the part of the demand (economic assets) that is not protected by ecosystems in the whole upstream basin.*" "*If an extreme rain episode occurred, areas of unmet demand would be more likely to flood.*" Values are in hectares. Lower values indicate smaller areas prone to floods.
→ The Soil Retention unmet demand in floodplains for the maximum return period (500 years). "*Where the soil erosion rate exceeds the soil formation rate, the protective role of vegetation is not enough, leading to the degradation of the ecosystem condition. In this case, the net soil losses represent the ES unmet demand for soil retention. This is calculated as the difference between the soil erosion and soil formation rates.*" Values are in tonnes per hectare. Lower values indicate less net soil losses.
→ The Soil Organic Carbon (SOC) saturation capacity (ESDAC) in floodplains for the maximum return period (500 years) has been used as a proxy for Carbon Sequestration. The SOC is "*expressed as the ratio between the actual and the potential SOC stock. Values close to 0 indicate a great potential of soil to store more carbon.*"
→ The Nature-based recreation is a "*cultural ecosystem service defined as the biophysical characteristics or qualities of ecosystems that are viewed, observed, experienced or enjoyed in a passive, or active, way by people*". Data used expresses the amount of population per hectare that lives beyond 4 km from recreational areas.

The next step was the transformation of the derived raster layers related to the above-selected ES into a 0 to 1 scale using raster calculator and fuzzy membership based on linear transformation. Raster values were inverted when necessary to maintain an equal negative signal in all criteria. R2Us where only one service was present were excluded from the analysis and identified as no data. Synthesizing the Ecosystem Services Assessment Indicator, we sum all ES using cell statistics, ignoring the No Data cells in the calculation, and divide by the number of ES present using the raster calculator. The average values of each ES have been assigned to each R2Us using zonal statistics and data management tools, except for Crop pollination where the majority values were used. Similarly, average values of the Ecosystem Services Assessment Indicator were given to R2Us, with higher values indicating areas with a higher mismatch or higher demand.

Integration of restoration needs and ES assessment

When considering the possibility of implementing restoration activities, the areas with high ES assessment values are potentially those where ES co-benefits will be more relevant. Thus, mapping the ES assessment values with the restoration needs enables locating the areas where restoration activities are necessary while also showing those where potential ES co-benefits may be higher.

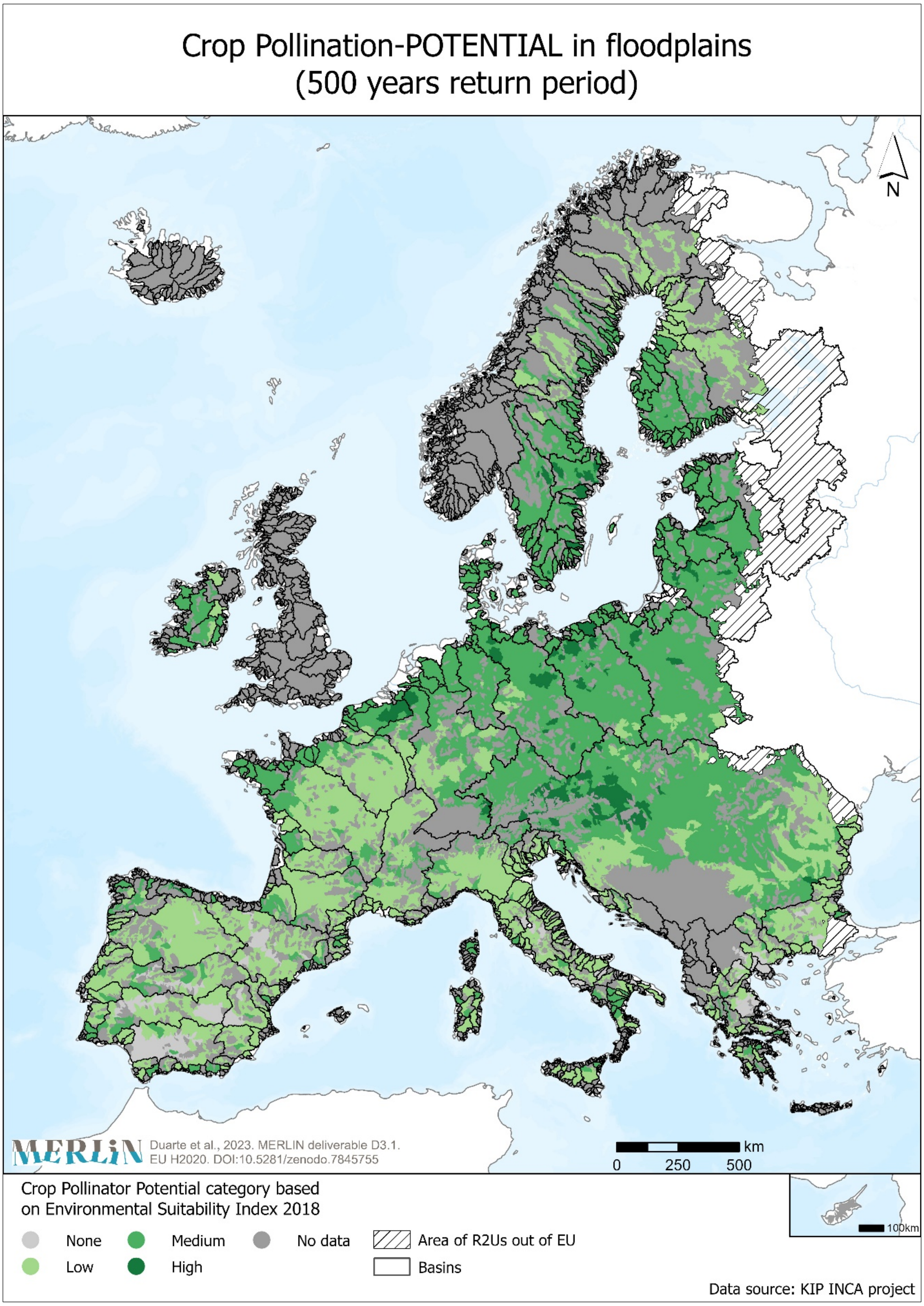


Figure 29. Crop Pollination Ecosystem Service Potential for each River Restoration Unit (R2U). Majority values were taken considering only the floodplain areas of R2Us, established based on the 500-year flood return period.

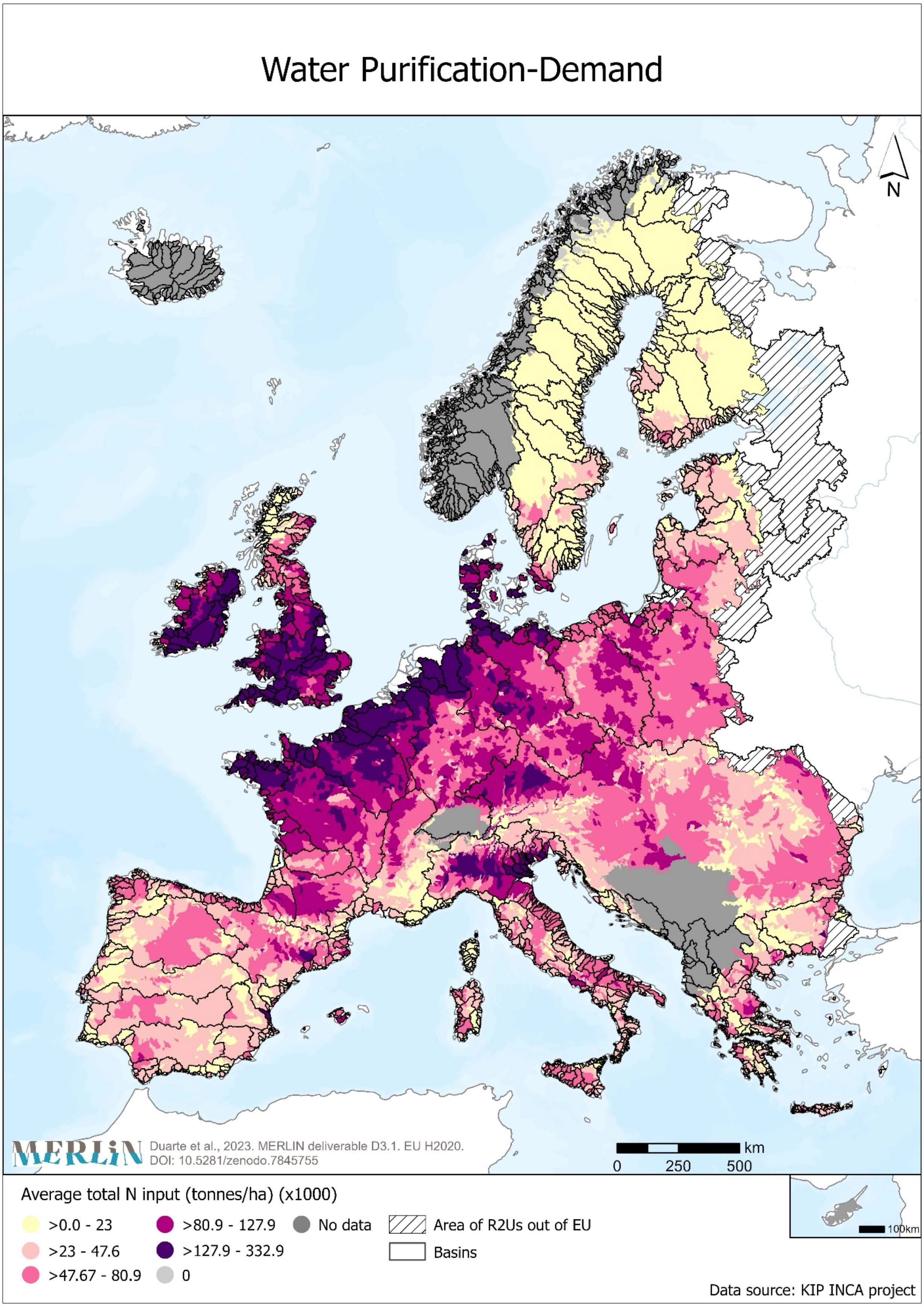


Figure 30. Water Purification Ecosystem Service Demand for each River Restoration Unit (R2U). Average values were calculated for the entire R2U area.

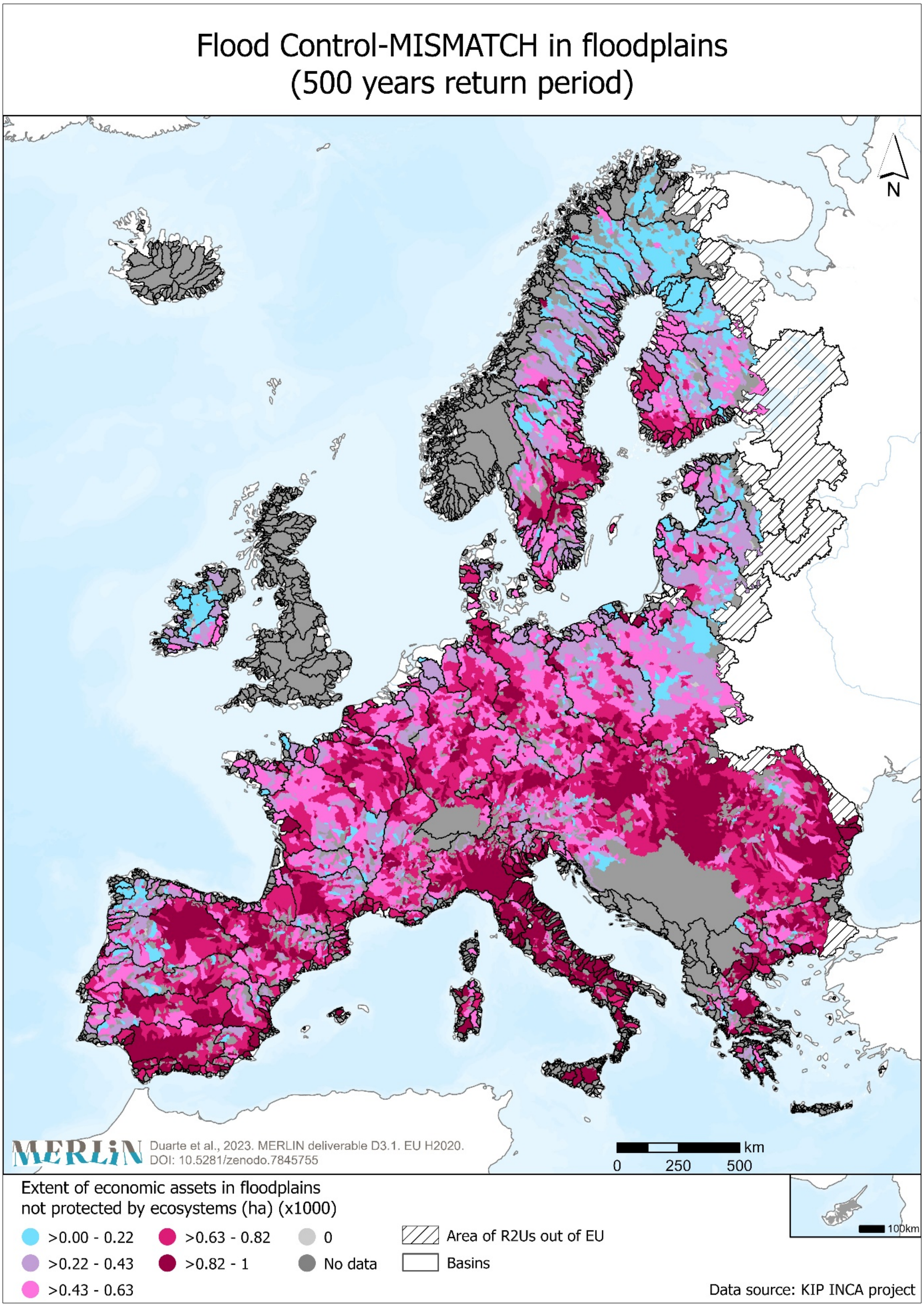


Figure 31. Flood Control Ecosystem Service Unmet Demand for each River Restoration Unit (R2U). Average values were calculated considering only the floodplain areas of R2Us, established based on the 500-year flood return period.

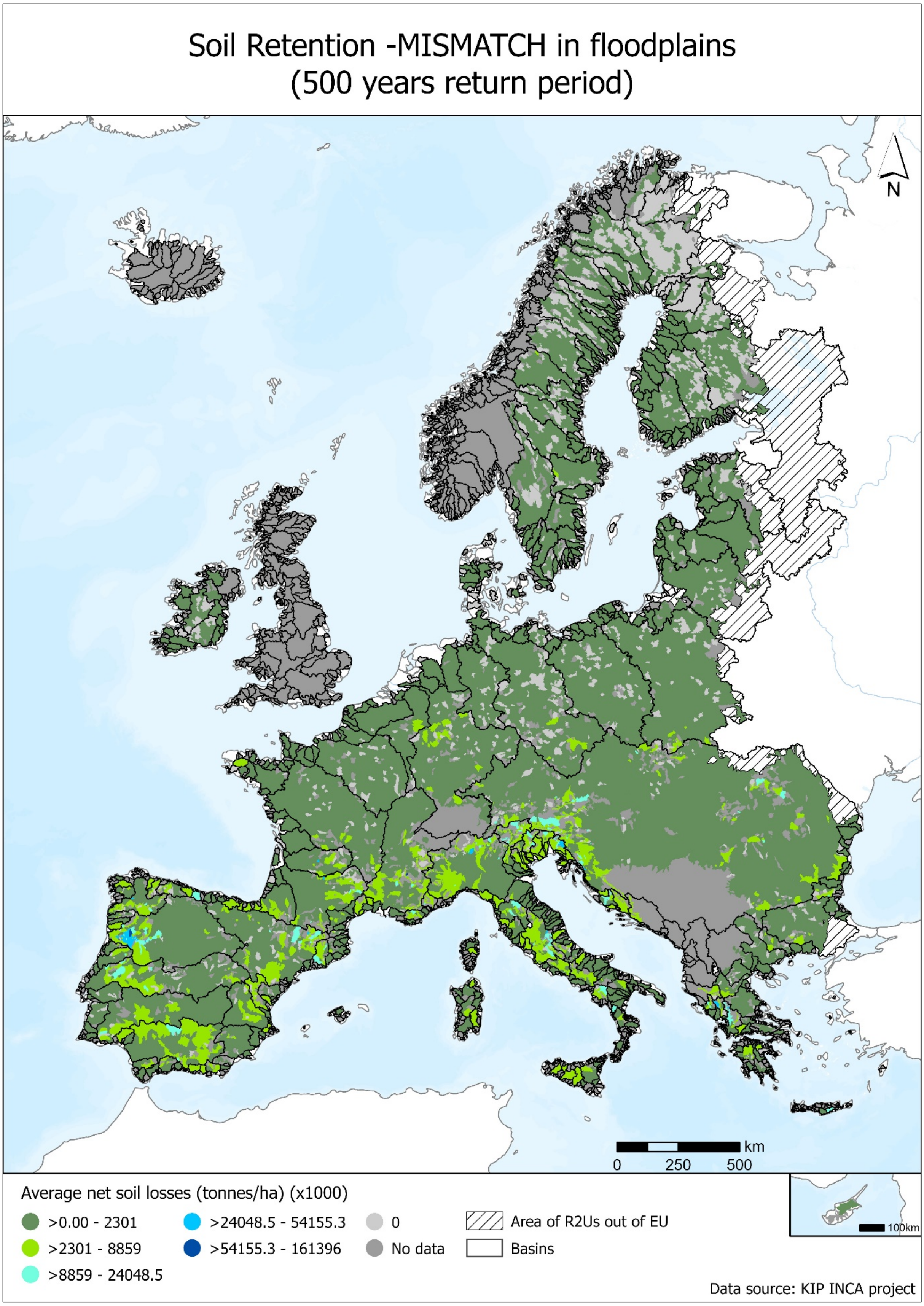


Figure 32. Soil Retention Ecosystem Service Unmet Demand for each River Restoration Unit (R2U). Average values were calculated using only the floodplain areas of R2Us, established based on the 500-year flood return period.

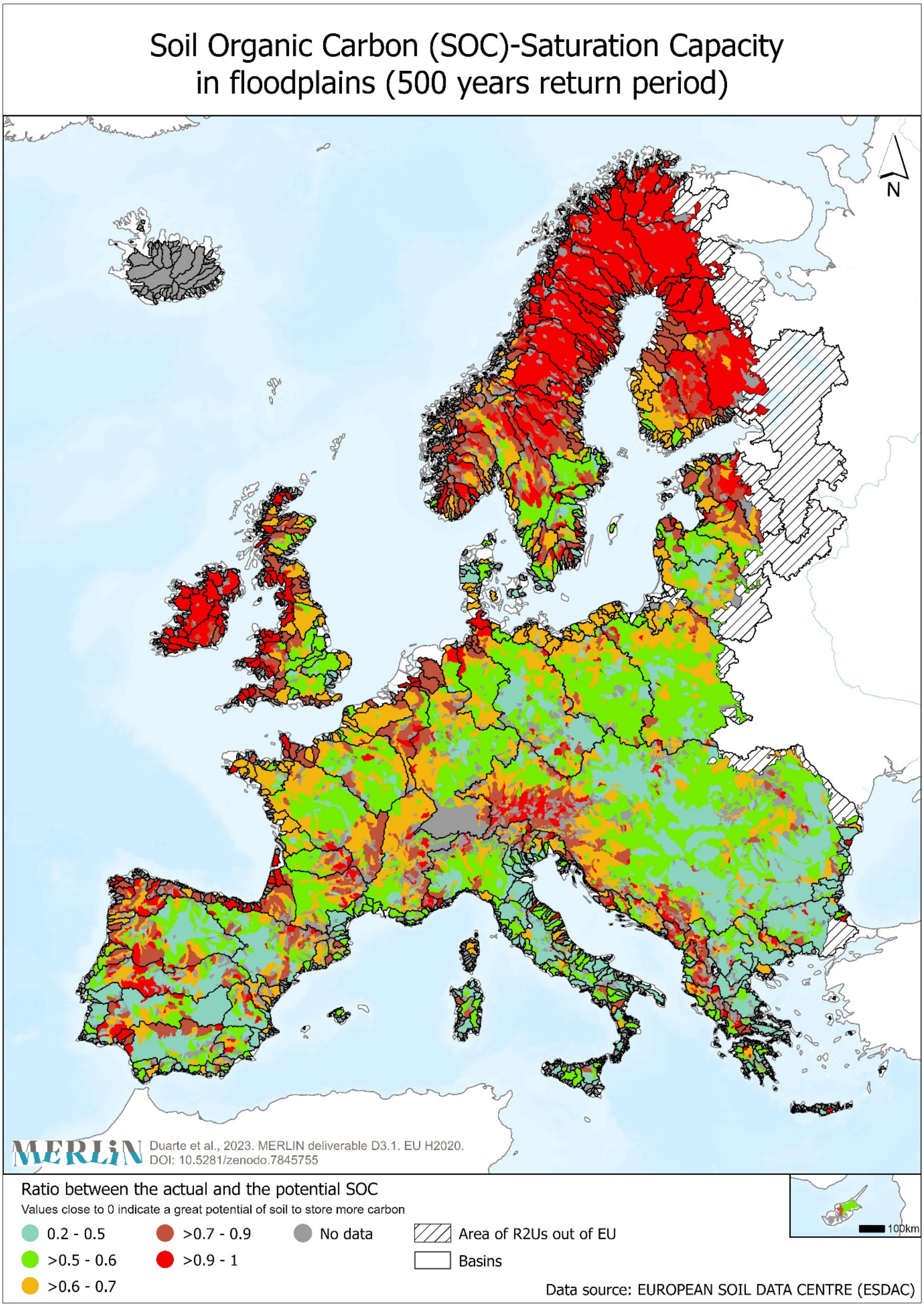


Figure 33. Soil Organic Carbon- Saturation Capacity, reflecting the potential carbon retention Ecosystem Service for each River Restoration Unit (R2U). Average values were calculated for the entire R2U area.

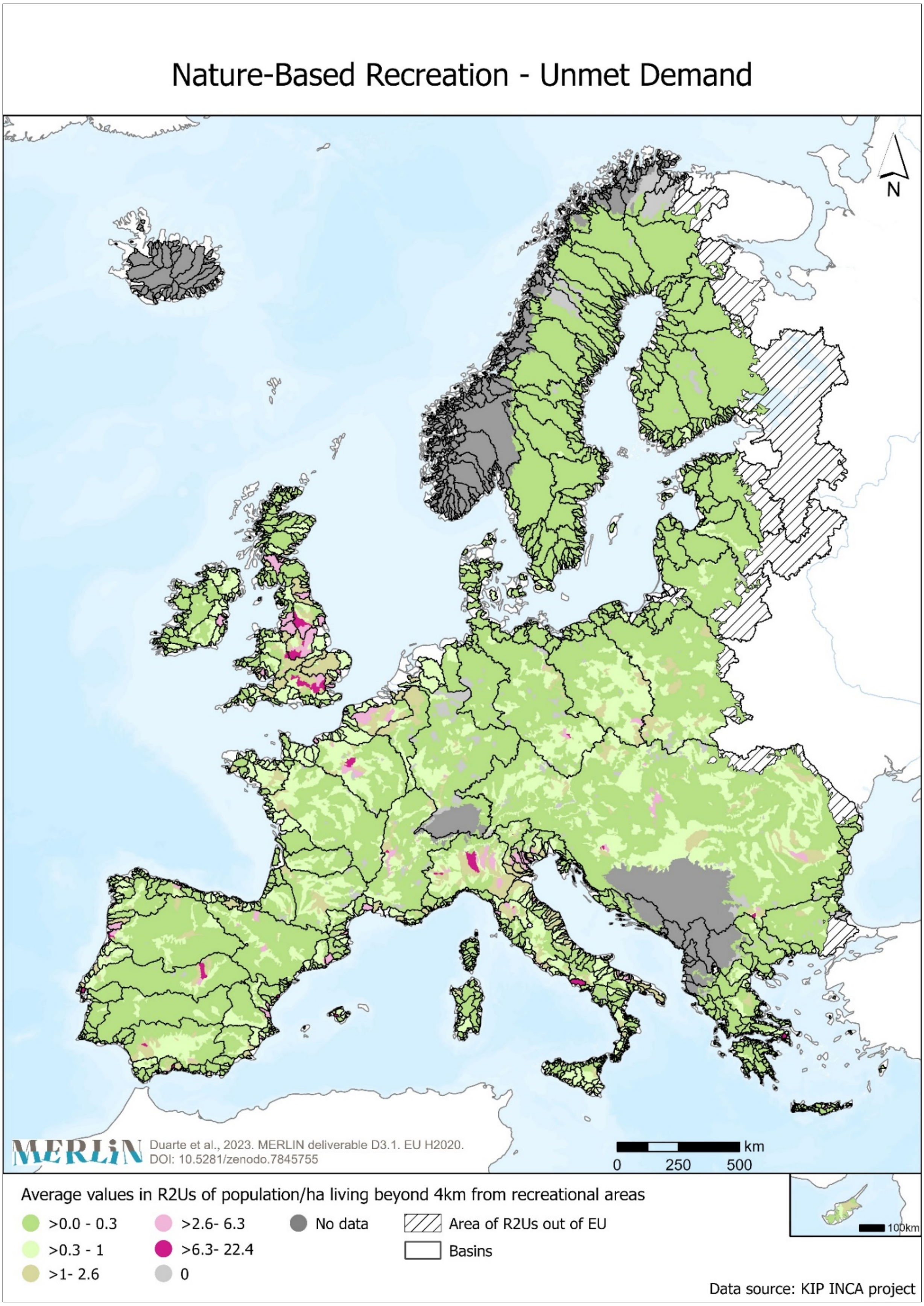


Figure 34. Nature-based recreation, reflecting the average amount of population per hectare living beyond 4 km from recreational areas for each River Restoration Unit (R2U).

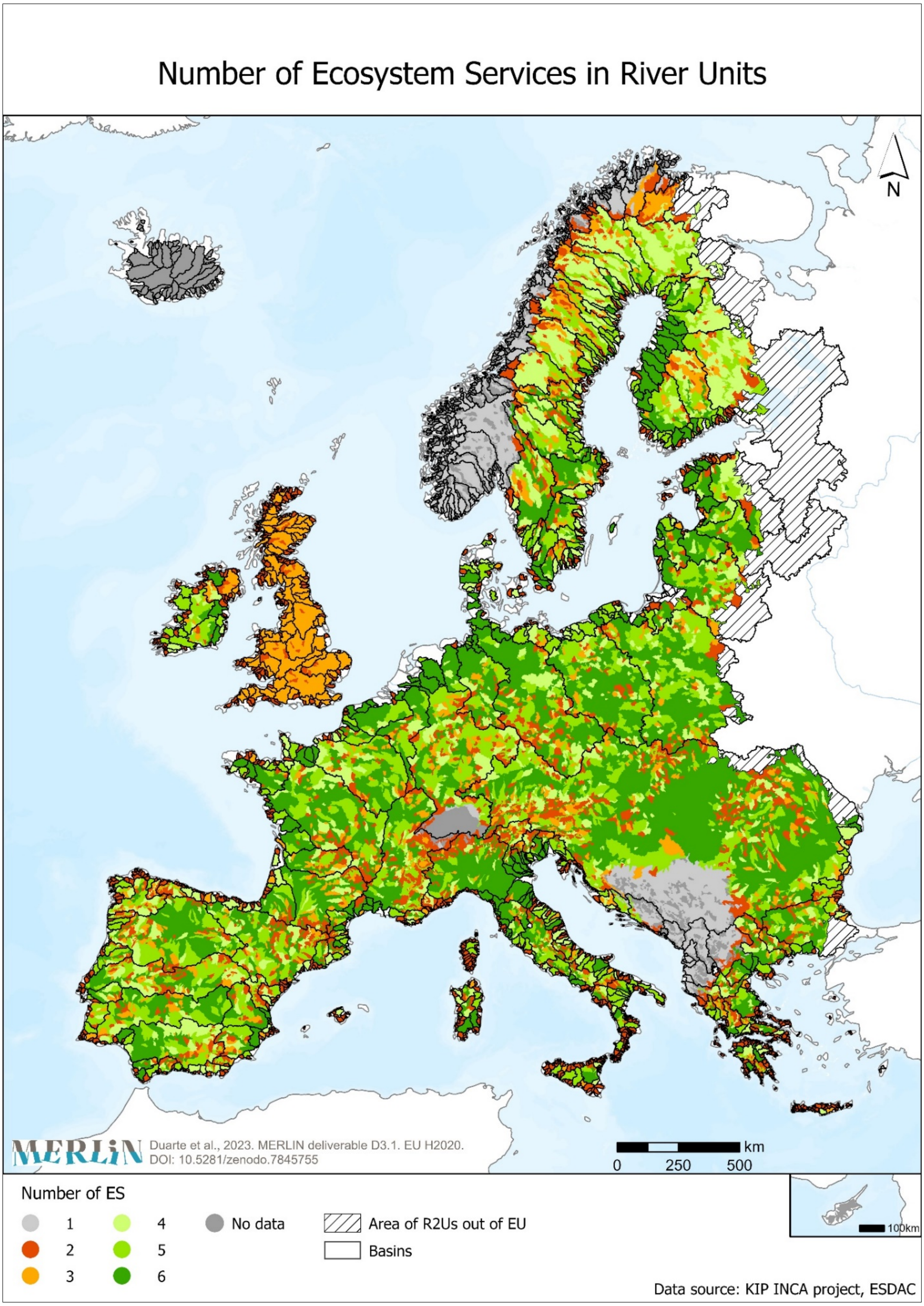


Figure 35. Number of Ecosystem Services under analysis for each River Restoration Unit.

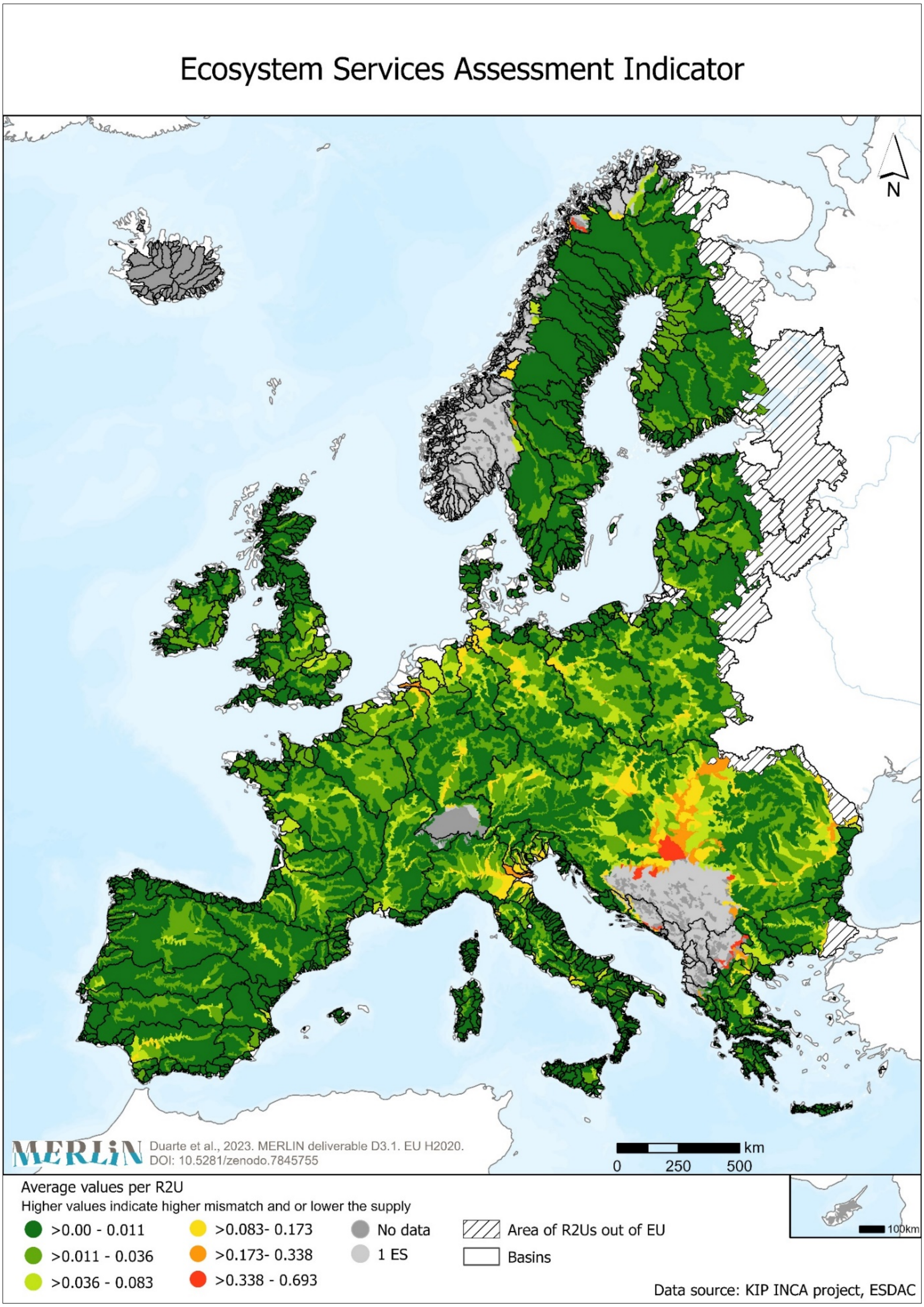


Figure 36. Ecosystem Services (ES) Assessment Indicator for each river Restoration Unit. Values were obtained by summing the values

established in each R2U for all ES and dividing by the number of ES present.

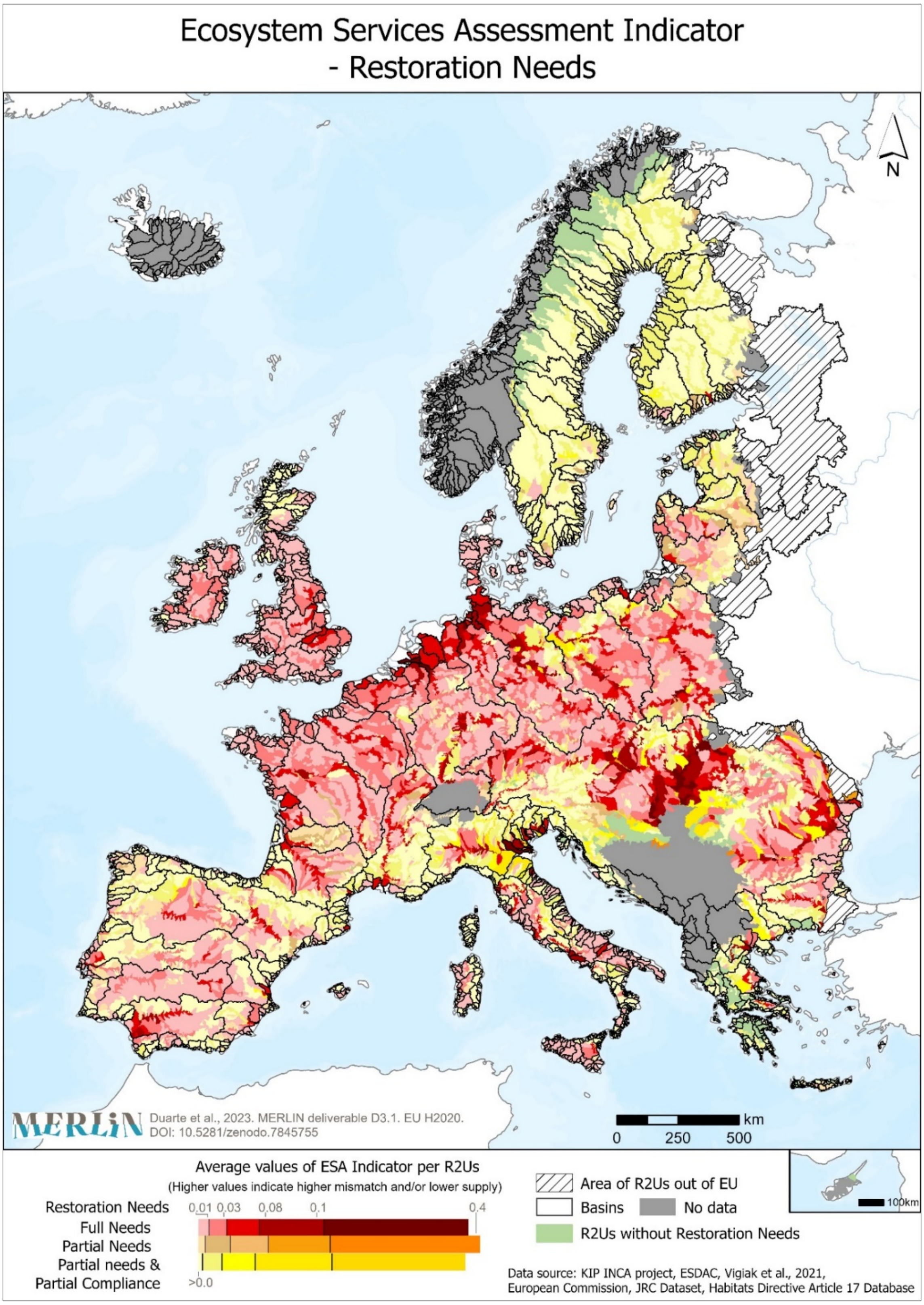


Figure 37. Integration of restoration needs and Ecosystem Service (ES) Assessment indicator for each River Restoration Unit. Restoration Needs classes: "Partial Needs + Partial Compliance" –a mixed situation of abiding by one directive and not abiding by the

other; "Partial needs" – not abiding just by one directive; "Needs" – not abiding by both directives. Higher ES assessment values indicate higher potential co-benefits of Ecosystem Services when implementing restoration actions.

Constraints to restoration

Data and Methods

The 2018 Human Footprint data of the Last of the Wild, v3 (Venter et al., 2018) has been used as a proxy for all constraints to restoration as it is an accepted worldwide index that represents the degree of Human affection to the system by the integration of eight variables of human pressure. "*This dataset provides a global map of the cumulative human pressure on the environment, at a spatial resolution of ~1 km. The human pressure is measured using eight variables including built-up environments, population density,* electric *power infrastructure, crop lands, pasture lands, roads, railways, and navigable waterways*". Values of the Human Footprint have been given to R2Us using the geoprocessing tool zonal statistics and data management tools to obtain all statistic types. The mean values per R2U were chosen for the mapping. No areas were excluded based on the "Human Footprint".

Integration of restoration needs and restoration constraints

When considering the possibility of implementing restoration activities, the areas with high human influence will translate to a high degree of implementation difficulty. For instance, in urban environments, matching human activities, social acceptance, economic willingness and ecological effectivity of restoration measures towards the goal of improving ecosystem functioning tends to be more complicated than in areas where human presence is less dominant. Thus, mapping the restoration constraints with the restoration needs enables locating the areas in need of restoration where a higher easiness of implementation will tend to occur.

References

Venter, O., E. W. Sanderson, A. Magrach, J. R. Allan, J. Beher, K. R. Jones, H. P. Possingham, W. F. Laurance, P. Wood, B. M. Fekete, M. A. Levy, and J. E. Watson. 2018. Last of the Wild Project, Version 3 (LWP-3): 1993 Human Footprint, 2018 Release. Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4H9938Z. Accessed March 2023.

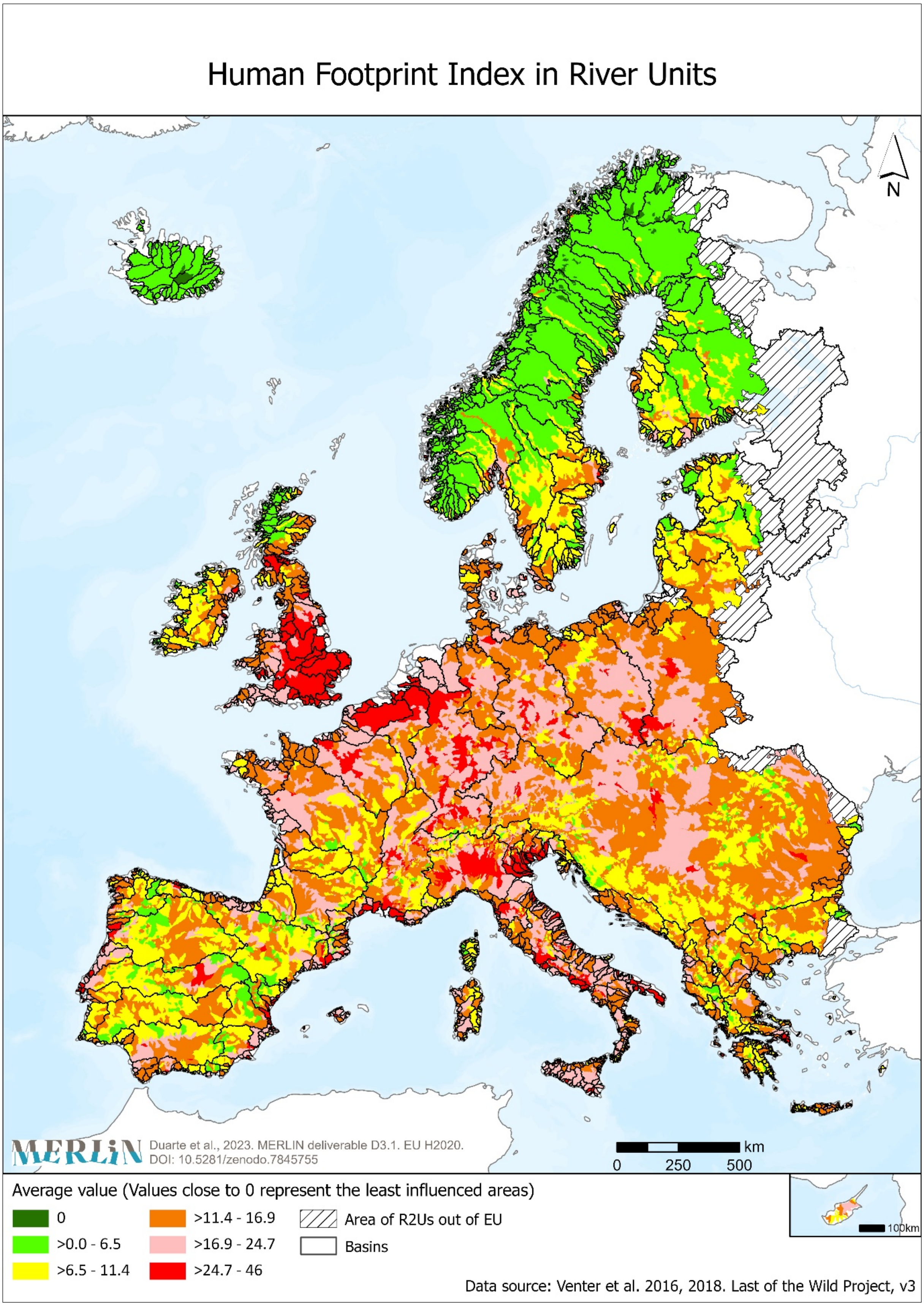


Figure 38. Average Human Footprint Index values for each River Restoration Unit.

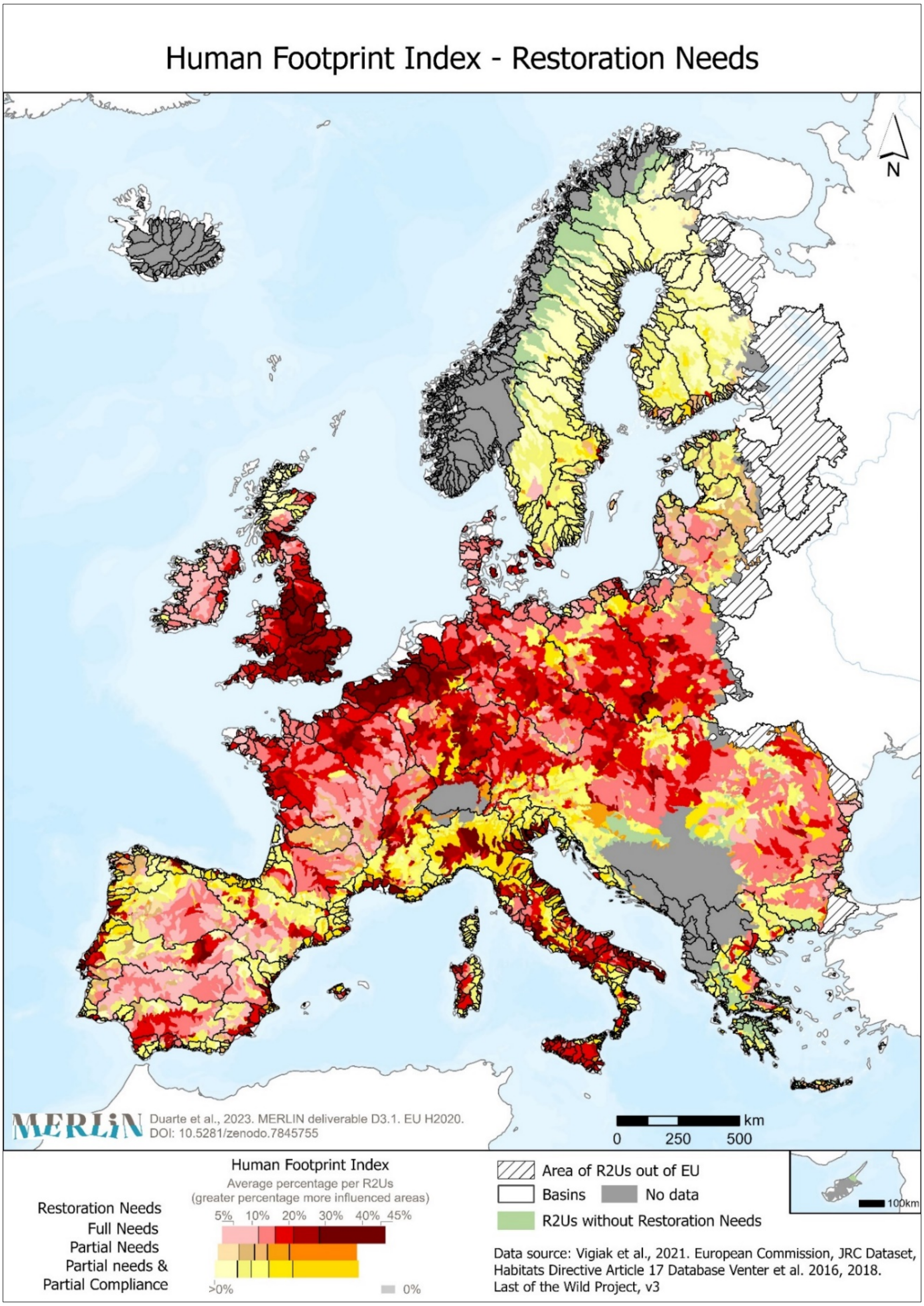


Figure 39. Integration of restoration needs and Restoration Constraints (based on the Human Footprint Index – HFI) for each River Restoration Unit. Restoration Needs classes: "Partial Needs + Partial Compliance" –a mixed situation of abiding by one directive and not abiding by the other; "Partial needs" – not abiding just by one directive; "Needs" – not abiding by both directives. Lower values of restoration constraints indicate higher easiness of implementation of restoration actions.

Enablers to restoration

Data and Methods

Restoration actions towards improving freshwater ecosystems must occur in areas where these ecosystems are present. Moreover, in those areas where freshwater ecosystems are included in the N2K areas, implementing restoration actions is facilitated not only by legal protections. Also, given the nature of the European Directives, these areas represent a higher legal commitment towards nature conservation by Member States and thus areas where implementing ecological restoration activities is required to fulfil legal requirements. Considering this, areas where N2K sites intersect floodplains, or where it intersects wetlands outside floodplains were considered passive enablers of restoration actions. To locate these areas we used the dataset of the N2K protected sites (https://www.eea.europa.eu/data-and-maps/data/natura-14), complemented by the UK Protected Area Datasets (https://jncc.gov.uk/our-work/uk-protected-area-datasets-for-download/), the datasets of Dotorri et al. (2021) on the flooded areas with a return period of 500 years (https://data.jrc.ec.europa.eu/dataset/1d128b6c-a4ee-4858-9e34-6210707f3c81) and the Extended wetland ecosystem layer 2018 (https://sdi.eea.europa.eu/catalogue/idp/api/records/de2d0d77-a389-49d0-84d7-73a29046823f). Using a series of spatial operations we determined the area within the floodplain protected by Nature 2000 sites plus the areas outside of floodplains that coincides with wetlands that are protected by N2K sites and represented this as a percentage of the R2U.

Integration of restoration needs and restoration enablers

The areas covered by N2K protection status translate to a higher responsibility of Member States along with the higher legal status of conservation objectives and actions when compared to areas outside the N2K. Thus, when considering the possibility of implementing restoration activities, these areas should be targeted first when not abiding by the legal commitments, i.e., the Habitats Directive. As such, mapping the restoration enablers with the restoration needs provides the location of the areas in need of restoration where N2K coverage is higher. These are the areas were there are more legal restoration enabling mechanisms.

Reference

Dottori, Francesco; Alfieri, Lorenzo; Bianchi, Alessandra; Skoien, Jon; Salamon, Peter (2021): River flood hazard maps for Europe and the Mediterranean Basin region. European Commission, Joint Research Centre (JRC) [Dataset] doi: 10.2905/1D128B6C-A4EE-4858-9E34-6210707F3C81 PID: http://data.europa.eu/89h/1d128b6c-a4ee-4858-9e34-6210707f3c81

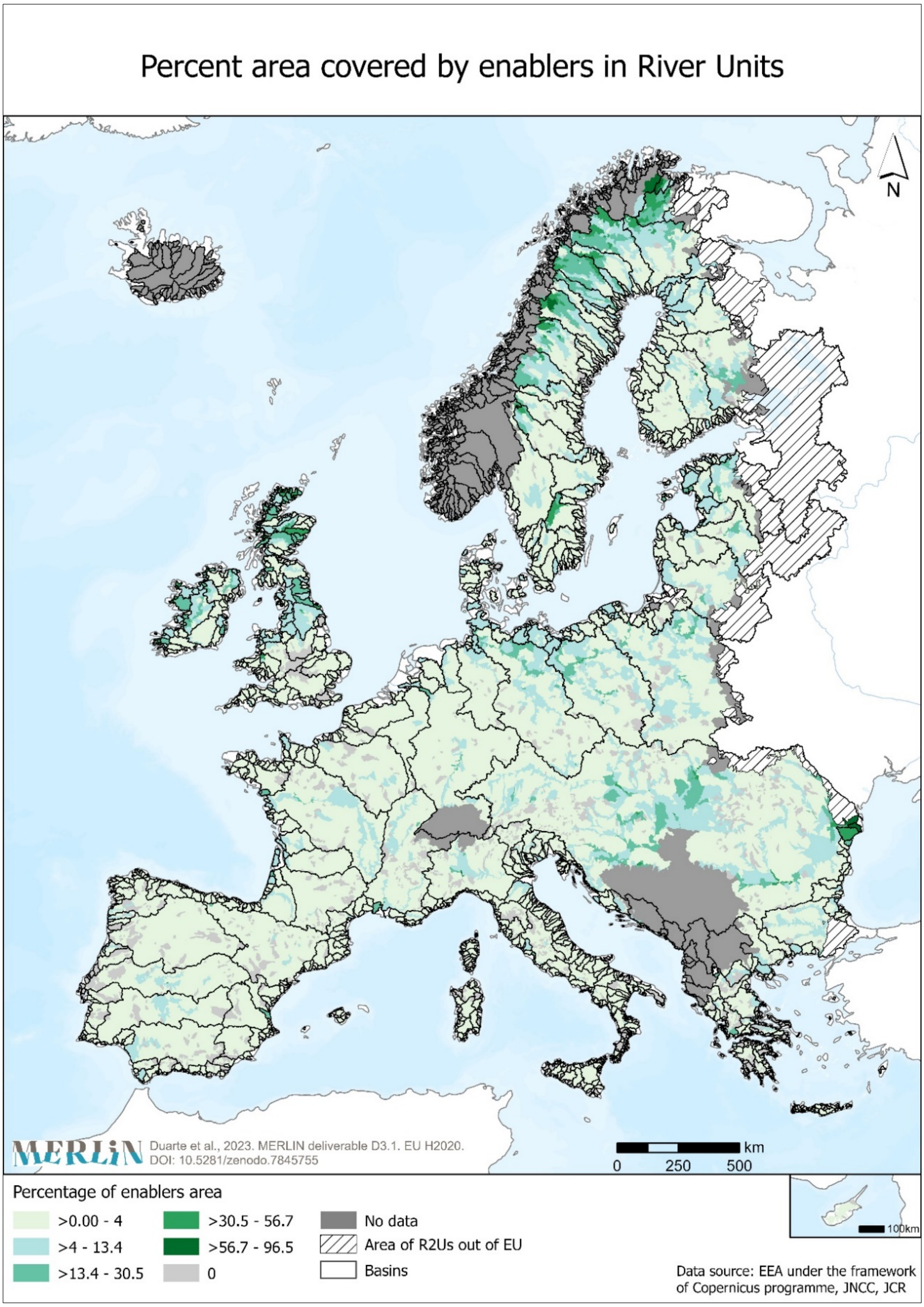


Figure 40. Percentage of the area covered by Restoration Enablers in River Restoration Units. Restoration enablers' areas are composed of floodplain areas included in the Natura 2000 network of protected sites (N2000) and of wetland areas outside floodplains also included in the N2000. The floodplain areas of R2Us were established based on the 500-year flood return period.

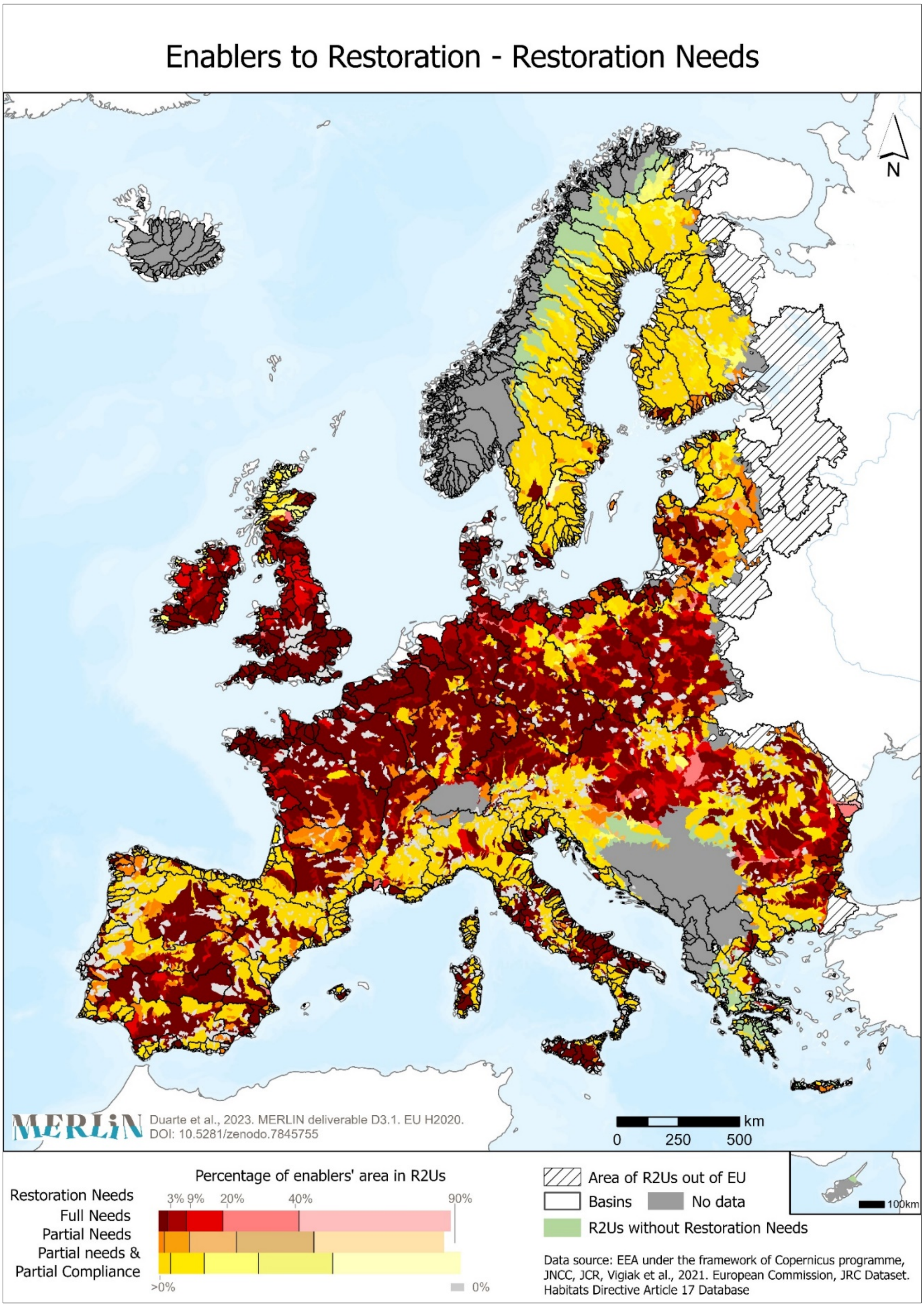


Figure 41. Integration of restoration needs and restoration enablers for each River Restoration Unit. Restoration Needs classes: “Partial Needs + Partial Compliance” – a mixed situation of abiding by one directive and not abiding by the other; "Partial needs" – not abiding just by one directive; "Needs" – not abiding by both directives. Higher values of restoration enablers translates to having a higher degree of legal commitment towards freshwater conservation.

Restoration Potential Indicator

Data

By integrating the indicators of ES co-benefits, restoration constraints and restoration enablers we were able to create an index, the Restoration Potential Index (RPI), reflecting the potential to obtain ES co-benefits from these actions, the easiness of implementing restoration actions and the areas of higher legal responsibility to restore.

Methods

The potential to obtain higher ES co-benefits is associated with higher ES assessment values where higher demand and mismatch occur. Higher human presence and influence will translate to higher difficulty in implementing restoration actions towards good ecosystem functioning, i.e., lower restoration constraint values translate to the easiness of restoration implementation. Finally, having a higher percentage of floodplains and wetlands under the N2K protection areas indicates higher legal commitments in those areas along with higher priority for conservation and ecosystem functioning. As such, the restoration constraint values were inverted before the overall integration into one single index value.

Both the ES assessment indicator values and the restoration constraint values present a negative relation with restoration needs, meaning higher values represent fewer potential co-benefits and higher restraints, respectively. Conversely, the restoration enablers present a positive relation, with higher values indicating a higher easiness of action. As, such, the later parameter was inverted before the overall integration into a single index value. To establish the RPI, and since all components originally ranged between 0 and 1 (or 0 to 100%), values were obtained by calculating the area created when representing the three components in a radar graph. This creates an indicator value for which higher values translate to higher potential ES co-benefits upside, easiness of action towards restoration and higher legal commitments present, while lower values indicate the opposite. Noteworthy, as mentioned above, the absolute values of RPI express the combination of three components, they should only be used to rank the R2U areas.

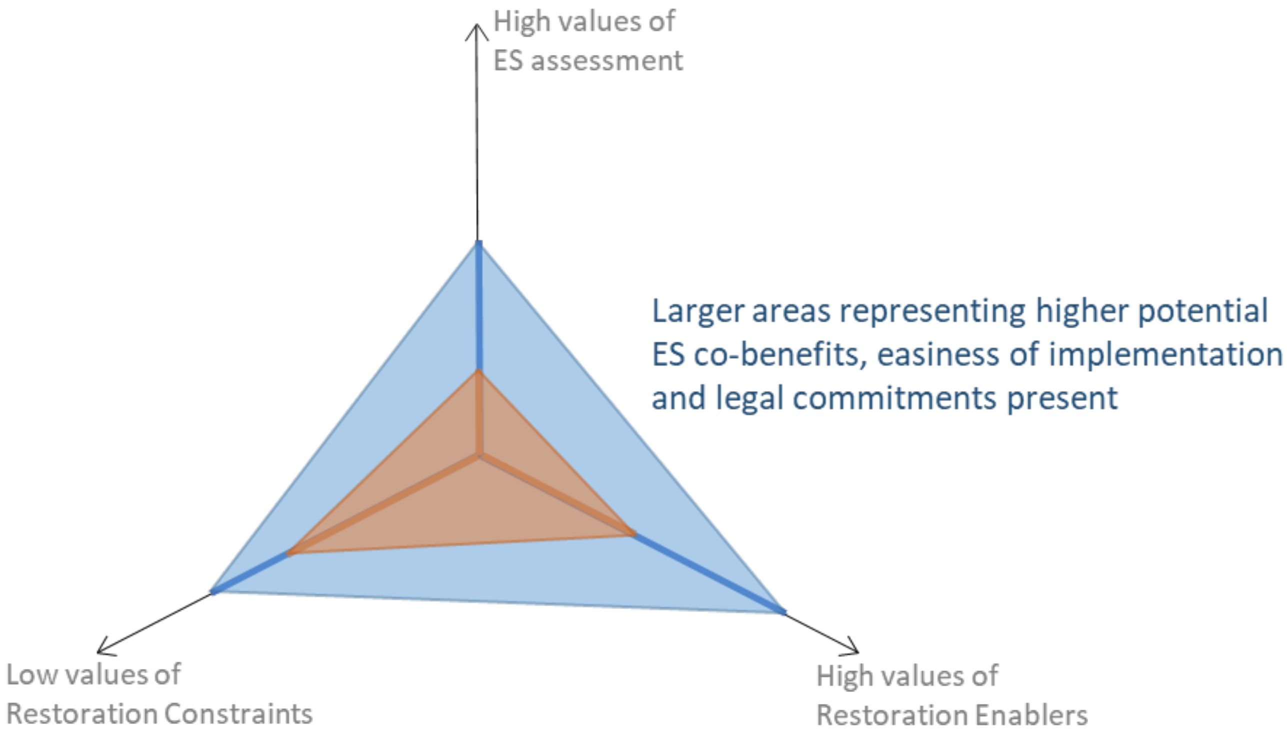


Figure 42. Diagram detailing the scheme of radar graph representation using the three components of the Restoration Potential Index.

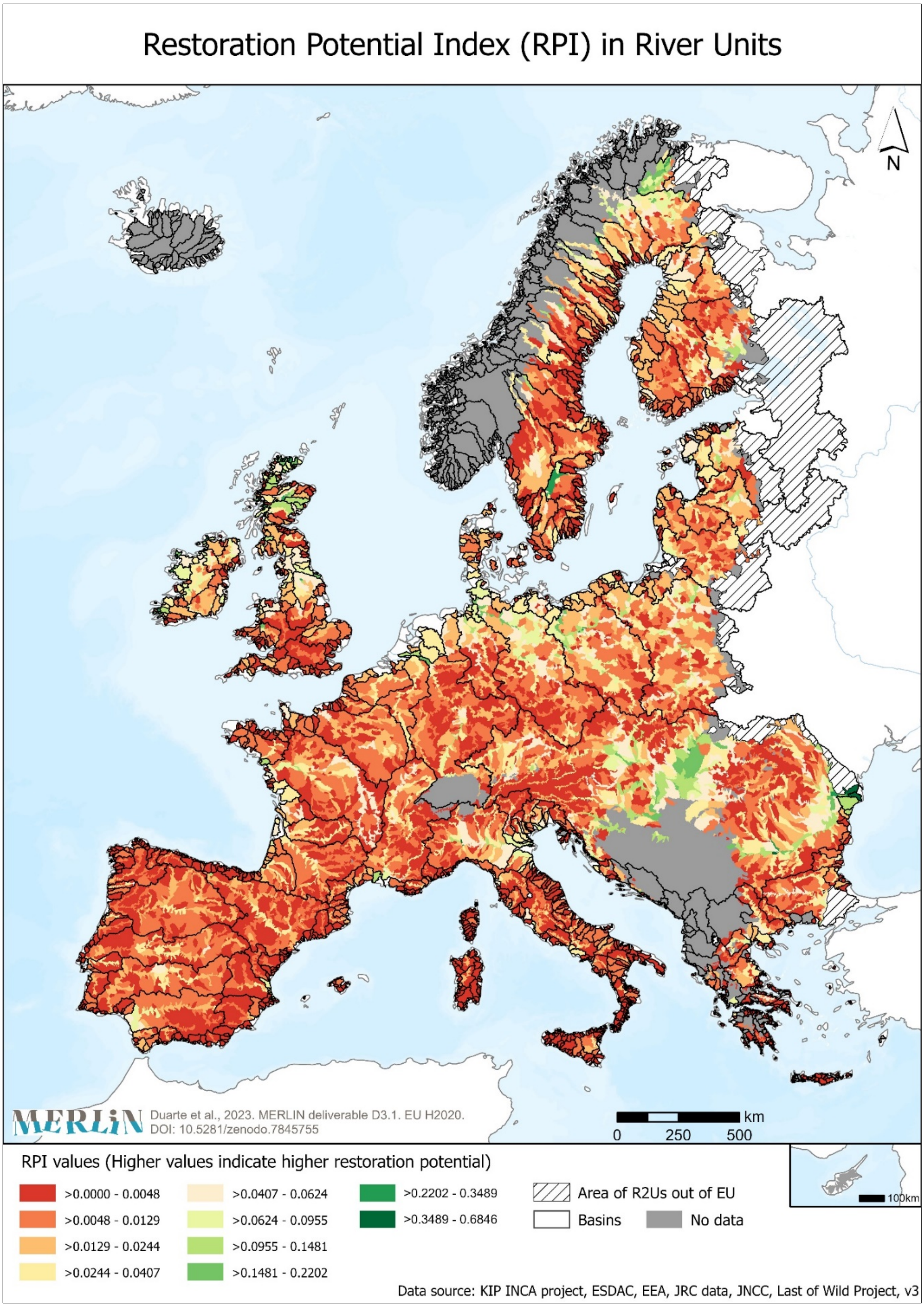


Figure 43. Restoration Potential Indicator for each River Restoration Unit. Values reflect the integration of the Ecosystem Services Assessment Indicator, the indicator of Restoration Constraints and the indicqator of Restoration Enablers.

Part III – Integration of restoration needs and restoration potential

Data and Methods

The restoration needs were determined by crossing the integrated composite indicator of conservation status (ciCS) of freshwater-related protected habitats and species under the Habitats Directive output with the output of the ciCS for Water Framework Directive good ecological status predictions. This was accomplished through a bivariate choropleth map, which resulted in a simplified reclassification into "Full Compliance" (abiding by both directives), "Partial compliance" (abiding just by one directive), "Partial Needs + Partial Compliance" (when having a mixed situation of abiding by one directive but not by the other), "Partial needs" (not abiding just by one directive), "Full Needs" (not abiding by both directives) and "Unknown" (when data was missing or was inconclusive on both Directives). Noteworthy, the "Partial" terminology is always a consequence of having a lack of data for one of the Directives, while abiding or non-abiding by the other.

Crossing the restoration needs with the rank of RPI values will allow the ranking of the areas throughout Europe where restoration needs are present but also determine their restoration potential. This allows prioritising areas in need of restoration by their upside in terms of potential benefits for both nature and society. Thus providing a broad-scope guideline on where action and restoration policies should be focused.

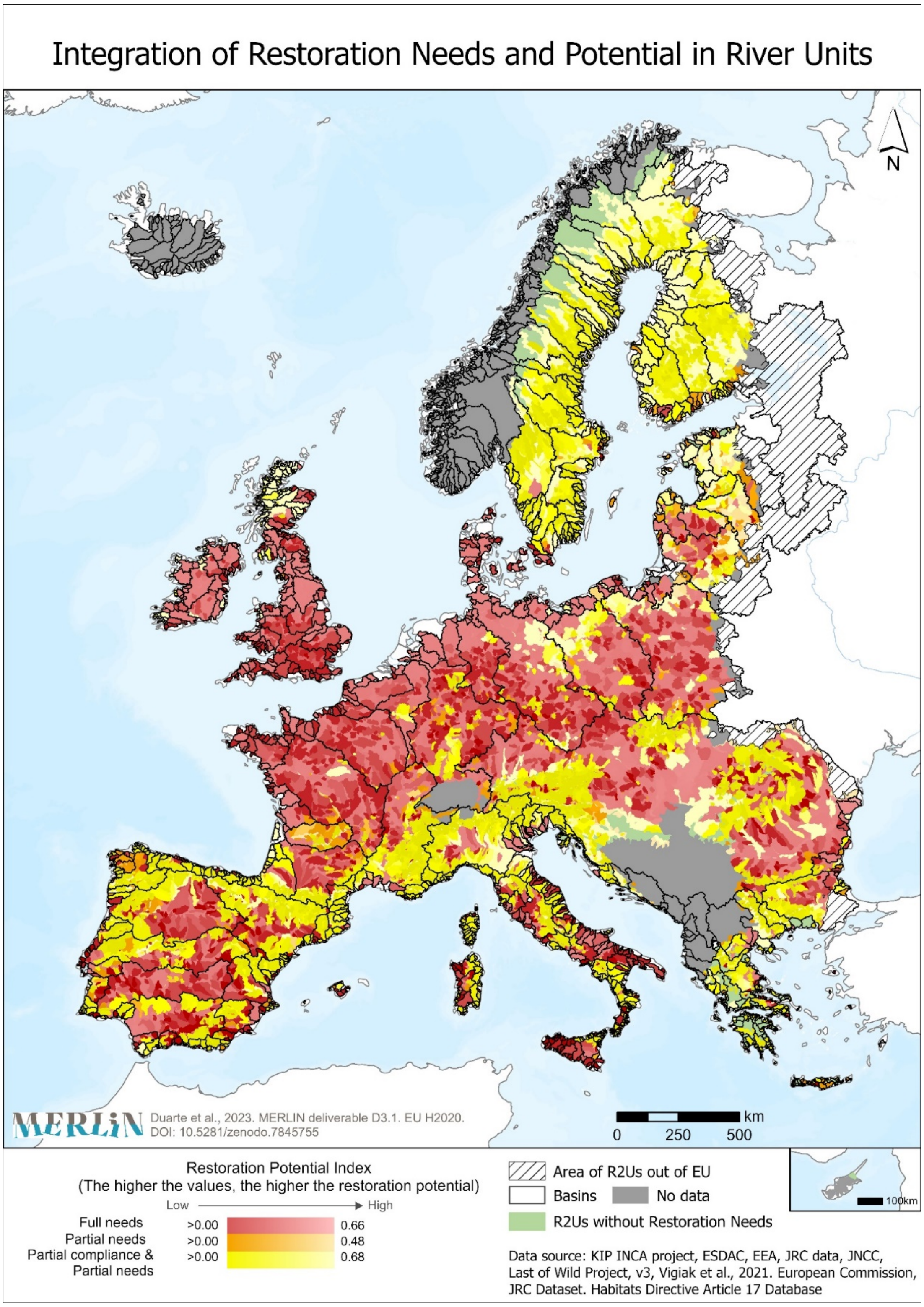


Figure 44. Integration of restoration needs and Restoration Potential Index (RPI) for each River Restoration Unit. Restoration Needs classes: "Partial Needs + Partial Compliance" –a mixed situation of abiding by one directive and not abiding by the other; "Partial needs" – not abiding just by one directive; "Needs" – not abiding by both directives. Lower RPI values indicate higher potential co-benefits of Ecosystem Services and easiness of restoration measures implementation.

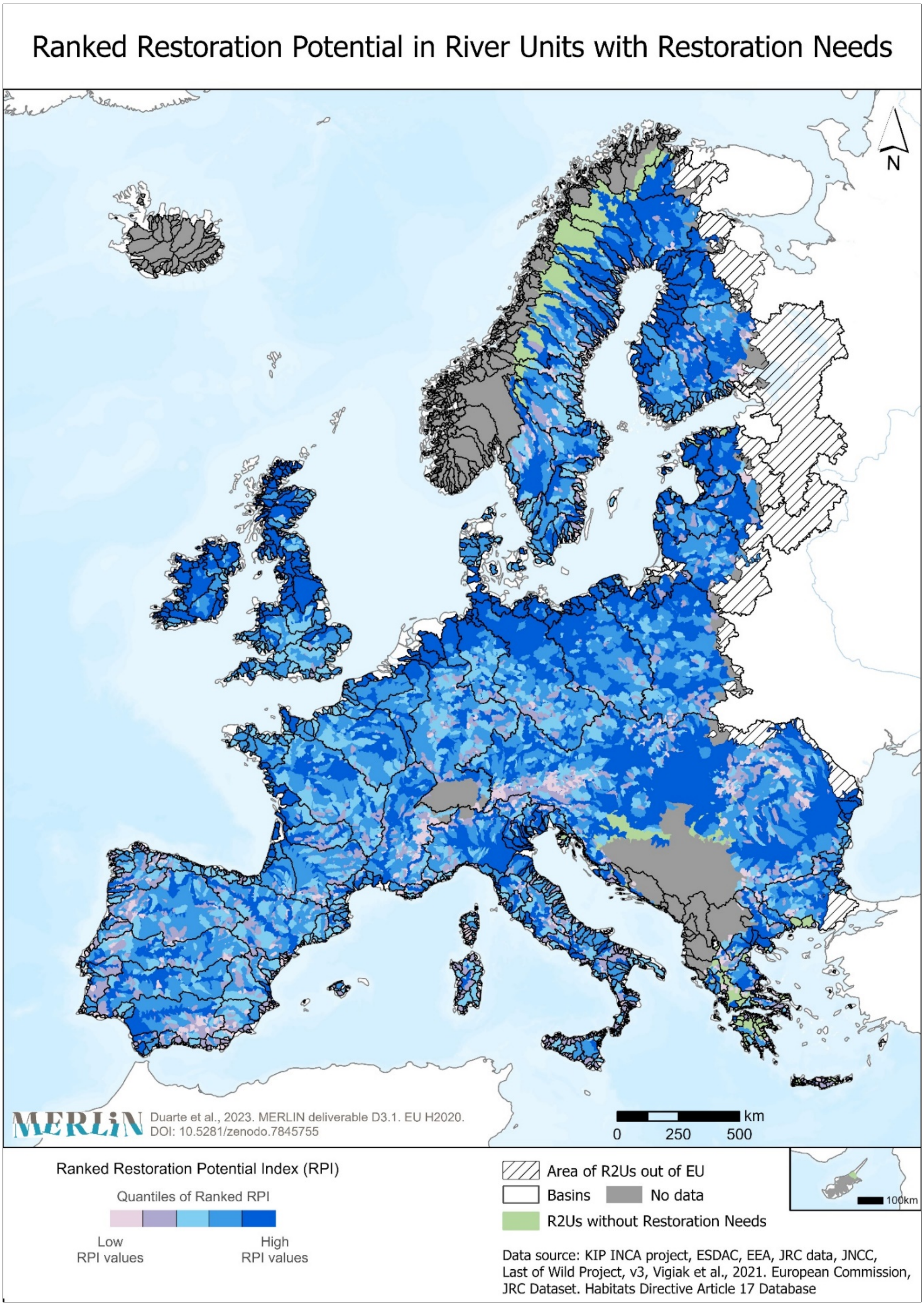


Figure 45. Representation of RPI rank values with the areas of Restoration Needs. Darker blue colours represent the areas in need of restoration that should be prioritised according with their restoration potential.

Synthesis

The work developed resulted in an integrative overview of Europe's current state of freshwater habitats, associated species, and overall ecological condition. It allowed for the spatialization of some of the variables affecting such states, and how projected climate changes will predictably impact freshwater systems. The River Restoration Units (R2Us) across Europe were classified based on their integrative need for restoration (*Restoration Needs*), i.e., their abidance or lack thereof, to the goals of both Habitats and Water Framework Directives.

Since the restoration of freshwater habitats cannot be homogenous across Europe, the potential for restoration was determined by integrating freshwater-related ecosystem services (ES), defining potential co-benefits of restoration for ES, identifying significant constraints to restoration, and potential facilitators of restoration (restoration enablers). These three axes of action were integrated into the Restoration Potential Index (RPI), which represents the ease of restoration and its potential co-benefits (*Restoration Potential*).

Classifying R2Us according to their Restoration Needs and Restoration Potential allowed for an integration that demonstrates the potential for restoration.

The take-home messages of this deliverable are:

- River Restoration Units (R2Us) are a useful way of aggregating river segments (and respective drainage area) into a reasonable spatial resolution for data aggregation and depiction at large spatial extents while abiding by river network functioning in a meaningful way.
- In some areas of Europe, there is a mismatch between habitats and species conservation status, meaning that in some regions, species are faring better than habitats and vice-versa. Of course, this is a wide-extent approach, with increased resolution these mismatches can be better interpreted, and the close relation between habitats and species clearer.
- Some areas in the EU are faring particularly poorly in their abidance to the Habitats Directive, where freshwater-related habitats and species have an unfavourable status.
- The goal of good ecological status (sensu WFD) is not predicted to be achieved in extensive areas across central, western, and southern Europe.
- Restoration needs are almost constant throughout the EU, which is a clear warning that the restoration of freshwater systems is urgently needed.
- Future climate changes, including hydrological changes, will exacerbate the observed overall differences across the EU. The extremes will become further apart without proactive action.
- There is a high number of large transversal barriers affecting European Freshwaters, producing dramatic habitat fragmentation that will particularly affect species with a waterborne life cycle stage, as their longitudinal and lateral displacement is impaired.
- The fragmentation extent imposed by transversal barriers may affect restoration efforts that do not restore continuity, hindering the restoration benefits extensively for downstream and upstream areas.
- Highly urbanized areas with low Ecosystem Services mismatch and less freshwater environments encompassed by N2K sites will have a lower potential for restoration.
- Areas of full restoration needs with water availability and occurring outside highly urbanized areas tend to have a higher potential for restoration co-benefits.
- The Central part of Europe from France to Poland, the UK, the mid and lowland areas of the Danube basin and central parts of the Iberian Peninsula appear to be those where restoration is effectively needed while also potentially having higher co-benefits for both nature and society.
- The predicted climatic changes will have an impact on water resources, which are critical for freshwater habitats and species' favourable status and water bodies' good ecological quality. Therefore, a future Prestoration (restoring ecosystem structure and function in the face of a changing climate) exercise is necessary to determine future restoration needs and potentials under global change scenarios.
- The map outputs of this deliverable should inform restoration managers and decision-makers of the areas both in need of restoration and the highest potential upside.
- There is great potential to use the data aggregated at the River Restoration Units to further inform policy, management, restoration and conservation.

Annex I – Map outputs

River Units and freshwater-related ecosystems

Title	Location of the Study Area- River Restoration Units

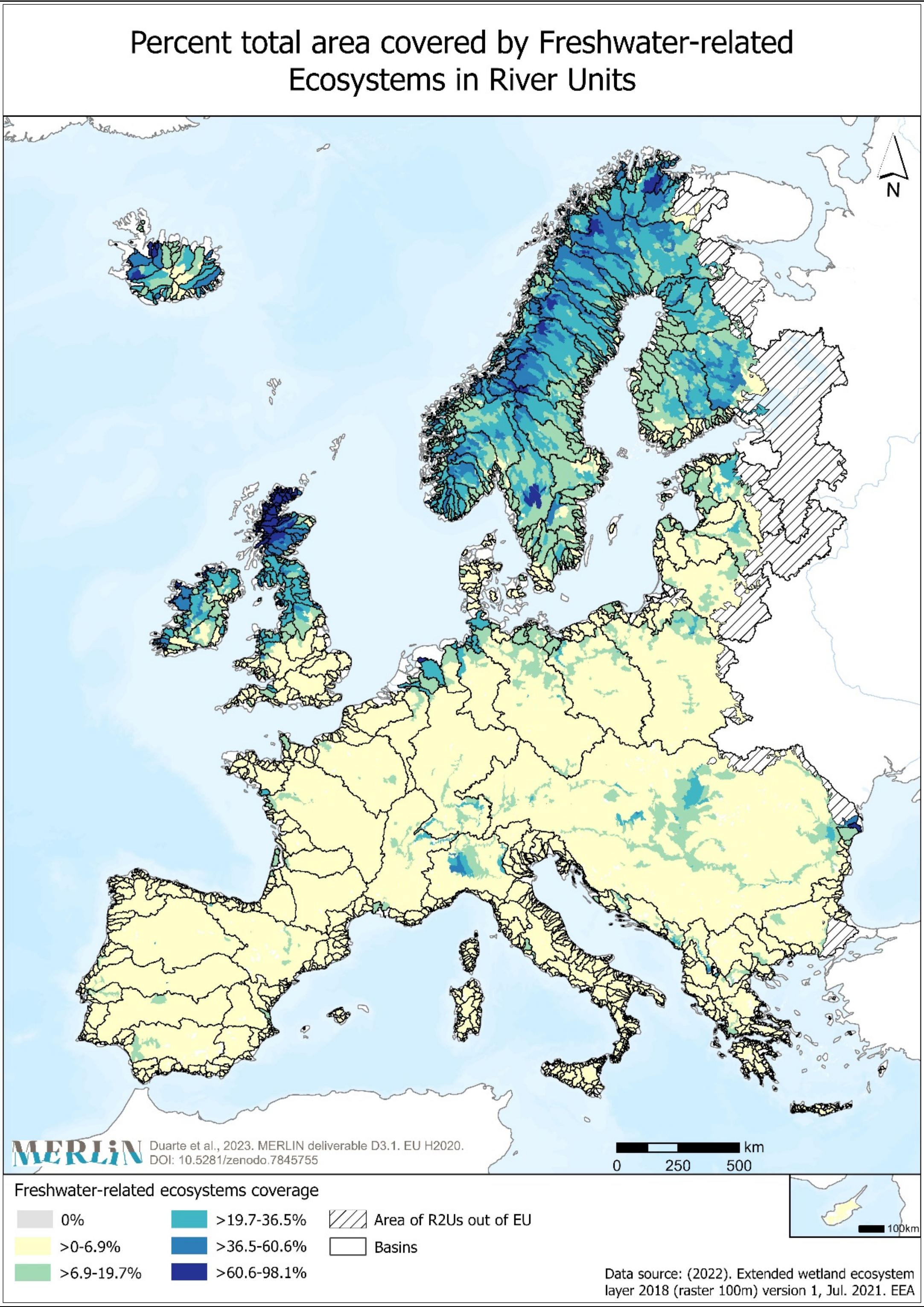
Summary	Location of study area at River Restoration Units (R2Us) scale of analysis. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	The study area includes all river basins where the Strahler value is three or higher located in EU Member States (MS) and former MS, along with Iceland and other continental enclaves that share borders with multiple European countries (e.g., Switzerland, Norway and the Balkans) given that a substantial amount of data coverage (HFI, Land use characterization datasets, climatic data, among others) goes beyond EU-MS borders and that most countries in these regions have close connections with the EU. A higher resolution spatial scale of analysis is used; the River Restoration Units (R2Us). R2Us abides by the riverscape concept of river basins' functioning, thus respecting the directional, dendritic and hierarchical nature of river networks while also facilitating the aggregation of data from multiple sources with distinct resolutions. Concerning the R2Us and the study area, on the eastern border of the EU the delineation of the study area abided by the following criteria: a) maintain the R2Us as indivisible units, and; b) retain all the R2Us in which at least 10% of the area overlaps an EU-MS territory.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) CCM data: – De Jager, Alfred; Vogt, Jürgen (2007): Rivers and Catchments of Europe Catchment Characterisation Model (CCM). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/fe1878e8-7541-4c66-8453-afdae7469221
Limitation	No limitation

<table>
<tr><td>Title</td><td>Typology of River Restoration Units</td></tr>
<tr><td></td><td>
</td></tr>
<tr><td>Summary</td><td>Typology of River Restoration Units (R2Us).
Creation Date: March 2023
Resolution: R2U
Version: 3.0
Responsible: School of Agriculture, University of Lisbon</td></tr>
<tr><td>Description</td><td>River Units typology :
Large river unit – units composed of the segments having strahler value above 3, upstream drainage area (UDA) above 1000 km² and upstream river</td></tr>
</table>

	length (URL) above 1000 km. These coincide with the main stem portions of river networks; **Small river unit** – units composed of segments with strahler equal to 3 or UDA below 1000 km^2 or URL below 1000 km; **Large River head unit** – small river units located in the most upstream part of the main stem of river networks; **Small river basin** – sea outlet basins with strahler equal to 3 or UDA below 1000 km^2 or URL below 1000 km.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) CCM data: – De Jager, Alfred; Vogt, Jürgen (2007): Rivers and Catchments of Europe Catchment Characterisation Model (CCM). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/fe1878e8-7541-4c66-8453-afdae7469221
Limitation	No limitation

Title	Percent total area covered by Freshwater-related Ecosystems in River Units



Summary	Percentage of wetlands coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Percentage of wetland area in River Restoration Units. It includes the are and percentage occupied by 12 distinct wetland typologies exclusively

	related with freshwater environments (transition and marine environments were excluded). The dataset "Extended wetland ecosystem" is a derived product of the CLC layer for the year 2018 (v20) which has then been reclassified into 20 wetland classes on the basis of ancillary spatial layers ("Water and Wetness 2018" and "Riparian Zone Layer" Copernicus products, the "Ecosystem types of Europe" v3.1 and "The Global Spatial Water Explorer" datasets).
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: –Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
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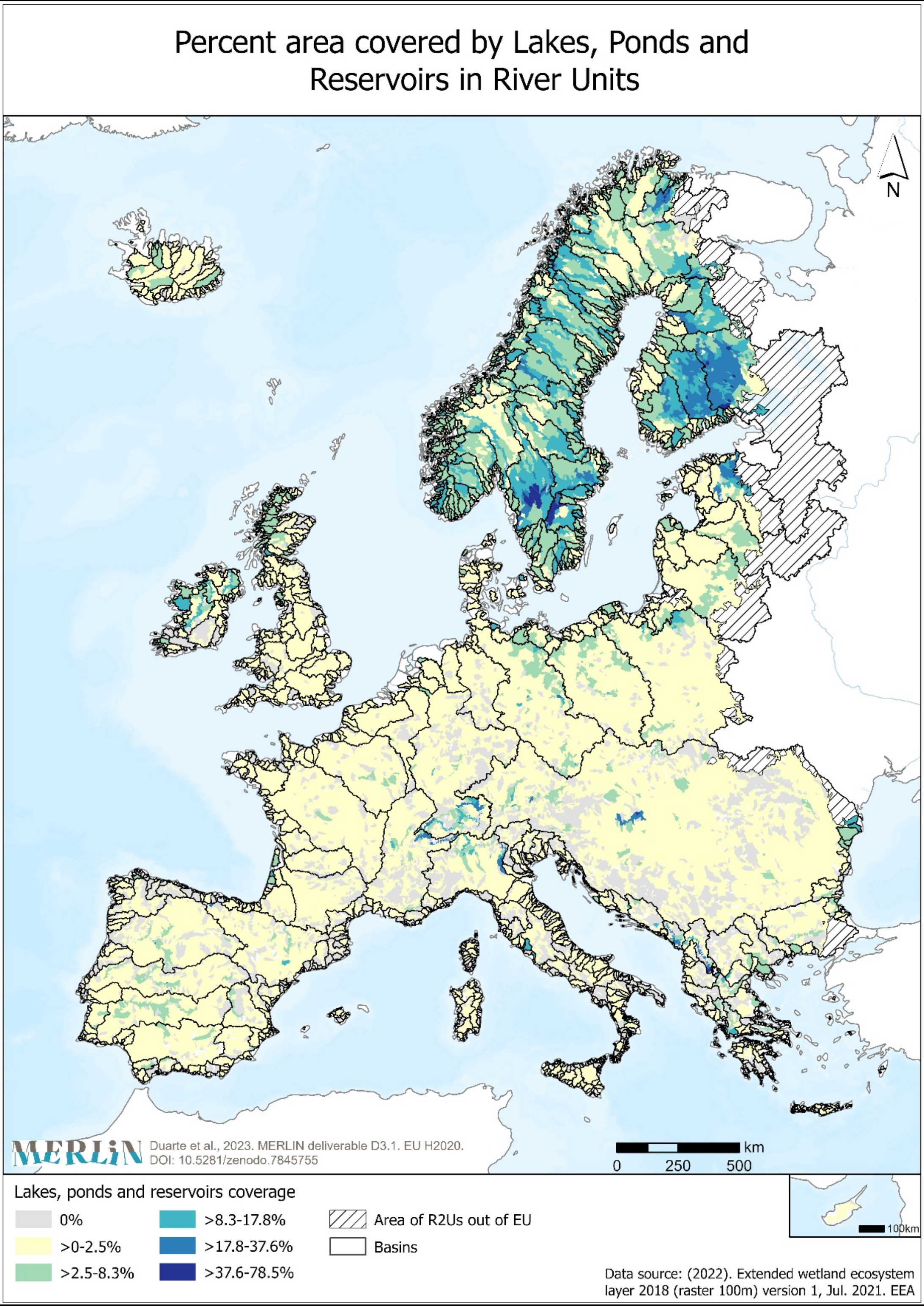
Title	Freshwater-related Ecosystems in River Restoration Units
	
Summary	Location of extended wetlands in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Wetland area in River Restoration Units in square kilometres. It includes the area and percentage occupied by 12 distinct wetland typologies exclusively related to freshwater environments (transition and marine

	environments were excluded). The dataset "Extended wetland ecosystem" is a derived product of the CLC layer for the year 2018 (v20) which has then been reclassified into 20 wetland classes on the basis of ancillary spatial layers ("Water and Wetness 2018" and "Riparian Zone Layer" Copernicus products, the "Ecosystem types of Europe" v3.1 and "The Global Spatial Water Explorer" datasets).
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

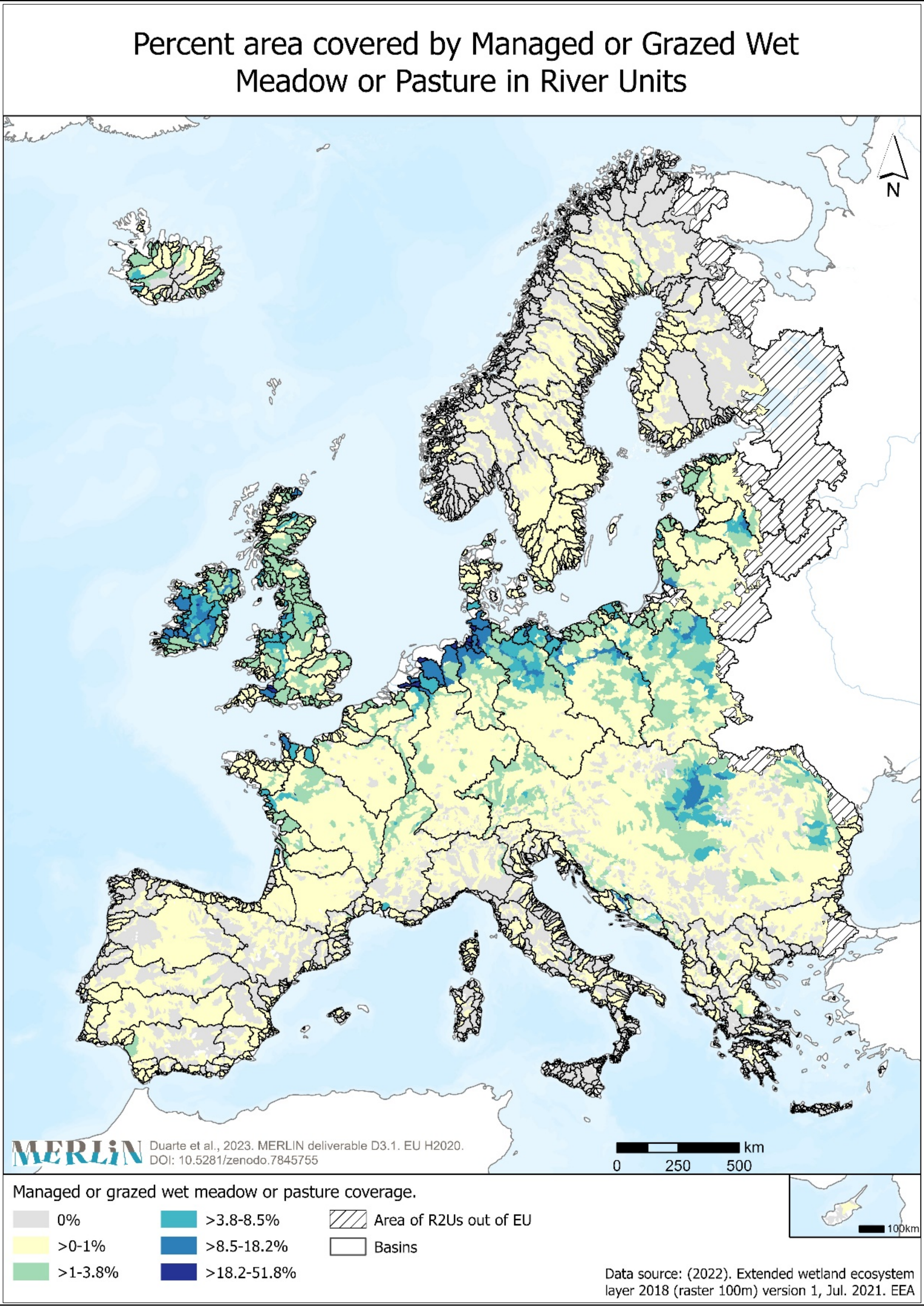
Title	Percent area covered by Inland Marshes in River Units
	
Summary	Percentage of Inland marshes coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Percentage of Inland marshes area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

Title	Percent area covered by Lakes, Ponds and Reservoirs in River Units
	
Summary	Percentage of lakes, ponds and reservoirs coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Percentage of lakes, ponds and reservoirs area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

Title	Percent area covered by Managed or Grazed Wet Meadow or Pasture in River Units



Summary	Percentage of managed or grazed wet meadow or pasture coverage area River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Percentage of managed or grazed wet meadow or pasture area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

Title	Percent area covered by Natural Seasonally or Permanently Wet Grasslands in River Units
	
Summary	Percentage of natural seasonally or permanently wet grasslands coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U

	Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Percentage of natural seasonally or permanently wet grasslands area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
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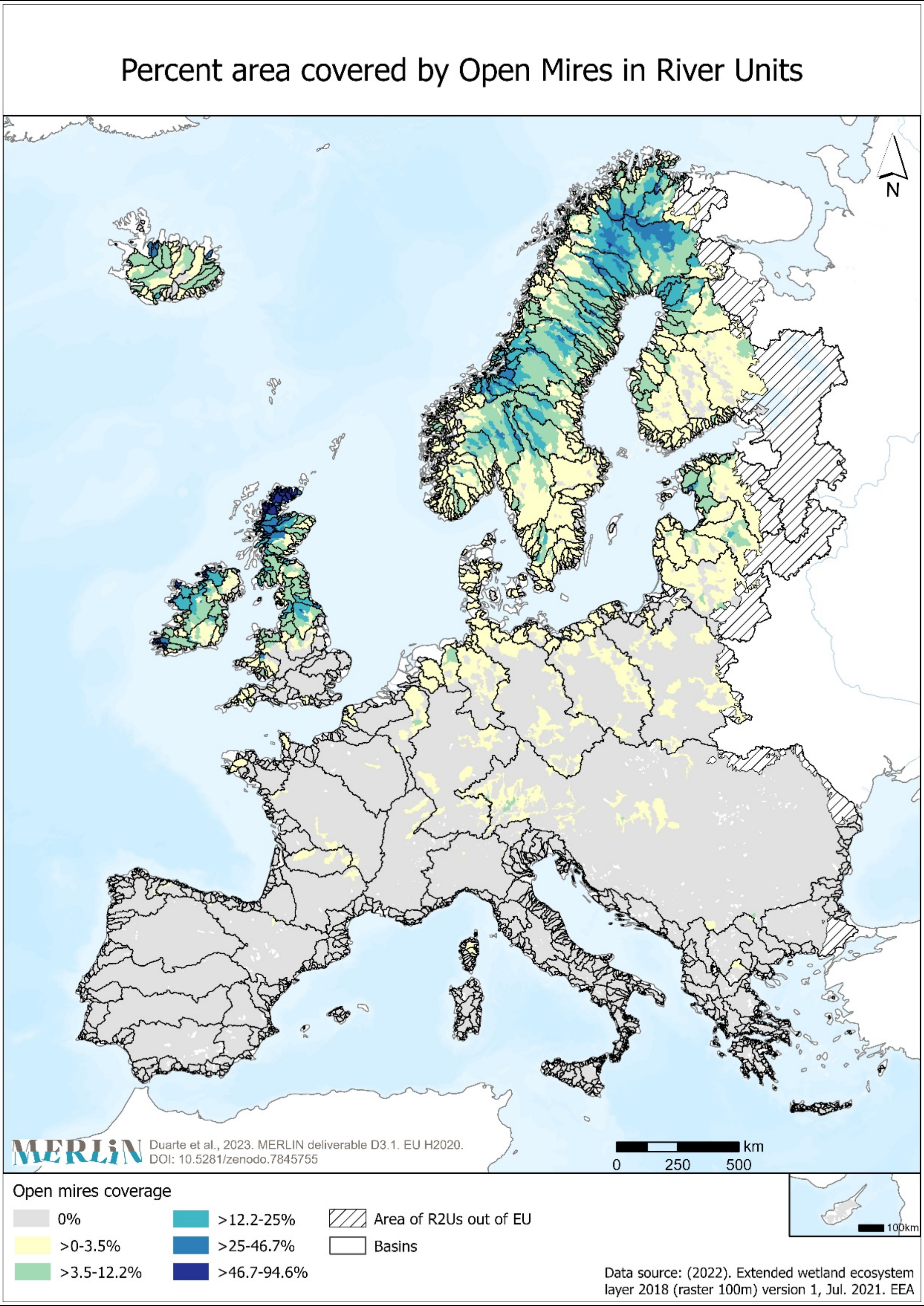
<table>
<tr><td>Title</td><td>Percent area covered by Open Mires in River Units</td></tr>
<tr><td></td><td>
</td></tr>
<tr><td>Summary</td><td>Percentage of open mires coverage area in River Restoration Units (R2Us).
Creation Date: March 2023
Resolution: R2U
Version: 3.0</td></tr>
</table>

	Responsible: School of Agriculture, University of Lisbon
Description	Percentage of open mires area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
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Title	Percent area covered by Rice Fields in River Units

Summary	Percentage of rice fields coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U

	Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Percentage of rice fields area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
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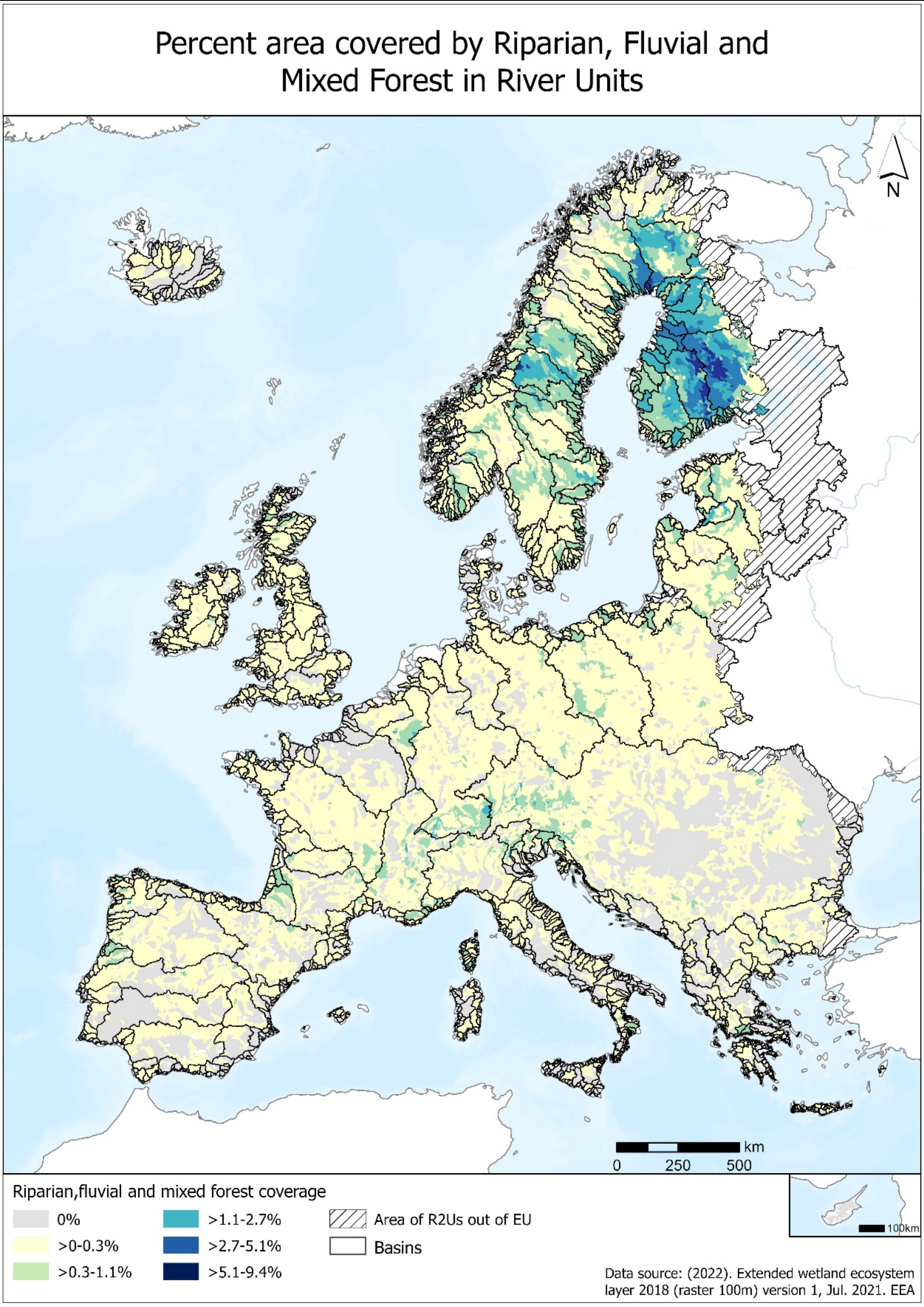
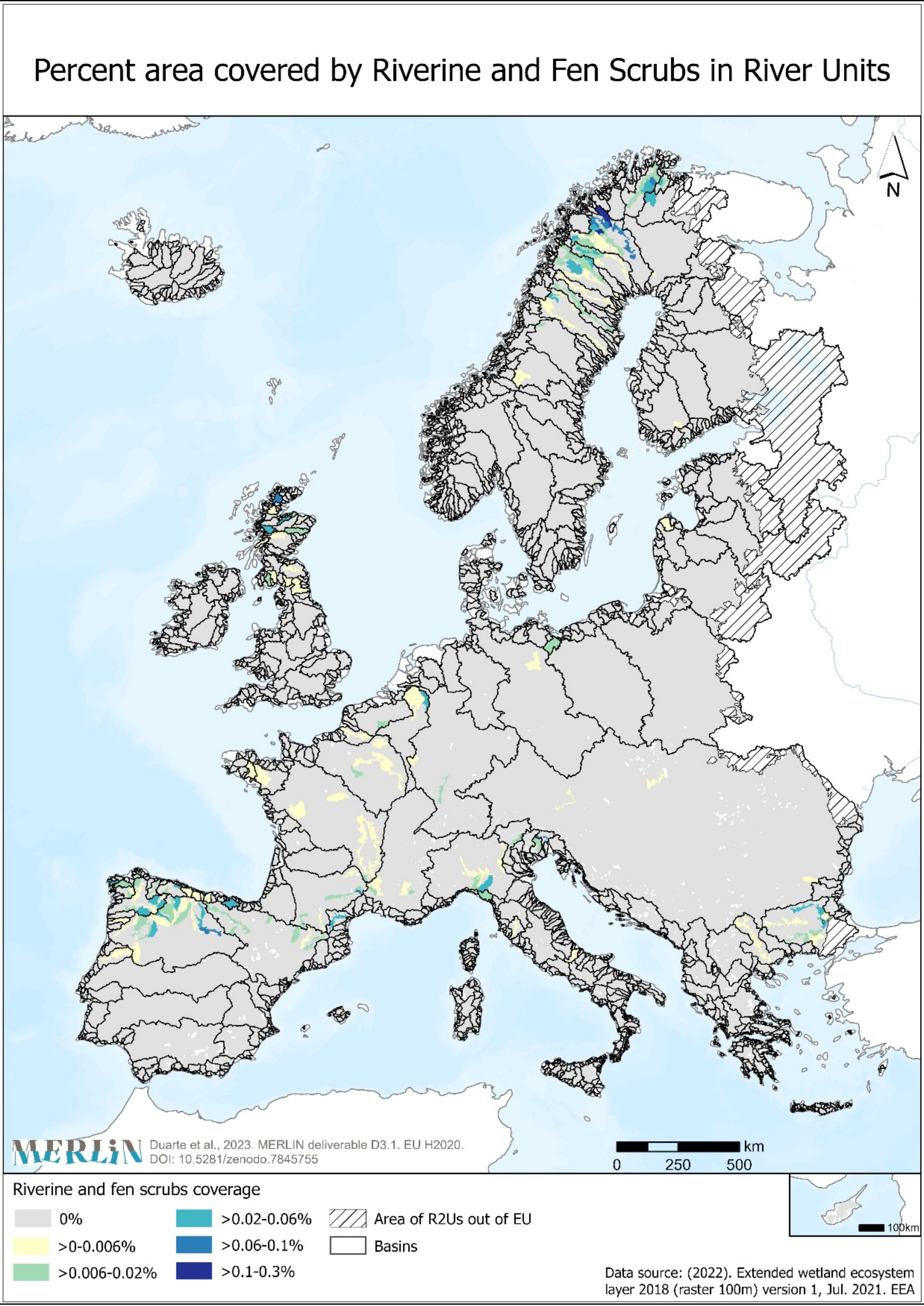
Title	Percent area covered by Riparian, Fluvial and Mixed Forest in River Units
	
Summary	Percentage of riparian, fluvial and mixed forest coverage area in River Restoration Units (R2Us). Creation Date: March 2023

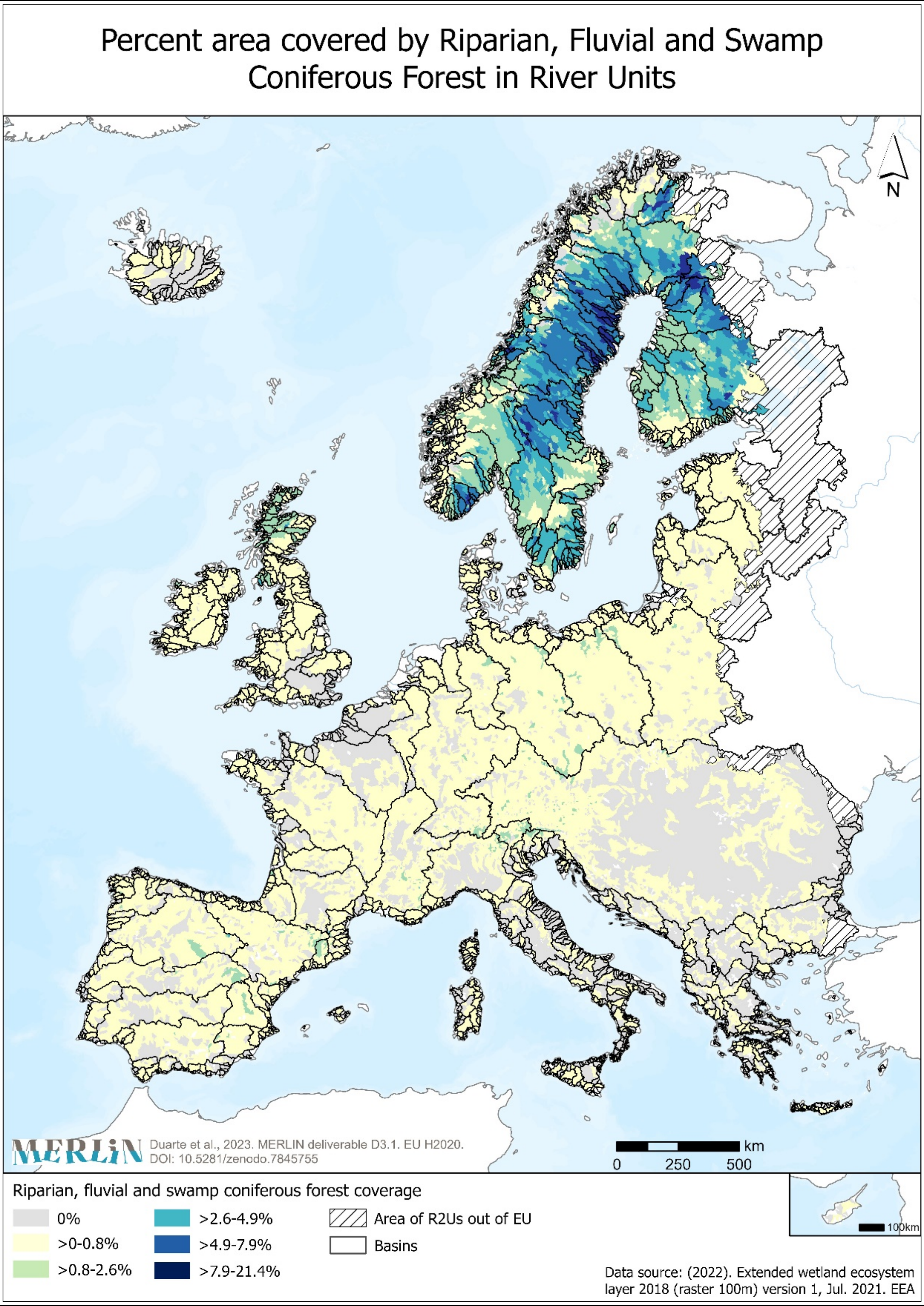
	Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Percentage of riparian, fluvial and mixed forest area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

Title	Percent area covered by Riverine and Fen Scrubs in River Units
	
Summary	Percentage of riverine and fen scrubs coverage area in R2Us Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Percentage of riverine and fen scrubs area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

Title	Percent area covered by Riparian, Fluvial and Swamp broadleaved forest in River Units
	
Summary	Percentage of riparian, fluvial and swamp broadleaved forest coverage area in R2Us Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Percentage of riparian, fluvial and swamp broadleaved forest area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

Title	Percent area covered by Riparian, Fluvial and Swamp Coniferous Forest in River Units
	
Summary	Percentage of riparian, fluvial and swamp coniferous forest coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Percentage of riparian, fluvial and swamp coniferous forest area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
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Title	Percent area covered by Water Courses in River Units
	
Summary	Percentage of water courses coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Percentage of riparian, fluvial and swamp coniferous forest area in River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
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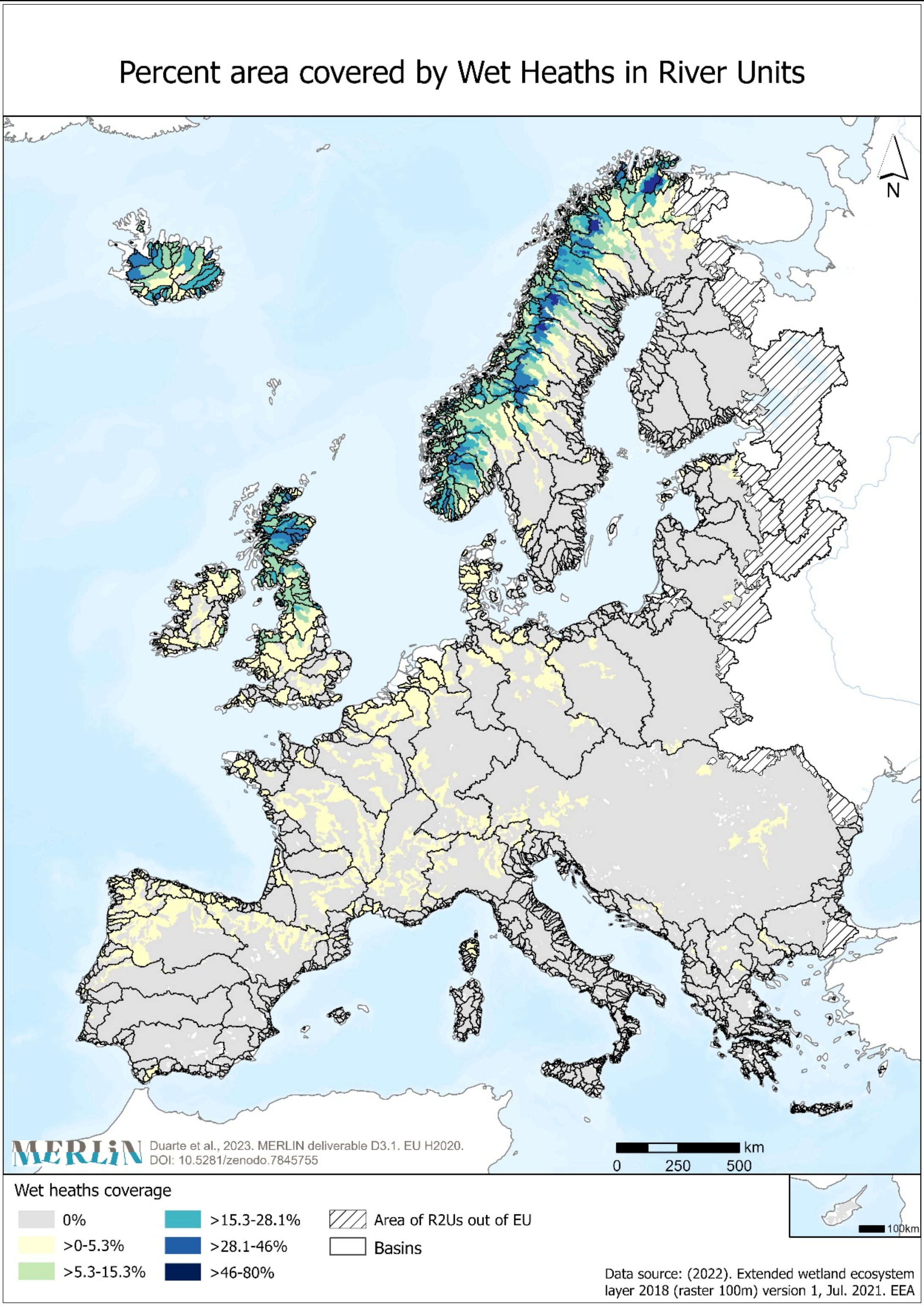
Title	Percent area covered by Wet Heaths in River Units



Summary	Percentage of wet heaths coverage area in River Restoration Units (R2Us). Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Percentage of wet heaths area in River Restoration Units.

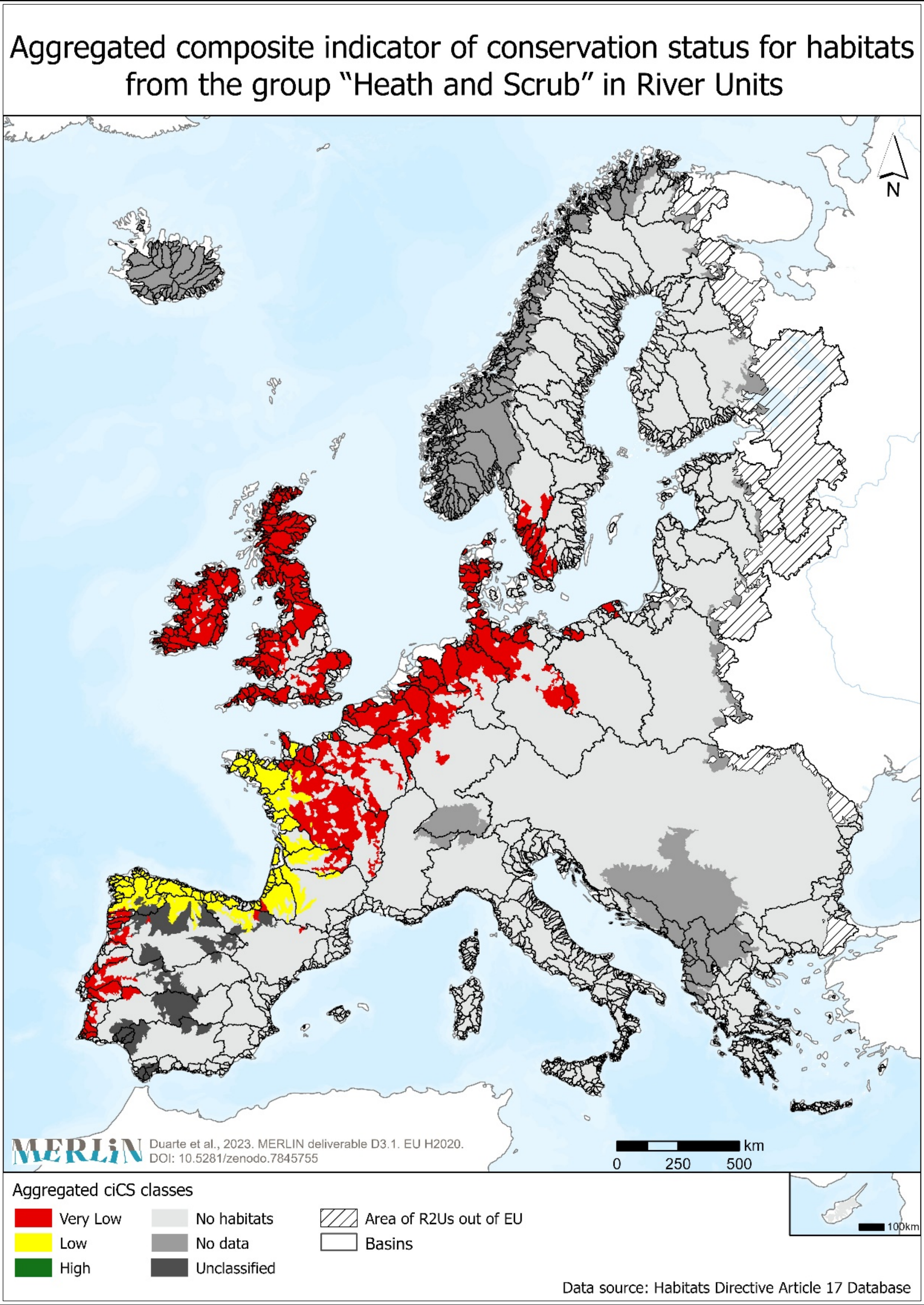
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Wetlands data: – Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021 (https://sdi.eea.europa.eu/catalogue/idp/eng/catalog.search#/metadata/de2d0d77-a389-49d0-84d7-73a29046823f)
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (https://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).

Habitats Directive

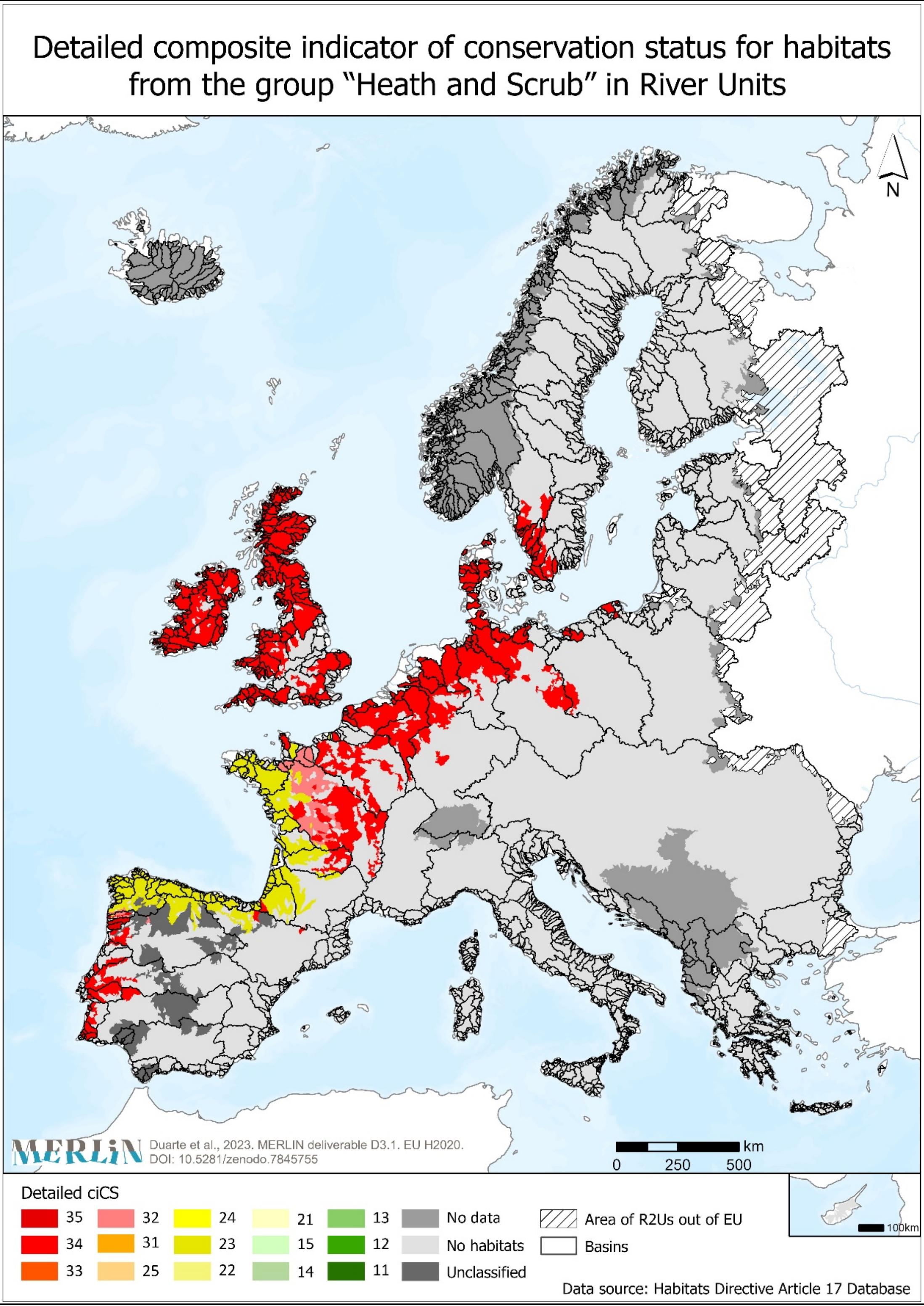
Habitats

<table>
<tr><td>Title</td><td>Number of habitats from the group “Heath and Scrub” in River Units</td></tr>
<tr><td></td><td>
</td></tr>
<tr><td>Summary</td><td>Number of habitats from the group “Grasslands” from article 17 of the Habitats Directive in the River Restoration Units.
Creation Date: March 2023
Resolution: R2U</td></tr>
</table>

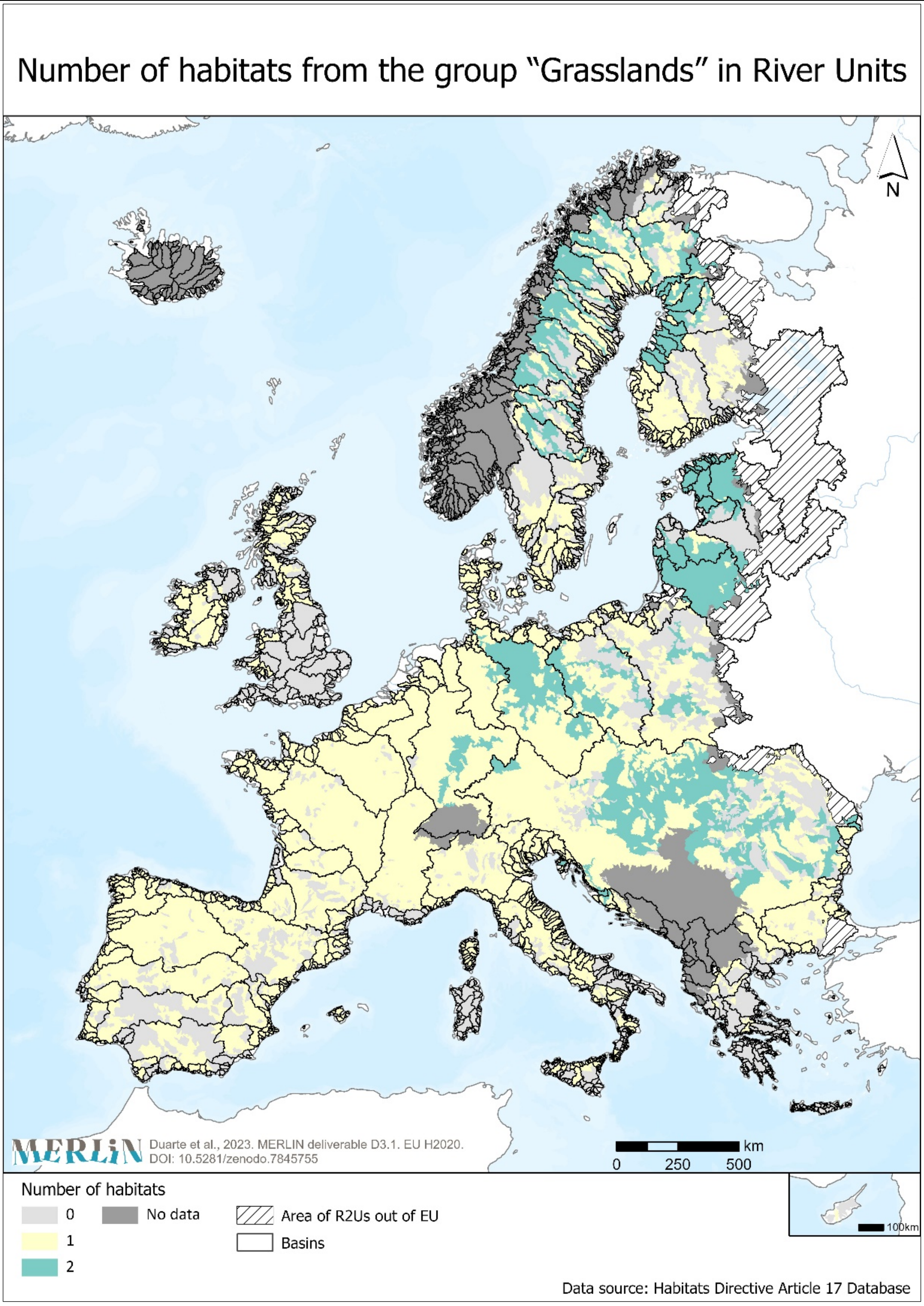
	Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Number of habitats from the group “Heath and Scrub” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for habitats from the group “Heath and Scrub” in River Units
	
Summary	Aggregated Composite Indicator ciCS of Habitats from the group “Heath and Scrub” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

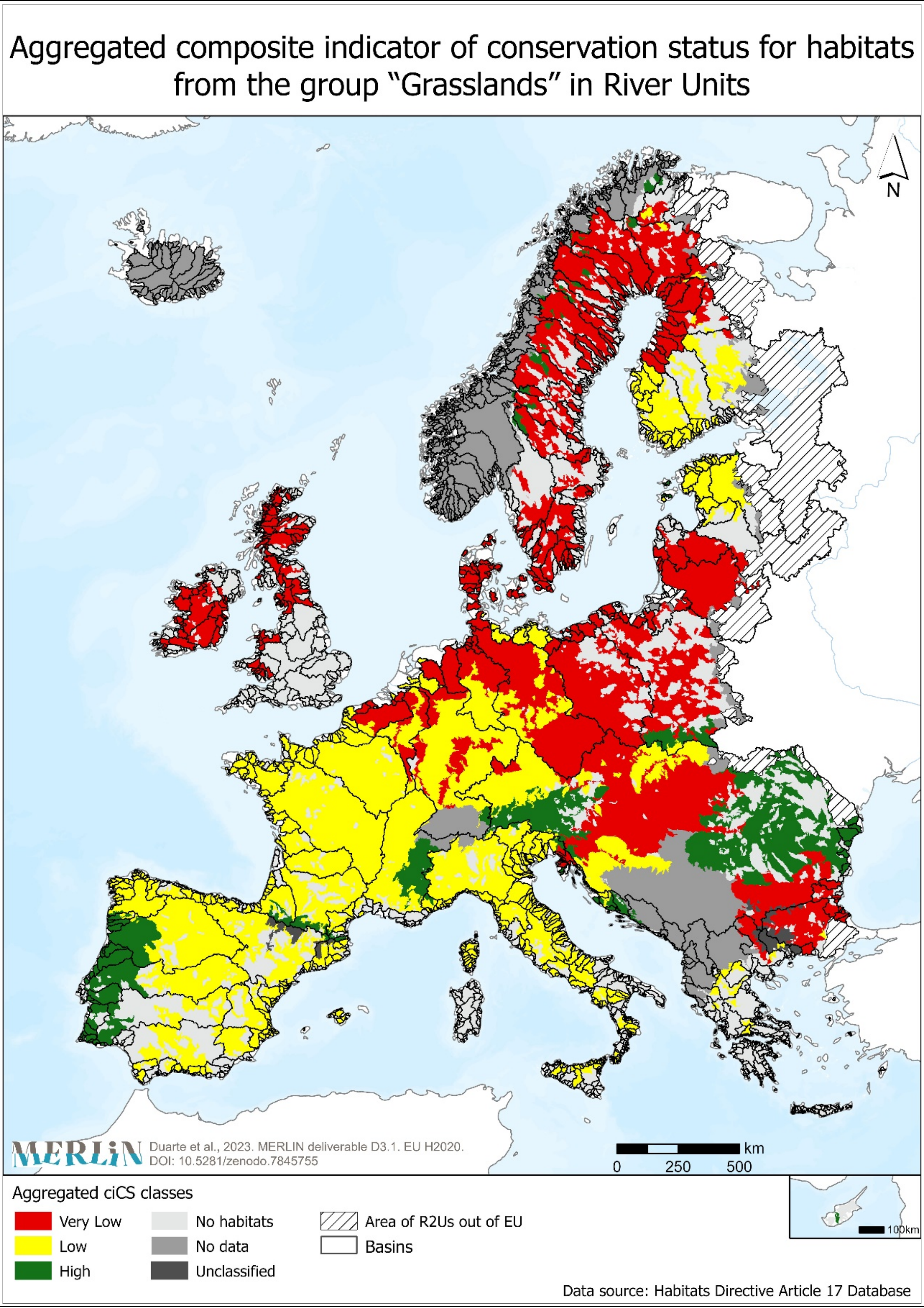
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Heath and Scrub” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for habitats from the group “Heath and Scrub” in River Units
	
Summary	Detailed Composite Indicator ciCS of Habitats from the group “Grasslands” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

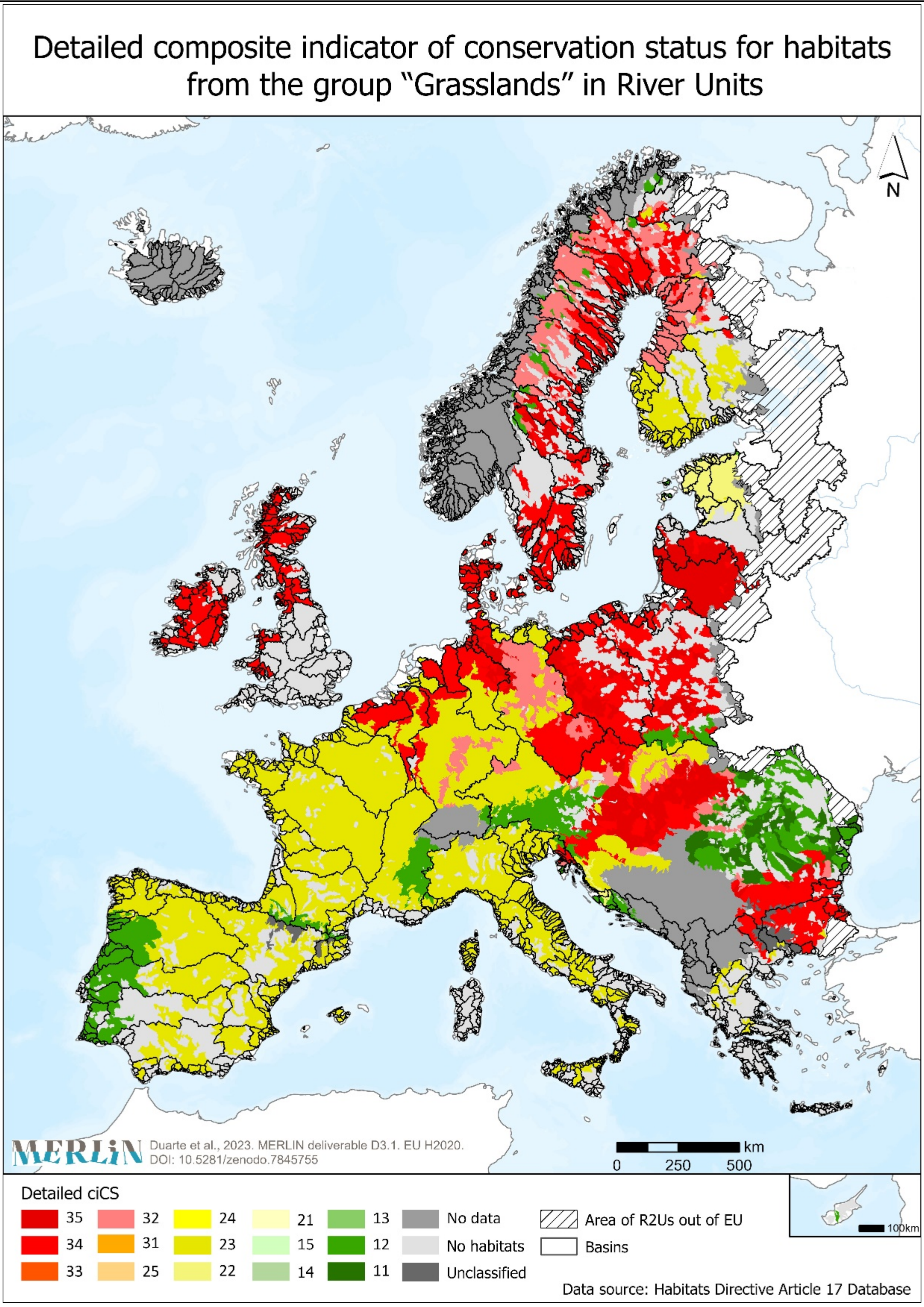
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Heath and Scrub” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of habitats from the group “Grasslands” in River Units
	
Summary	Number of habitats from the group “Grasslands” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Number of habitats from the group “Grasslands” present in the R2U.

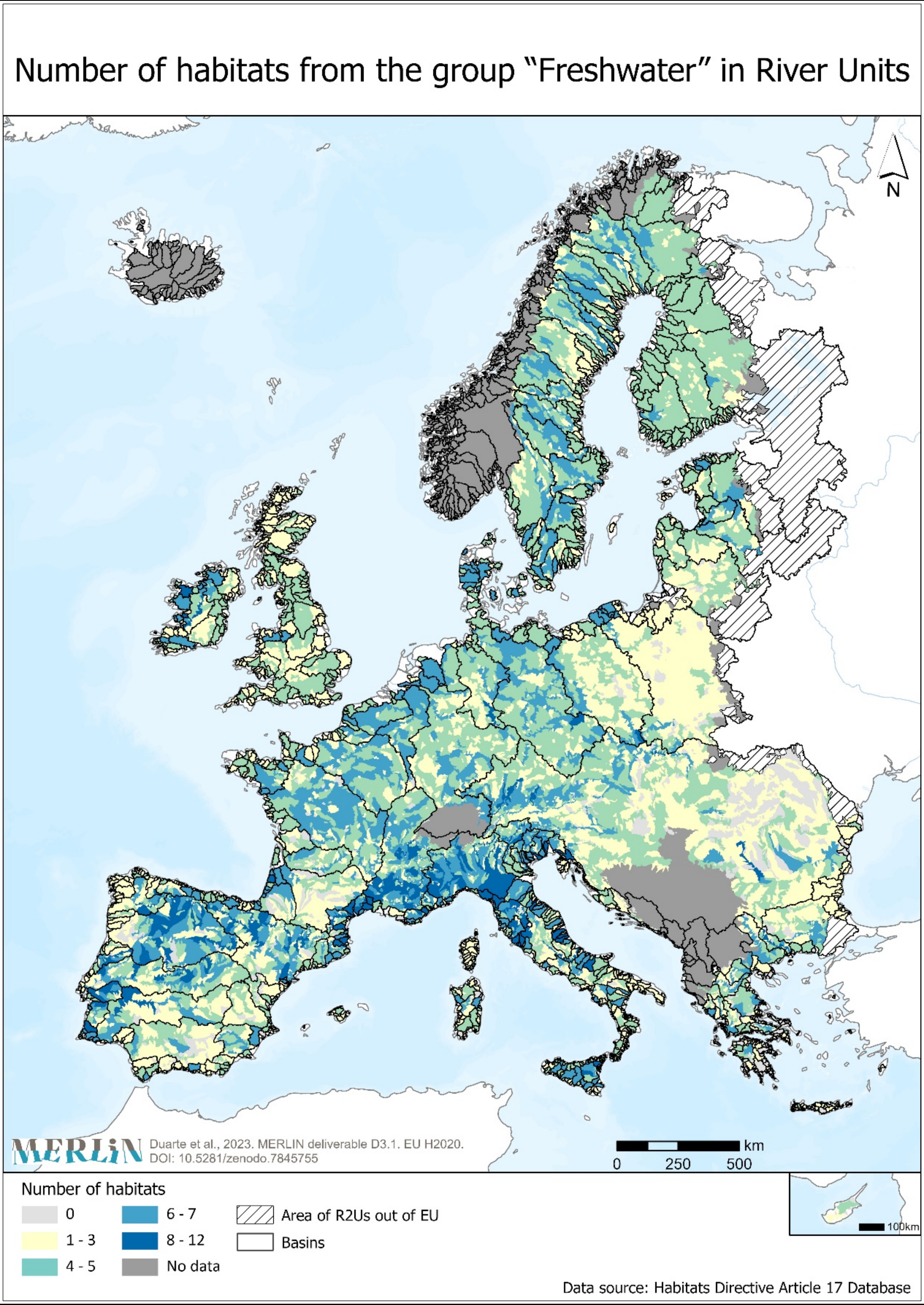
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for habitats from the group “Grasslands” in River Units
	
Summary	Aggregated Composite Indicator ciCS of Habitats from the group “Grasslands” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U

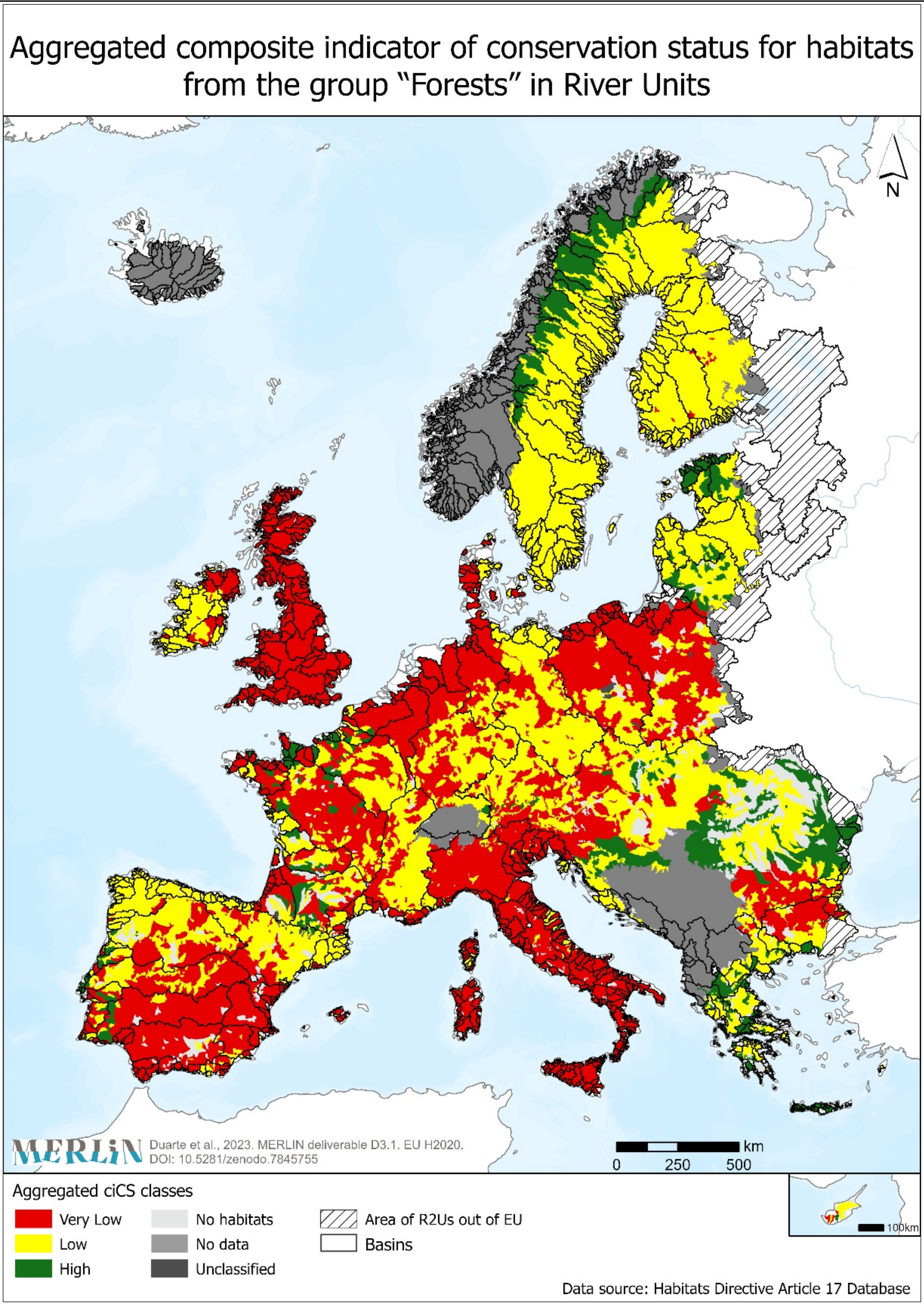
	Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Grasslands” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for habitats from the group “Grasslands” in River Units
	
Summary	Detailed Composite Indicator ciCS of Habitats from the group “Grasslands” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

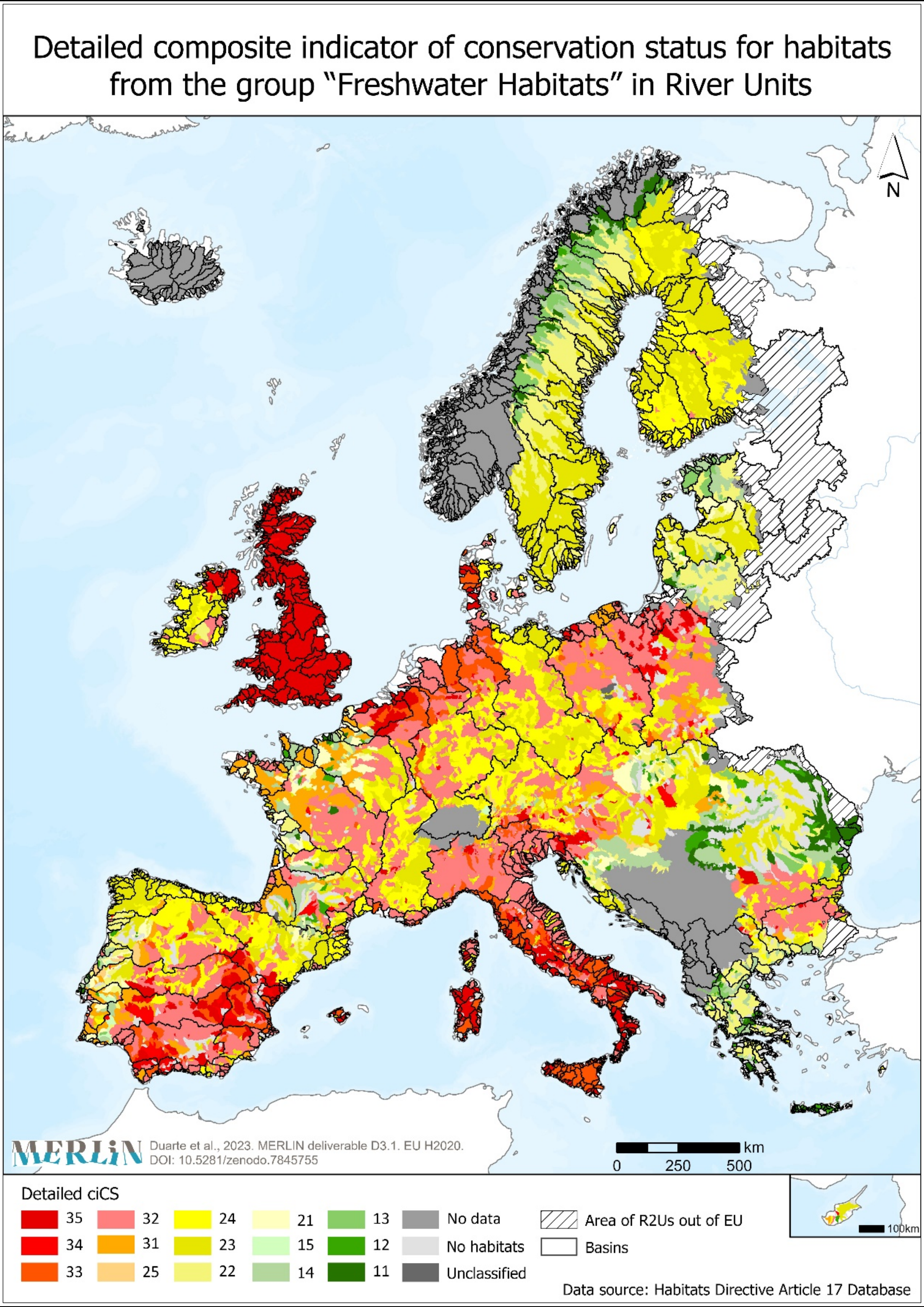
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Grasslands” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of habitats from the group “Freshwater Habitats” in River Units
	
Summary	Number of habitats from the group “Freshwater Habitats” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

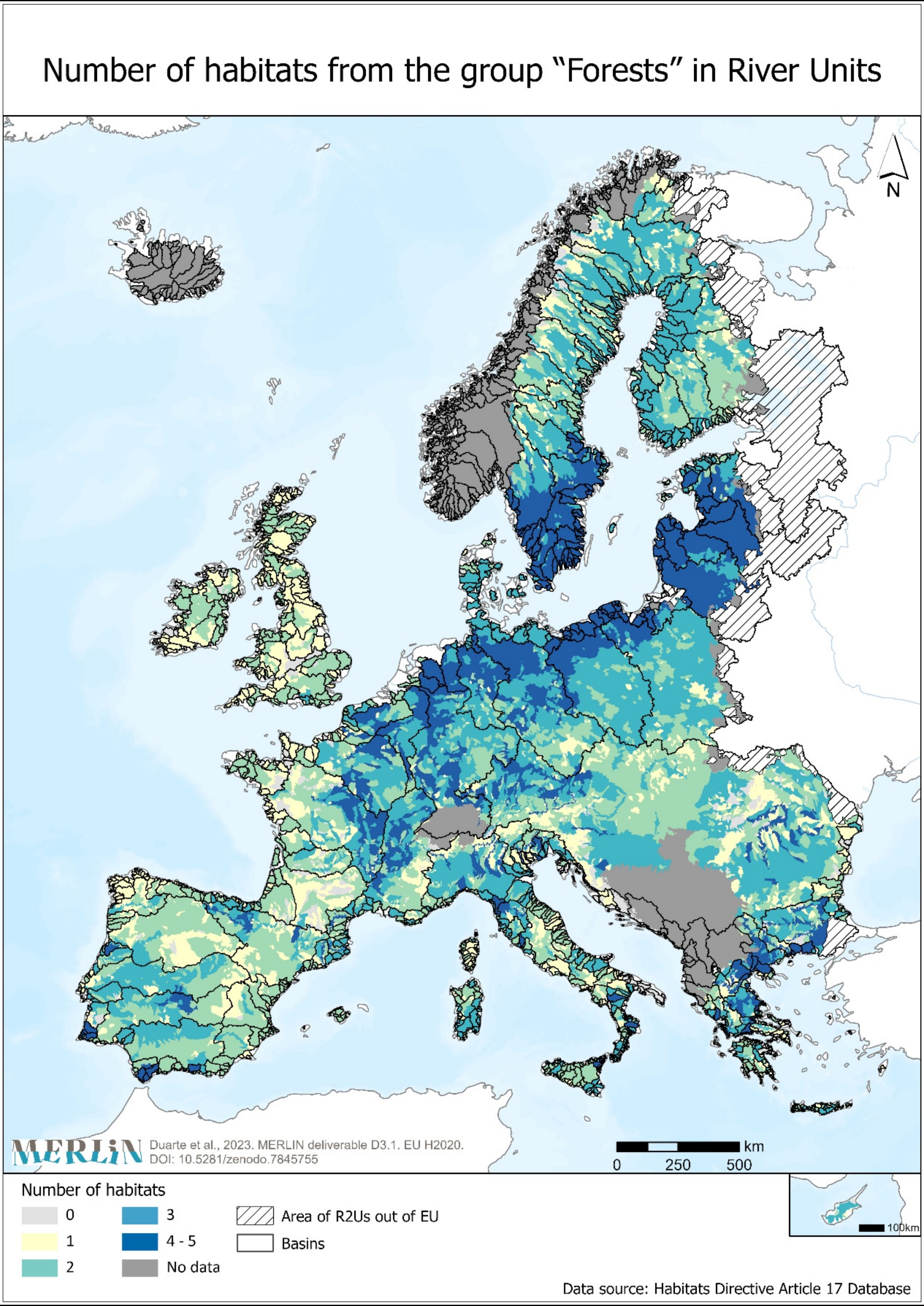
Description	Number of habitats from the group “Freshwater Habitats” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for habitats from the group “Freshwater Habitats” in River Units
	
Summary	Aggregated Composite Indicator ciCS of Habitats from the group “Freshwater Habitats” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

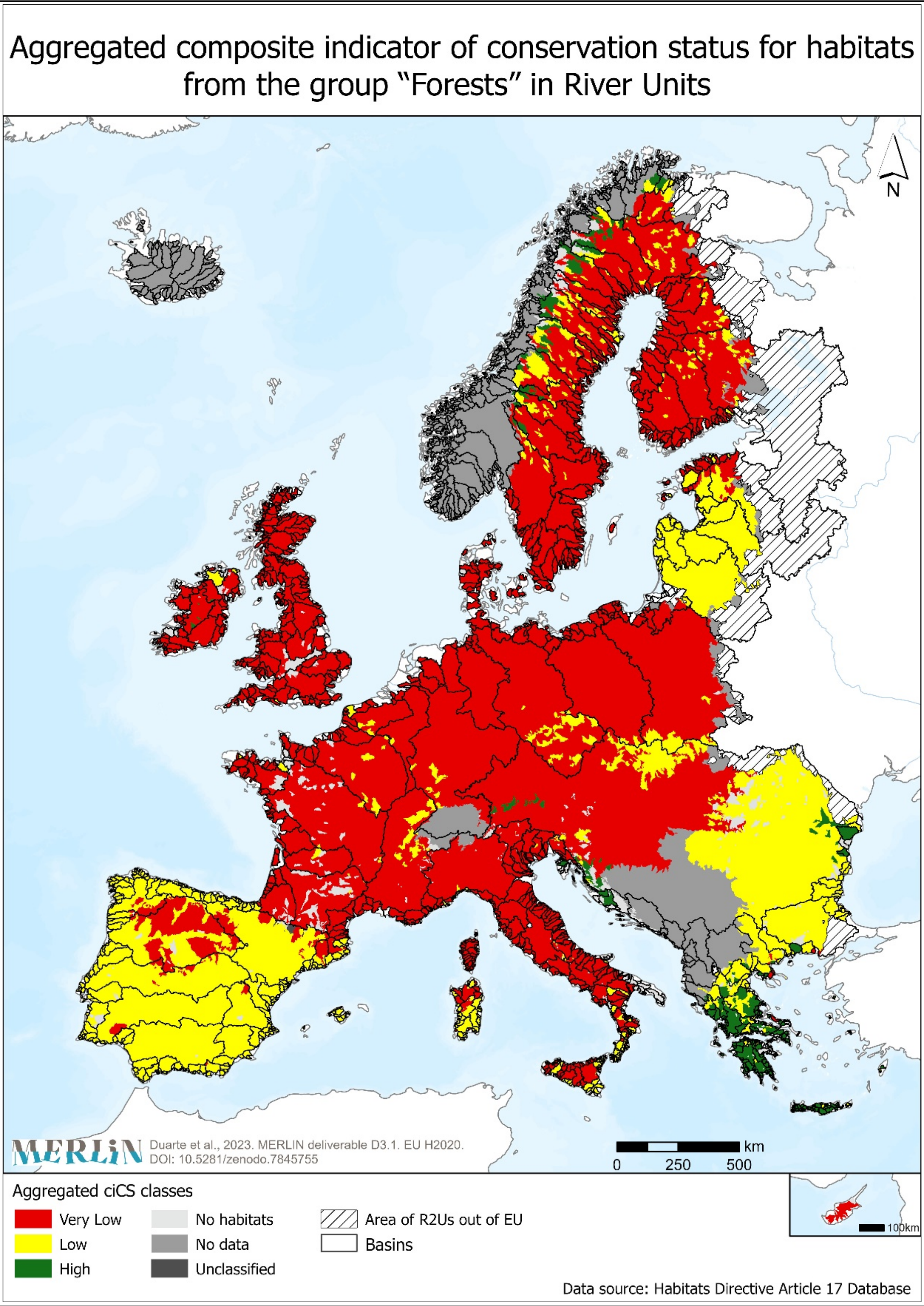
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Freshwater Habitats” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for habitats from the group “Freshwater Habitats” in River Units
	
Summary	Detailed Composite Indicator ciCS of Habitats from the group “Freshwater Habitats” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U

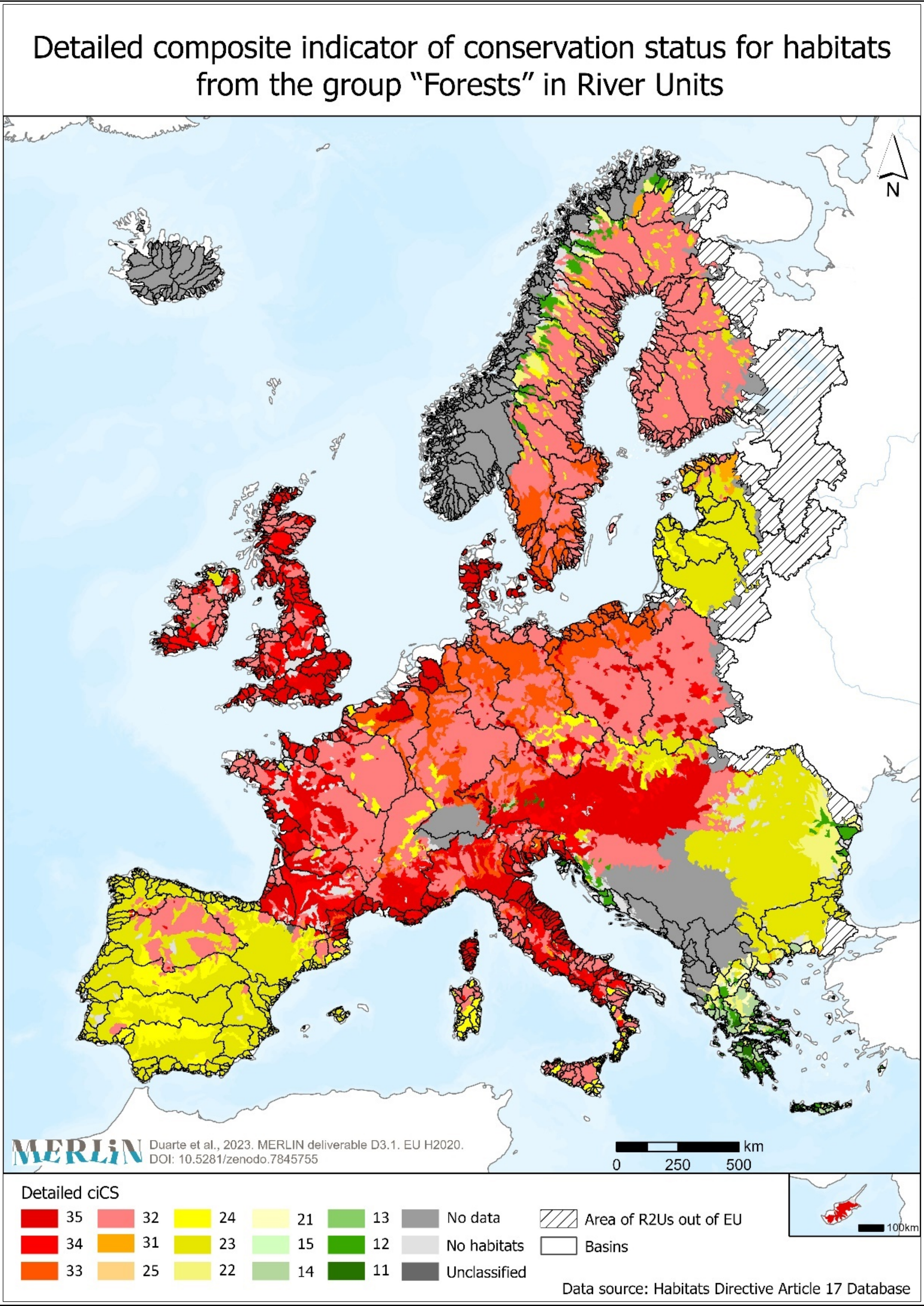
	Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Descriptio n	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Freshwater Habitats” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of habitats from the group “Forests” in River Units
	
Summary	Number of habitats from the group “Forests” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

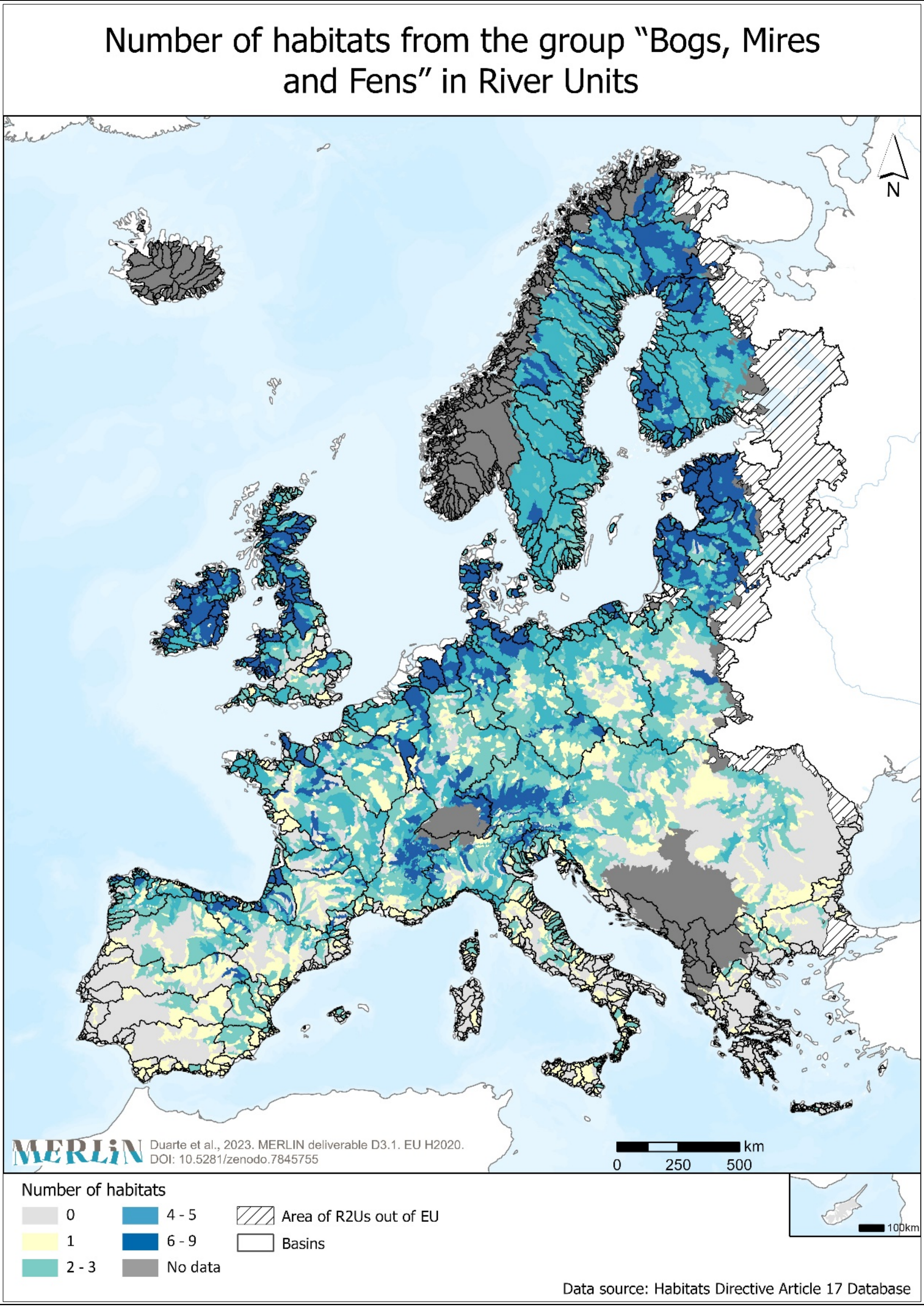
	Responsible: School of Agriculture, University of Lisbon
Description	Number of habitats from the group “Forests” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for habitats from the group “Forests” in River Units
	
Summary	Aggregated Composite Indicator ciCS of Habitats from the group “Forests” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

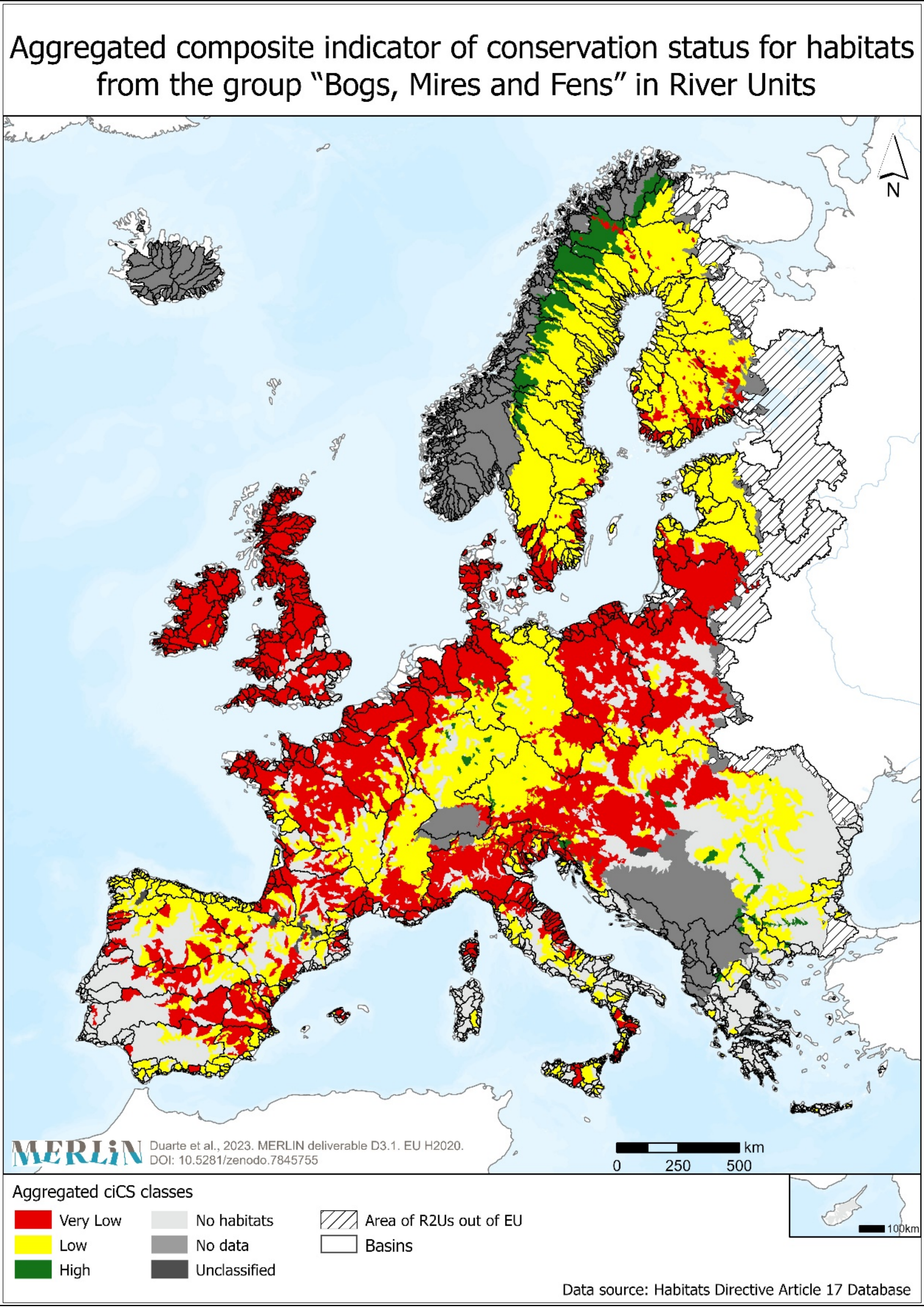
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Forests” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for habitats from the group “Forests” in River Units
	
Summary	Detailed Composite Indicator ciCS of Habitats from the group “Forests” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

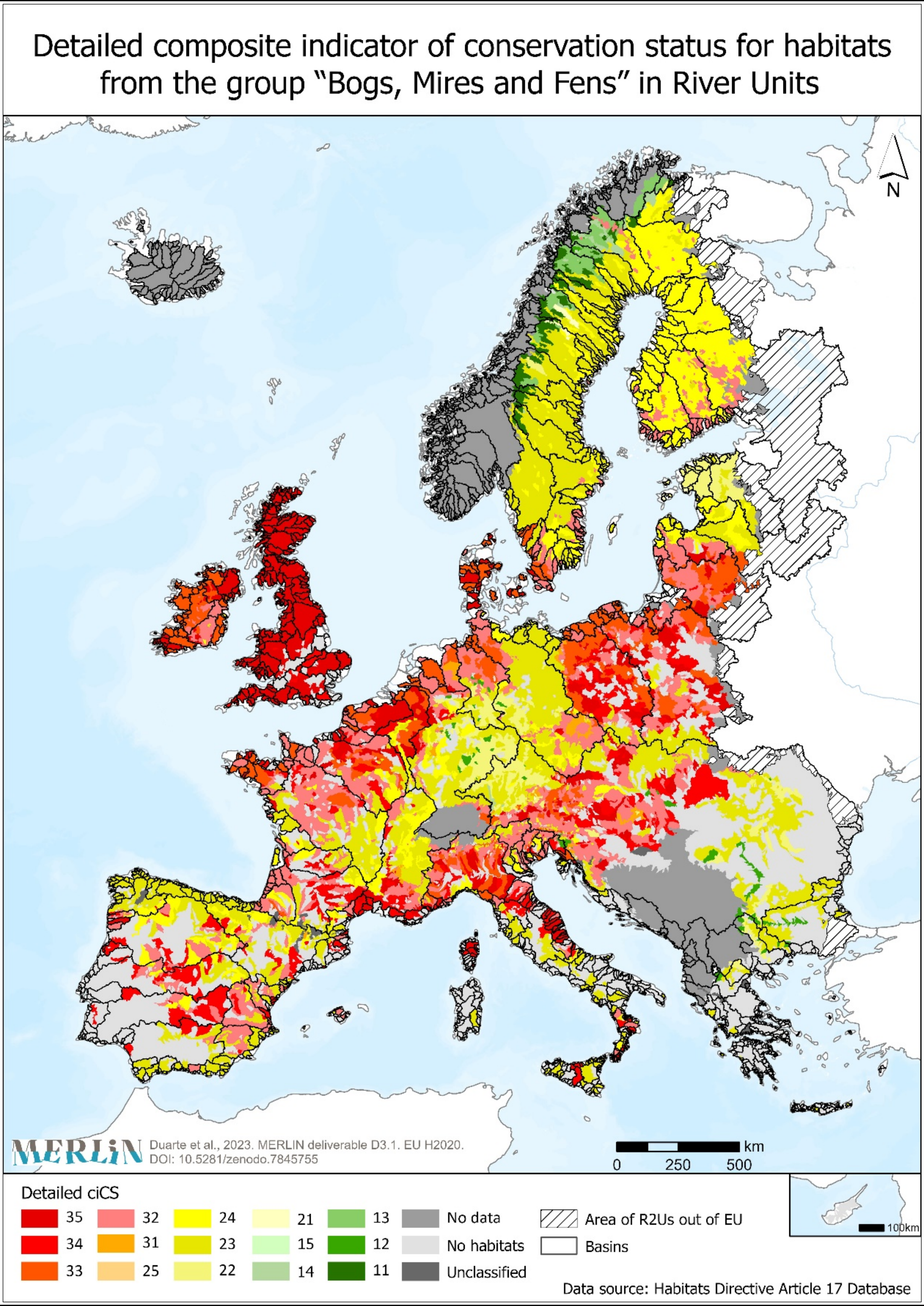
Descriptio n	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Forests” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of habitats from the group “Bogs, Mires and Fens” in River Units.
	
Summary	Number of habitats from the group from the group “Bogs, Mires and Fens” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

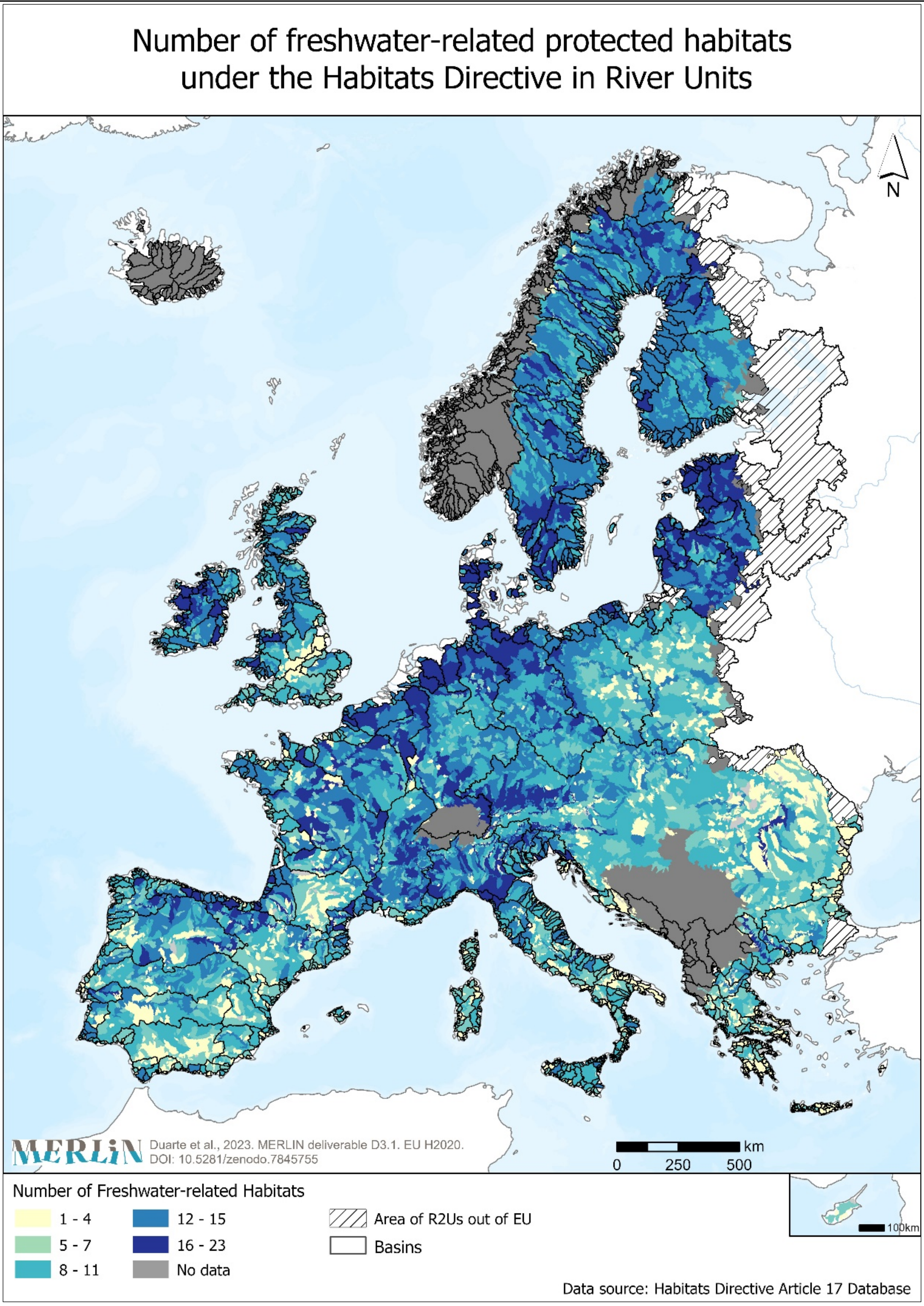
Description	Number of habitats from the group “Bogs, Mires and Fens”.present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for habitats from the group “Bogs, Mires and Fens” in River Units
	
Summary	Aggregated Composite Indicator ciCS of Habitats from the group “Bogs, Mires and Fens” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Bogs, Mires and Fens” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

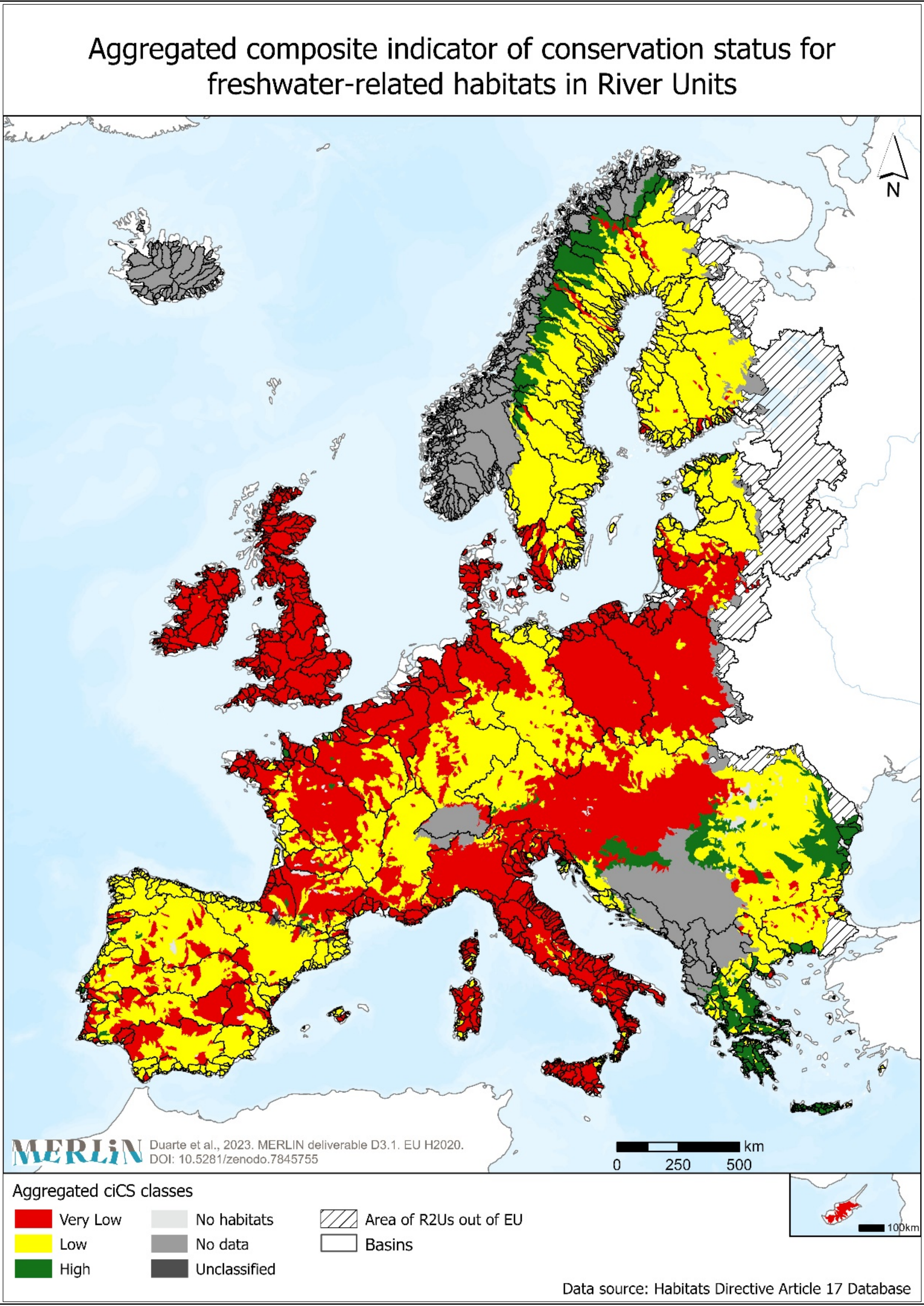
Title	Detailed composite indicator of conservation status for habitats from the group “Bogs, Mires and Fens” in River Units
	
Summary	Detailed Composite Indicator ciCS of Habitats from the group “Bogs, Mires and Fens” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U

	Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the habitats belonging to the group “Bogs, Mires and Fens” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of freshwater-related protected habitats under the Habitats Directive in River Units
	
Summary	The number of overall freshwater-related habitats from article 17 of the Habitats Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Number of overall habitats present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

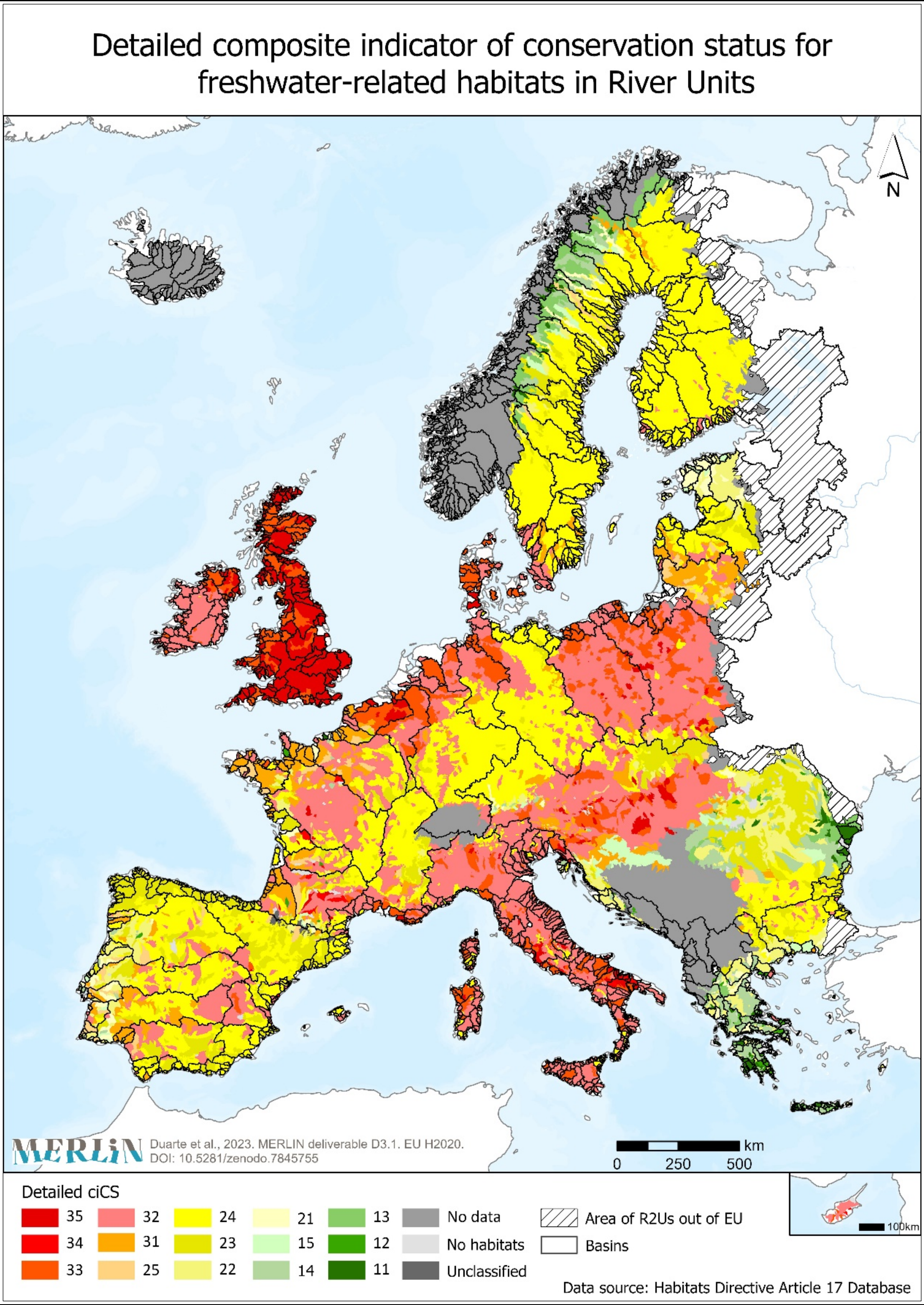
Title	Aggregated composite indicator of conservation status for freshwater-related protected habitats under the Habitats Directive in River Units



Summary	The aggregated Composite Indicator of Conservation Status (ciCS) for the overall freshwater-related from article 17 of the Habitats Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the overall habitats present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

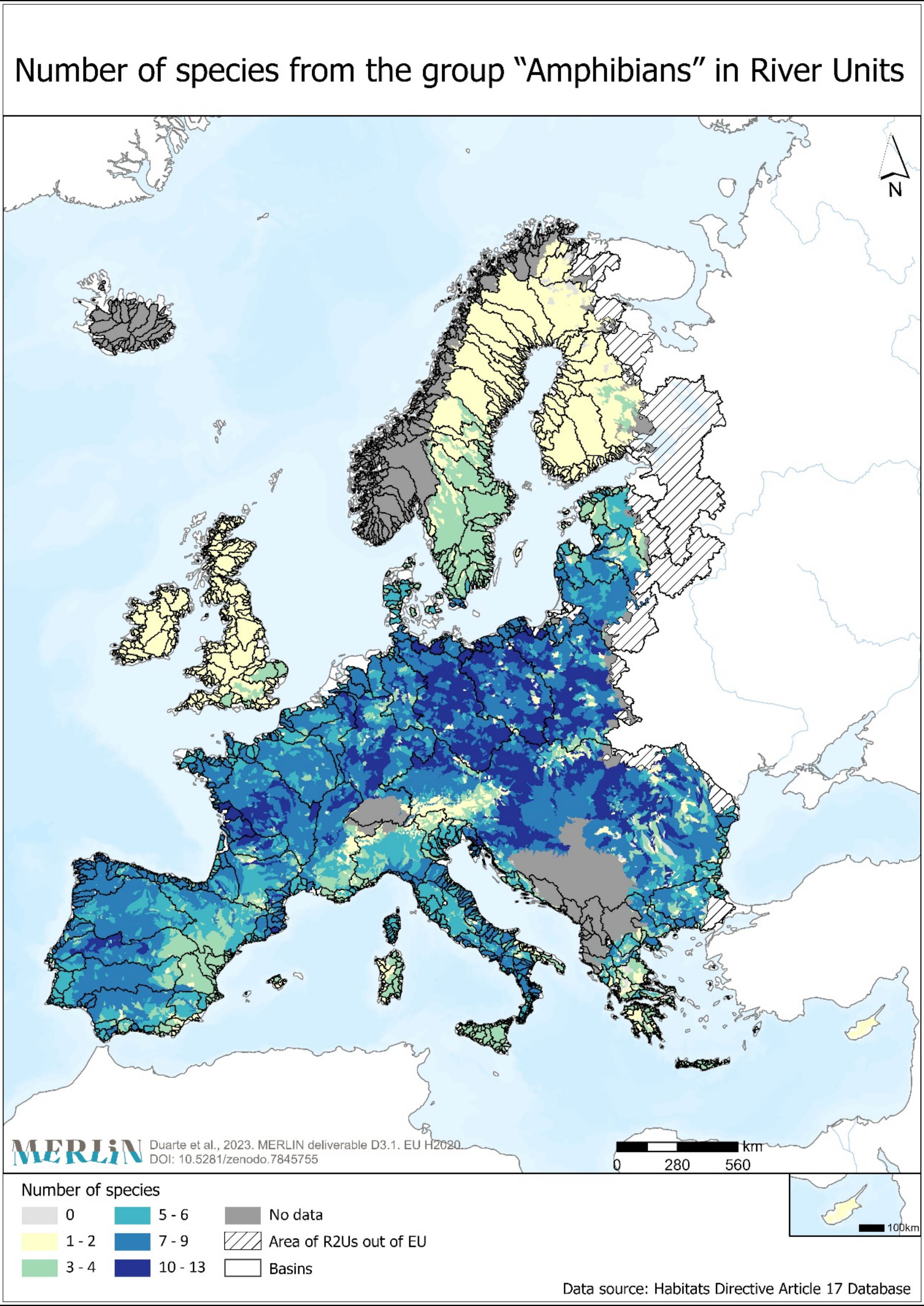
Title	Detailed composite indicator of conservation status for freshwater-related protected habitats under the Habitats Directive in River Units



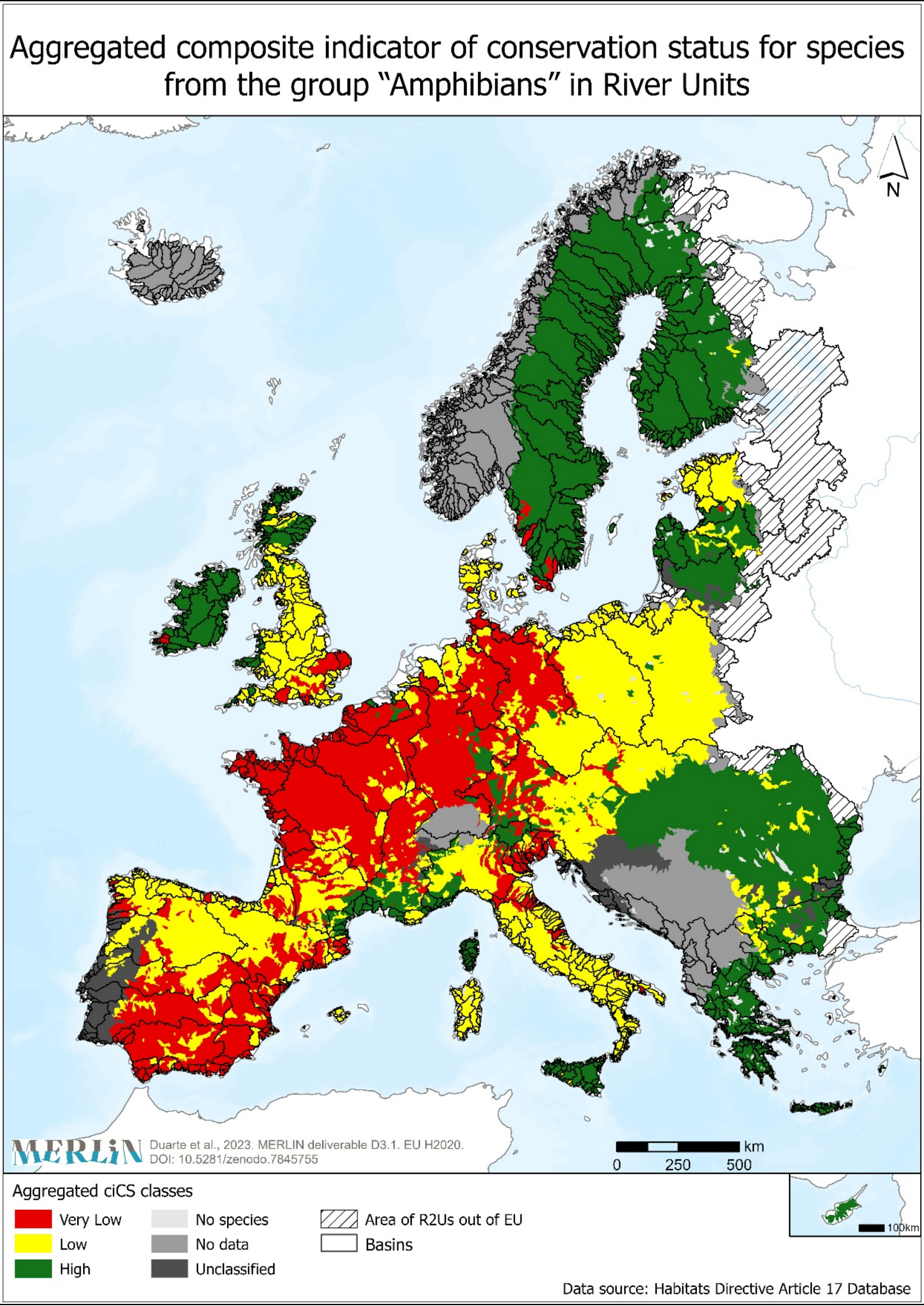
Summary	The detailed Composite Indicator of Conservation Status (ciCS) for the overall freshwater-related habitats from article 17 of the Habitats Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U

	Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the overall habitats present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

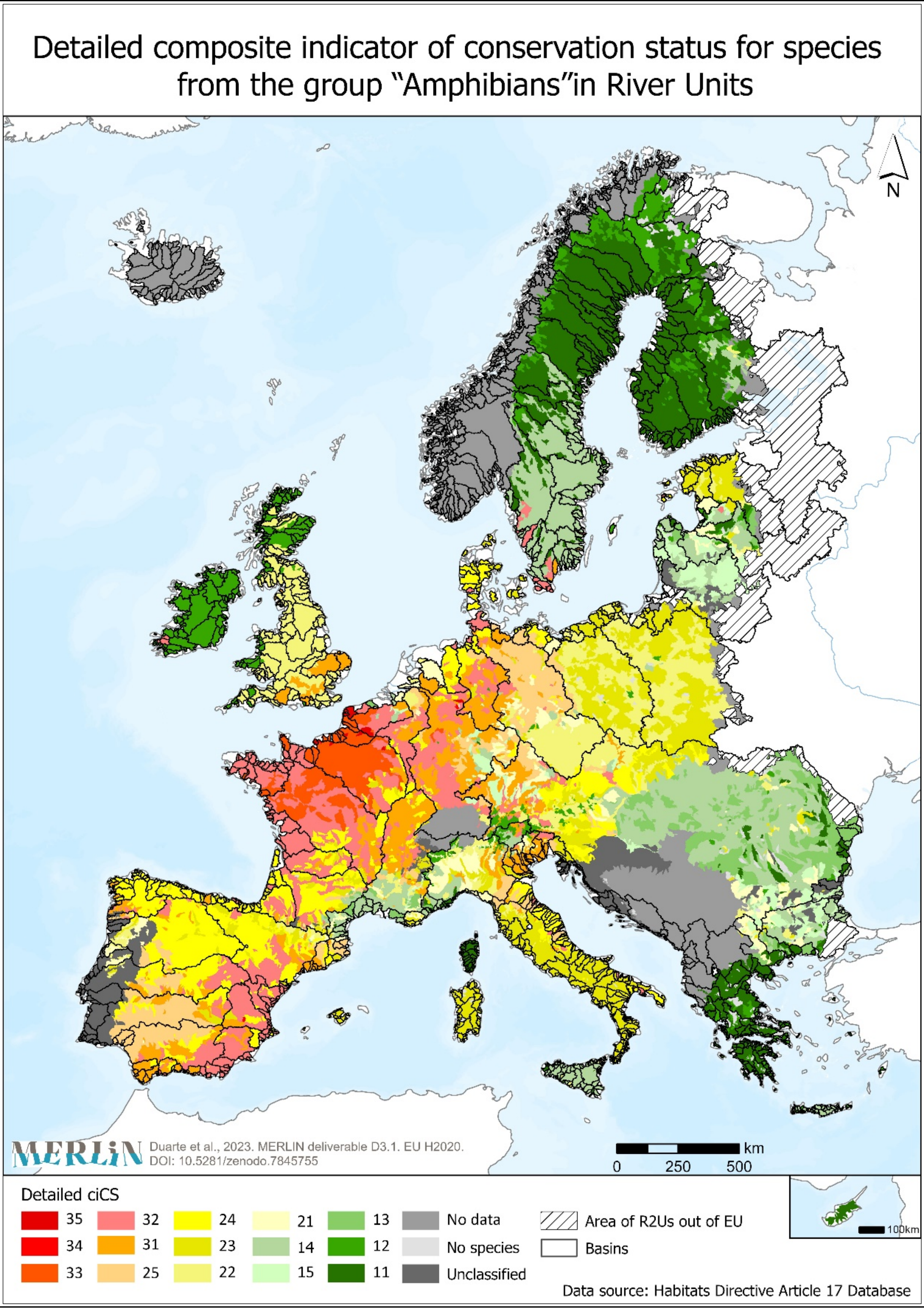
Species

Title	Number of species from the group “Amphibians” in River Units
	
Summary	Number of species from the group from the group “Amphibians” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

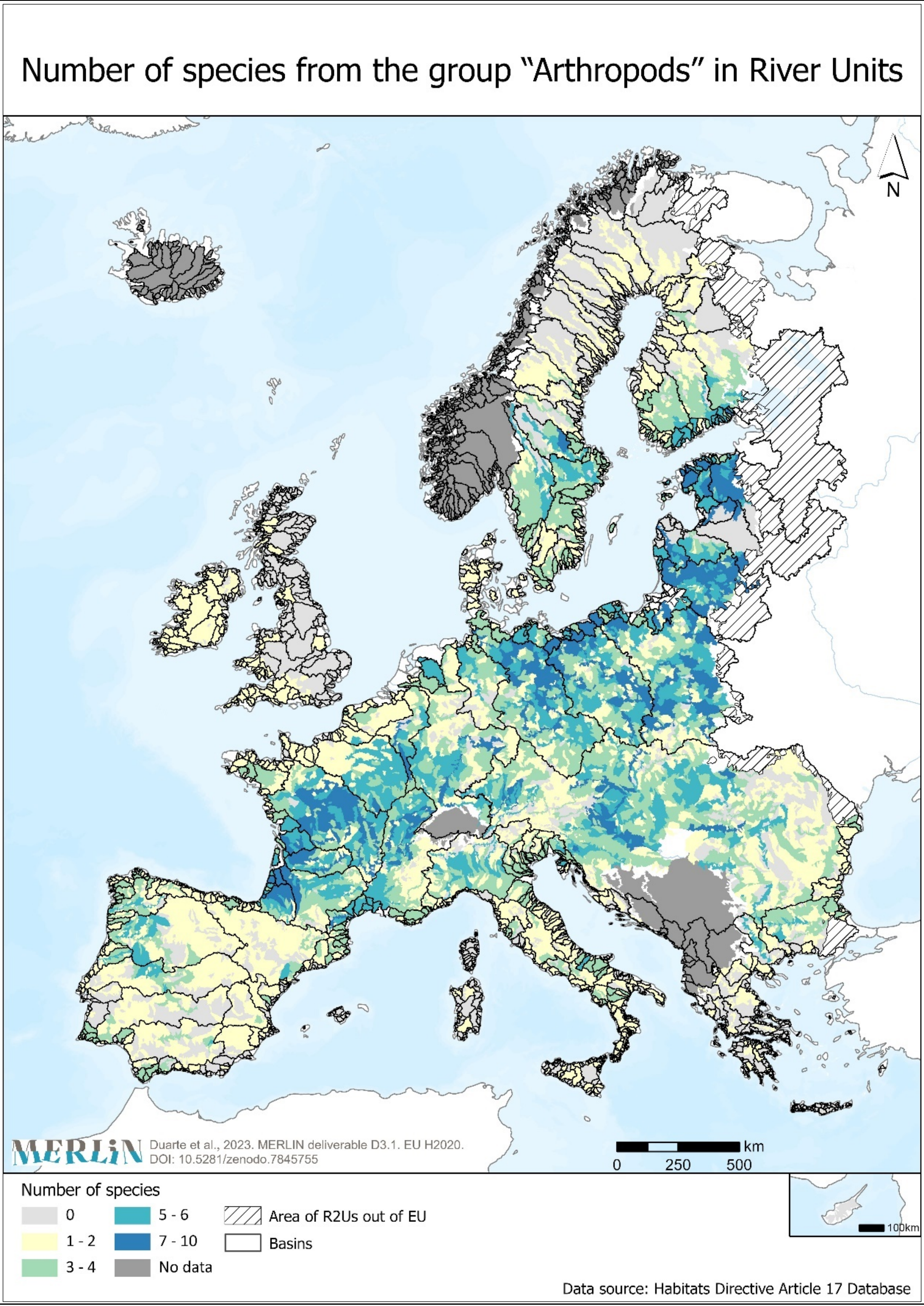
	Responsible: School of Agriculture, University of Lisbon
Description	Number of species from the group “Amphibians” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for species from the group “Amphibians” in River Units.
	
Summary	Aggregated Composite Indicator ciCS of Species from the group “Amphibians” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

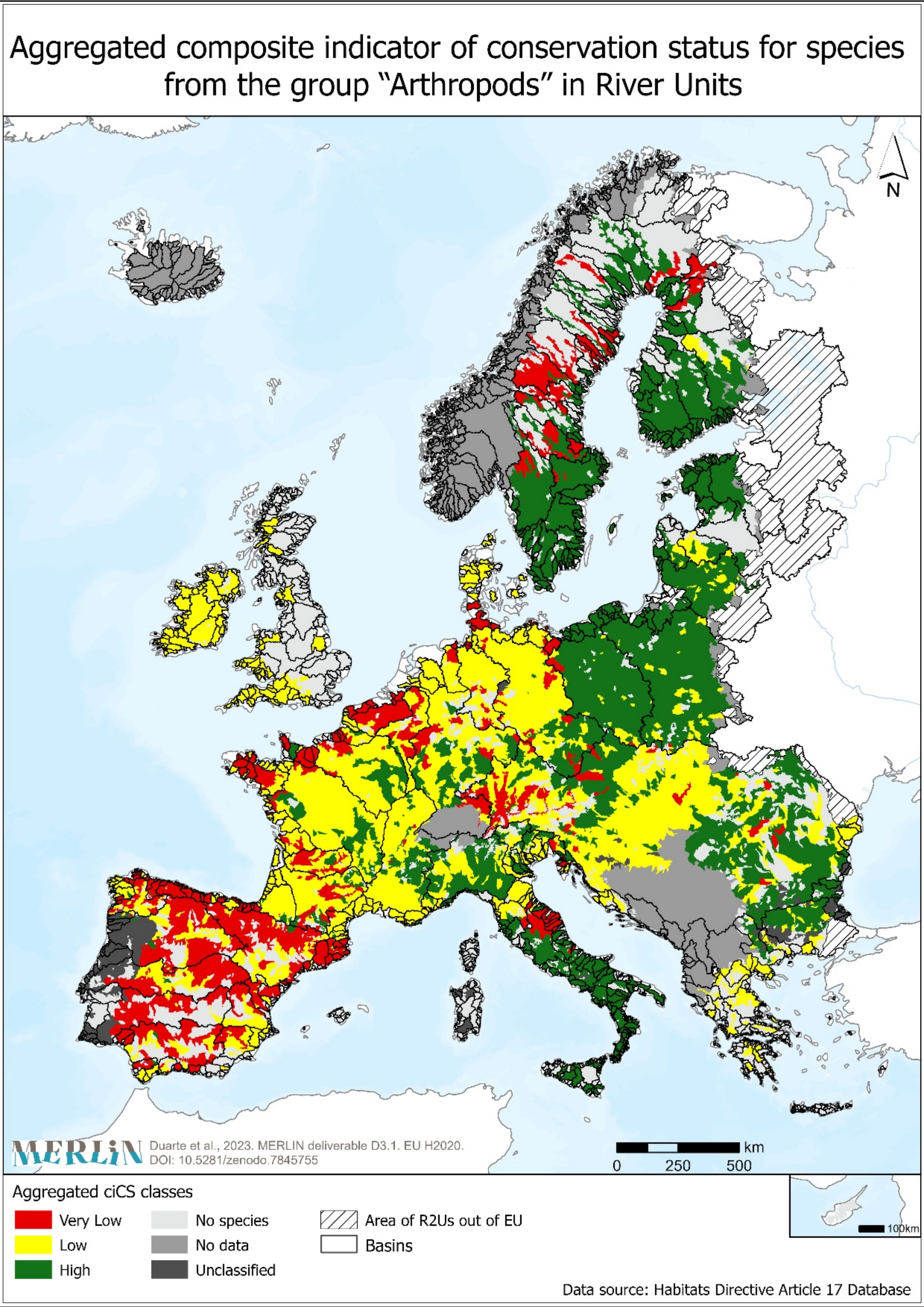
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Amphibians” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for species from the group "Amphibians" in River Units.
	
Summary	Detailed Composite Indicator ciCS of Species from the group "Amphibians" from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

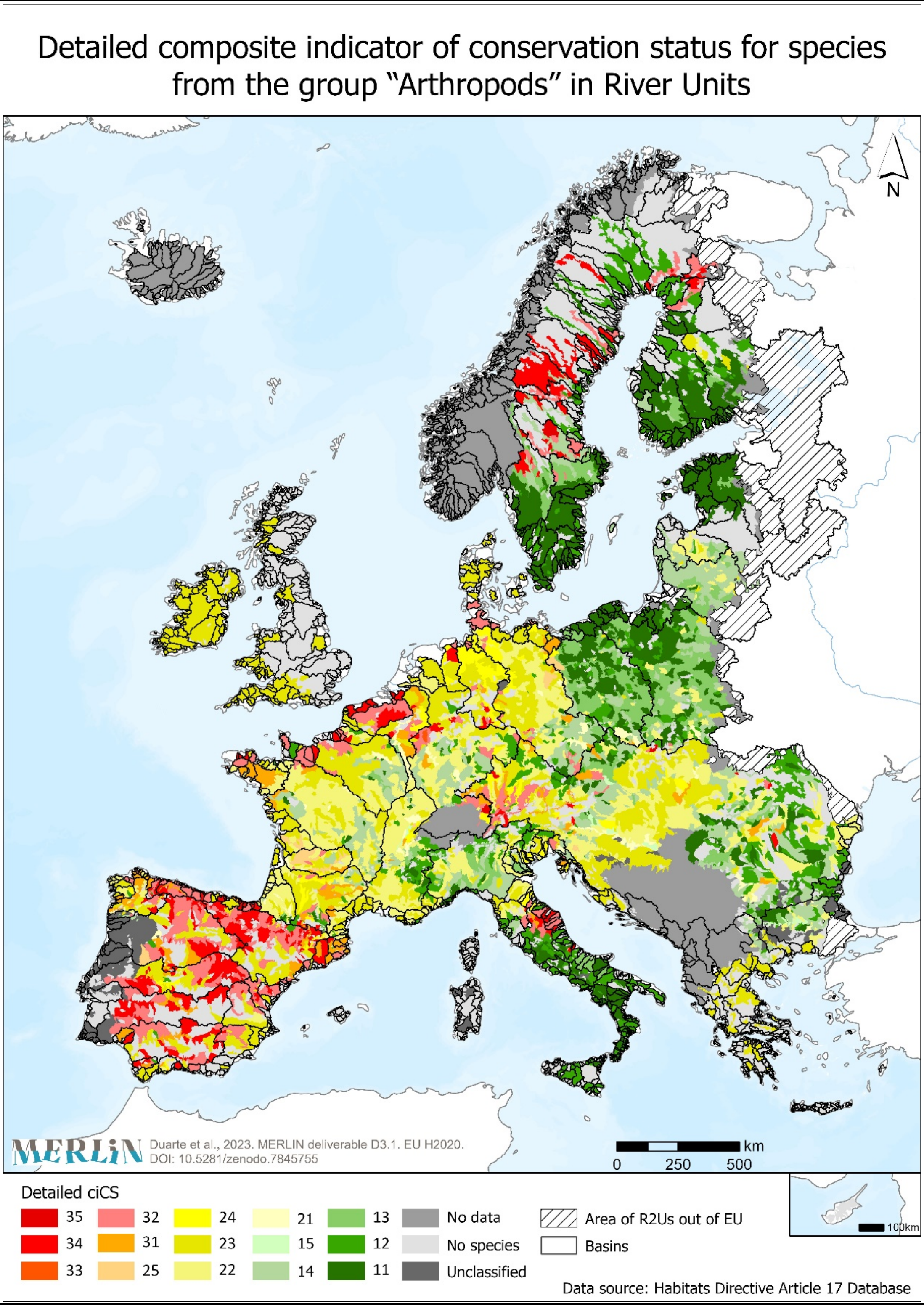
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Amphibians” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of species from the group “Arthropods” in River Units.
	
Summary	Number of species from the group from the group “Arthropods” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

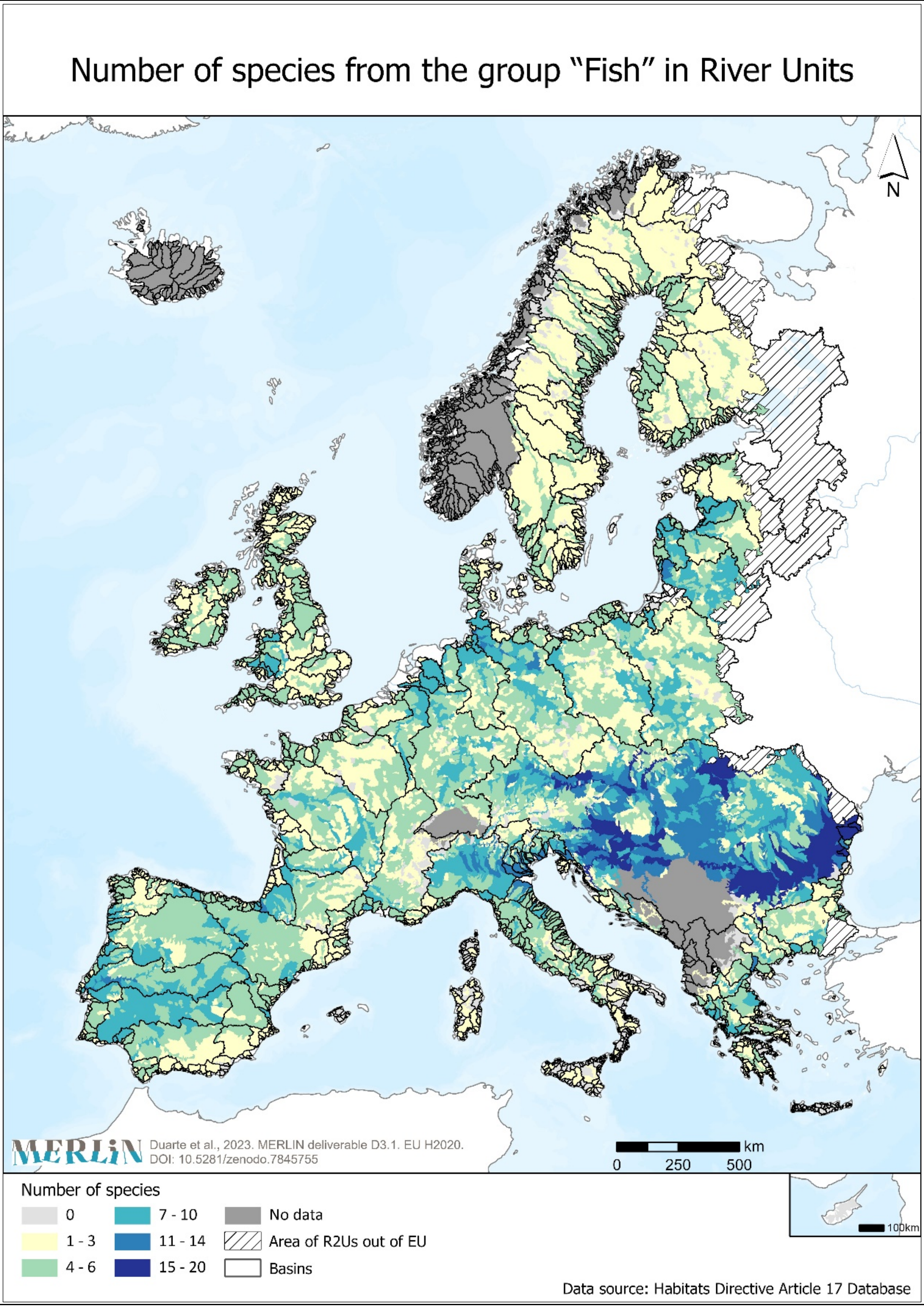
Description	Number of species from the group “Arthropods” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for species from the group “Arthropods” in River Units.
	
Summary	Aggregated Composite Indicator ciCS of Species from the group “Arthropods” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

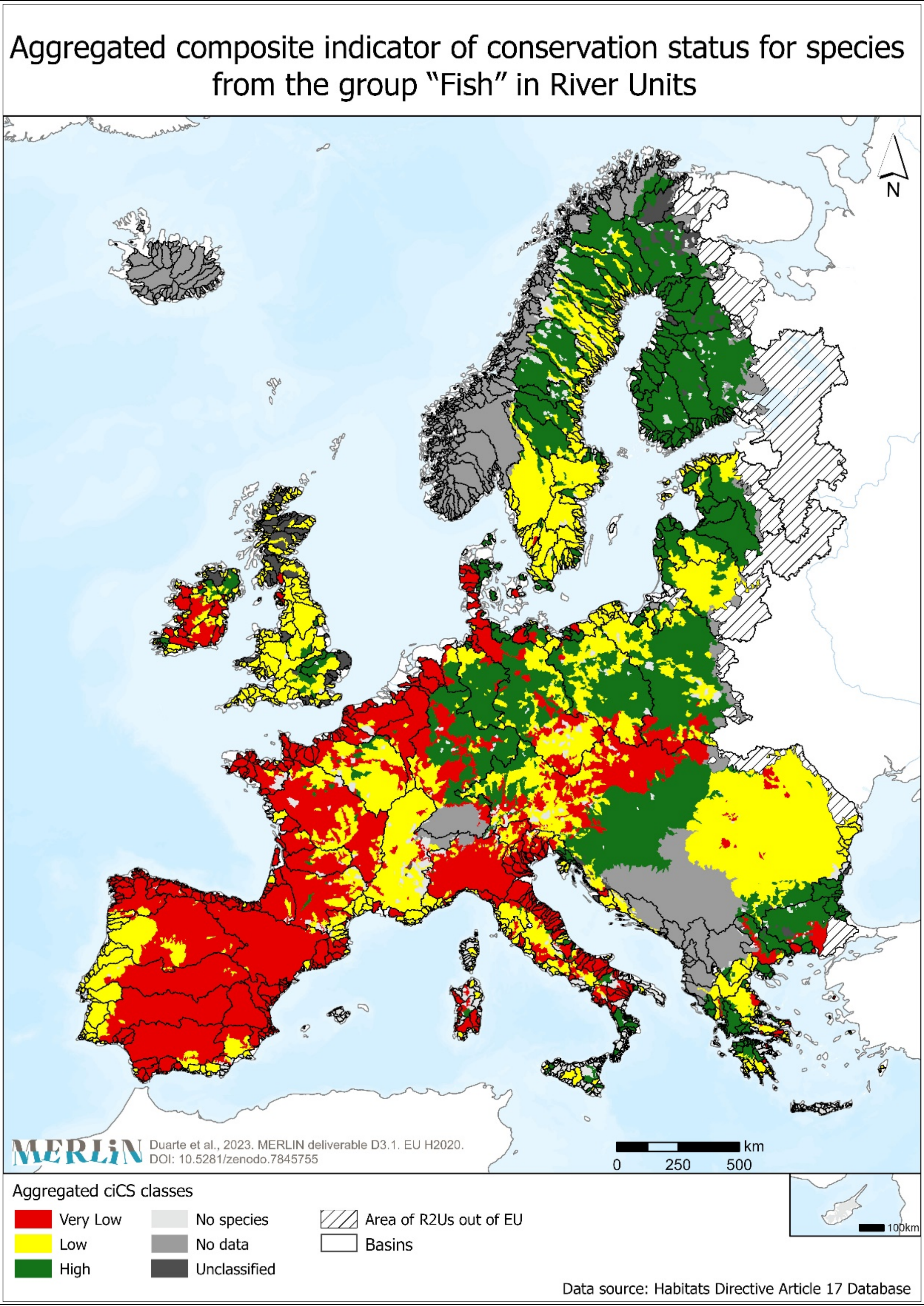
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Arthropods” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for species from the group “Arthropods” in River Units
	
Summary	Detailed Composite Indicator ciCS of Species from the group “Arthropods” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

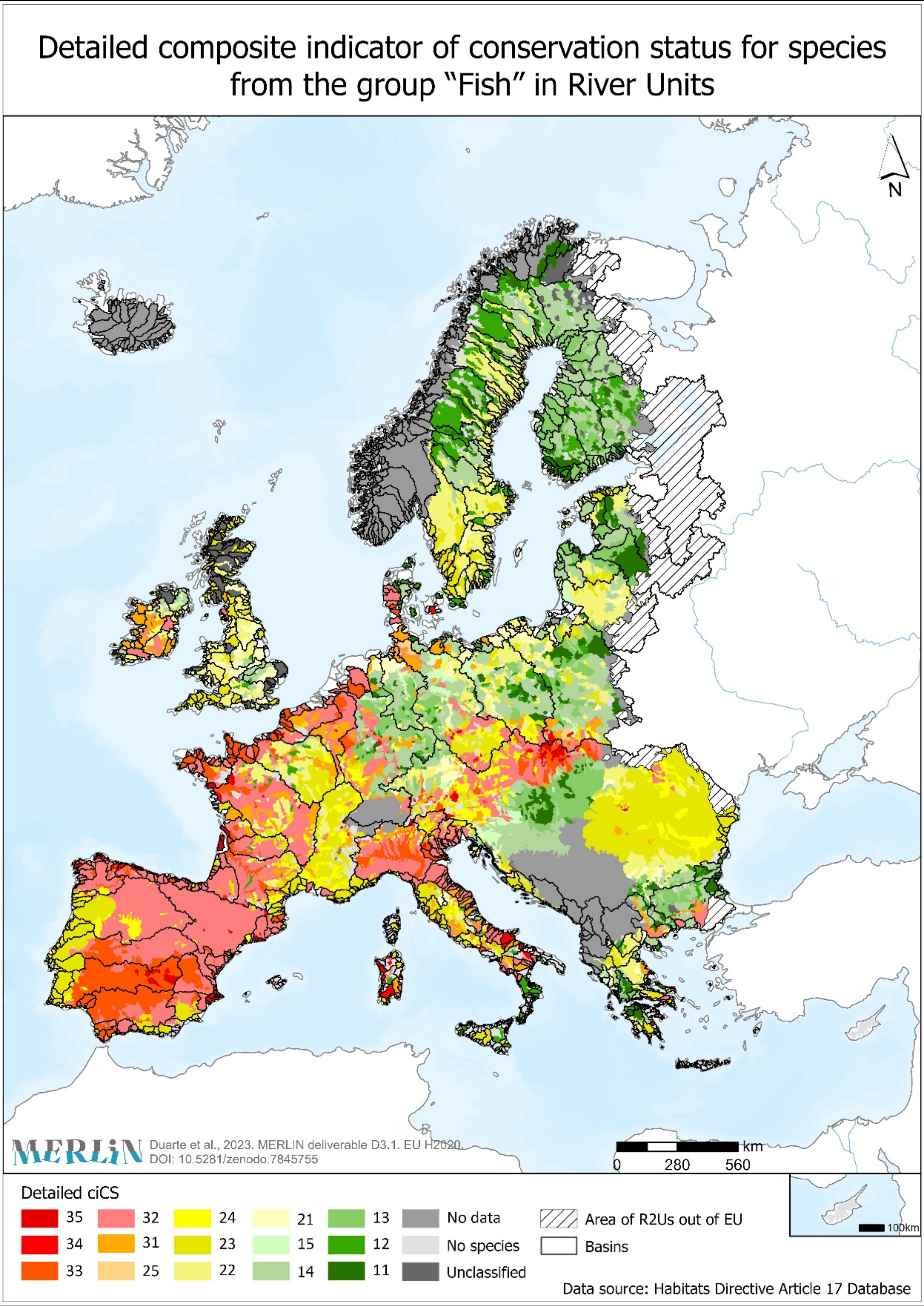
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group "Arthropods" present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of species from the group “Fish” in River Units
	
Summary	Number of species from the group from the group “Fish” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

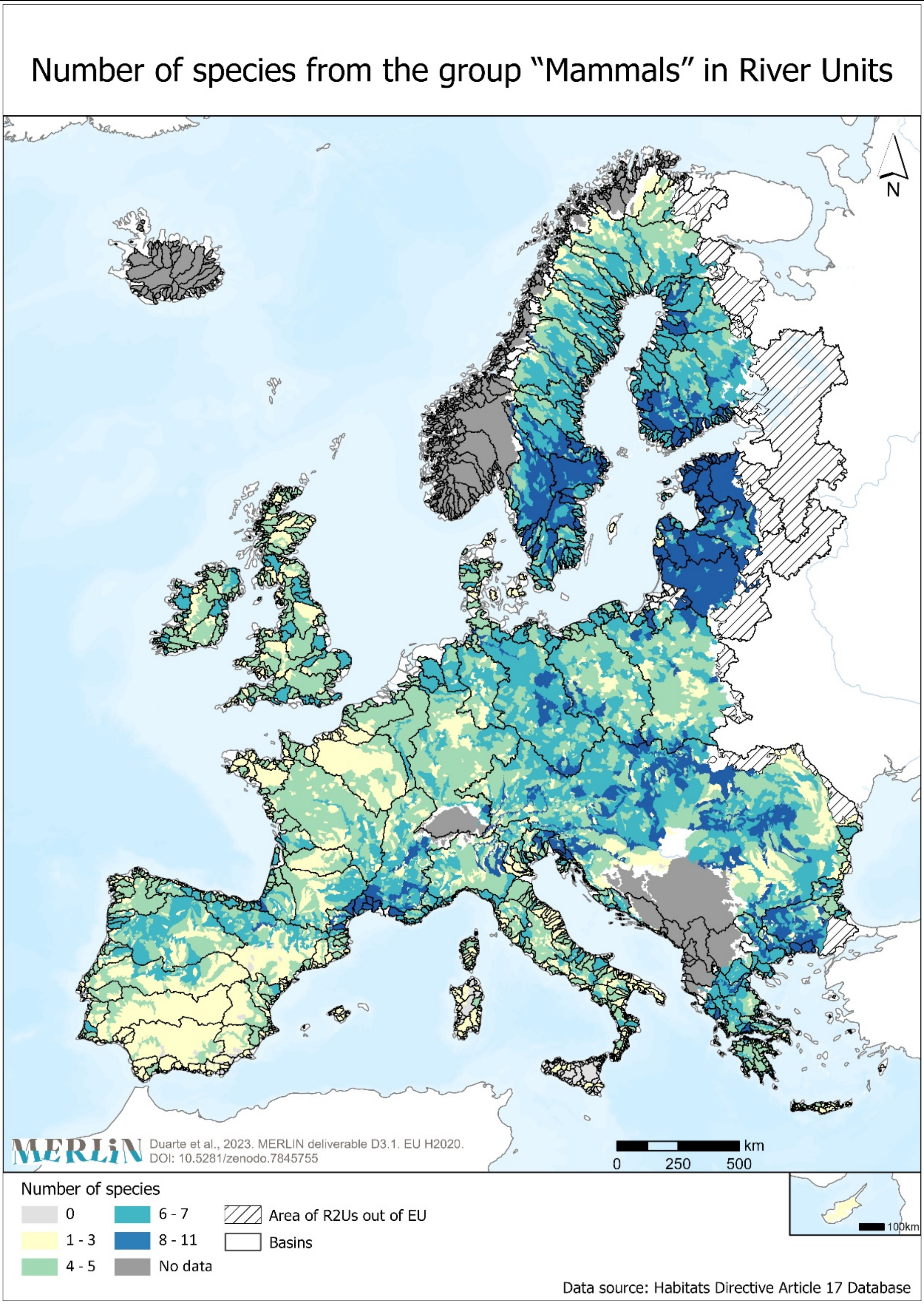
Description	Number of species from the group “Fish” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for species from the group “Fish” in River Units
	
Summary	Aggregated Composite Indicator ciCS of Species from the group “Fish” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Fish” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for species from the group “Fish” in River Units
	
Summary	Detailed Composite Indicator ciCS of Species from the group “Fish” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Fish” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of species from the group “Mammals” in River Units
	
Summary	Number of species from the group from the group “Mammals” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Number of species from the group “Mammals” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

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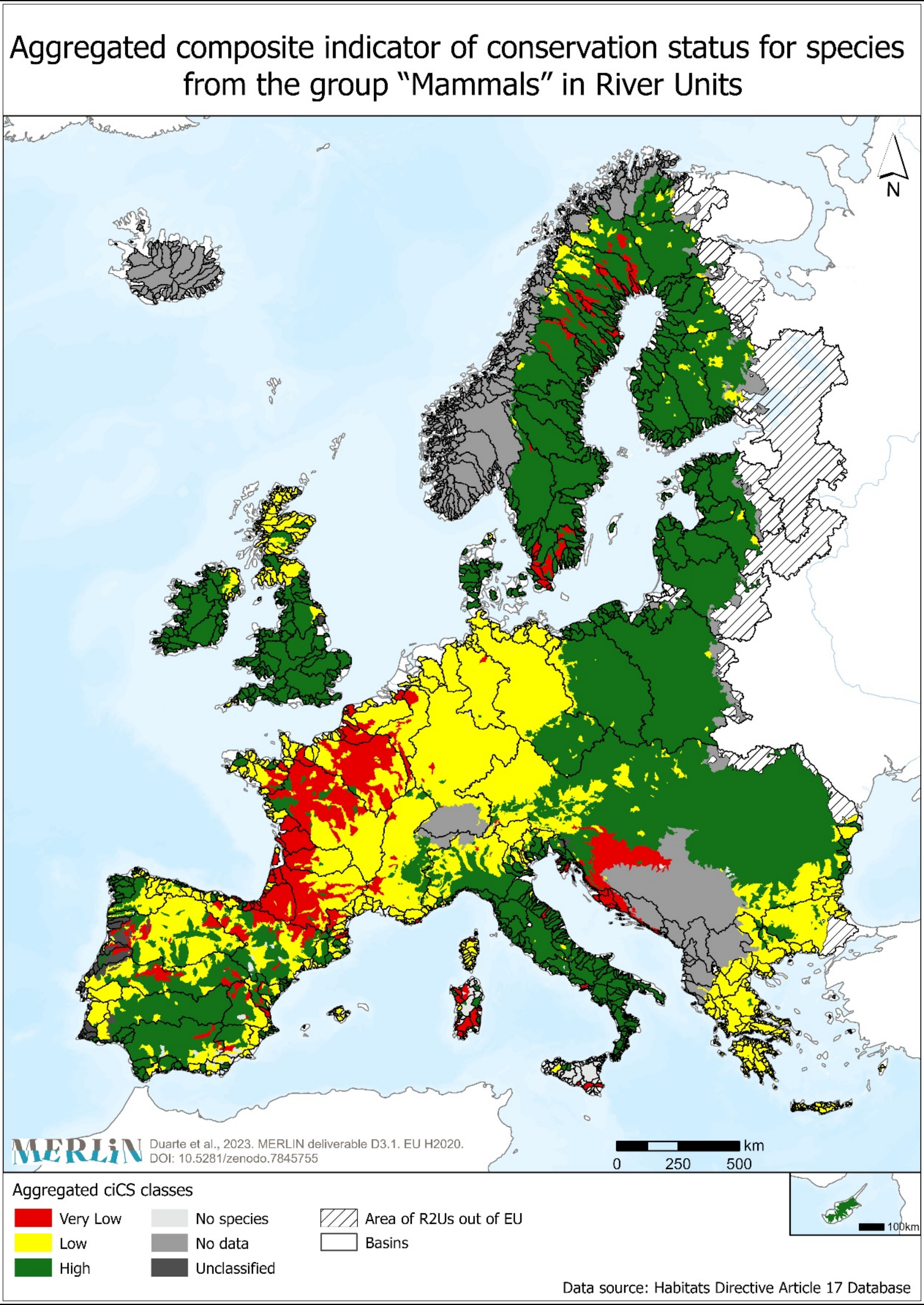
<tr><td>Title</td><td>Aggregated composite indicator of conservation status for species from the group “Mammals” in River Units</td></tr>
<tr><td></td><td>
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Creation Date: March 2023
Resolution: R2U
Version: 3.0</td></tr>
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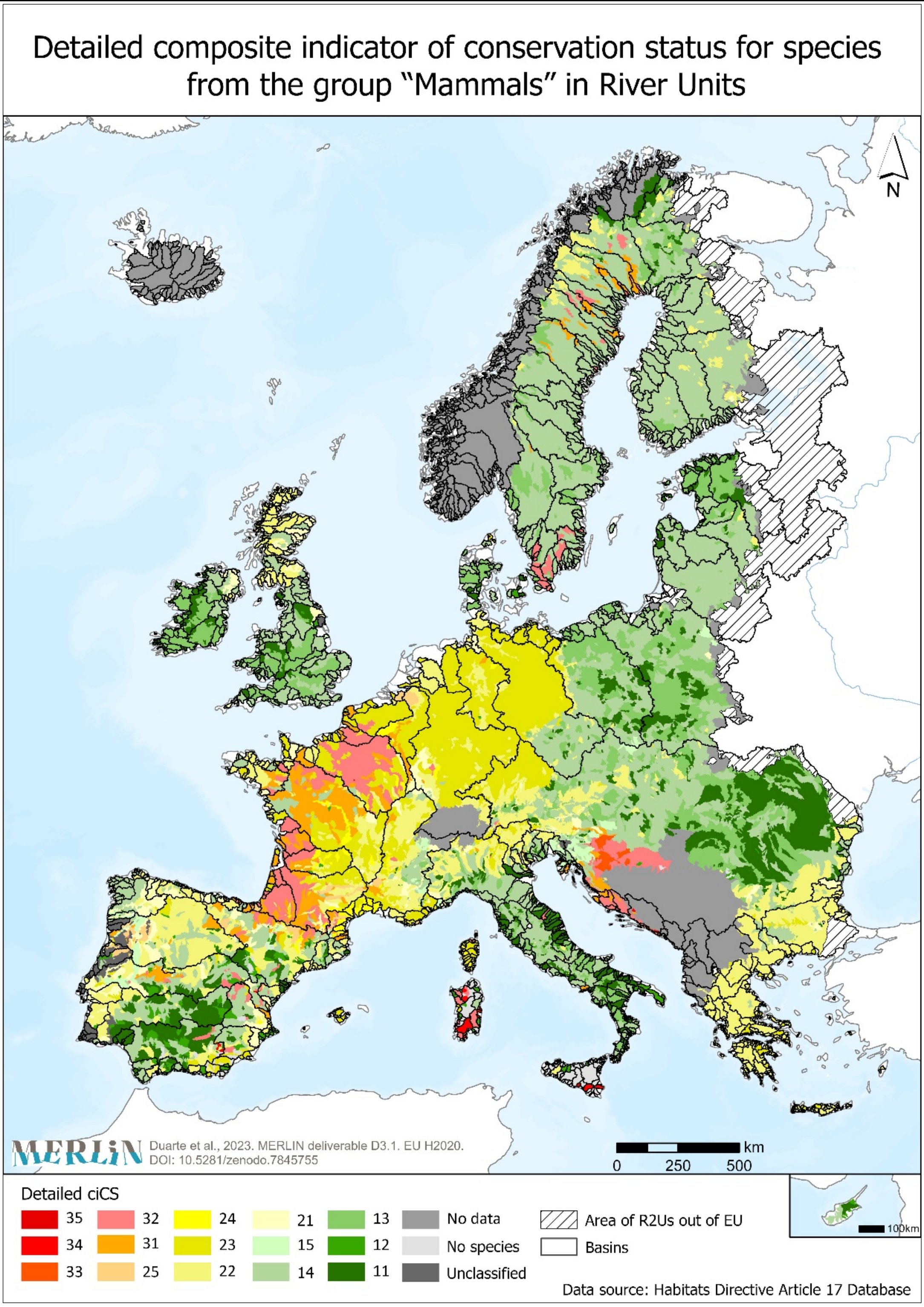
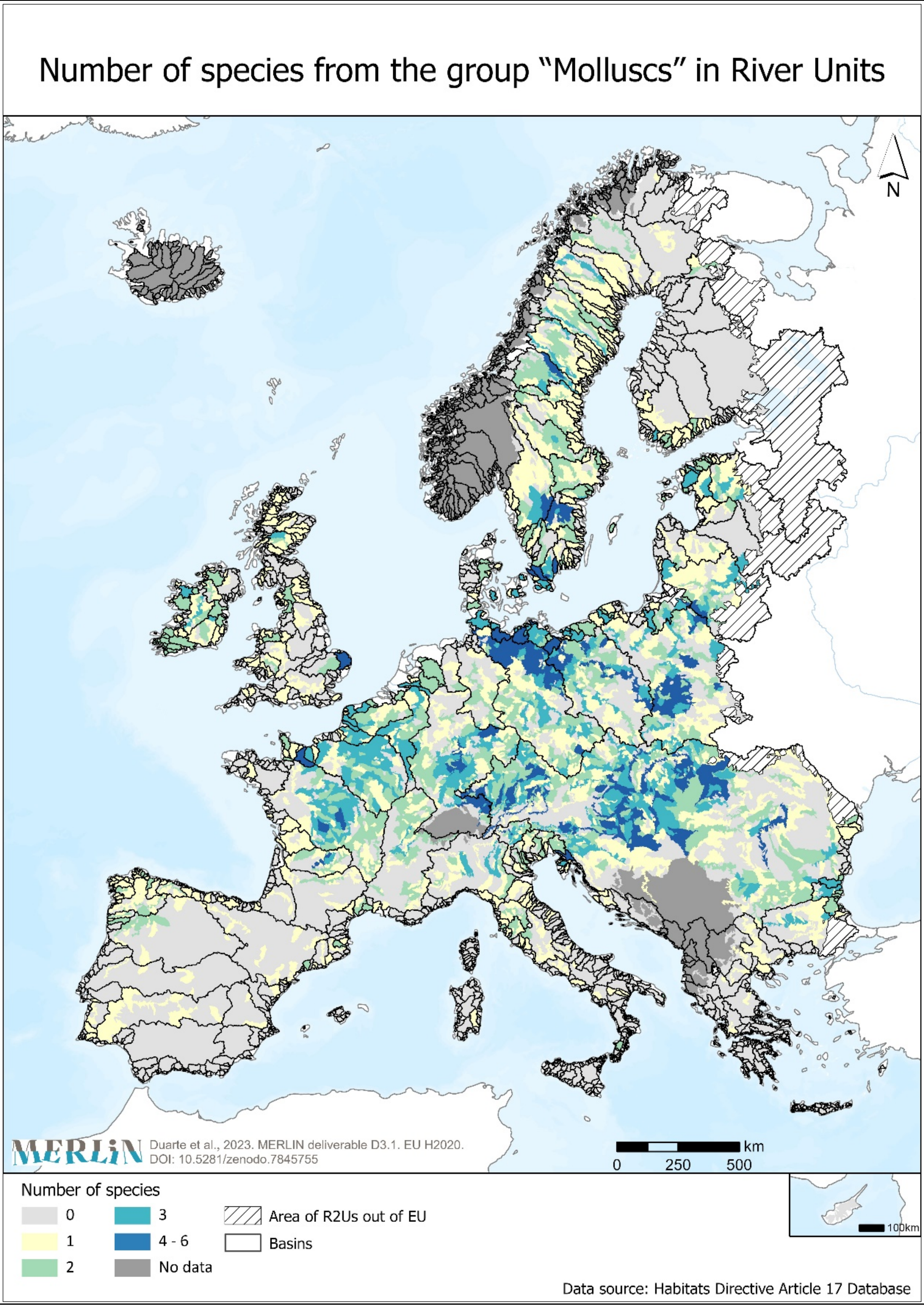
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Mammals” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for species from the group "Mammals" in River Units
	
Summary	Detailed Composite Indicator ciCS of Species from the group "Mammals" from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Mammals” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of species from the group “Molluscs” in River Units
	
Summary	Number of species from the group from the group “Molluscs” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Number of species from the group “Molluscs” present in the R2U.
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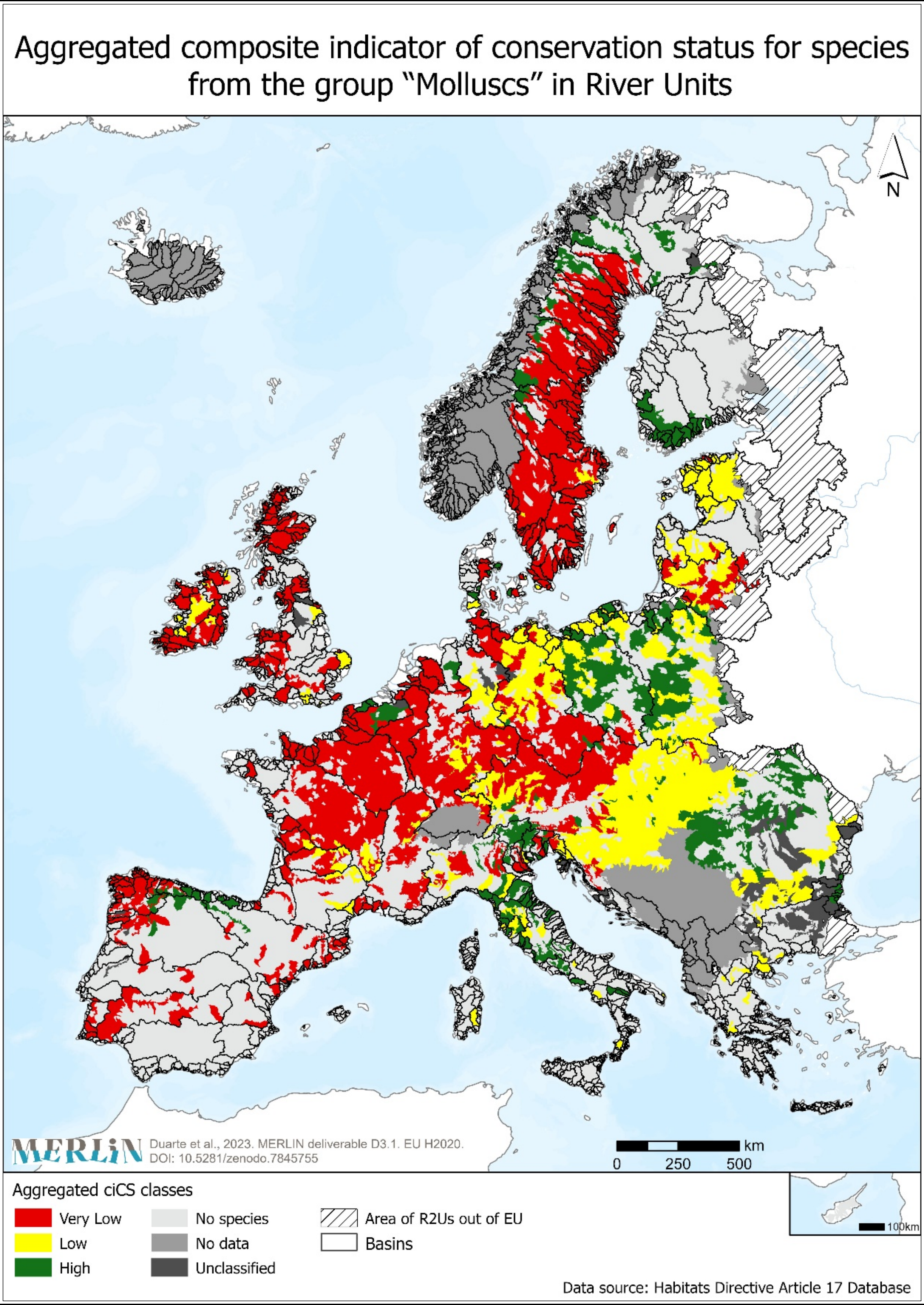
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for species from the group “Molluscs” in River Units.
	
Summary	Aggregated Composite Indicator ciCS of Species from the group “Molluscs” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Molluscs” present in the R2U.
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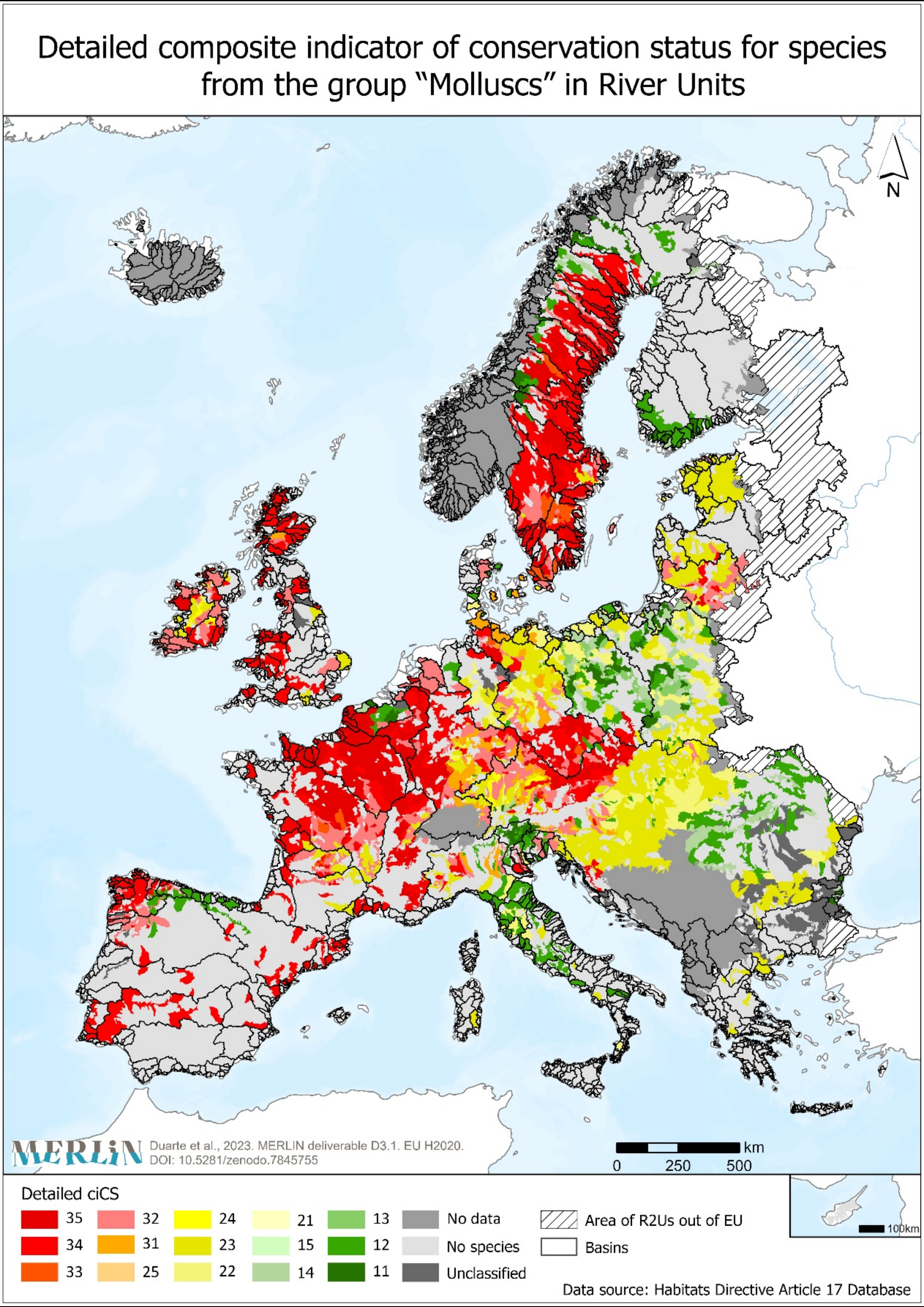
Title	Detailed composite indicator of conservation status for species from the group "Molluscs" in River Units
	
Summary	Detailed Composite Indicator ciCS of Species from the group "Molluscs" from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Molluscs” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

<table>
<tr><td>Title</td><td>Number of species from the group “Non-Vascular Plants” in River Units.</td></tr>
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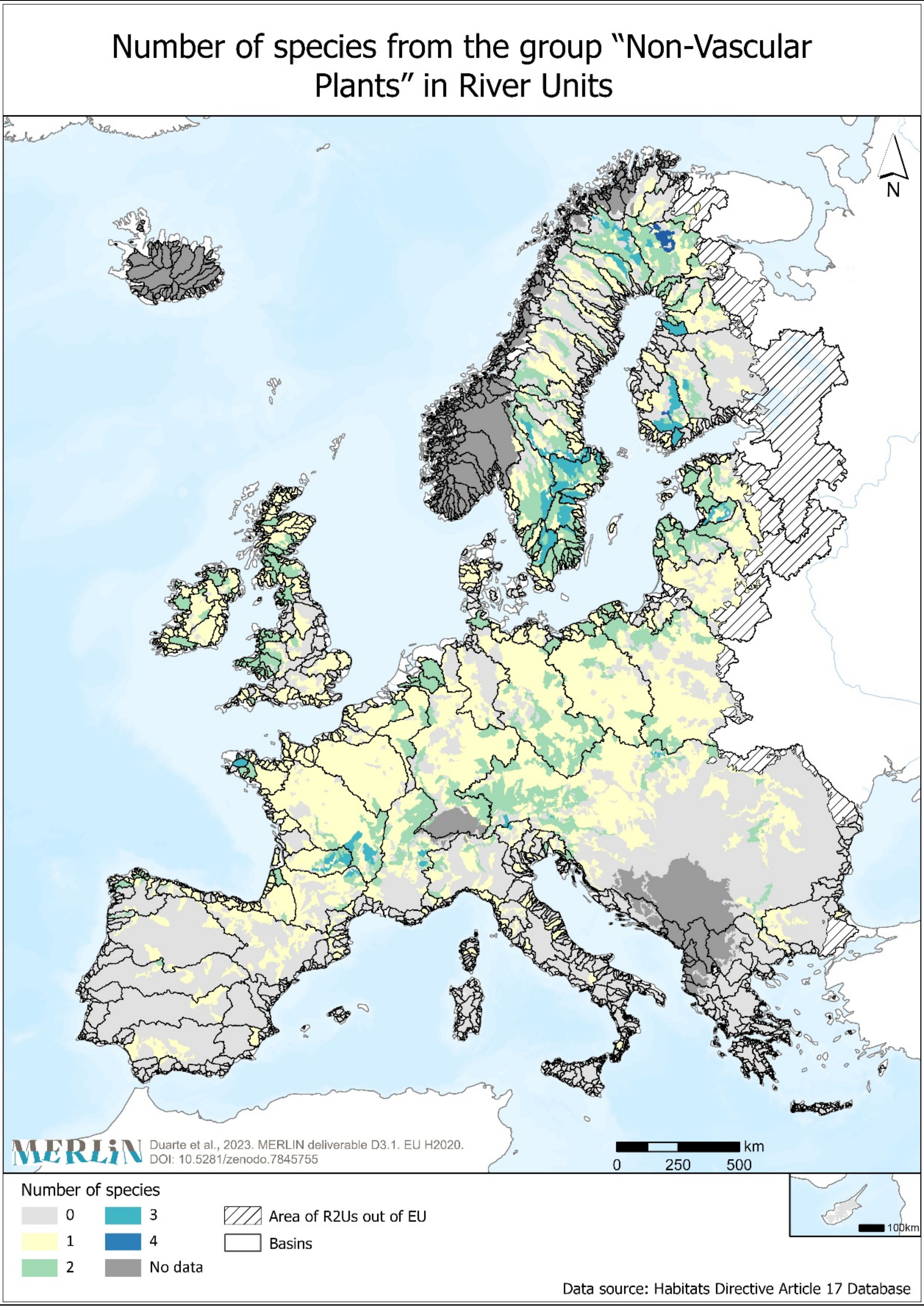

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<tr><td>Summary</td><td>Number of species from the group from the group “Non-Vascular Plants” from article 17 of the Habitats Directive in the River Restoration Units.
Creation Date: March 2023
Resolution: R2U
Version: 3.0
Responsible: School of Agriculture, University of Lisbon</td></tr>
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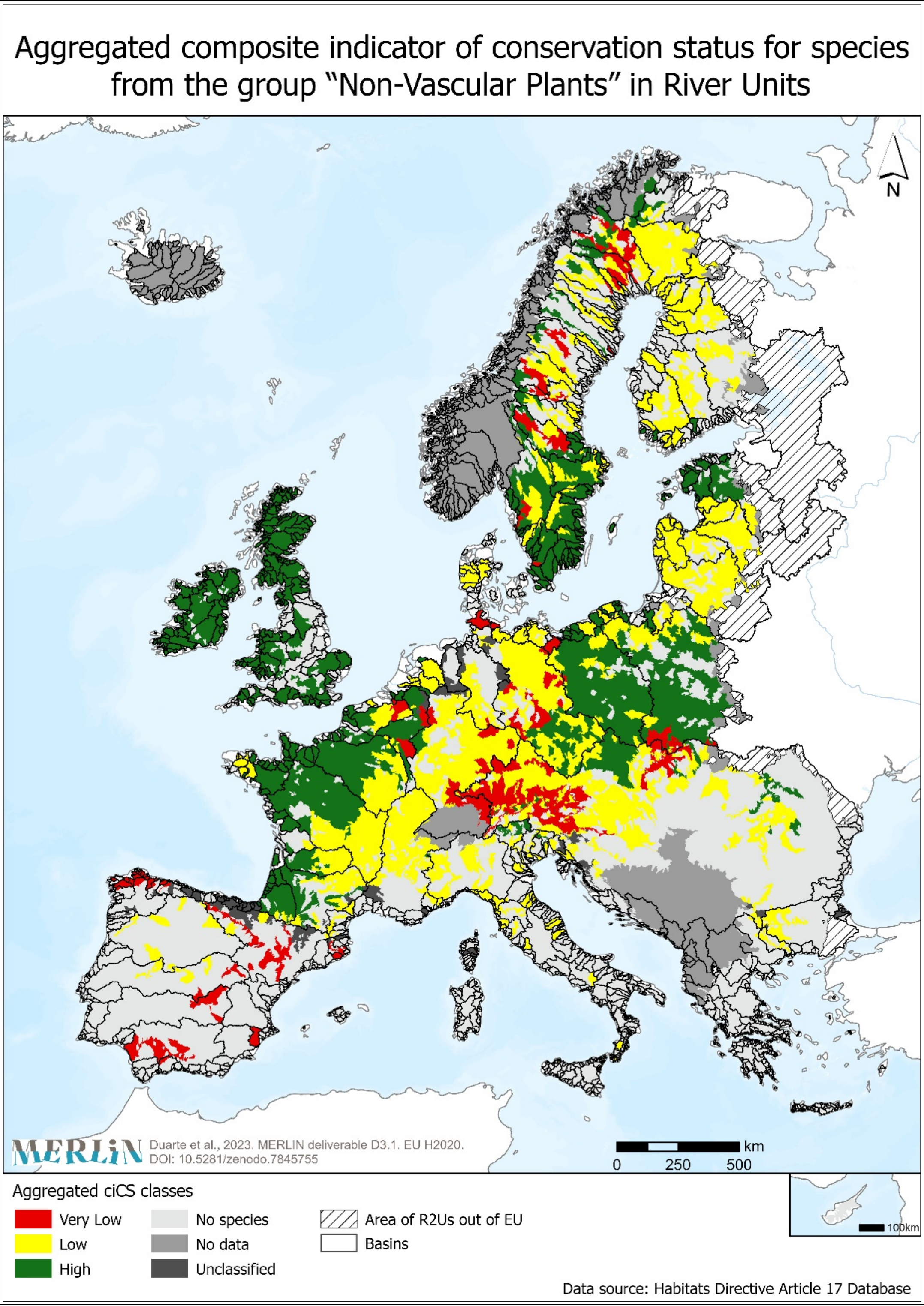
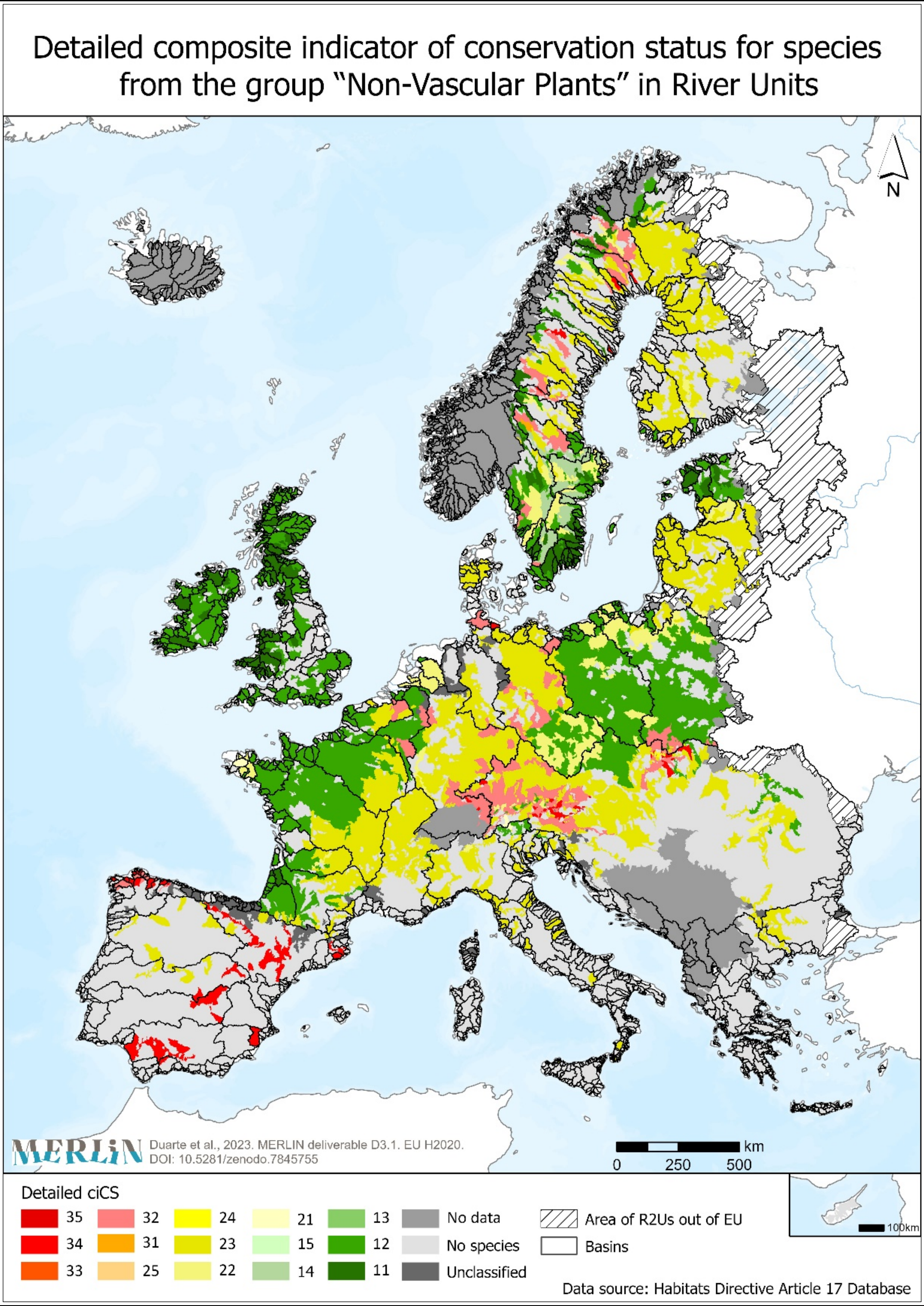
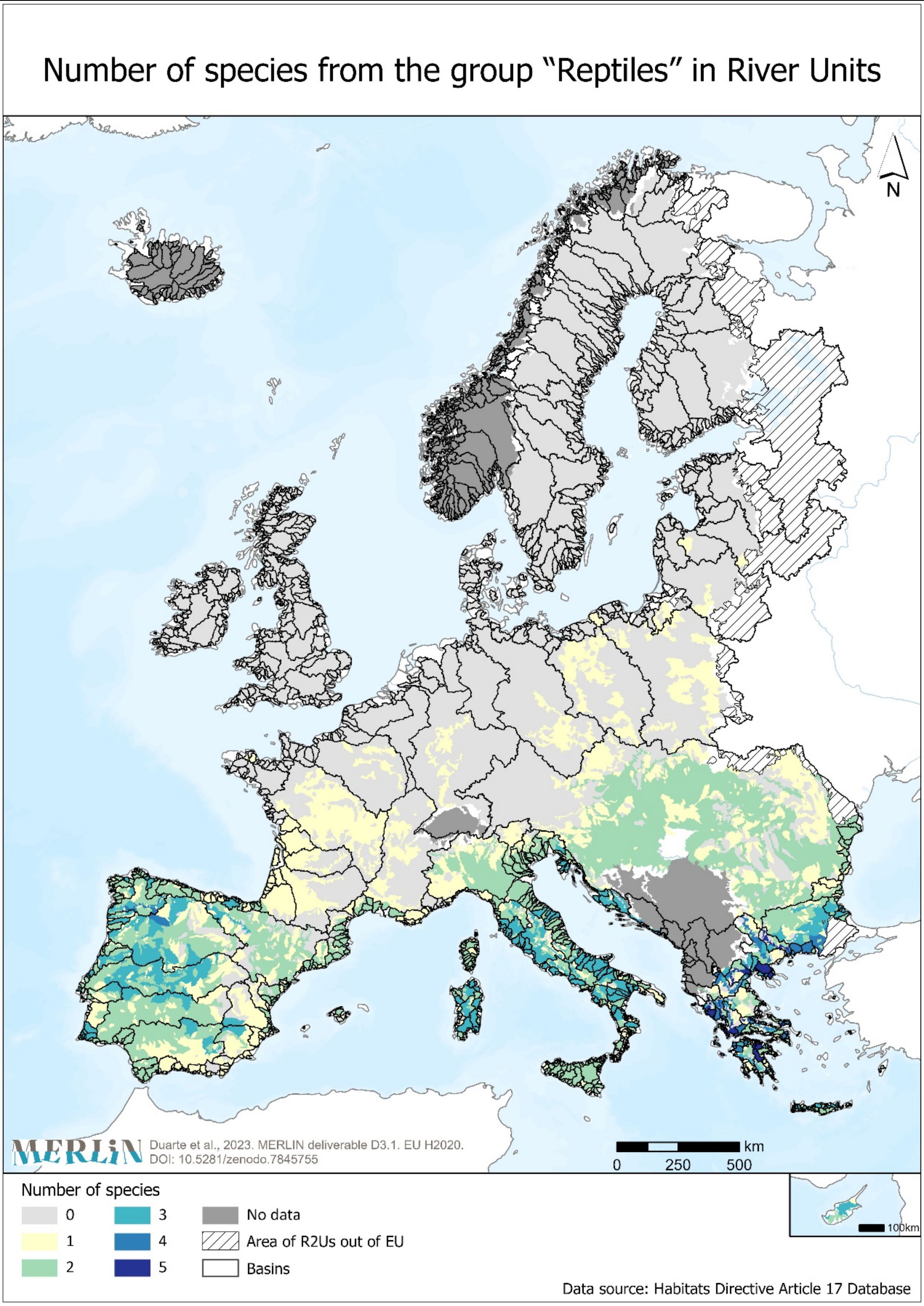
Description	Number of species from the group “Non-Vascular Plants” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for species from the group “Non-Vascular Plants” in River Units
	
Summary	Aggregated Composite Indicator ciCS of Species from the group “Non-Vascular Plants” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

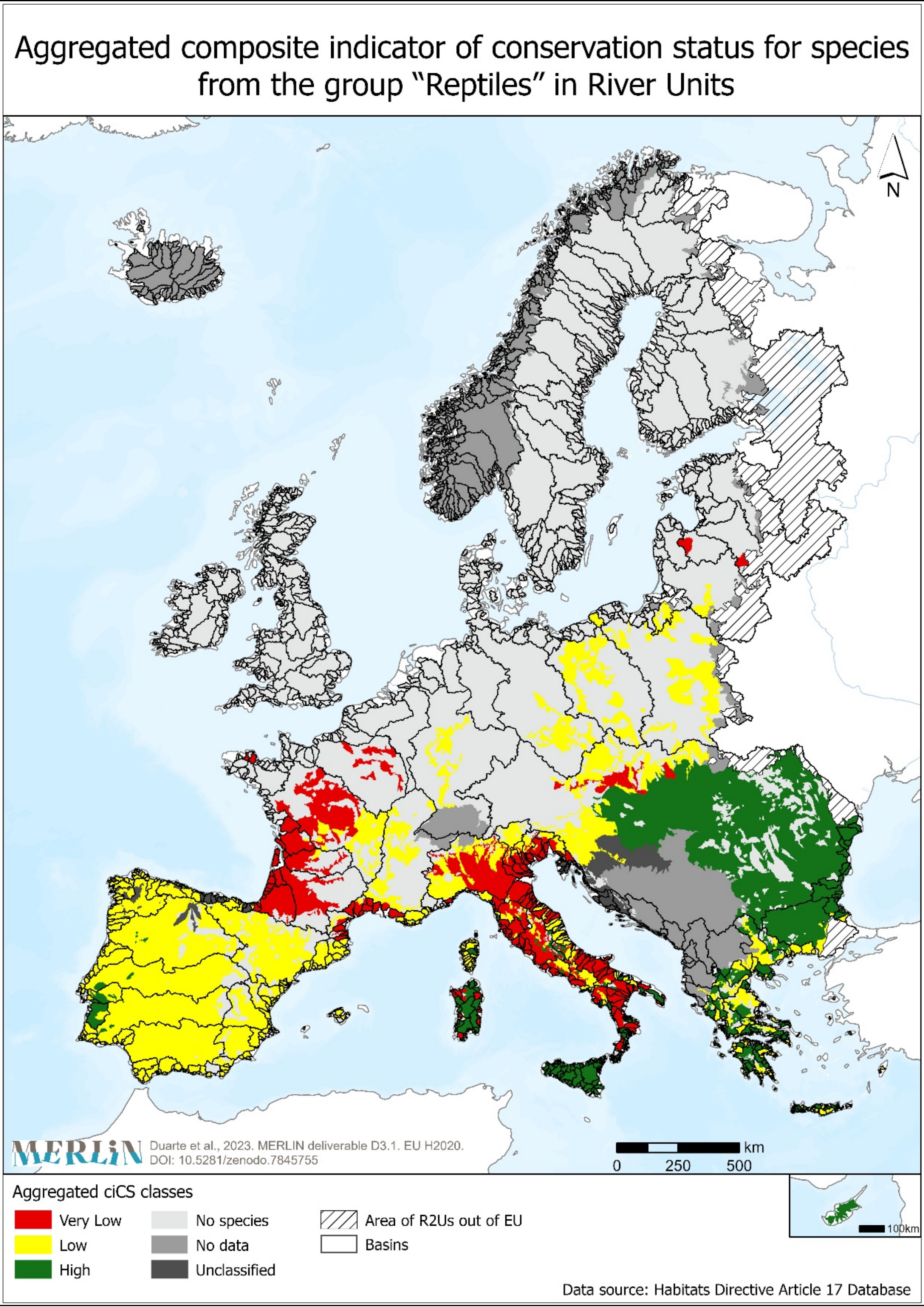
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Non-Vascular Plants” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for species from the group “Non-Vascular Plants” in River Units
	
Summary	Detailed Composite Indicator ciCS of Species from the group “Non-Vascular Plants” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Non-Vascular Plants” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

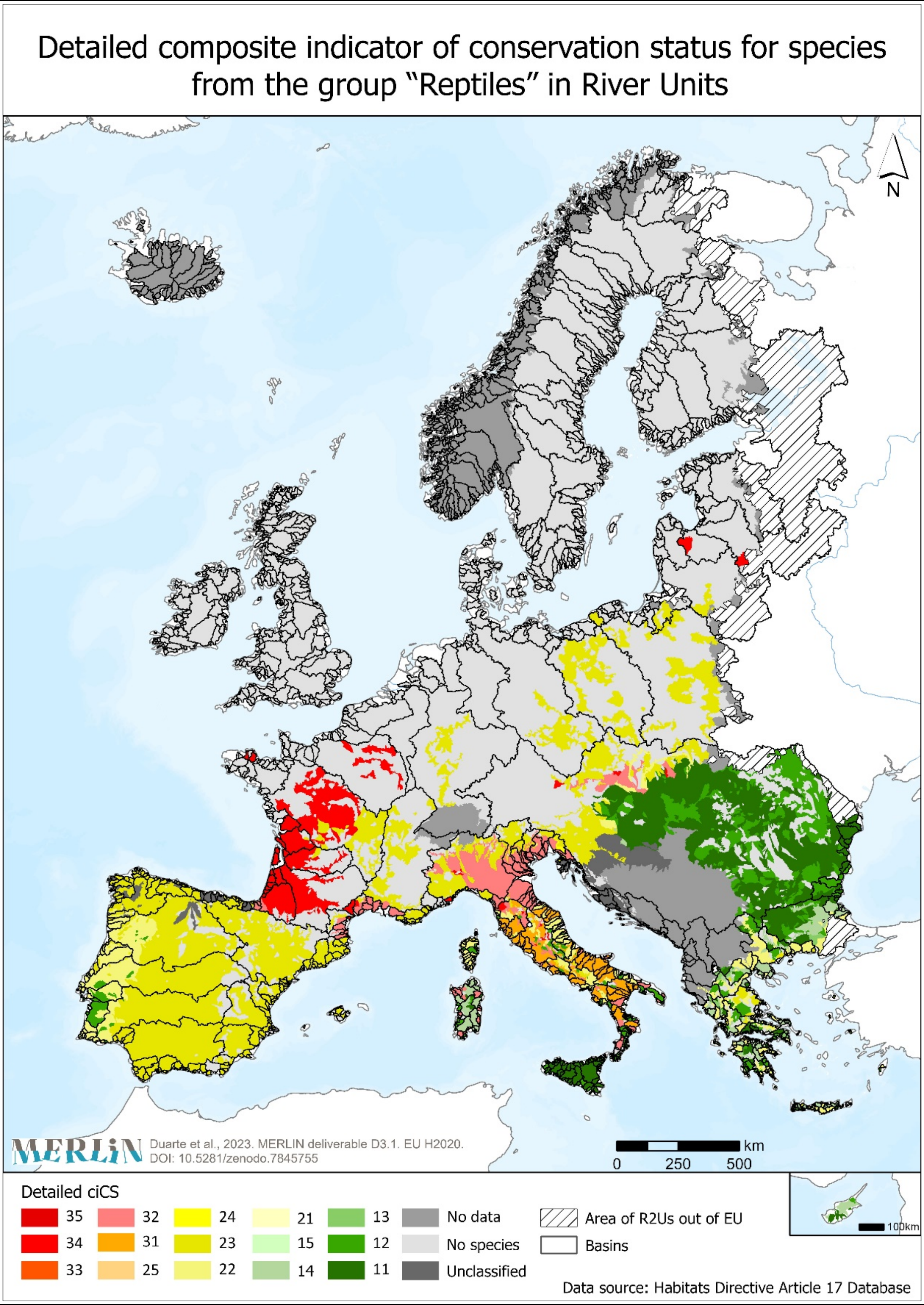
Title	Number of species from the group “Reptiles” in River Units
	
Summary	Number of species from the group from the group “Reptiles” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Number of species from the group “Reptiles” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for species from the group “Reptiles” in River Units.
	
Summary	Aggregated Composite Indicator ciCS of Species from the group “Reptiles” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

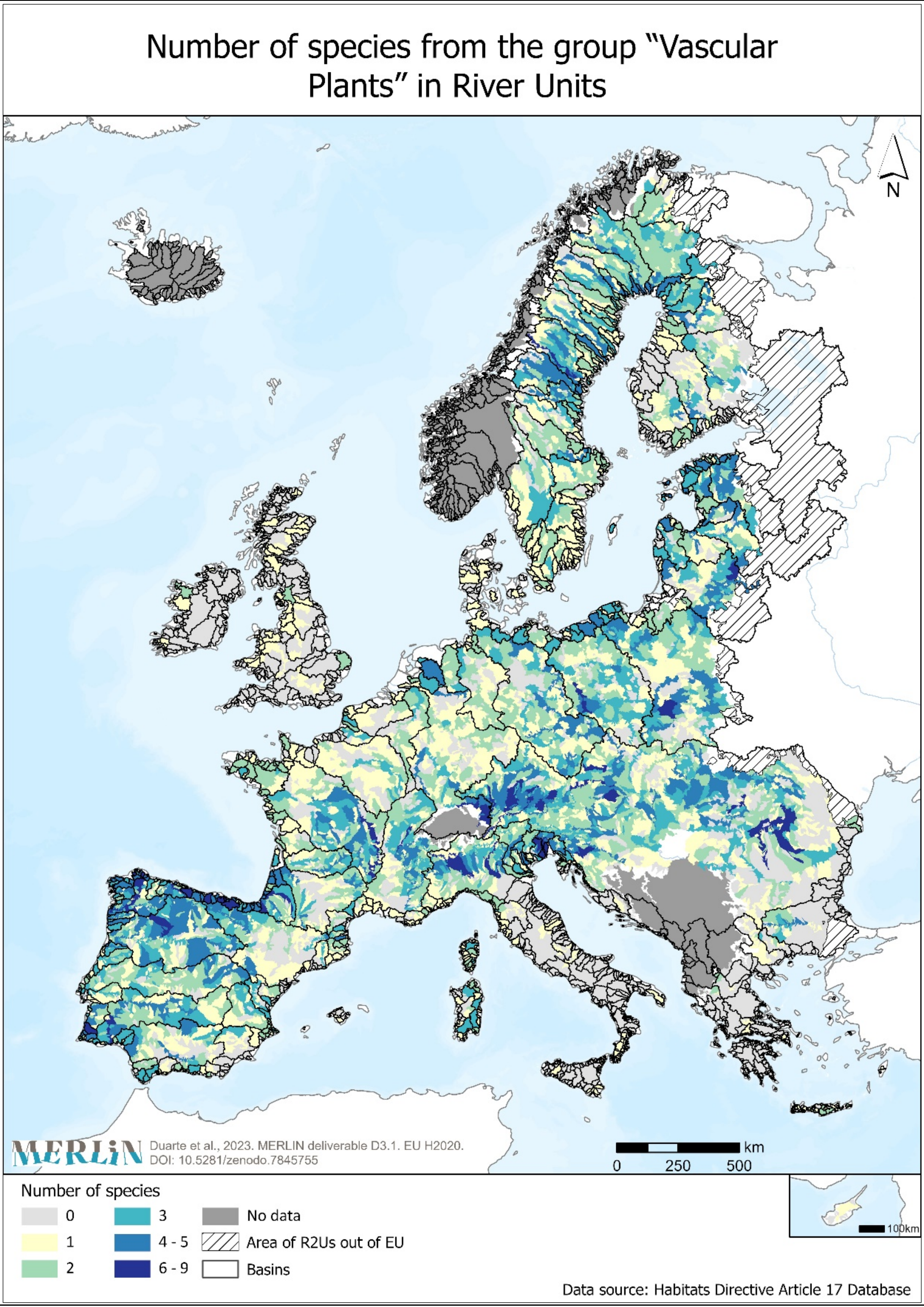
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Reptiles” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for species from the group “Reptiles” in River Units

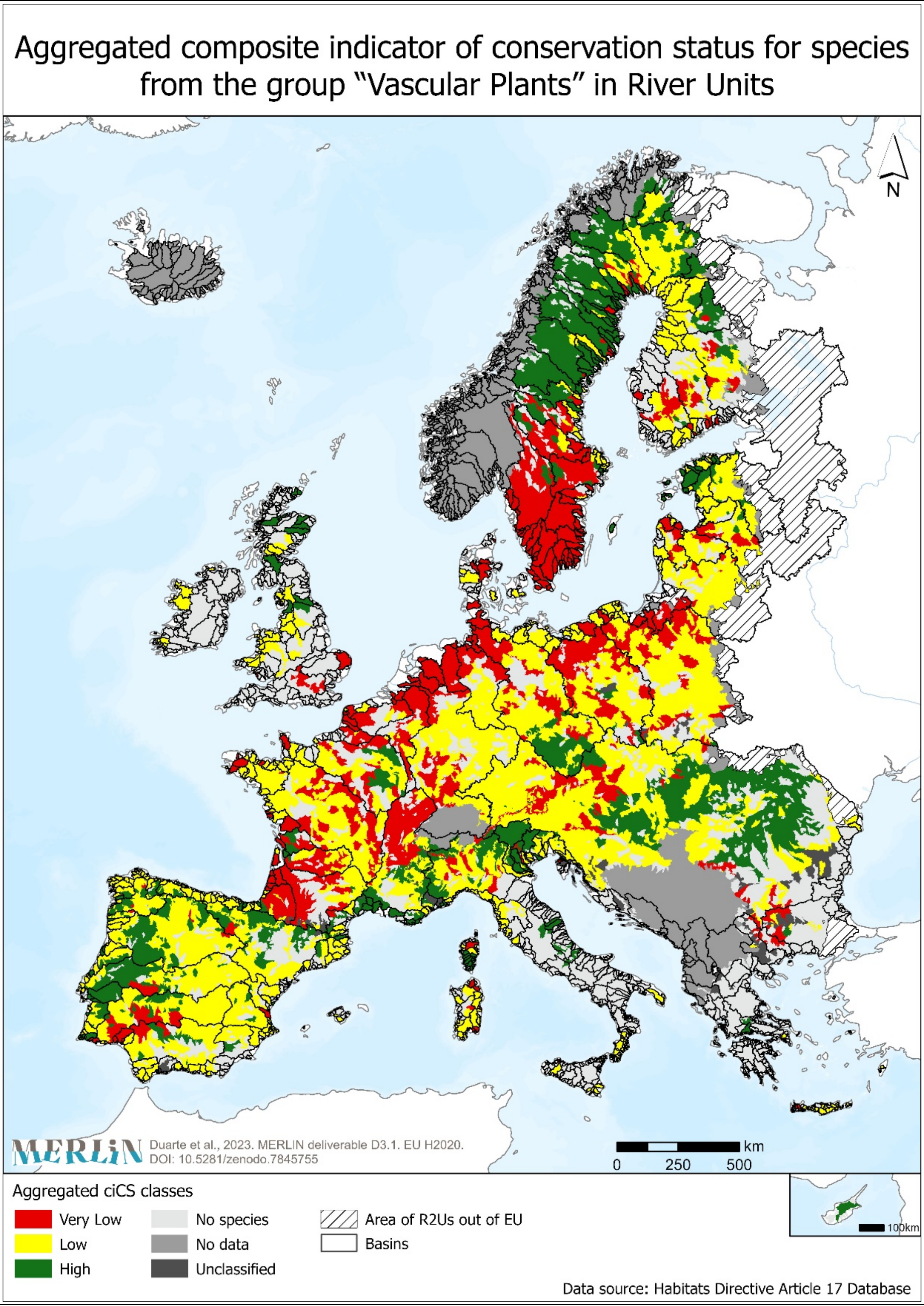


Summary	Detailed Composite Indicator ciCS of Species from the group “Reptiles” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

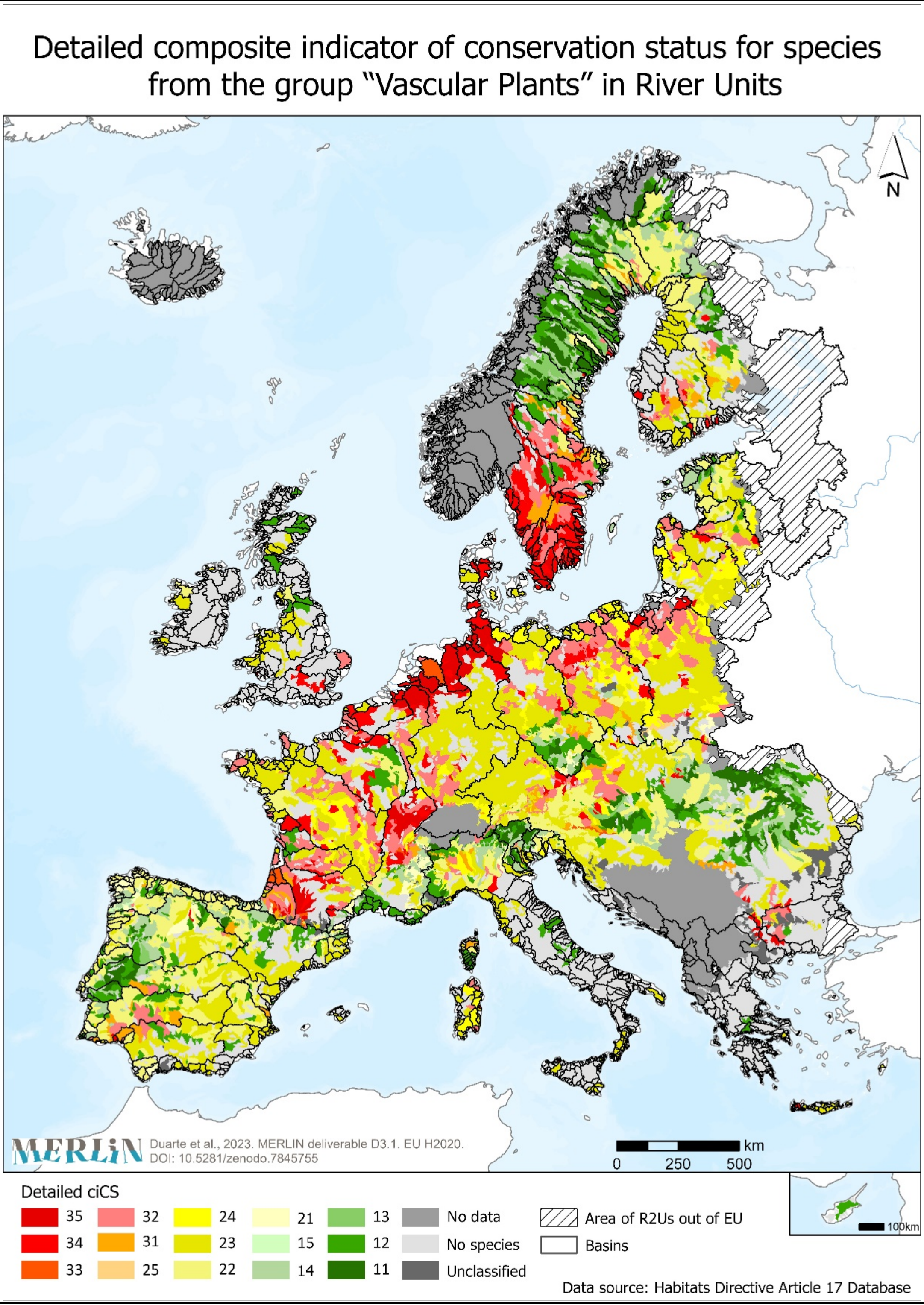
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Reptiles” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of species from the group “Vascular Plants” in River Units
	
Summary	Number of species from the group from the group “Vascular Plants” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

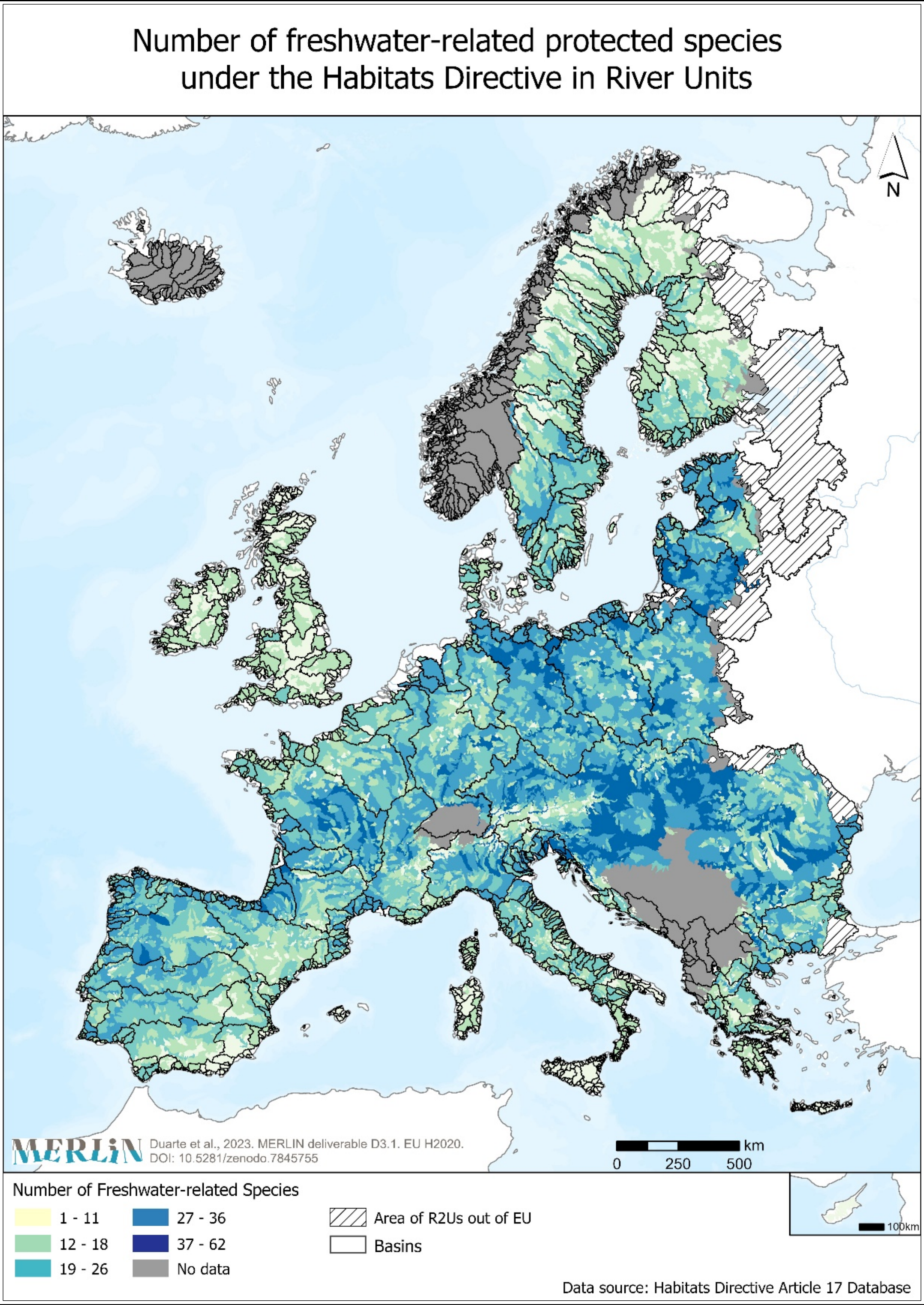
Description	Number of species from the group “Vascular Plants” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for species from the group “Vascular Plants” in River Units.
	
Summary	Aggregated Composite Indicator ciCS of Species from the group “Vascular Plants” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

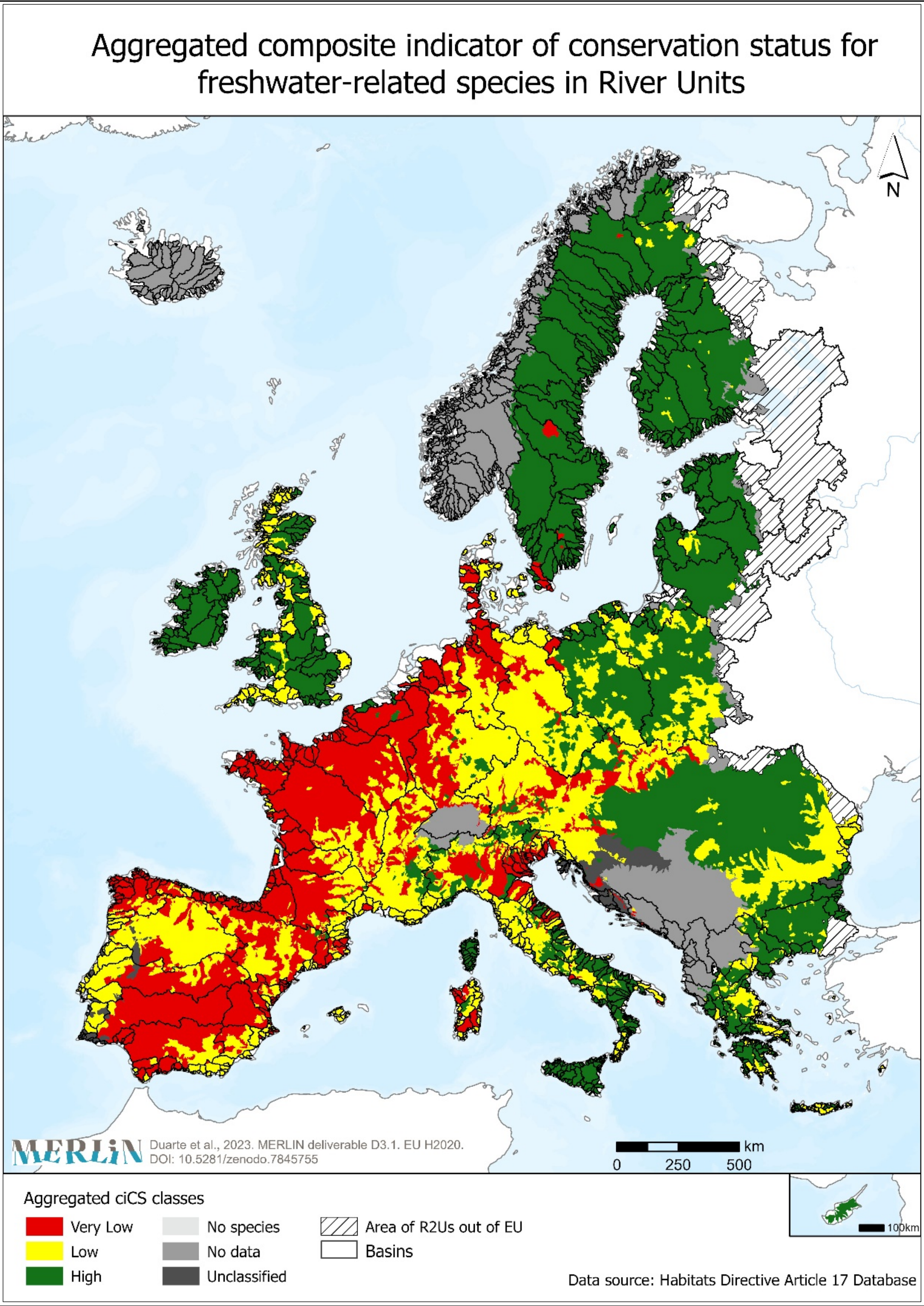
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Vascular Plants” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Detailed composite indicator of conservation status for species from the group “Vascular Plants” in River Units
	
Summary	Detailed Composite Indicator ciCS of Species from the group “Vascular Plants” from article 17 of the Habitats Directive in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

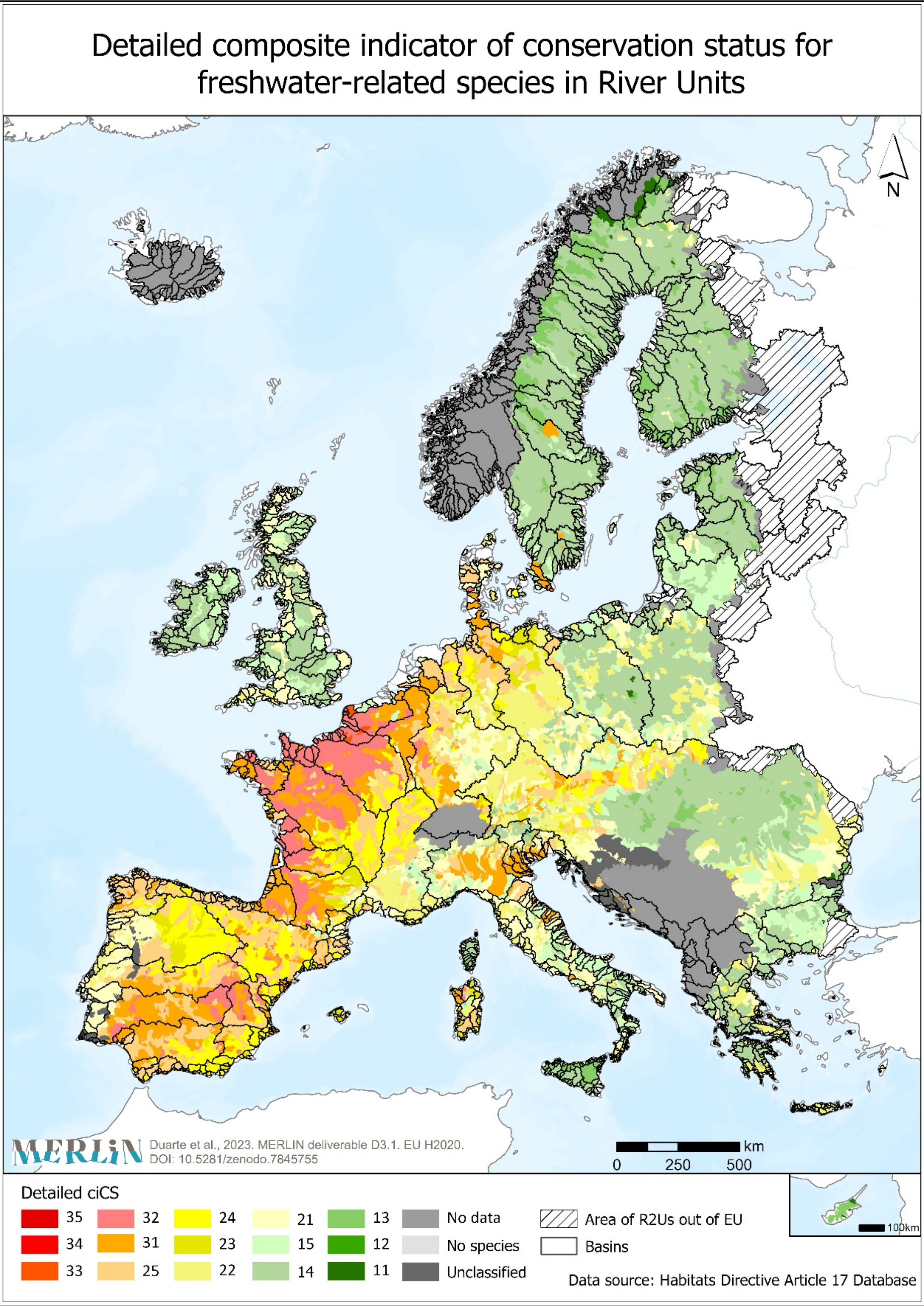
	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the species belonging to the group “Vascular Plants” present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Number of freshwater-related protected species under the Habitats Directive in River Units
.	
Summary	The number of overall freshwater-related species from article 17 of the Habitats Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

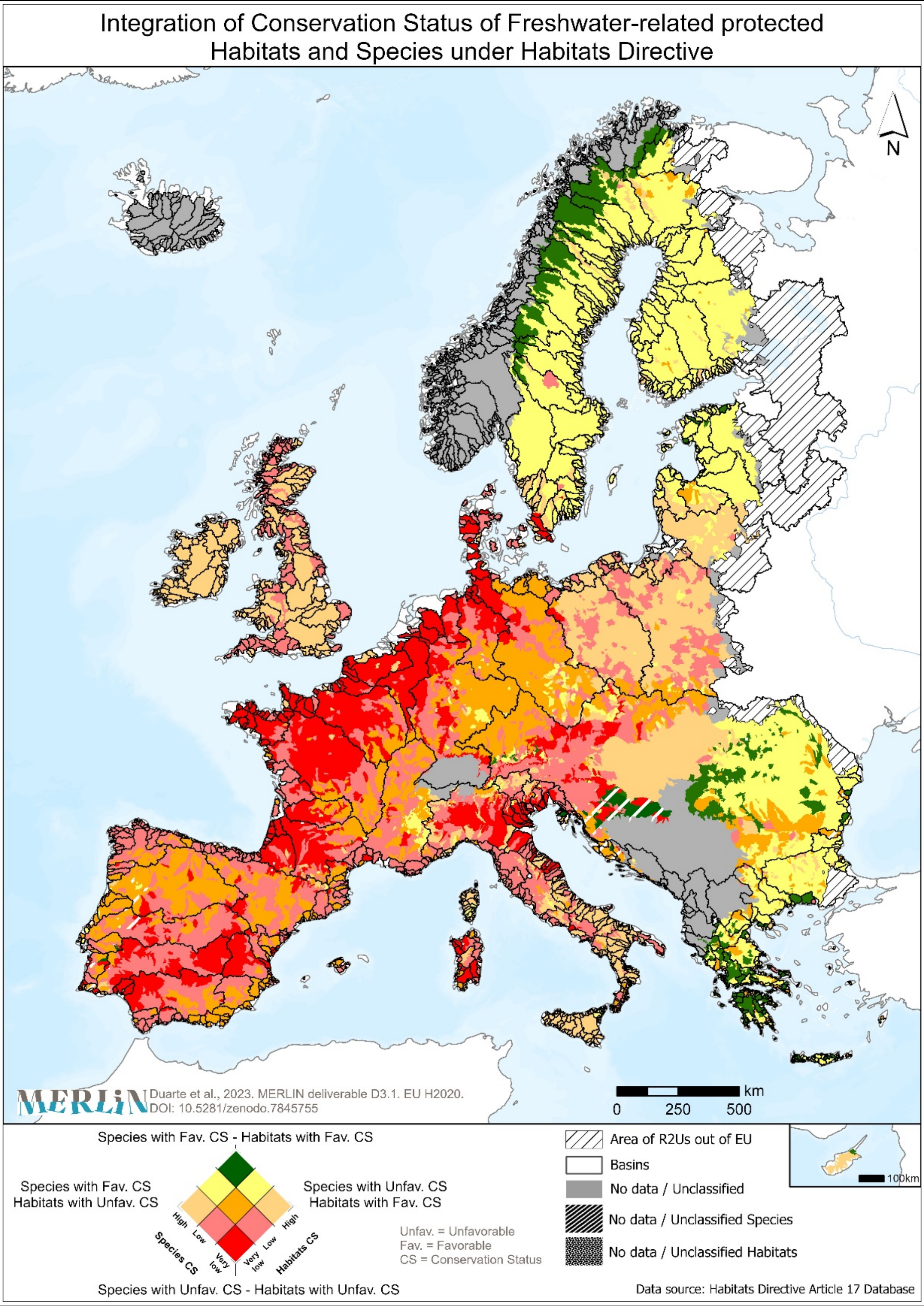
	Responsible: School of Agriculture, University of Lisbon
Description	Number of overall Species present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for freshwater-related protected species under the Habitats Directive in River Units
	
Summary	The aggregated Composite Indicator of Conservation Status (ciCS) for the overall freshwater-related species from article 17 of the Habitats Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the overall Species present in the R2U..
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

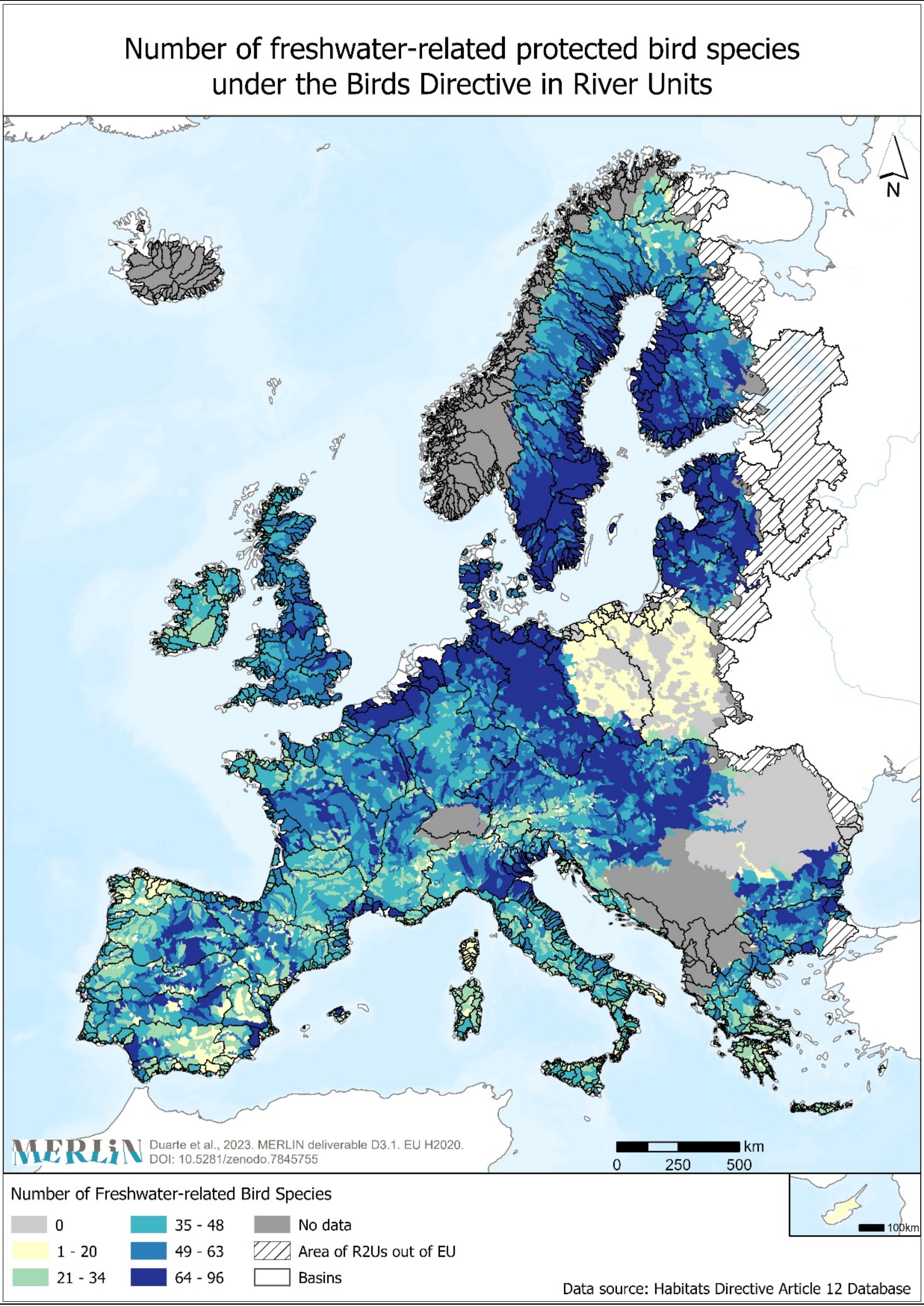
Title	Detailed composite indicator of conservation status for freshwater-related protected species under the Habitats Directive in River Units
	
Summary	The detailed Composite Indicator of Conservation Status (ciCS) for the overall freshwater-related species from article 17 of the Habitats Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the overall Species present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

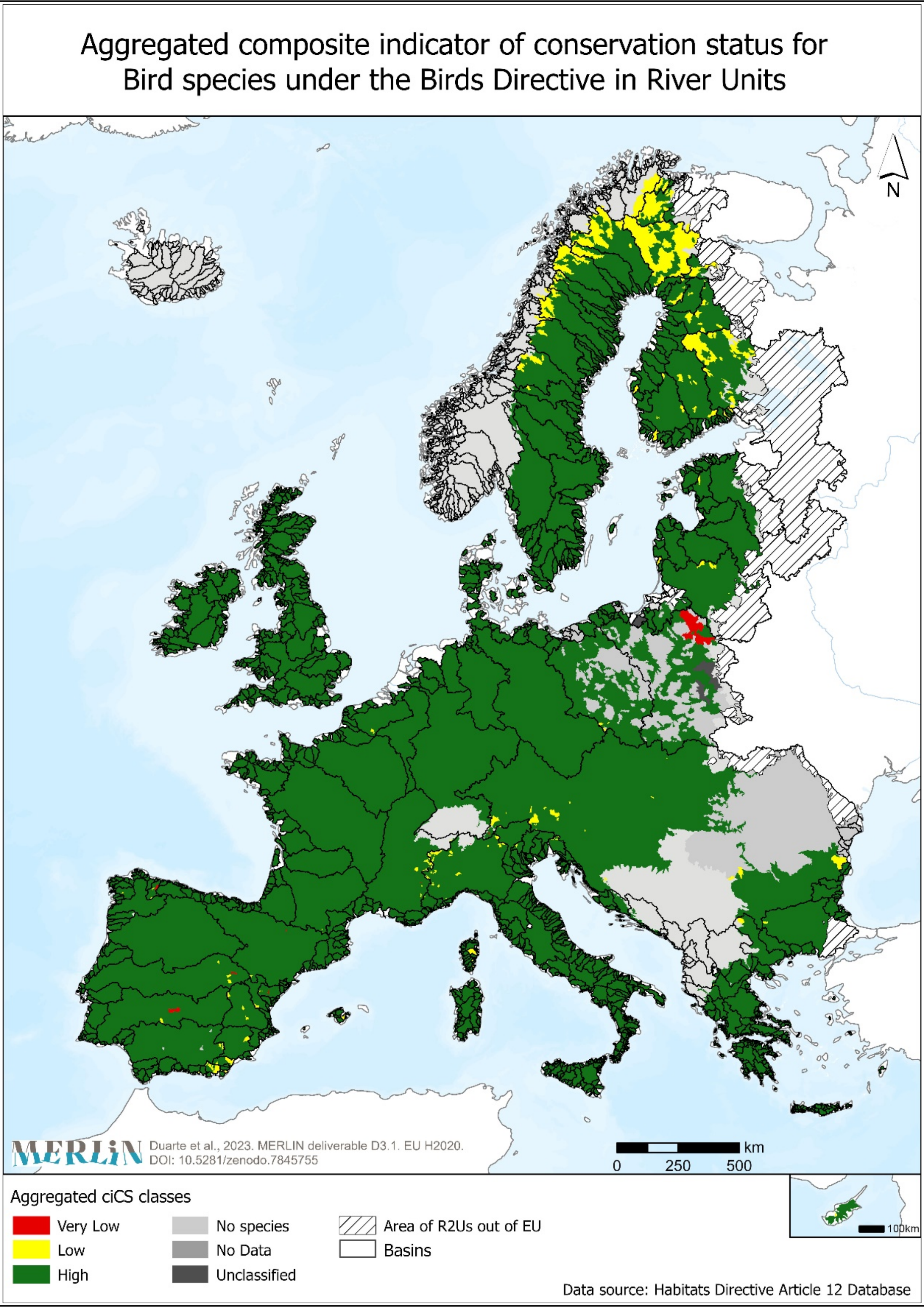
Title	Integration of Conservation Status of Freshwater-related protected Habitats and Species under Habitats Directive
	
Summary	The Integration between Composite Indicator of Conservation Status (ciCS) for the overall freshwater-related species and habitats from article 17 of the Habitats Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	The diamond legend was used to portray the combination of the overall needs considering the Habitats Directive and the needs according to the Water Framework Directive.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

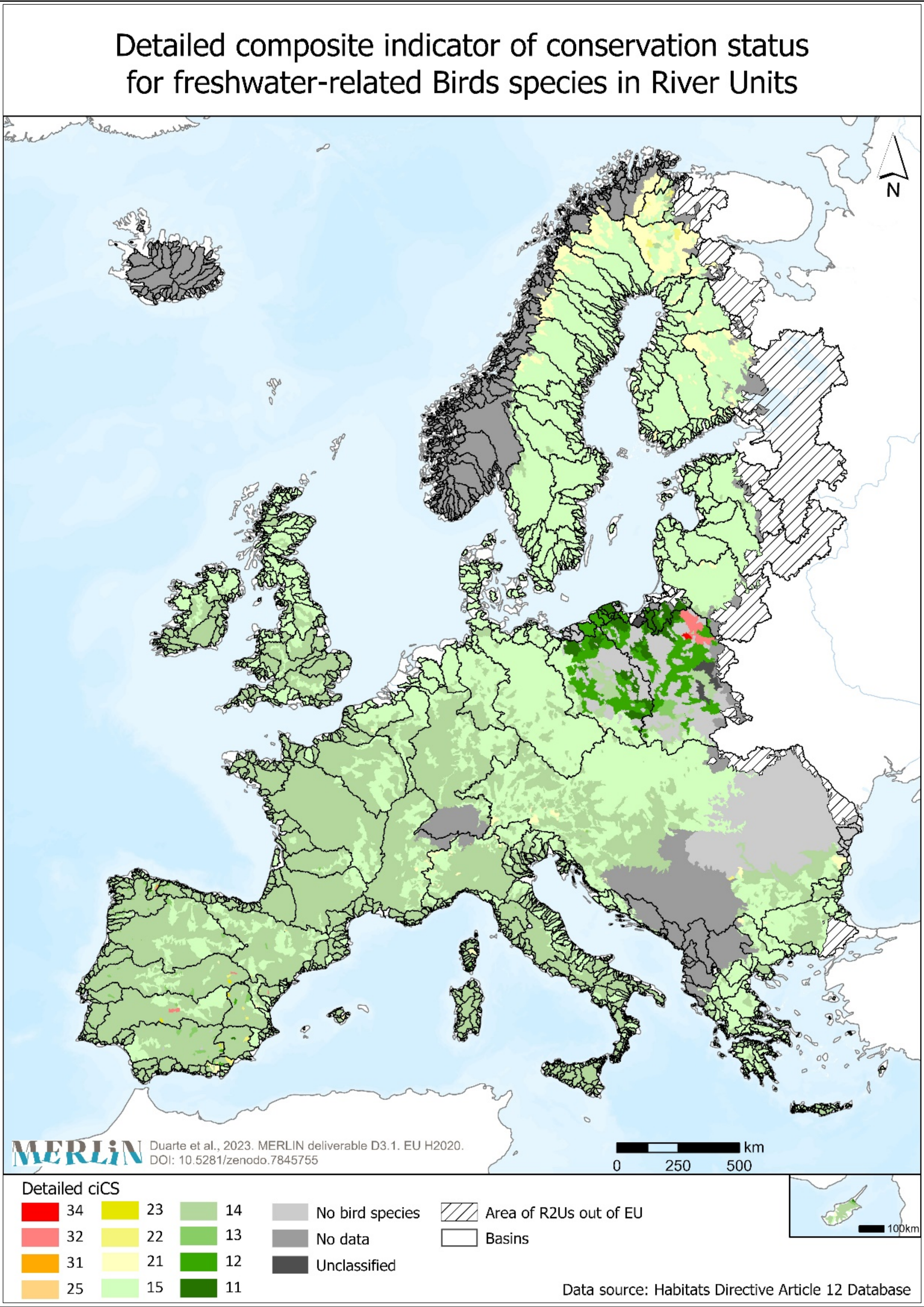
Birds Directive

Title	Number of freshwater-related protected bird species under the Birds Directive in River Units
	
Summary	The number of overall freshwater-related bird species from article 12 of the Birds Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	The number of overall Bird Species present in the River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Birds Directive data: – Article 12 Web Tool. 2022. [online] Available at: https://nature-art12.eionet.europa.eu/article12/; [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Title	Aggregated composite indicator of conservation status for freshwater-related Bird species in River Units
	
Summary	The aggregated Composite Indicator of Conservation Status (ciCS) for the overall Bird species from article 12 of the Birds Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Value of the aggregated Composite Indicator of Conservation Status (ciCS) considering the overall Species present in the River Restoration Units.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Birds Directive data: – Article 12 Web Tool. 2022. [online] Available at: https://nature-art12.eionet.europa.eu/article12/; [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

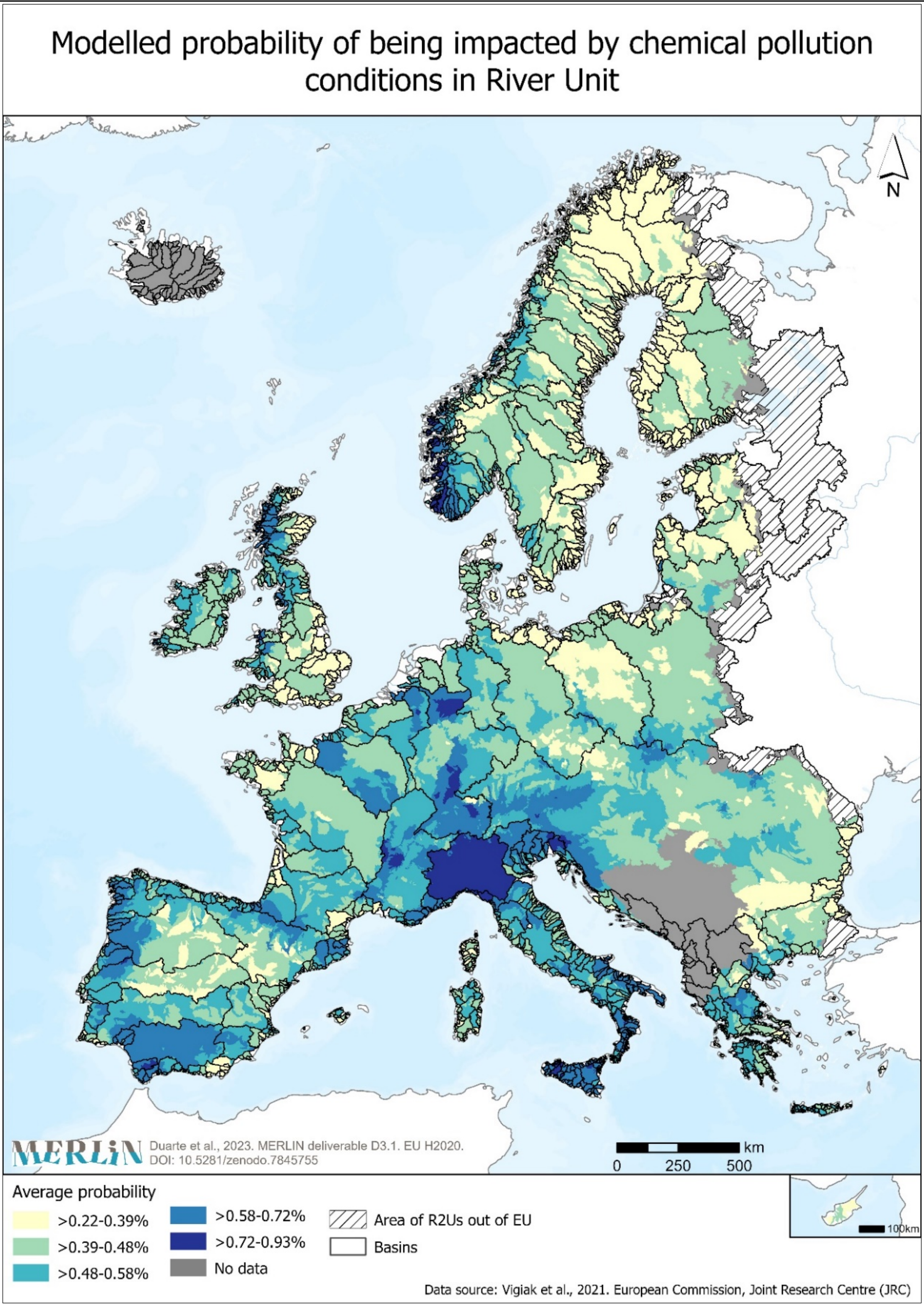
Title	Detailed composite indicator of conservation status for freshwater-related bird species in River Units
	
Summary	The detailed Composite Indicator of Conservation Status (ciCS) for the overall Bird species from article 12 of the Birds Directive present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the overall Species present in the R2U.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Birds Directive data: – Article 12 Web Tool. 2022. [online] Available at: https://nature-art12.eionet.europa.eu/article12/; [Accessed 31 March 2022]. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Water Framework Directive

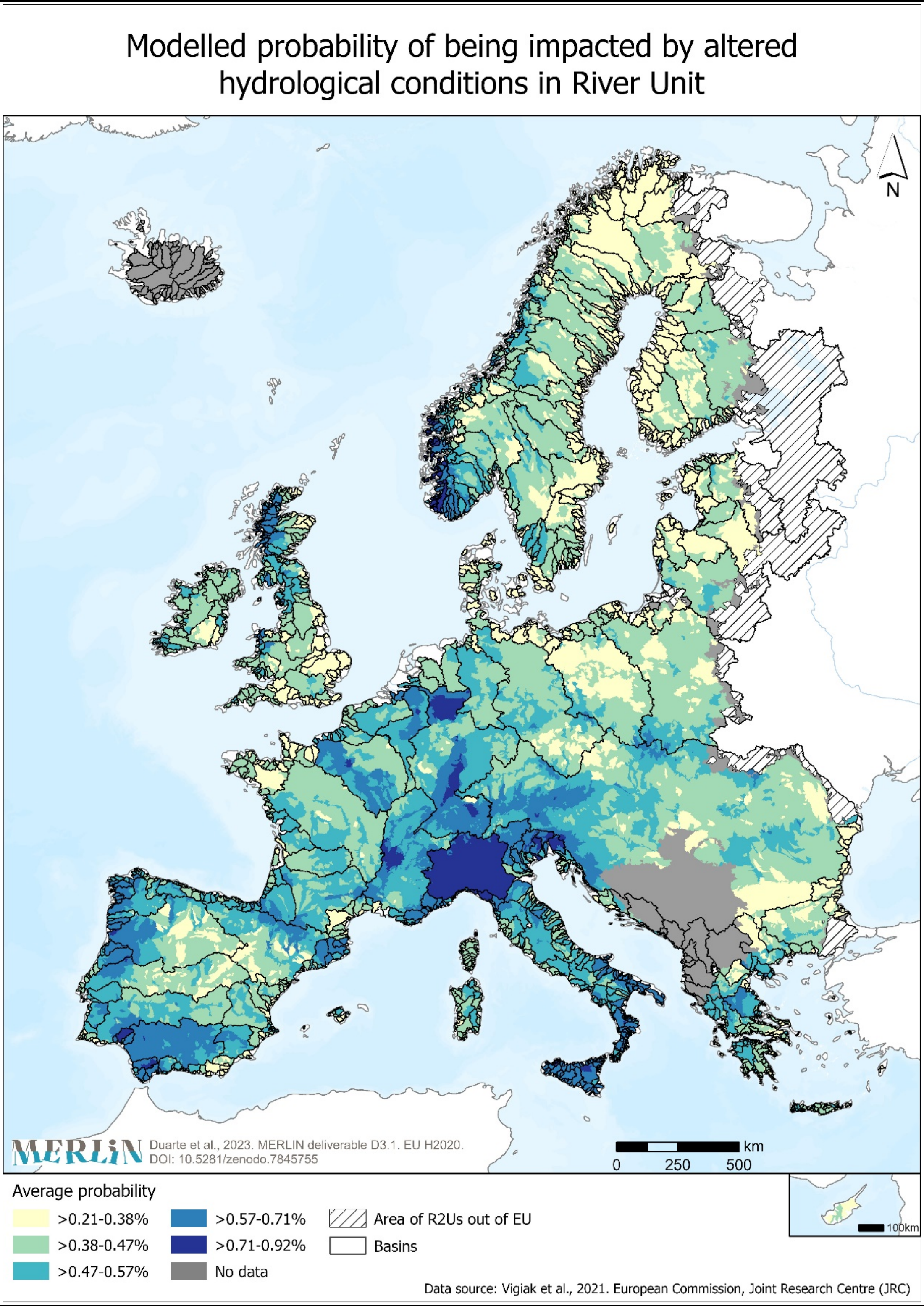
Title	Surface Water Bodies within River Restoration Units
	
Summary	Layer reporting the WFD river water bodies (2016) intersecting the river restoration units (R2U). Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

Description	This layer result from the intersection between three layers: "SurfaceWaterBodyLine" reported in the WFD 2016 spatial data sets (considering only river water bodies. Coastal, Territorial and Transitional water bodies were excluded), the WFD_River_Water_Bodies_Cycle_1 (UK) and EU_units_catchments.
Credits	– River Restoration Units – R2U (Developed under MERLIN, unpublished) – European Environment Agency (EEA) (2020) https://www.eea.europa.eu/data-and-maps/data/wise-wfd-spatial-3. INSPIRE (https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32007L0002&rid=1#d1e668-1-1) – Environment Agency (2021). WFD River Water Bodies Cycle 1 https://www.data.gov.uk/dataset/db84096f-5da0-4e6d-b4cf-8ce930b6abb4/wfd-river-water-bodies-cycle-1
Limitation	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged(https://www.eea.europa.eu/legal/copyright). Copyright holder: European Commission. Contains Environment Agency information © Environment Agency 2017. All rights reserved. Based on digital spatial data licensed from the Centre for Ecology & Hydrology, © NERC (CEH). © Contains Ordnance Survey data © Crown copyright and database right 2013

Title	Modelled probability of being Impacted by chemical pollution conditions in River Units
	
Summary	The probability of having any effect or impact by chemical pollution In River restoration Units to be impacted by Creation Date: March 2023 Resolution: R2U Version: 3.0

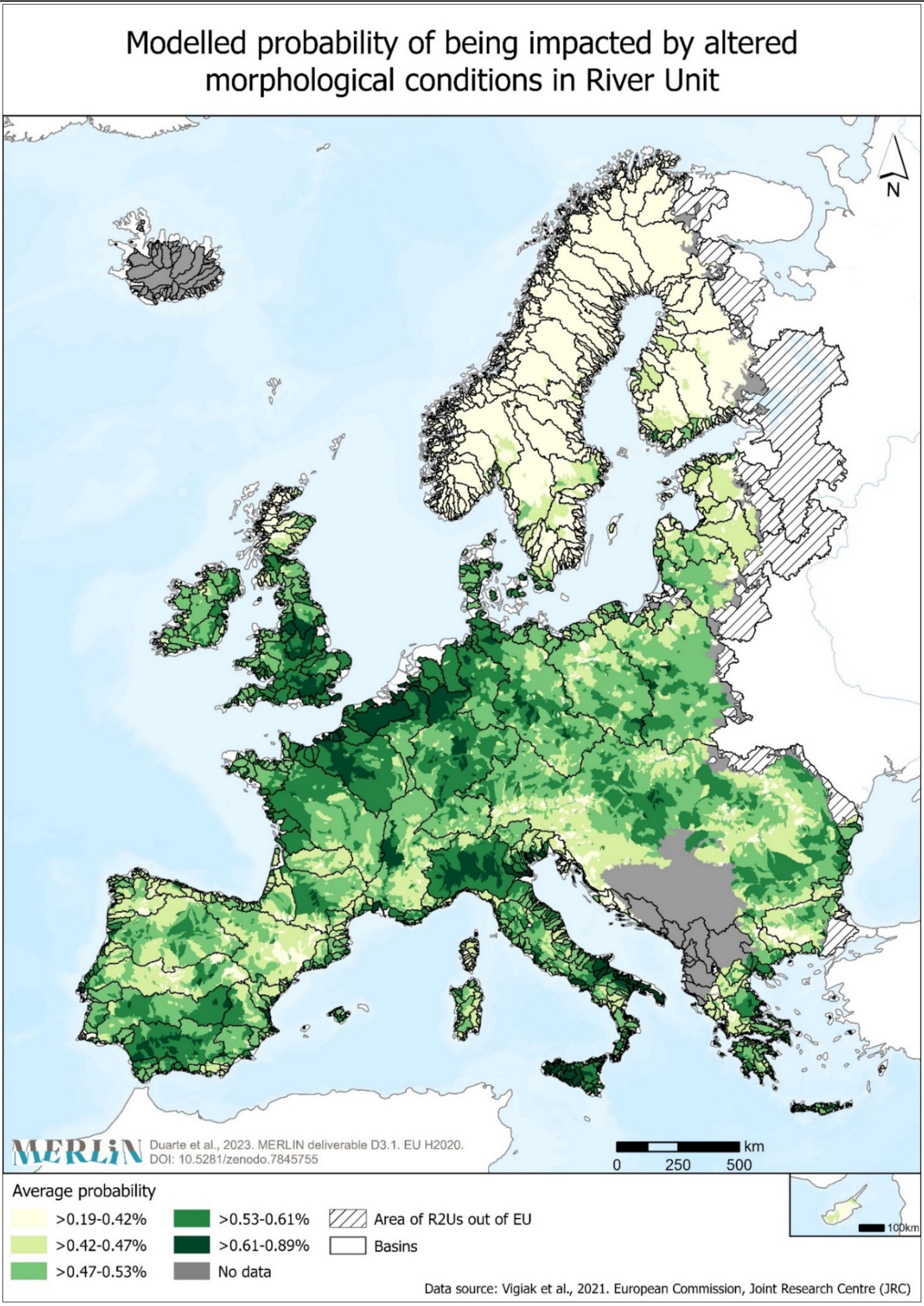
	Responsible: School of Agriculture, University of Lisbon
Description	Average modelled probability of being impacted by chemical pollution in River Restoration Units.
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitations https://data.jrc.ec.europa.eu/access-rights/no-limitations Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011.

Title	Modelled probability of being impacted by altered hydrological conditions in River Units

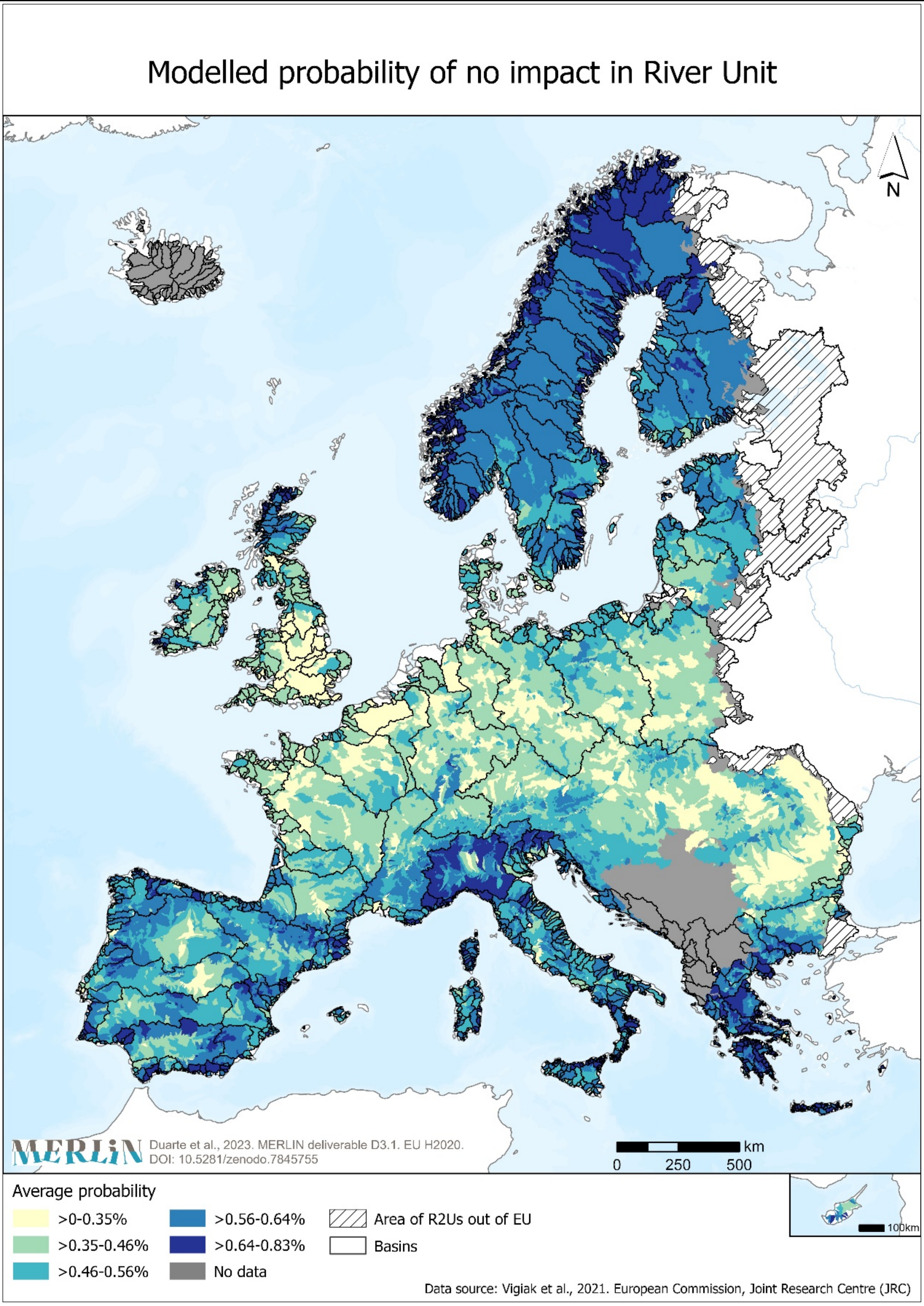


Summary	The probability of having any effect or impact by altered hydrological conditions in River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

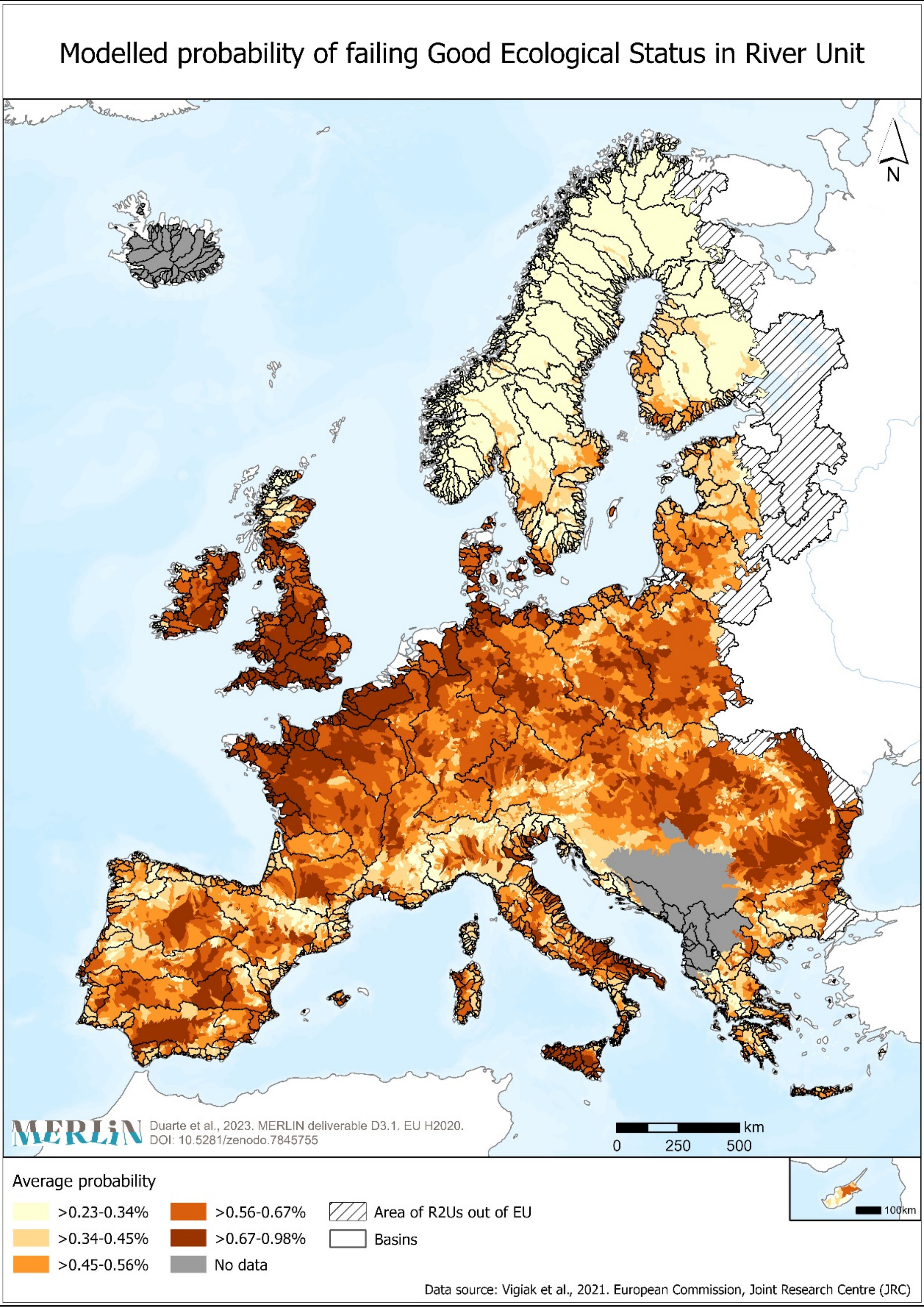
Description	Average modelled probability of being impacted by altered hydrological conditions in River Restoration Units
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v.1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitation https://data.jrc.ec.europa.eu/access-rights/no-limitations Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011.

Title	Modelled probability of being impacted by altered morphological conditions in River Units
	
Summary	The probability of having any effect or impact by altered morphological conditions in River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

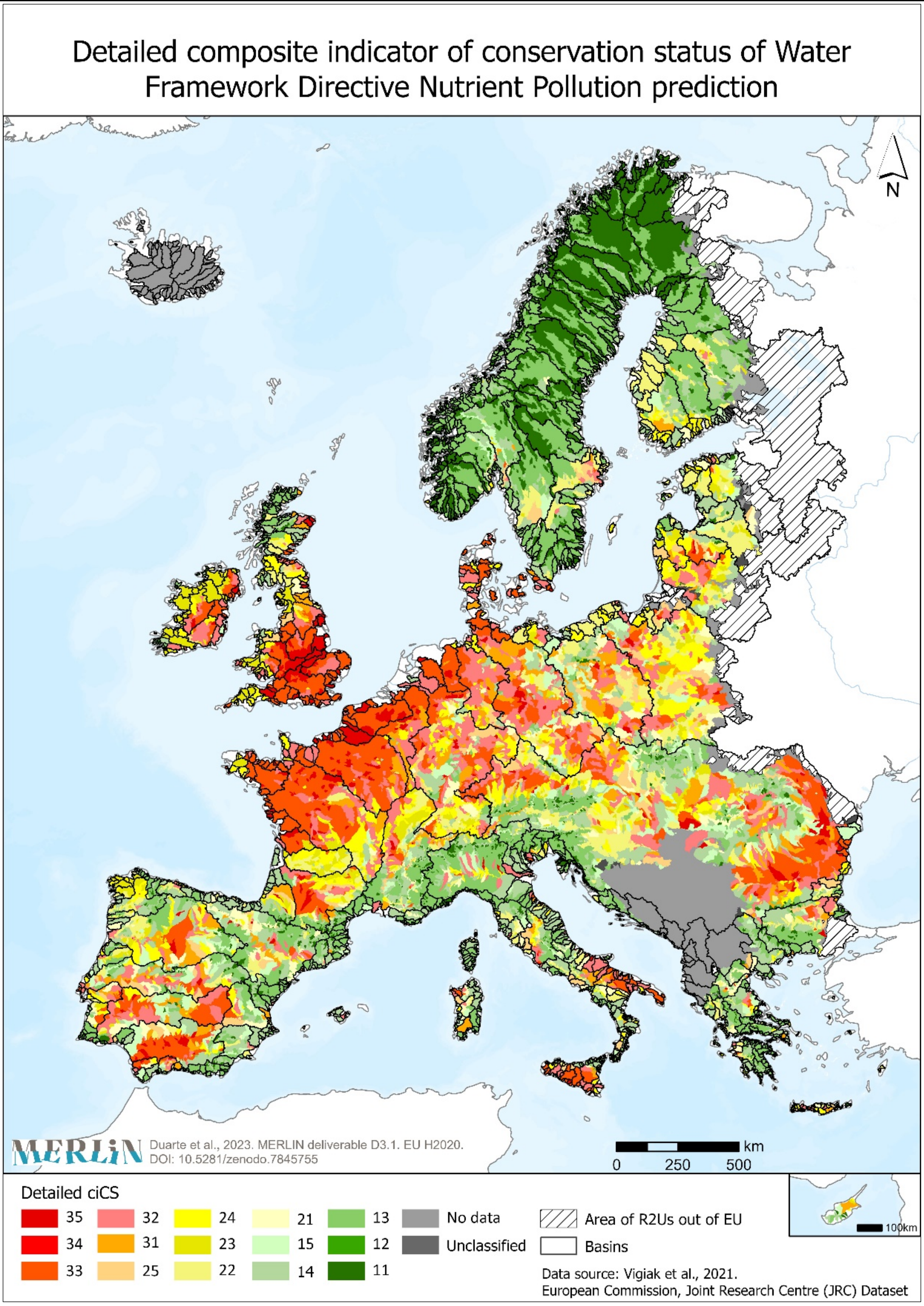
Description	Average modelled probability of being impacted by altered morphological conditions in River Restoration Units.
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitation https://data.jrc.ec.europa.eu/access-rights/no-limitations Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011

Title	Modelled probability of no Impact in River Units
	
Summary	The probability of not having any effect or impact in River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Average modelled probability of no impact in River Restoration Units

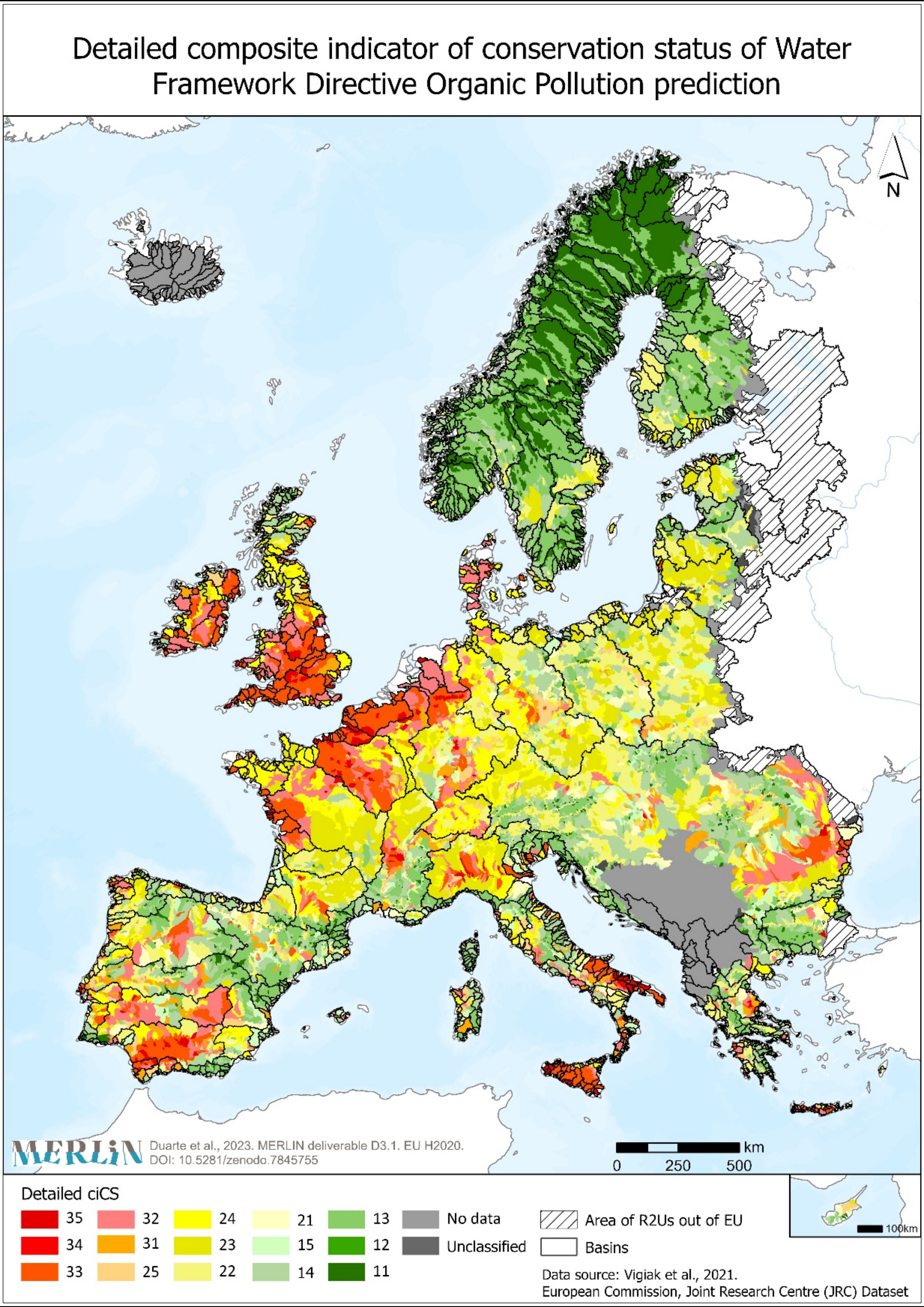
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitation https://data.jrc.ec.europa.eu/access-rights/no-limitations Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011.

Title	Modelled probability of failing Good Ecological Status in River Units
	
Summary	The probability of failing Good Ecological Status in River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

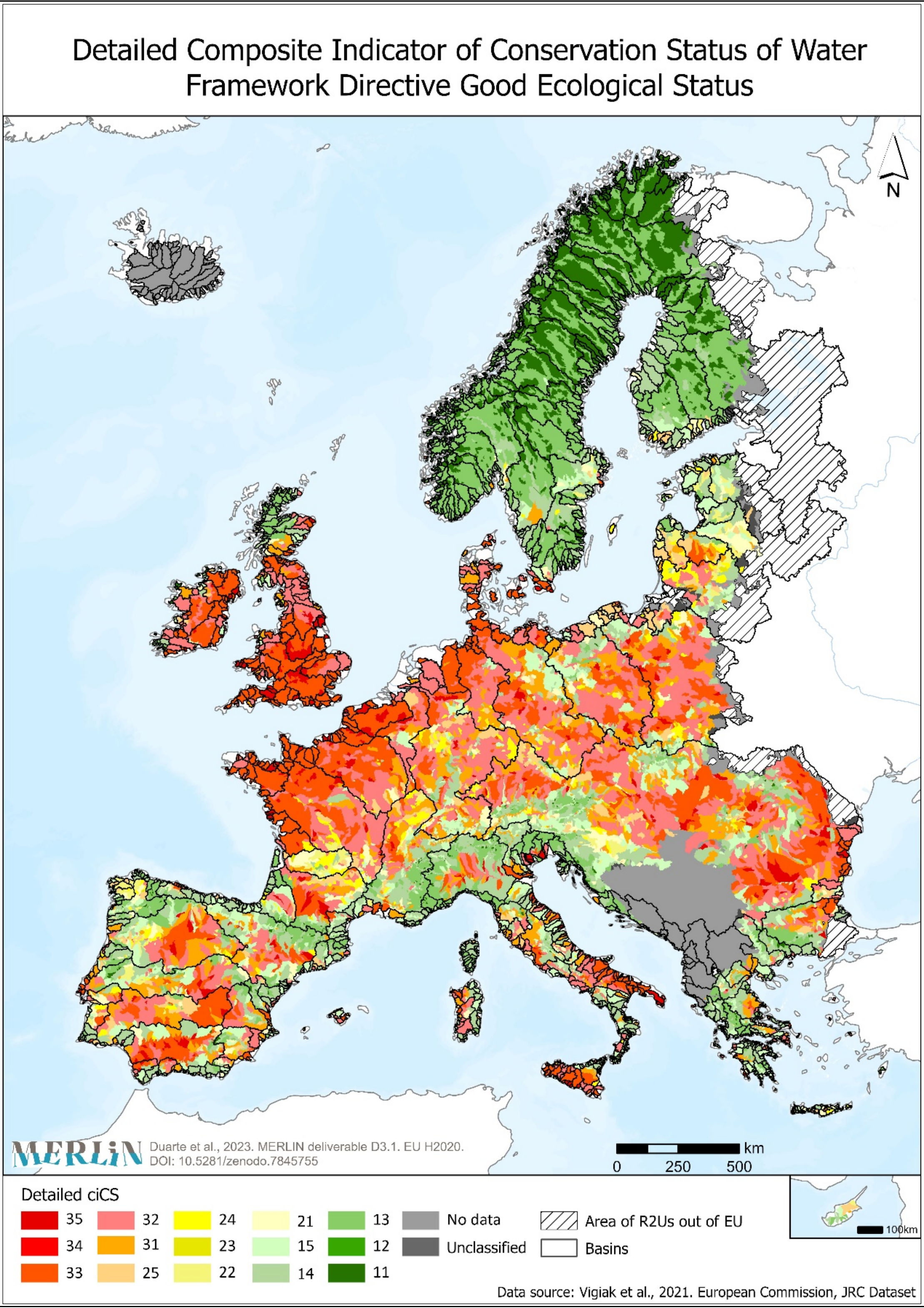
	Responsible: School of Agriculture, University of Lisbon
Description	Average modelled probability of failing Good Ecological Status in River Restoration Units
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitation https://data.jrc.ec.europa.eu/access-rights/no-limitations Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011

Title	Detailed composite indicator of conservation status of Water Frame Directive nutrient pollution prediction
	
Summary	The detailed Composite Indicator of Conservation Status (ciCS) for the Water Frame Directive nutrient pollution prediction present in the River Restoration Units. Creation Date: March 2023

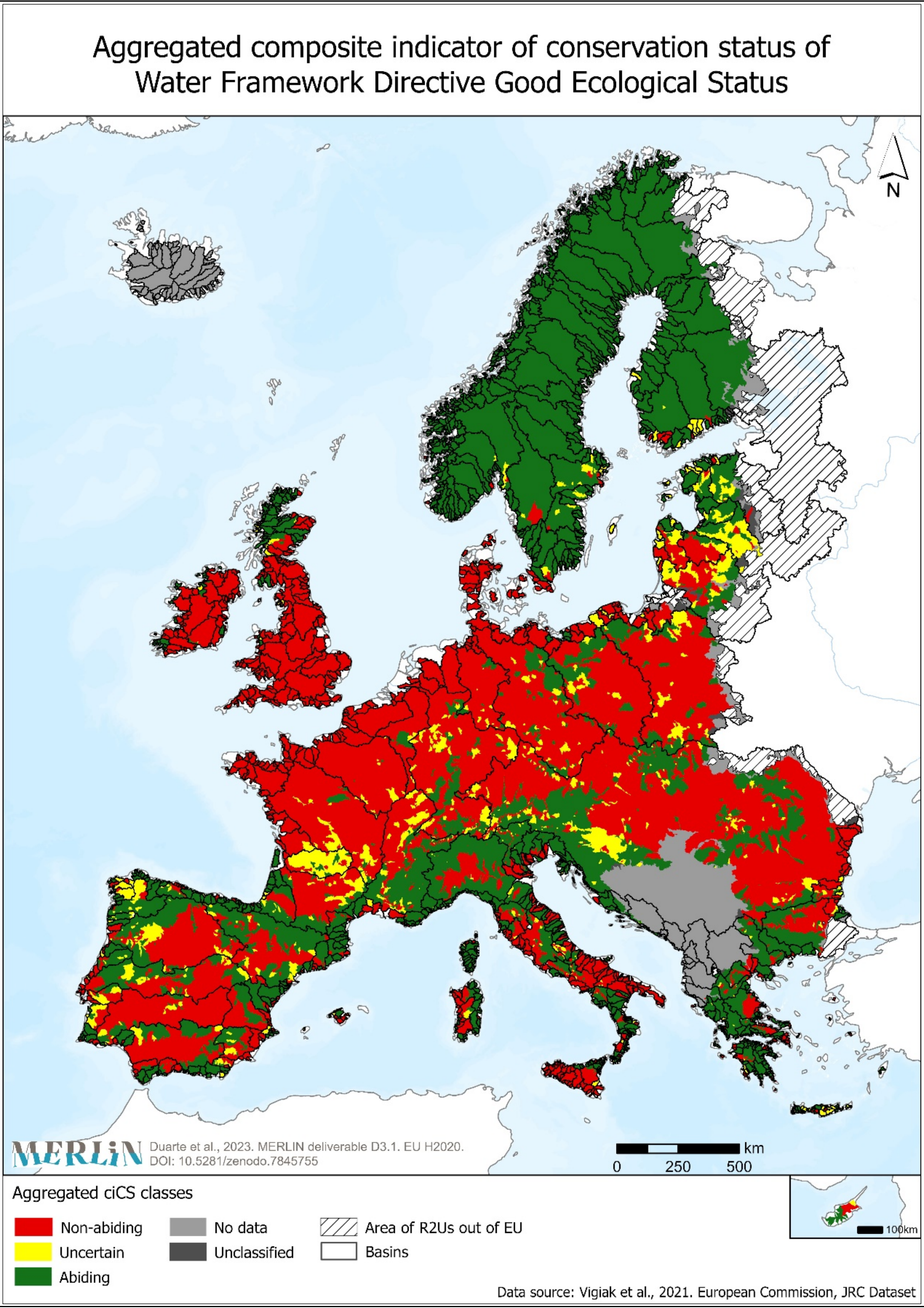
	Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the nutrient pollution prediction present in the R2U.
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitation https://data.jrc.ec.europa.eu/access-rights/no-limitations Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011

Title	Detailed composite indicator of conservation status of Water Frame Directive nutrient organic pollution prediction
	
Summary	The detailed Composite Indicator of Conservation Status (ciCS) for the Water Frame Directive nutrient pollution prediction present in the River Restoration Units. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Value of the detailed Composite Indicator of Conservation Status (ciCS) considering the nutrient pollution prediction present in River Restoration Units.
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011 (https://data.jrc.ec.europa.eu/access-rights/no-limitations)

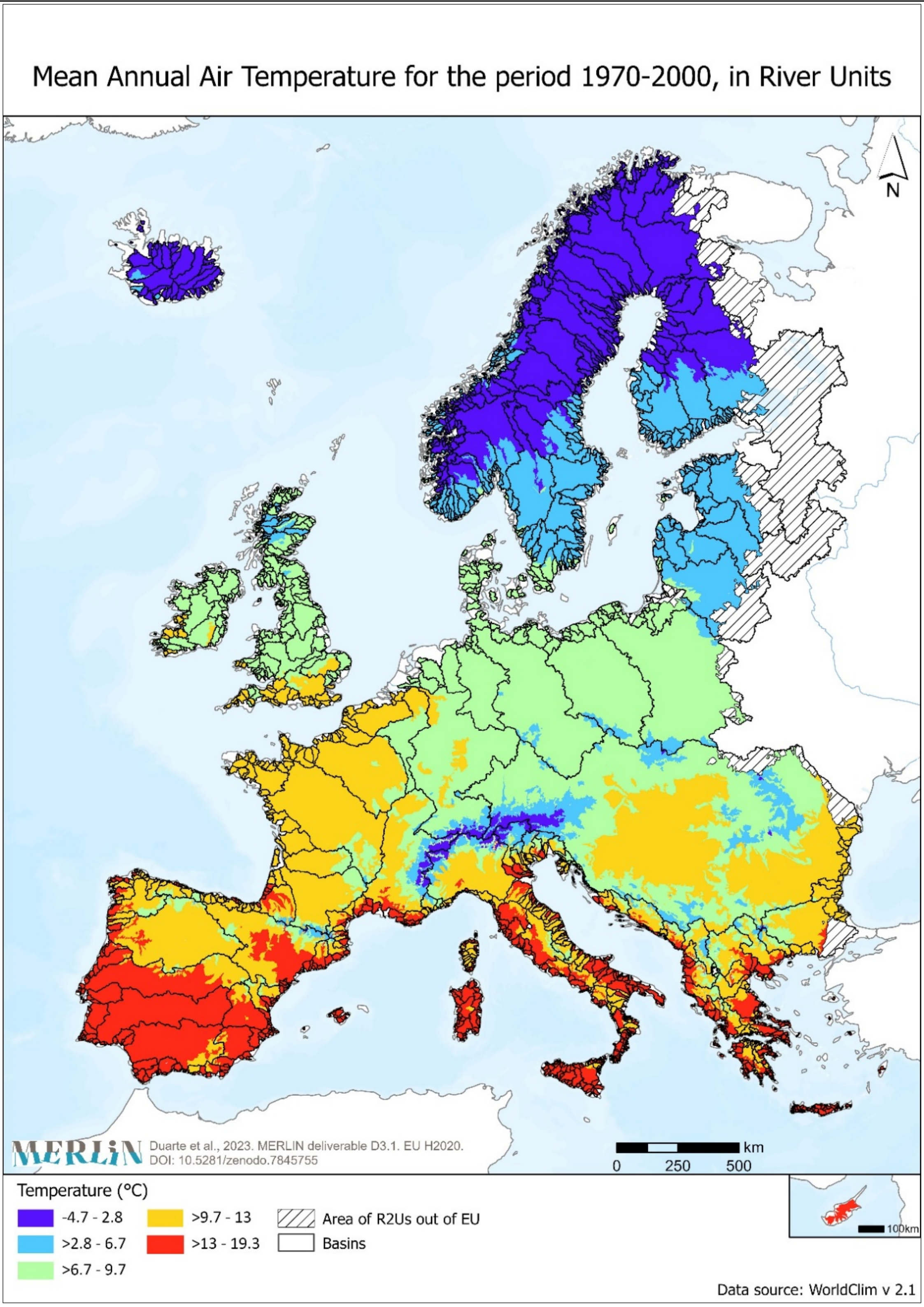
Title	Detailed composite indicator of conservation status of Water Frame Directive Good Ecological Status
	
Summary	The detailed Composite Indicator of Conservation Status (ciCS) approach was used to represent the abidance to the good Ecological Status (GES) according to the Water Framework Directive. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Using the Vigiak et al. (2021) outputs concerning the probability of failing the Good Ecological Status and the method developed by Carrao et al. (2020) we established the Composite Indicator of Conservation Status (ciCS). Orange to red areas indicate non-abidance, green areas indicate abidance and yellow areas represent uncertainty.
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) Water Framework Directive data: – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitation

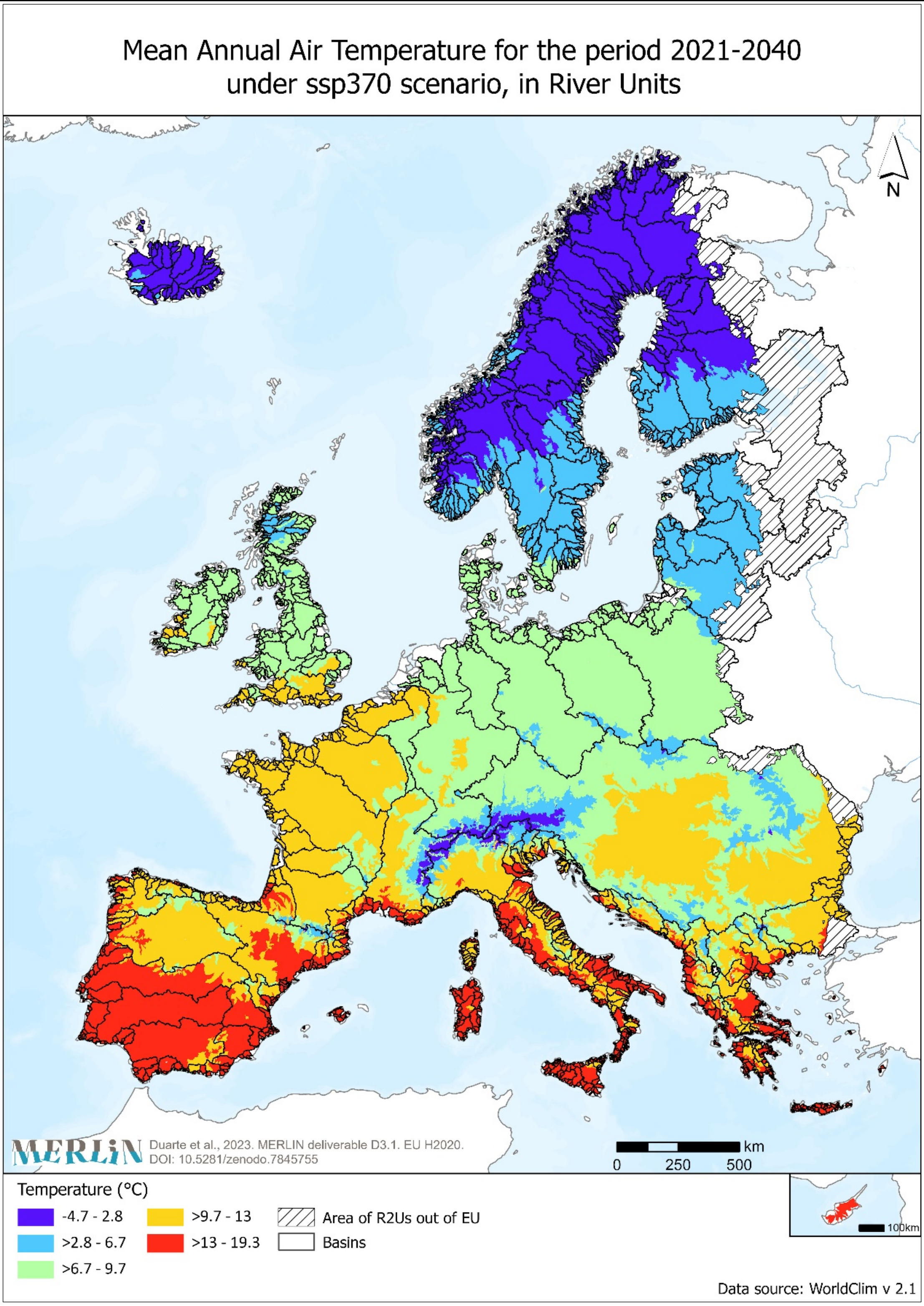
Title	Aggregated composite indicator of conservation status of Water Frame Directive Good Ecological Status
	
Summary	The aggregated Composite Indicator of Conservation Status (ciCS) approach was used to represent the abidance to the good Ecological Status (GES) according to the Water Framework Directive. Creation Date: March 2023 Resolution: R2U Version: 3.0

	Responsible: School of Agriculture, University of Lisbon
Description	Using the Vigiak et al. (2021) outputs concerning the probability of failing the Good Ecological Status and the method developed by Carrao et al. (2020) we established the Composite Indicator of Conservation Status (ciCS). Red areas indicate non-abidance, green areas indicate abidance and yellow areas represent uncertainty.
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) Water Framework Directive data: – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitation

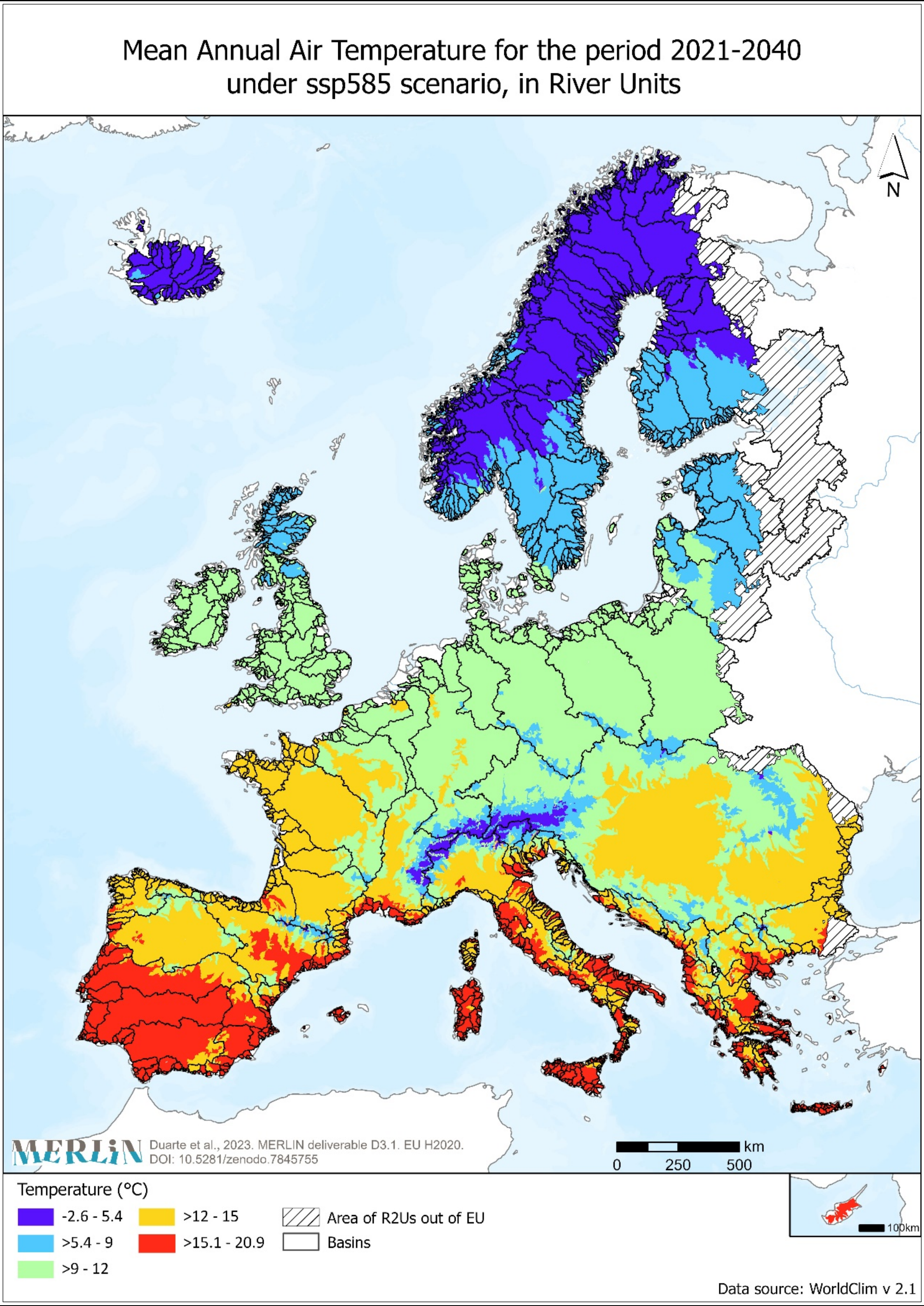
Climatic Change Projections

Title	Mean annual air temperature for the period 1970-2000, in River Units
	
Summary	This bioclimatic variable is the mean annual air temperature calculated as the mean annual daily mean air temperatures averaged over 1 year in the time period 1970-2000 (BIO1). Average values of BIO1 have been given to River Restoration Units using zonal statistics.

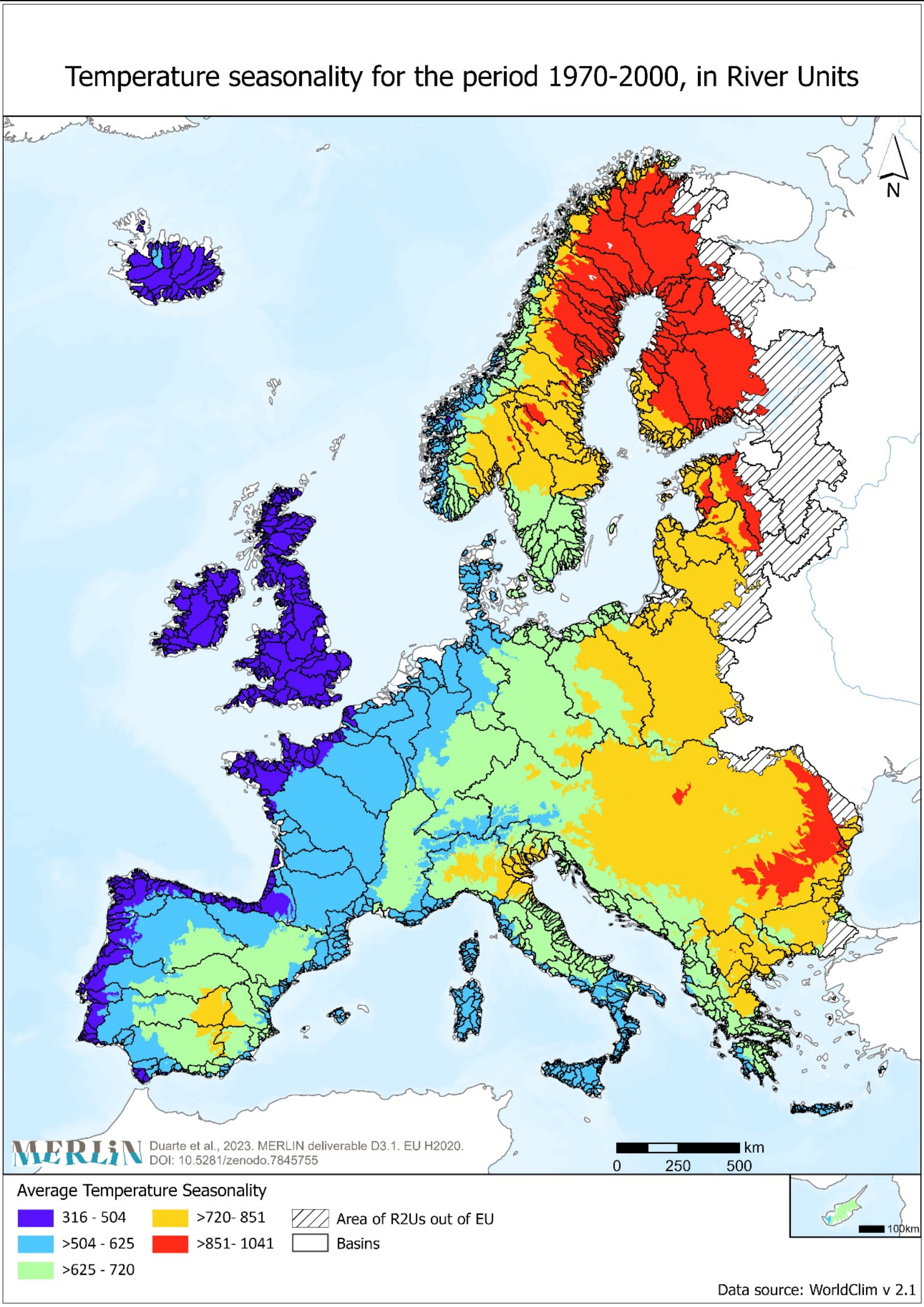
	Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO1 value per R2U for the time period 1970-2000 BIO1 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean annual air temperature for the period 2021-2040 under ssp370 scenario, in River Units
	
Summary	This bioclimatic variable is the mean annual air temperature calculated as the mean annual daily mean air temperatures averaged over 1 year in the time period 2021-2040 under ssp370 scenario (BIO1). Average values of BIO1 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

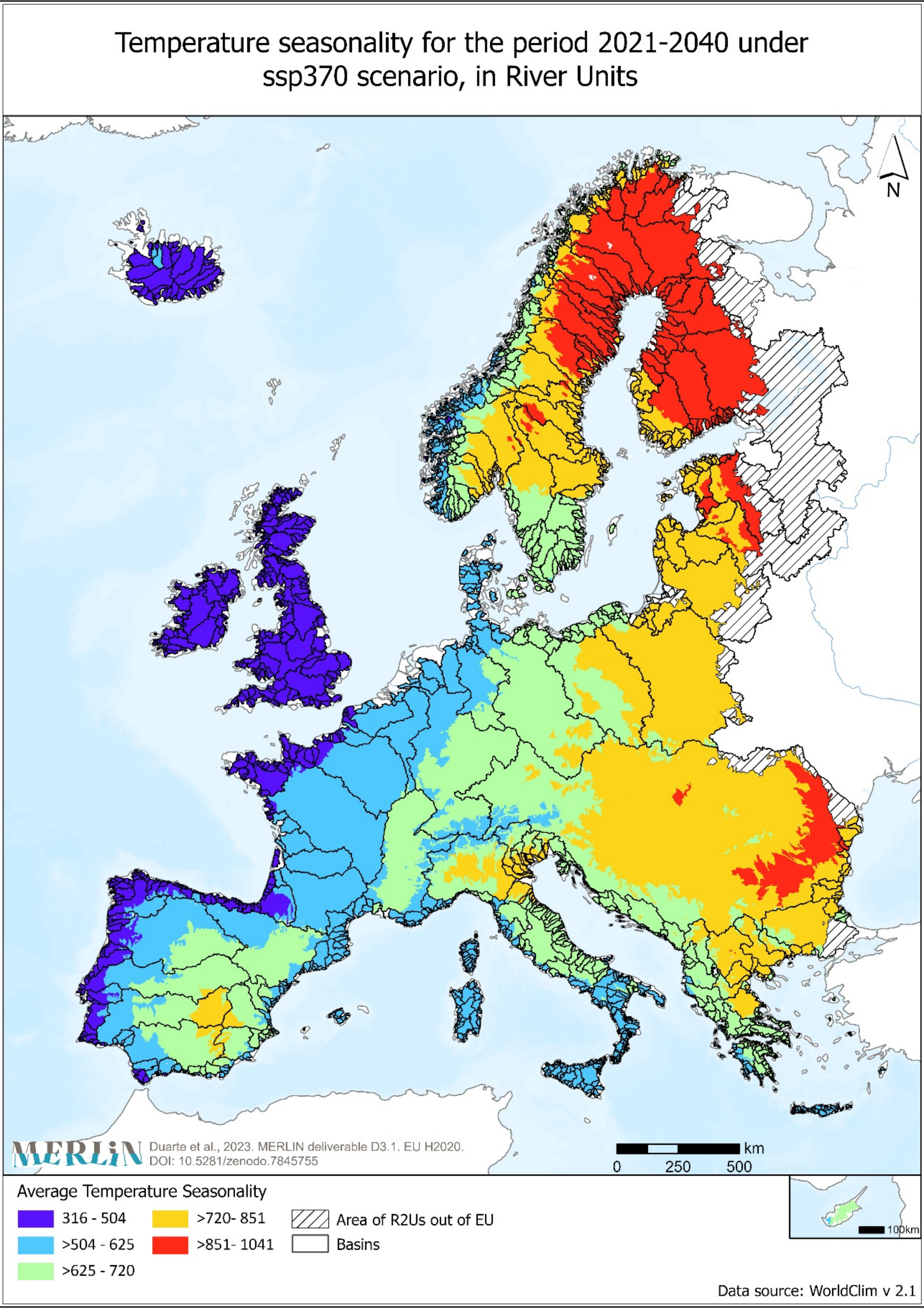
	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO1 value per R2U for the time period 2021-2040 under ssp370 scenario. BIO1 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean annual air temperature for the period 2021-2040 under ssp585 scenario, in River Units.
	
Summary	This bioclimatic variable is the mean annual air temperature calculated as the mean annual daily mean air temperatures averaged over 1 year in the time period 2021-2040 under ssp585 scenario (BIO1). Average values of BIO1 have been given to River Restoration Units using zonal statistics.

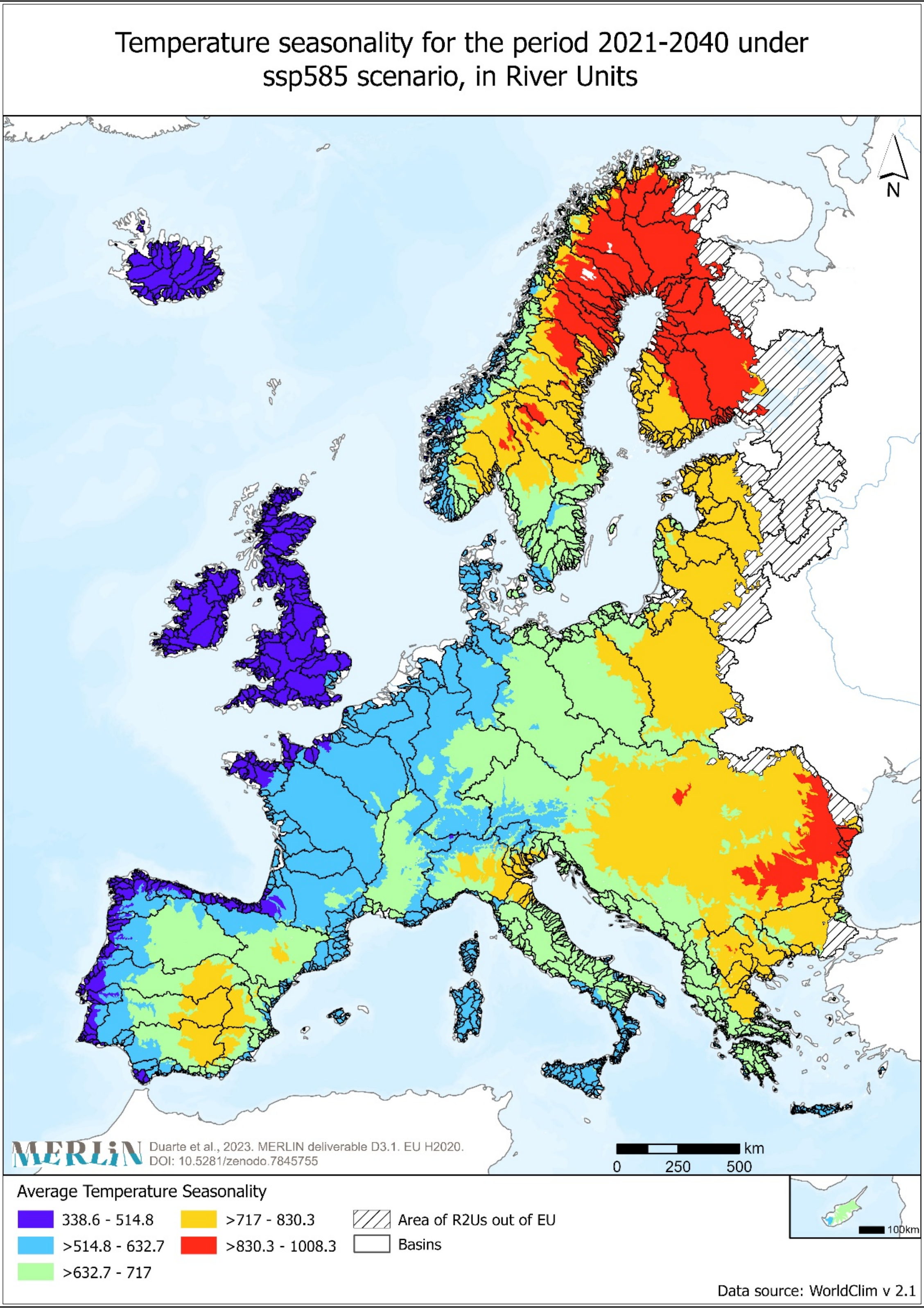
	Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO1 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO1 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Temperature seasonality for the period 1970-2000, in River Units
	
Summary	This bioclimatic variable is the standard deviation of the monthly mean temperature x 100 in the time period 1970-2000 (BIO4). Values of BIO4 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

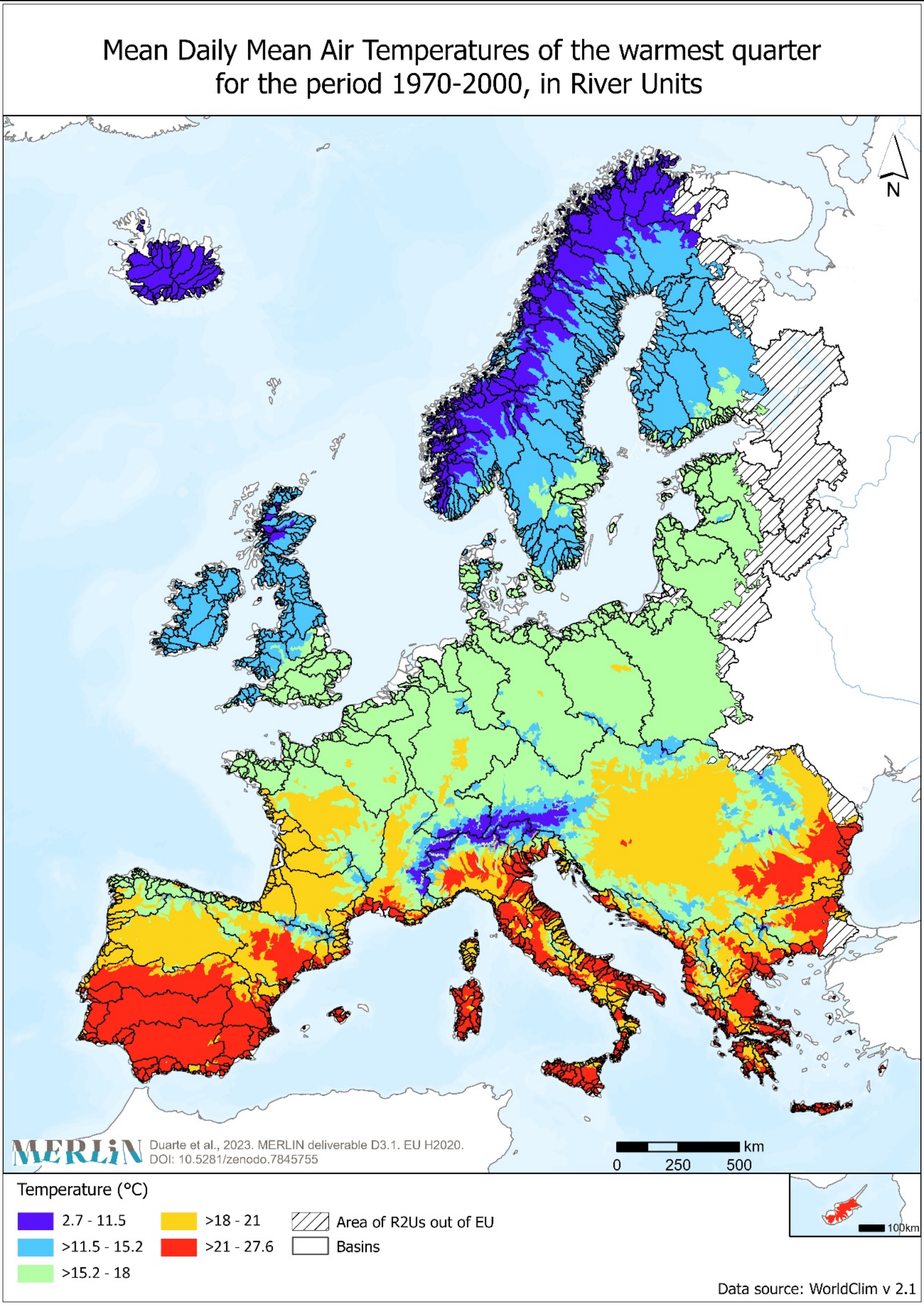
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO4 value per R2U for the time period 1970-2000 BIO4 from WorldClim version 2.1 in 2.5 minutes spatial resolution.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Temperature seasonality for the period 2021-2040 under ssp370 scenario, in River Units
	
Summary	This bioclimatic variable is the standard deviation of the monthly mean temperature x 100 in the time period 2021-2040 under ssp370 scenario (BIO4). Values of BIO4 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

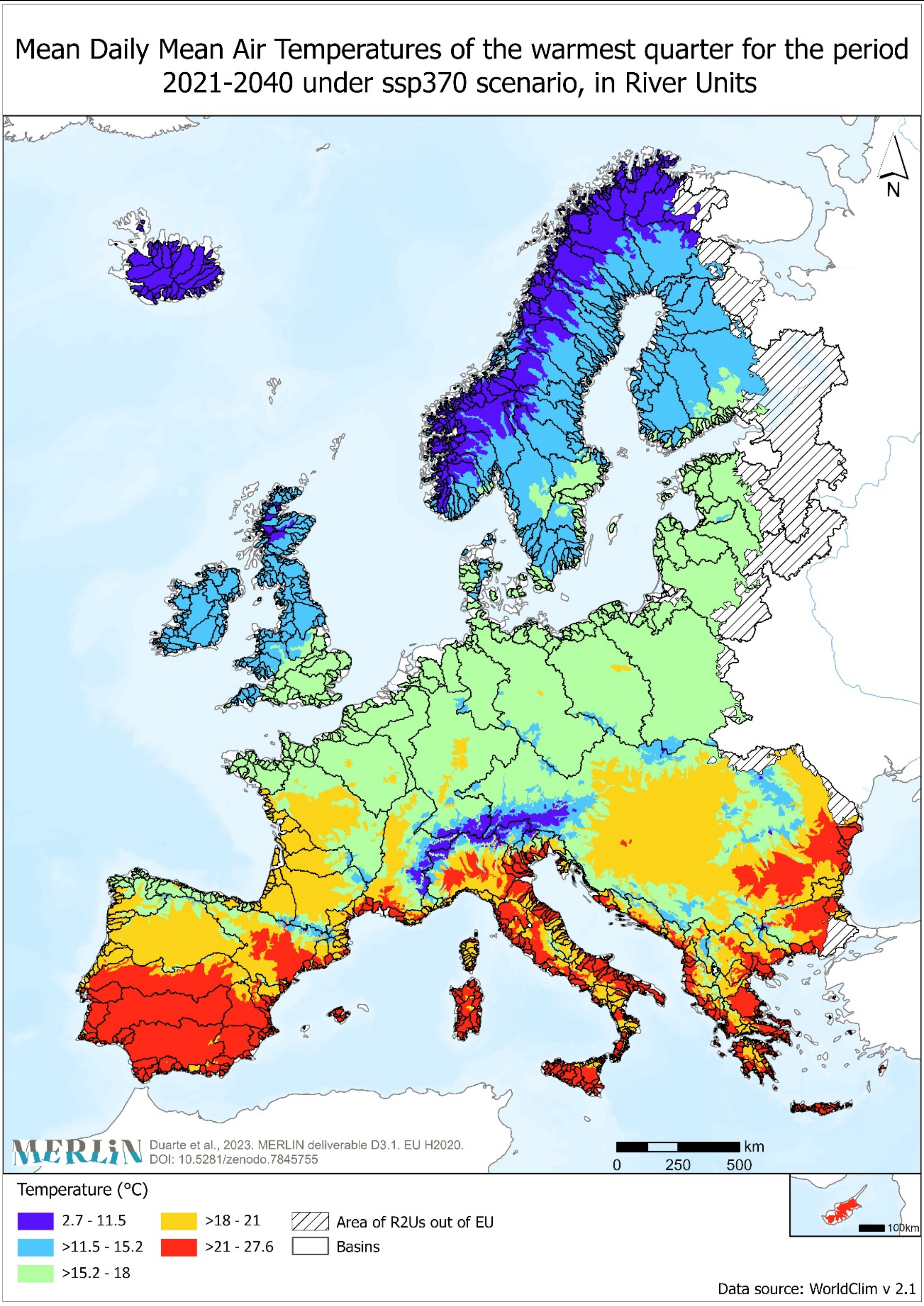
	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO4 value per R2U for the time period 2021-2040 under ssp370 scenario. BIO4 from WorldClim version 2.1 in 2.5 minutes spatial resolution.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Temperature seasonality for the period 2021-2040 under ssp585 scenario, in River Units
	
Summary	This bioclimatic variable is the standard deviation of the monthly mean temperature x 100 in the time period 2021-2040 under ssp585 scenario (BIO4). Values of BIO4 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

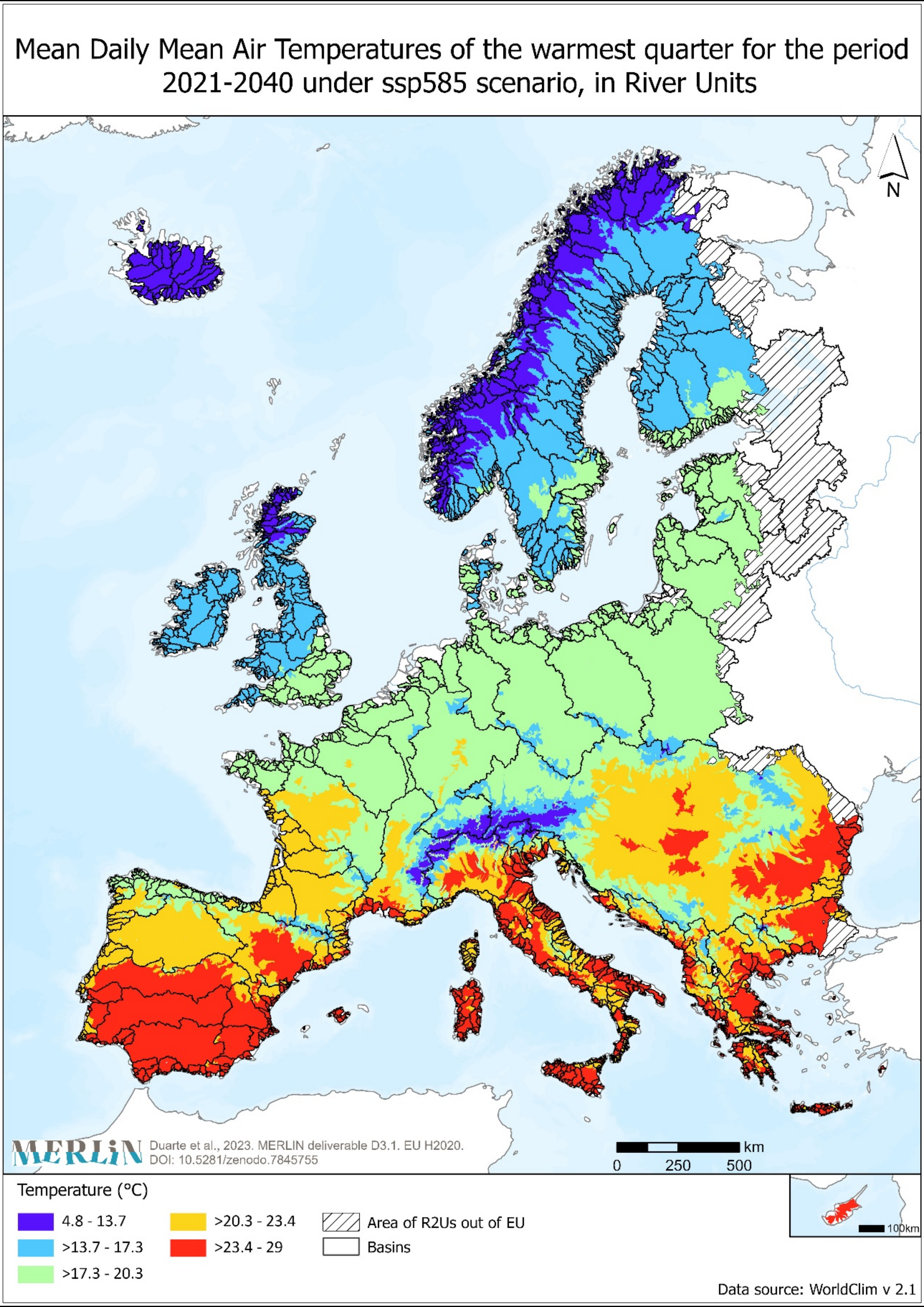
	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO4 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO4 from WorldClim version 2.1 in 2.5 minutes spatial resolution.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean daily mean air temperatures of the warmest quarter for the period 1970-2000, in River Units
	
Summary	This bioclimatic variable is the mean daily mean air temperatures of warmest quarter in the time period 1970-2000 (BIO10). Average values of BIO10 have been given to River Restoration Units using zonal statistics.

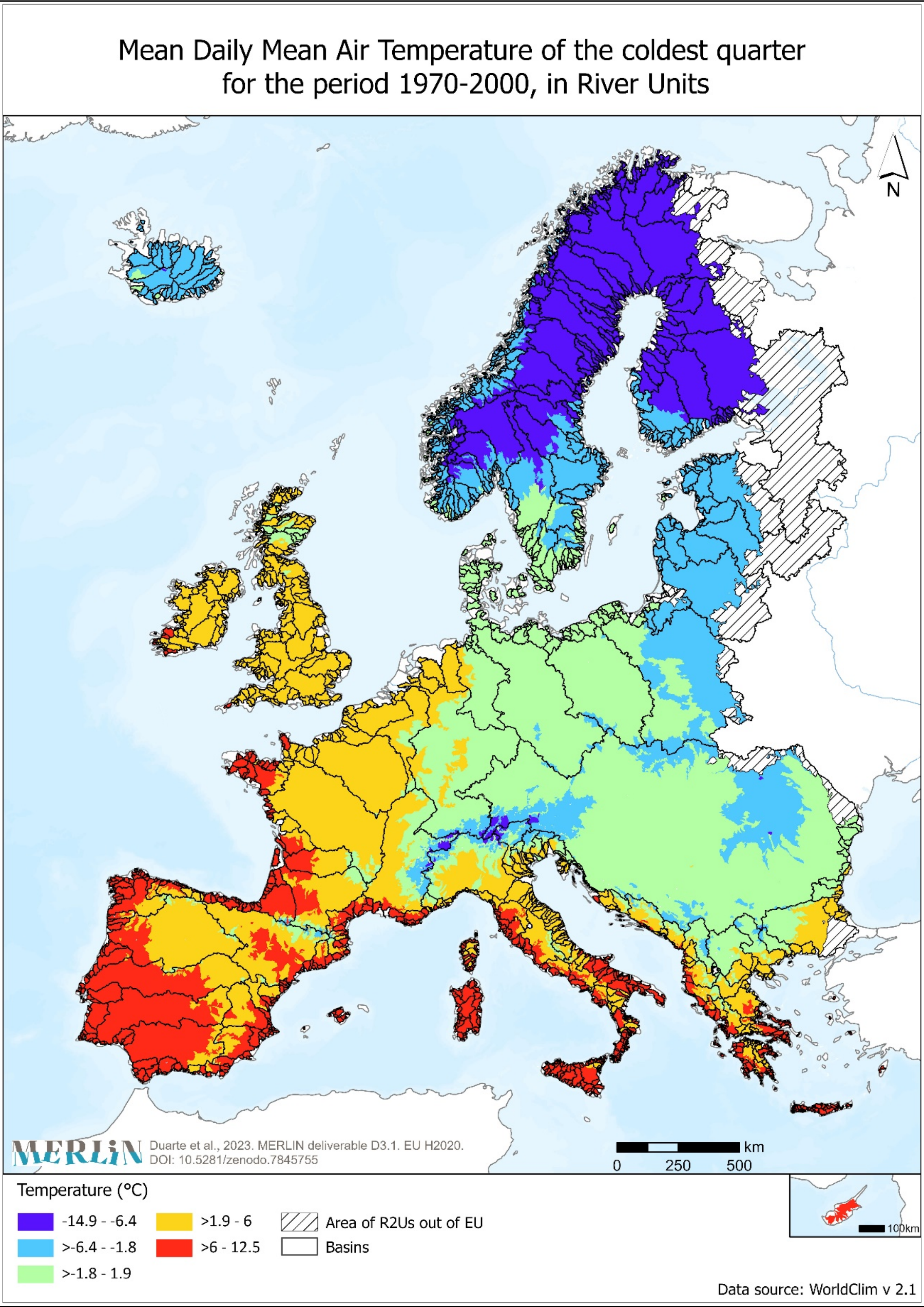
	Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO10 value per R2U for the time period 1970-2000 BIO10 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean daily mean air temperatures of the warmest quarter for the period 2021-2040 under ssp370 scenario, in River Units
	
Summary	This bioclimatic variable is the mean daily mean air temperatures of warmest quarter in the time period 2021-2040 under ssp370 scenario (BIO10). Average

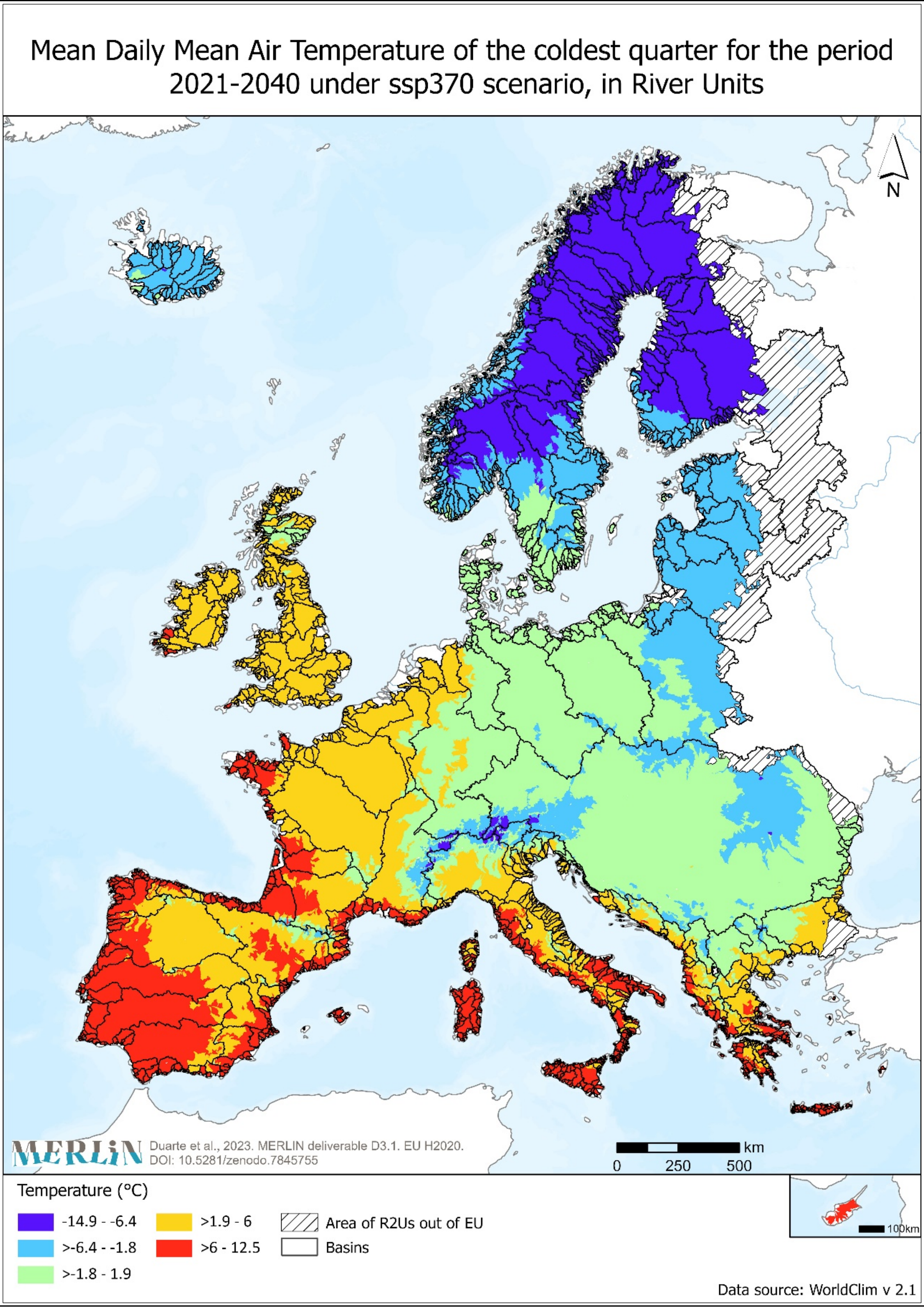
	values of BIO10 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO10 value per R2U for the time period 2021-2040 under ssp370 scenario. BIO10 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean daily mean air temperatures of the warmest quarter for the period 2021-2040 under ssp585 scenario, in River Units
	
Summary	This bioclimatic variable is the mean daily mean air temperatures of warmest quarter in the time period 2021-2040 under ssp585 scenario (BIO10). Average values of BIO10 have been given to River Restoration Units using zonal statistics.

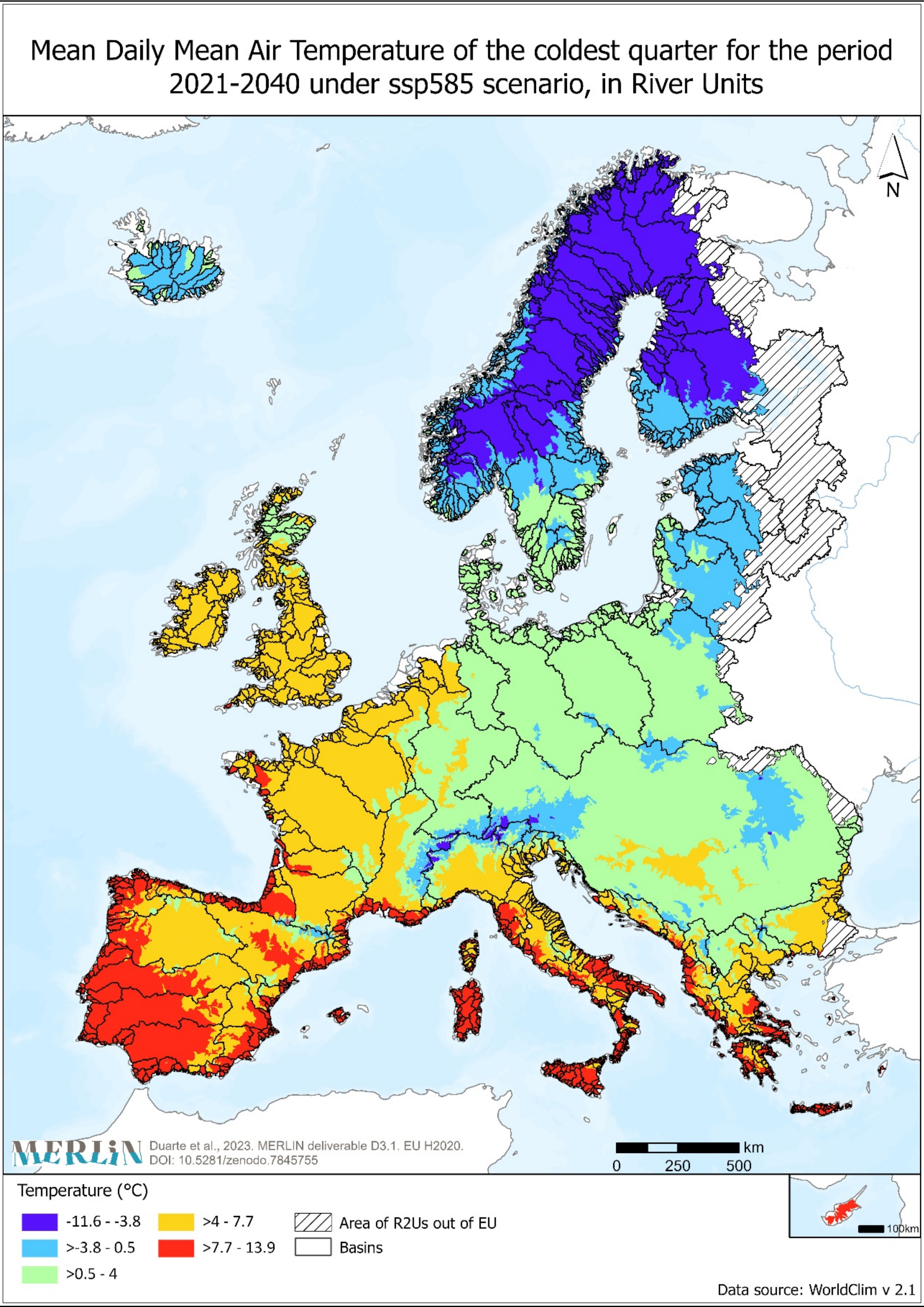
	Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO10 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO10 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean Daily Mean Air Temperature of the coldest quarter for the period 1970-2000, in River Units
	
Summary	This bioclimatic variable is the mean daily mean air temperatures of the coldest quarter in the time period 1970-2000 (BIO11). Values of BIO11 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

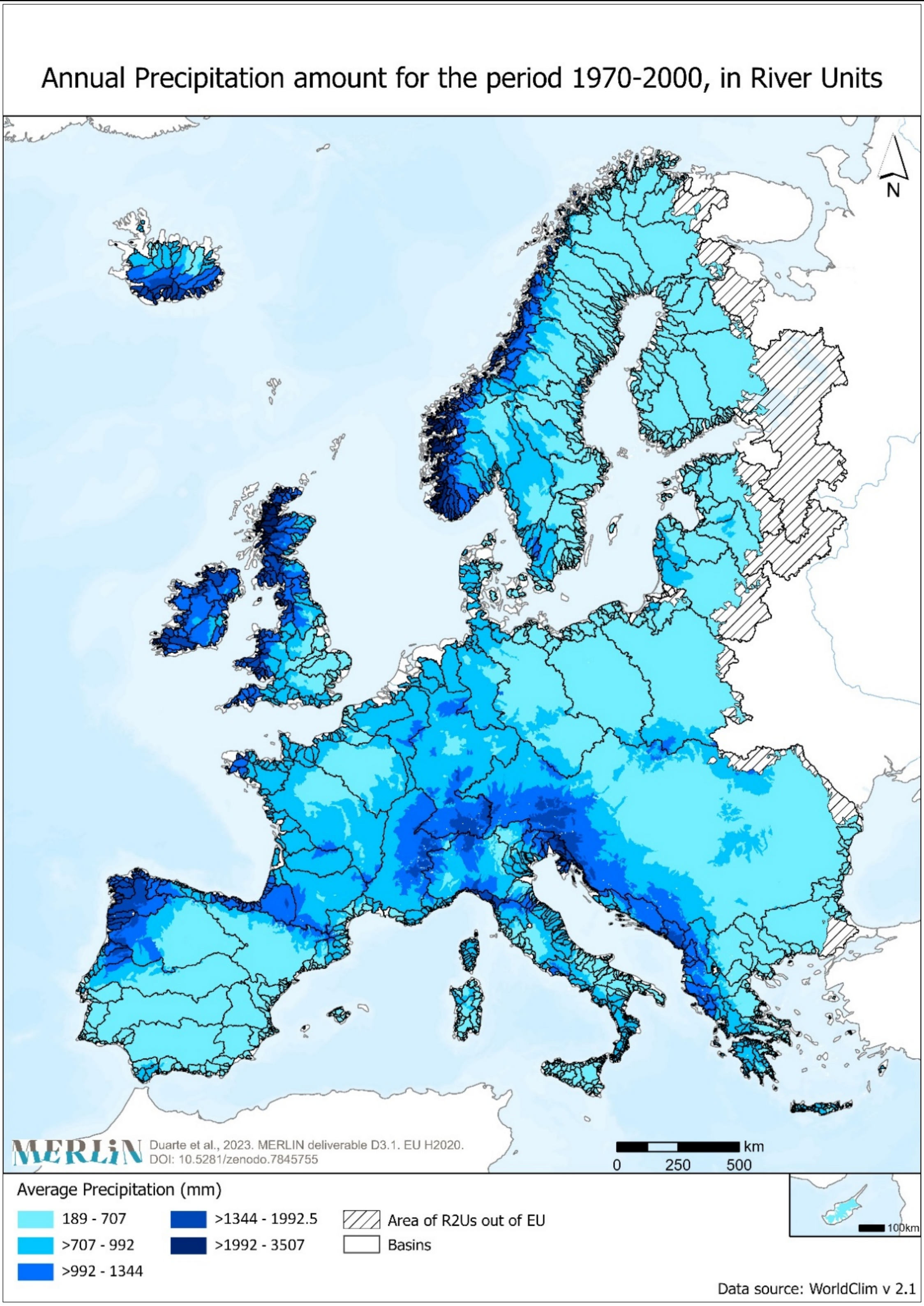
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO11 value per R2U for the time period 1970-2000. BIO11 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean Daily Mean Air Temperature of the coldest quarter for the period 2021-2040 under ssp370 scenario, in River Units
	
Summary	This bioclimatic variable is the mean daily mean air temperatures of the coldest quarter in the time period 2021-2040 under ssp370 scenario (BIO11). Values of BIO11 have been given to River Restoration Units using zonal statistics.

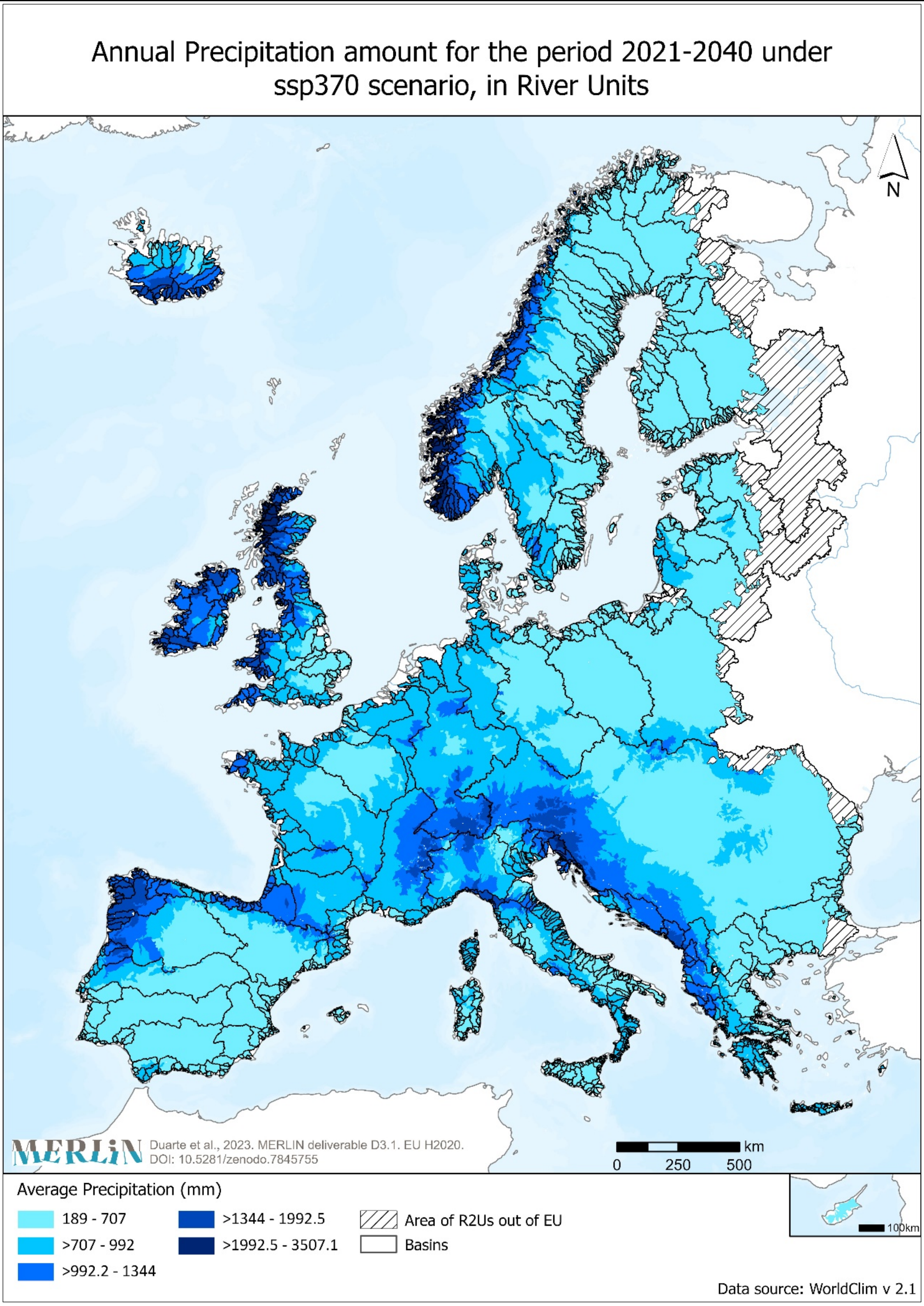
	Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO11 value per R2U for the time period 2021-2040 under ssp370 scenario. BIO11 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean Daily Mean Air Temperature of the coldest quarter for the period 2021-2040 under ssp585 scenario, in River Units
	
Summary	This bioclimatic variable is the mean daily mean air temperatures of the coldest quarter in the time period 2021-2040 under ssp585 scenario (BIO11). Values of BIO11 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

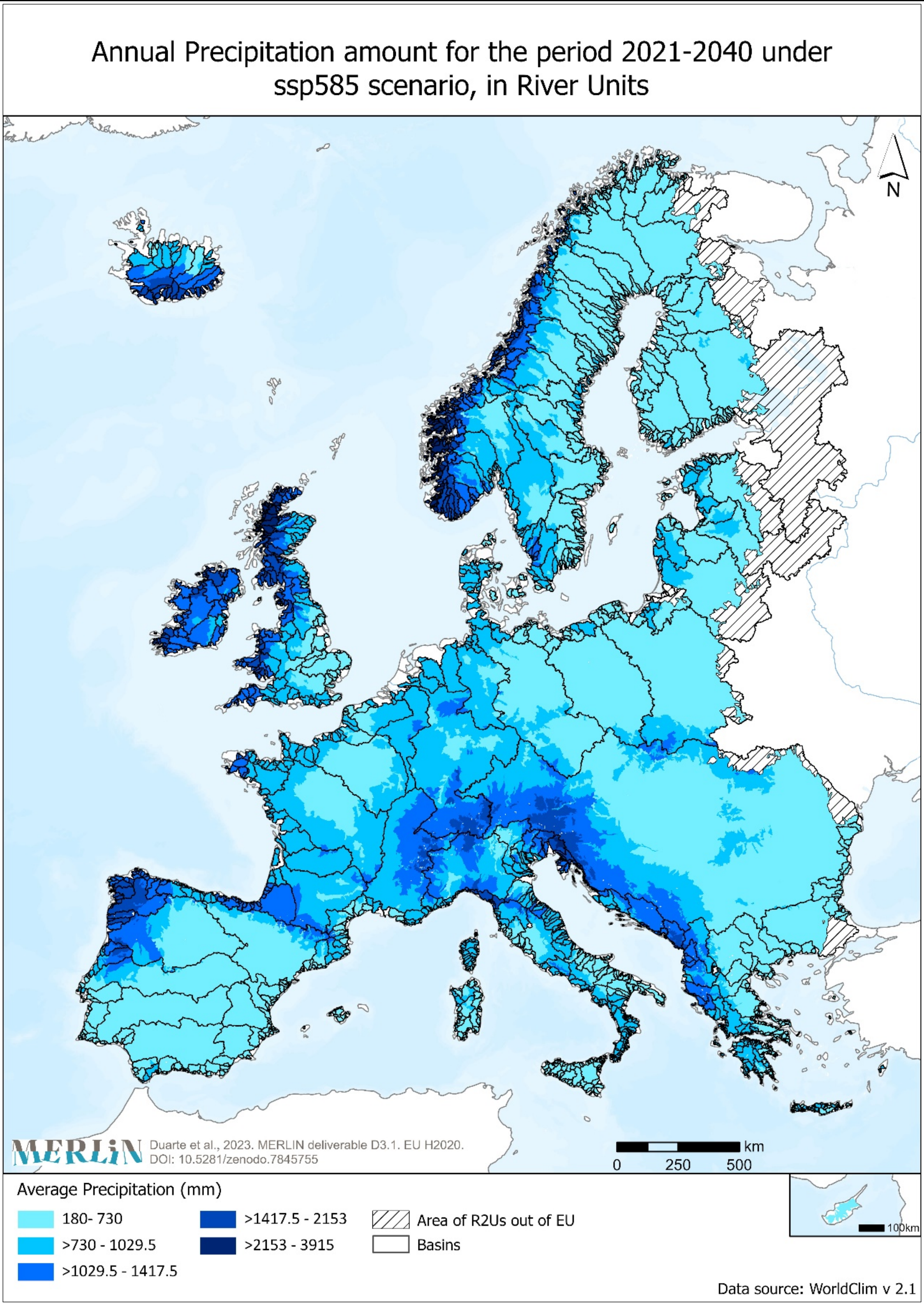
	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO11 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO11 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in °C.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Annual Precipitation amount for the period 1970-2000, in River Units
	
Summary	This bioclimatic variable is the accumulated precipitation amount over 1 year in the time period 1970-2000 (BIO12). Values of BIO12 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

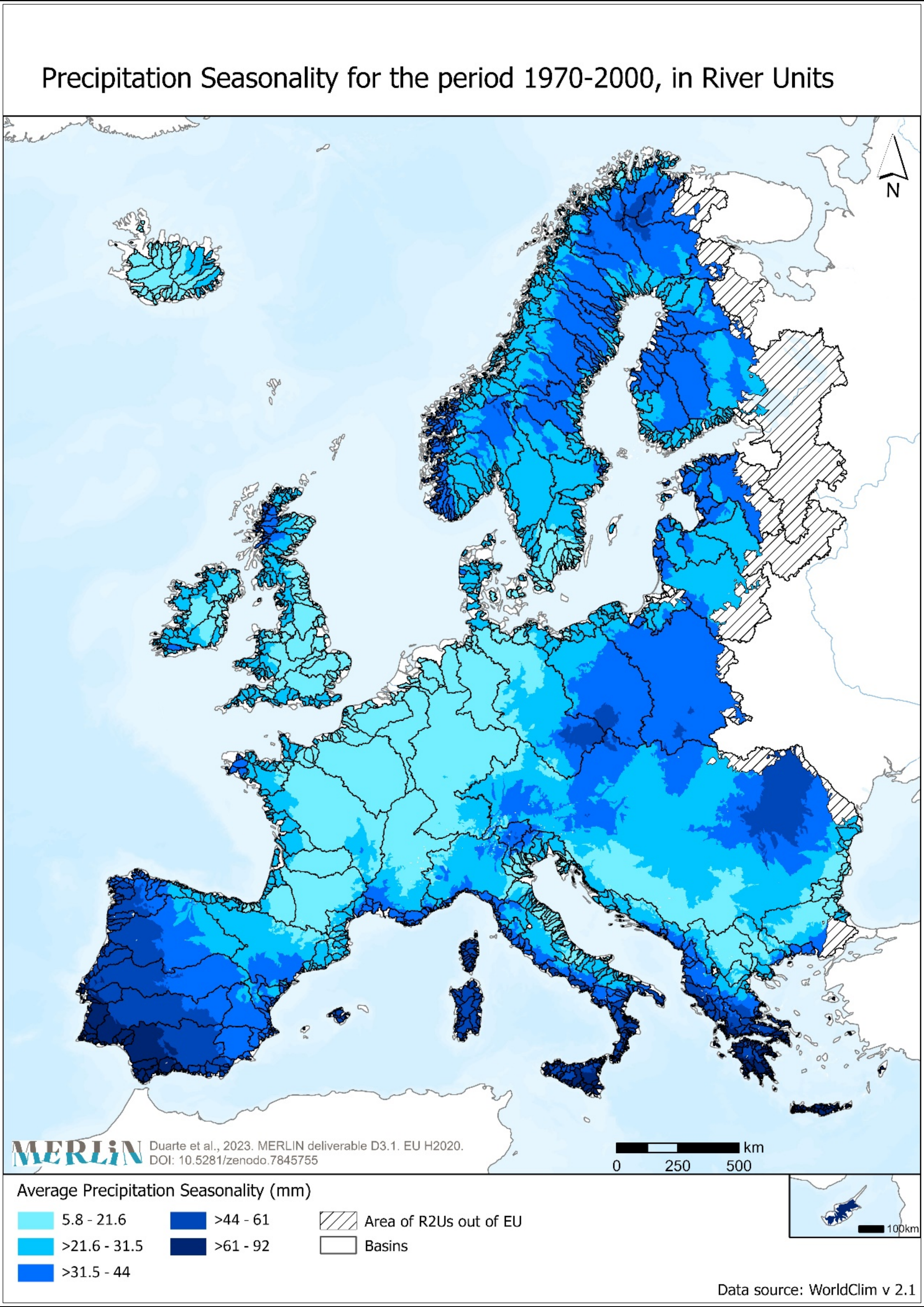
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO12 value per R2U for the time period 1970-2000 BIO12 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Annual Precipitation amount for the period 2021-2040 under ssp370 scenario, in River Units
	
Summary	This bioclimatic variable is the accumulated precipitation amount over 1 year in the time period 2021-2040 under ssp370 scenario (BIO12). Values of BIO12 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

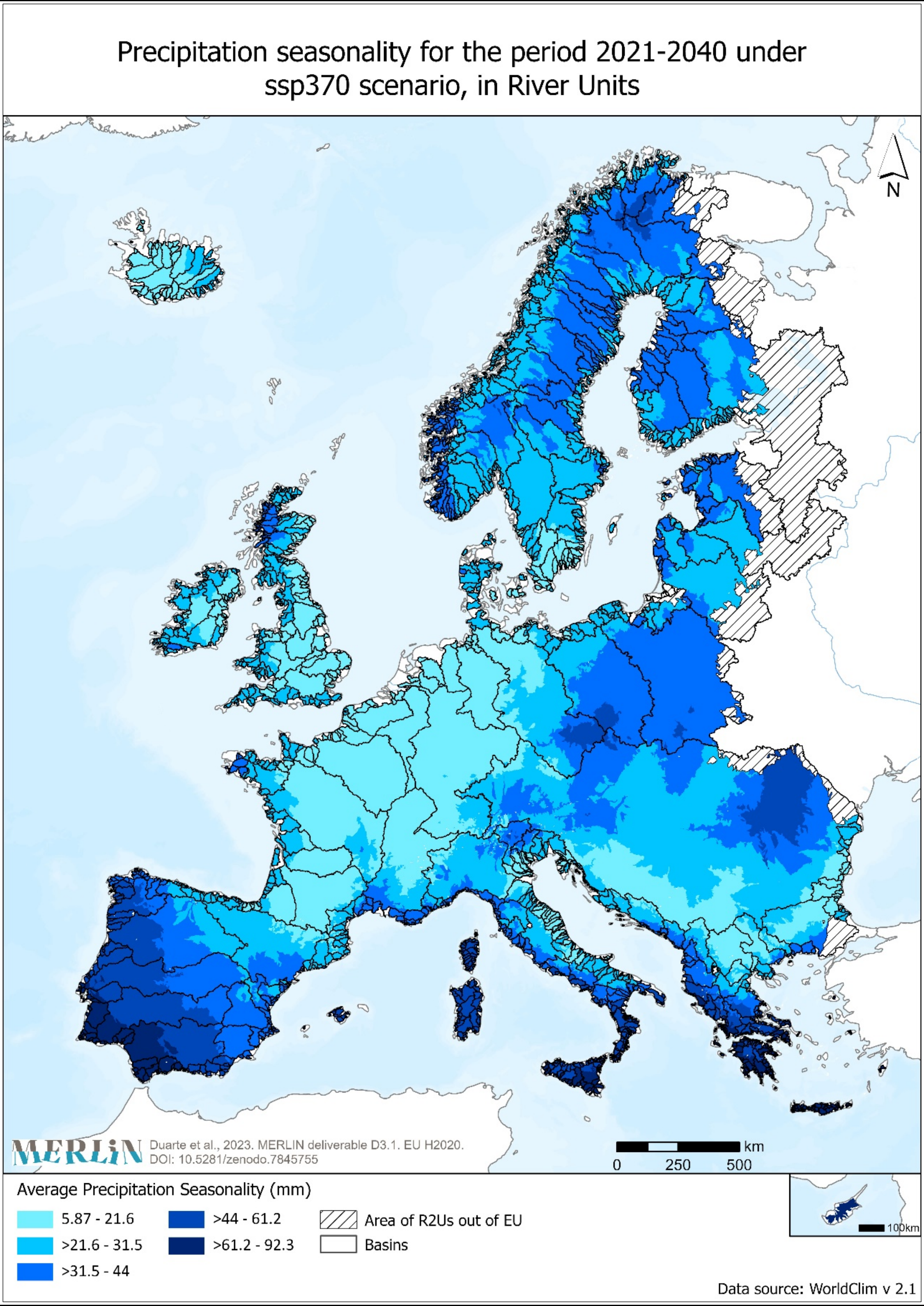
	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO12 value per R2U for the time period 2021-2040 under ssp370 scenario. BIO12 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Annual Precipitation amount for the period 2021-2040 under ssp585 scenario, in River Units.
	
Summary	This bioclimatic variable is the accumulated precipitation amount over 1 year in the time period 2021-2040 under ssp585 scenario (BIO12). Values of BIO12 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

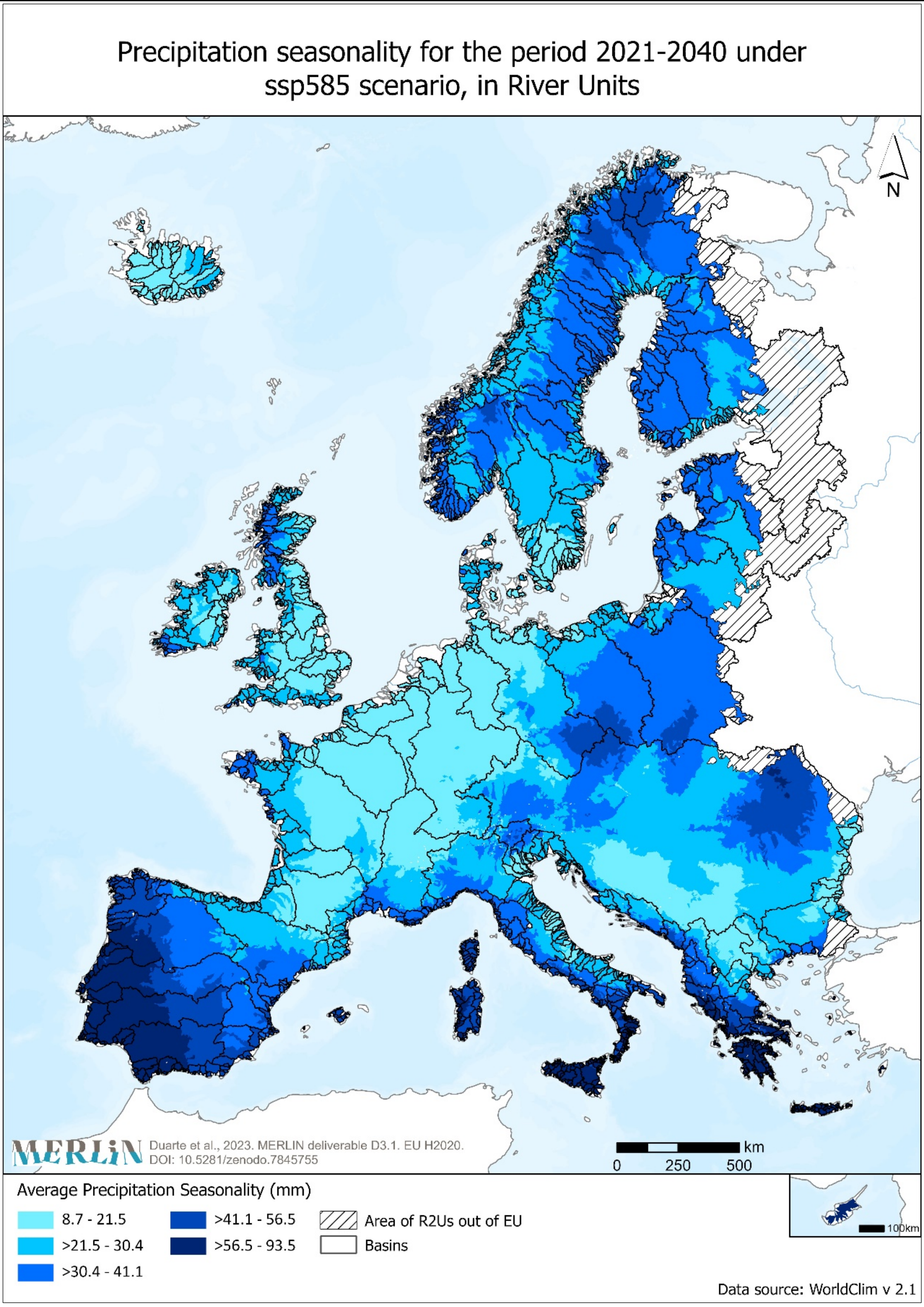
	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO12 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO12 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Precipitation seasonality for the period 1970-2000, in River Units
	
Summary	This bioclimatic variable is the Coefficient of Variation as the standard deviation of the monthly precipitation estimates expressed as a percentage of the mean of those estimates in the time period 1970-2000 (BIO15). Values of BIO15 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO15 value per R2U for the time period 1970-2000 BIO15 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

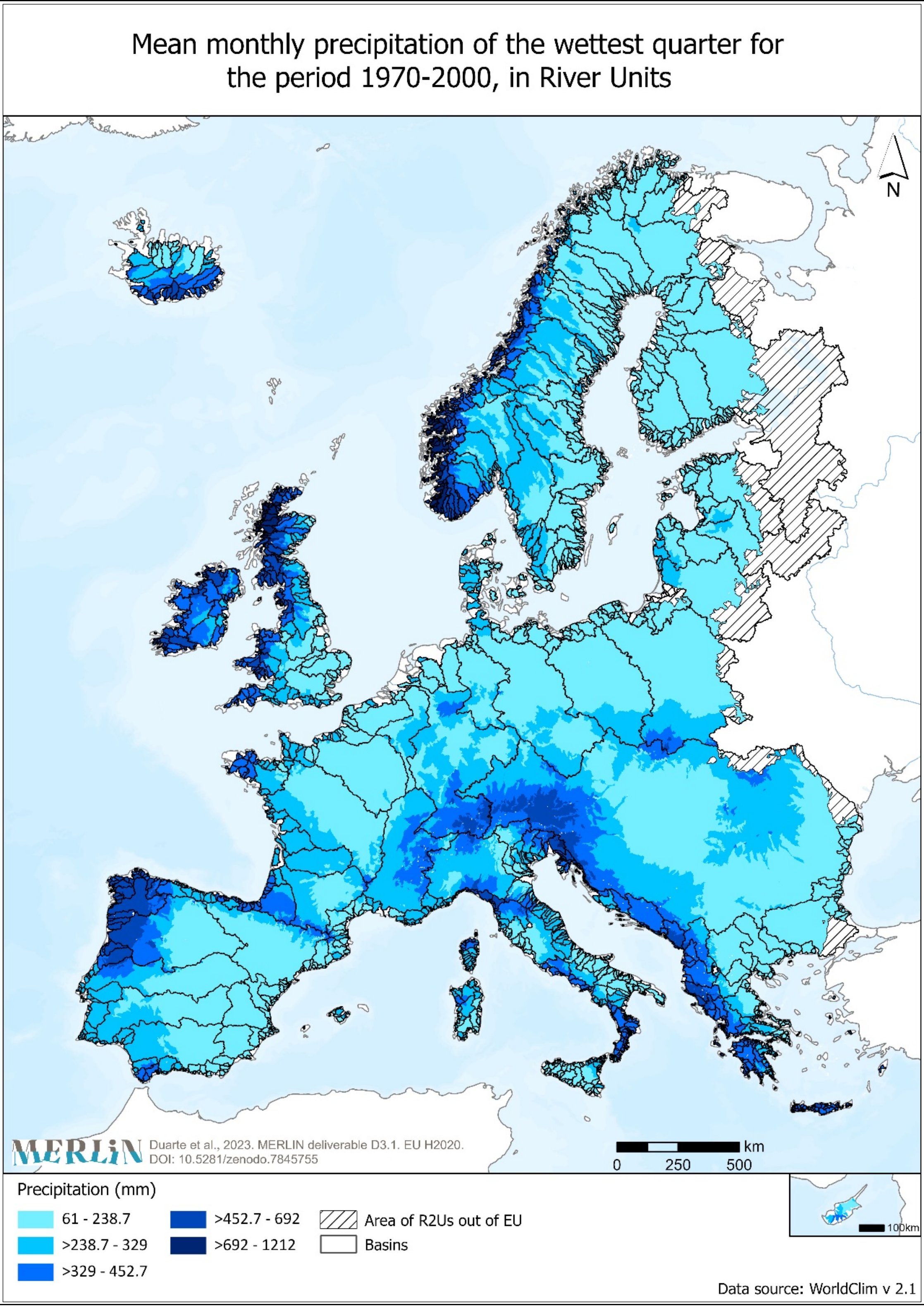
Title	Precipitation seasonality for the period 2021-2040 under ssp370 scenario, in River Units
	
Summary	This bioclimatic variable is the Coefficient of Variation as the standard deviation of the monthly precipitation estimates expressed as a percentage of the mean of those estimates in the time period 2021-2040 under ssp370

	scenario (BIO15). Values of BIO15 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO15 value per R2U for the time period 2021-2040 under ssp370 scenario. BIO15 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Precipitation seasonality for the period 2021-2040 under ssp585 scenario, in River Units
	
Summary	This bioclimatic variable is the Coefficient of Variation as the standard deviation of the monthly precipitation estimates expressed as a percentage of the mean of those estimates in the time period 2021-2040 under ssp585

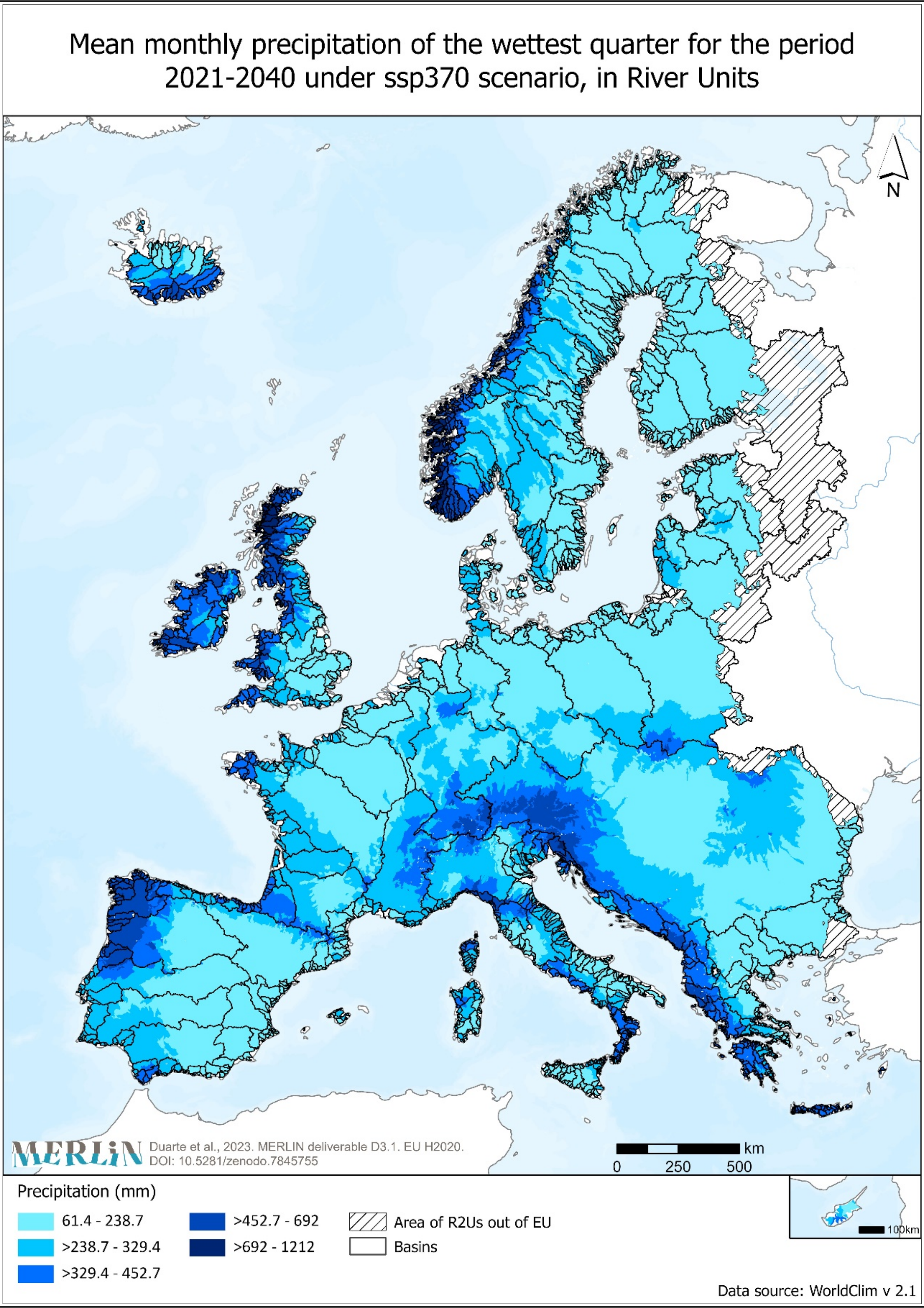
	scenario (BIO15). Values of BIO15 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO15 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO15 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean monthly precipitation of the wettest quarter for the period 1970-2000, in River Units

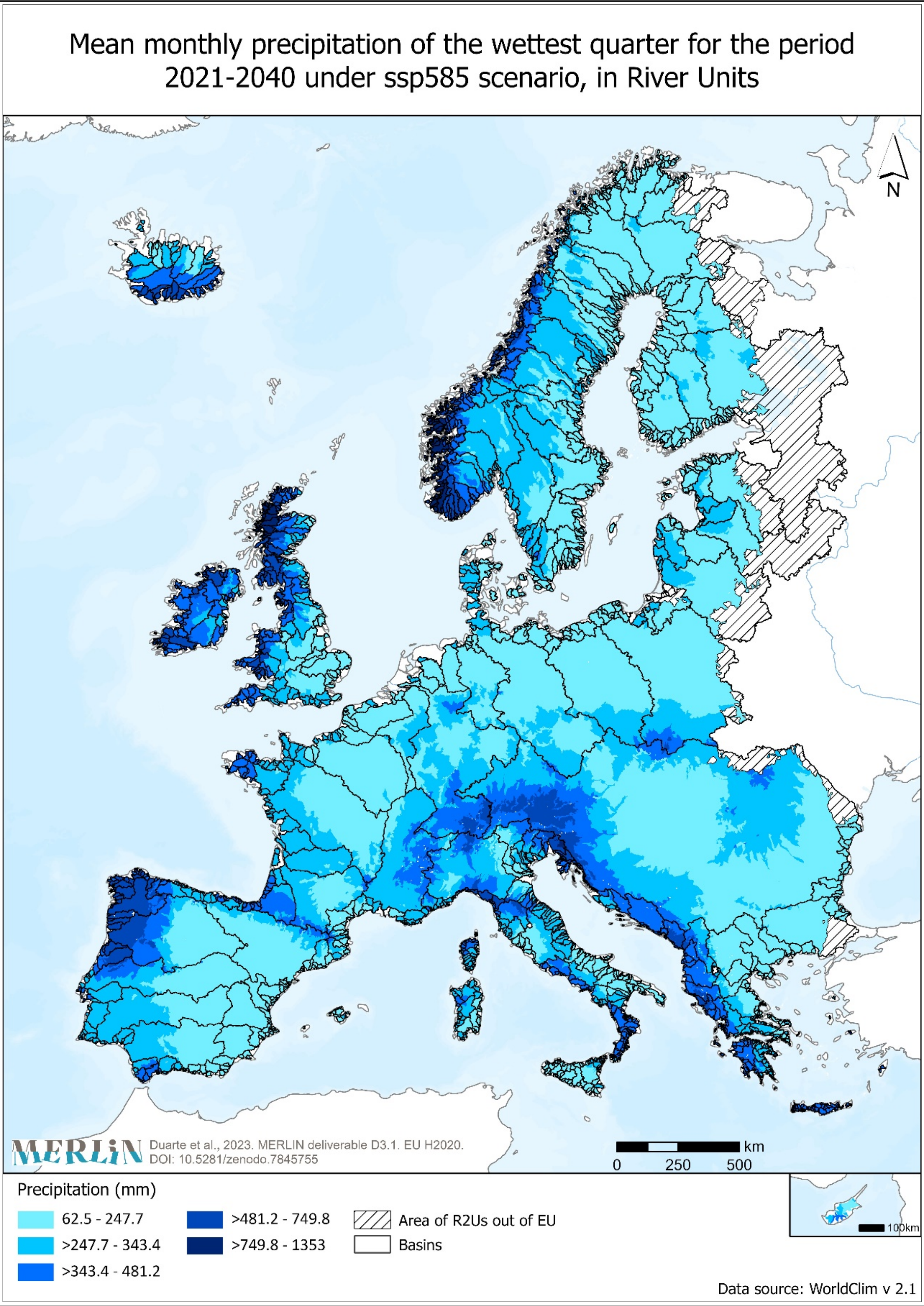


Summary	This bioclimatic variable is the mean monthly precipitation of the wettest quarter in the time period 1970-2000 (BIO16). Values of BIO16 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

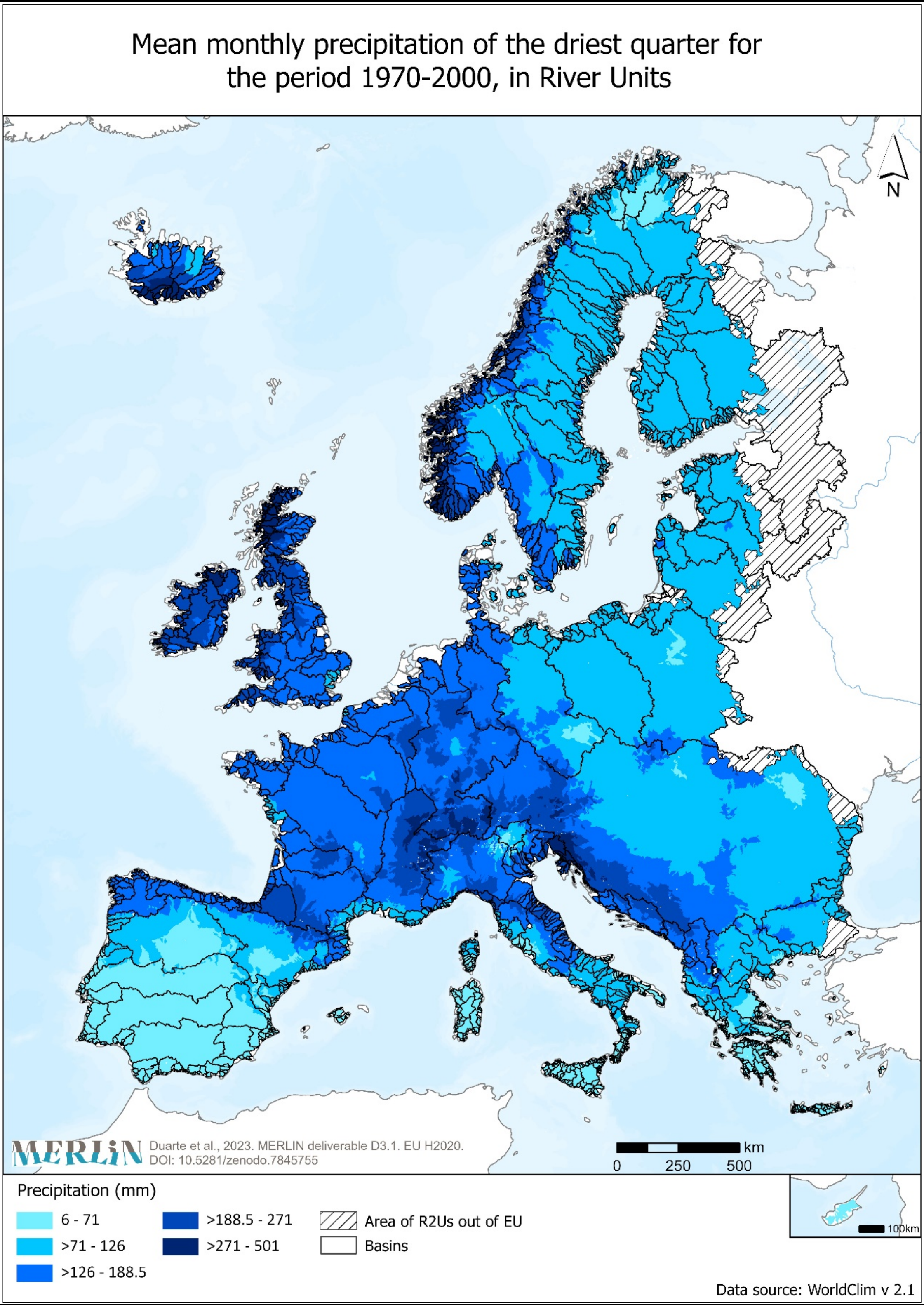
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO16 value per R2U for the time period 1970-2000. BIO16 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean monthly precipitation of the wettest quarter for the period 2021-2040 under ssp370 scenario, in River Units
	
Summary	This bioclimatic variable is the mean monthly precipitation of the wettest quarter in the time period 2021-2040 under ssp370 scenario (BIO16). Values of BIO16 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO16 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO16 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

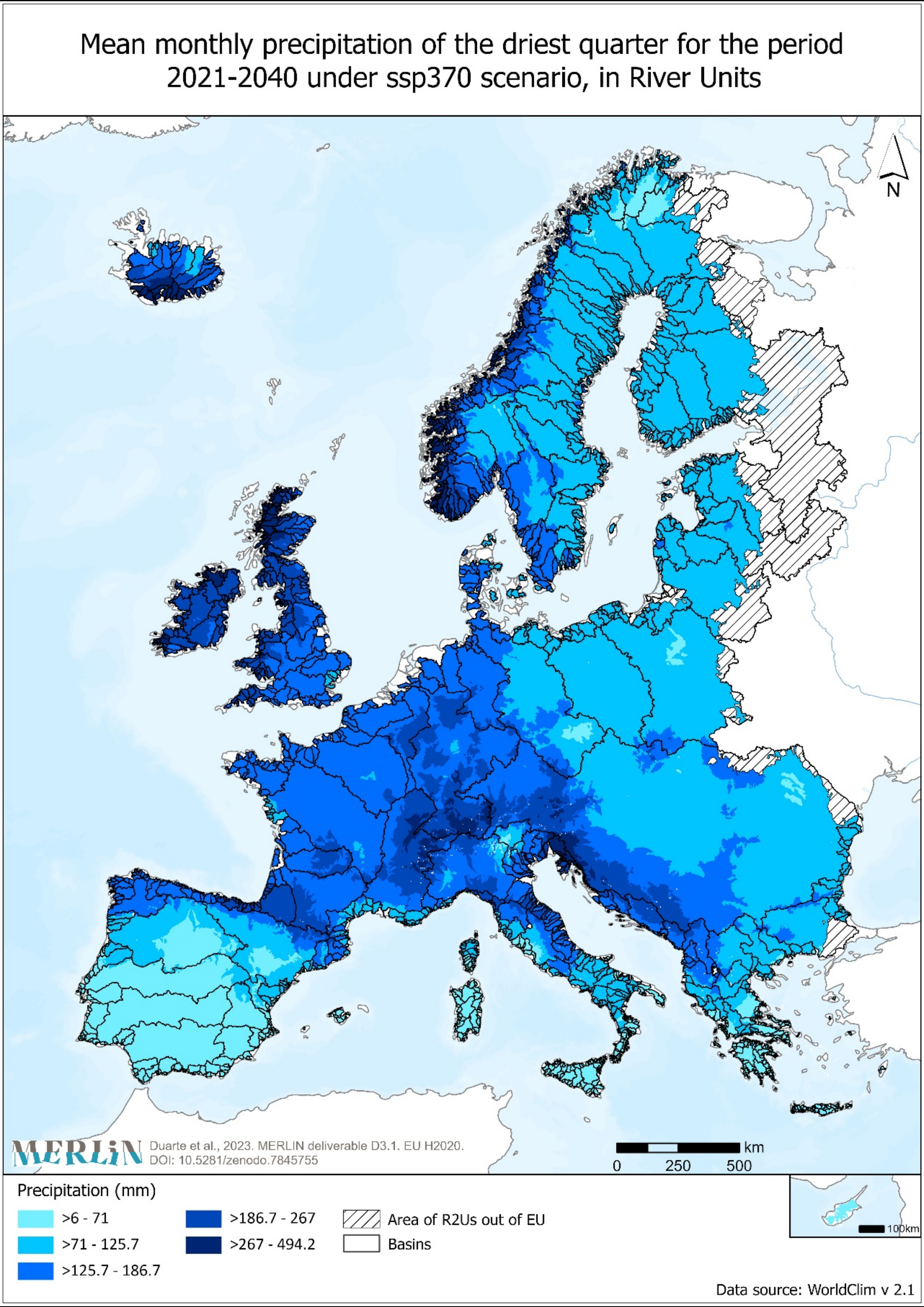
Title	Mean monthly precipitation of the wettest quarter for the period 2021-2040 under ssp585 scenario, in River Units
	
Summary	This bioclimatic variable is the mean monthly precipitation of the wettest quarter in the time period 2021-2040 under ssp585 scenario (BIO16). Values of BIO16 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO16 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO16 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean monthly precipitation of the driest quarter for the period 1970-2000, in River Units
	
Summary	This bioclimatic variable is the mean monthly precipitation of the driest quarter in the time period 1970-2000 (BIO17). Values of BIO17 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

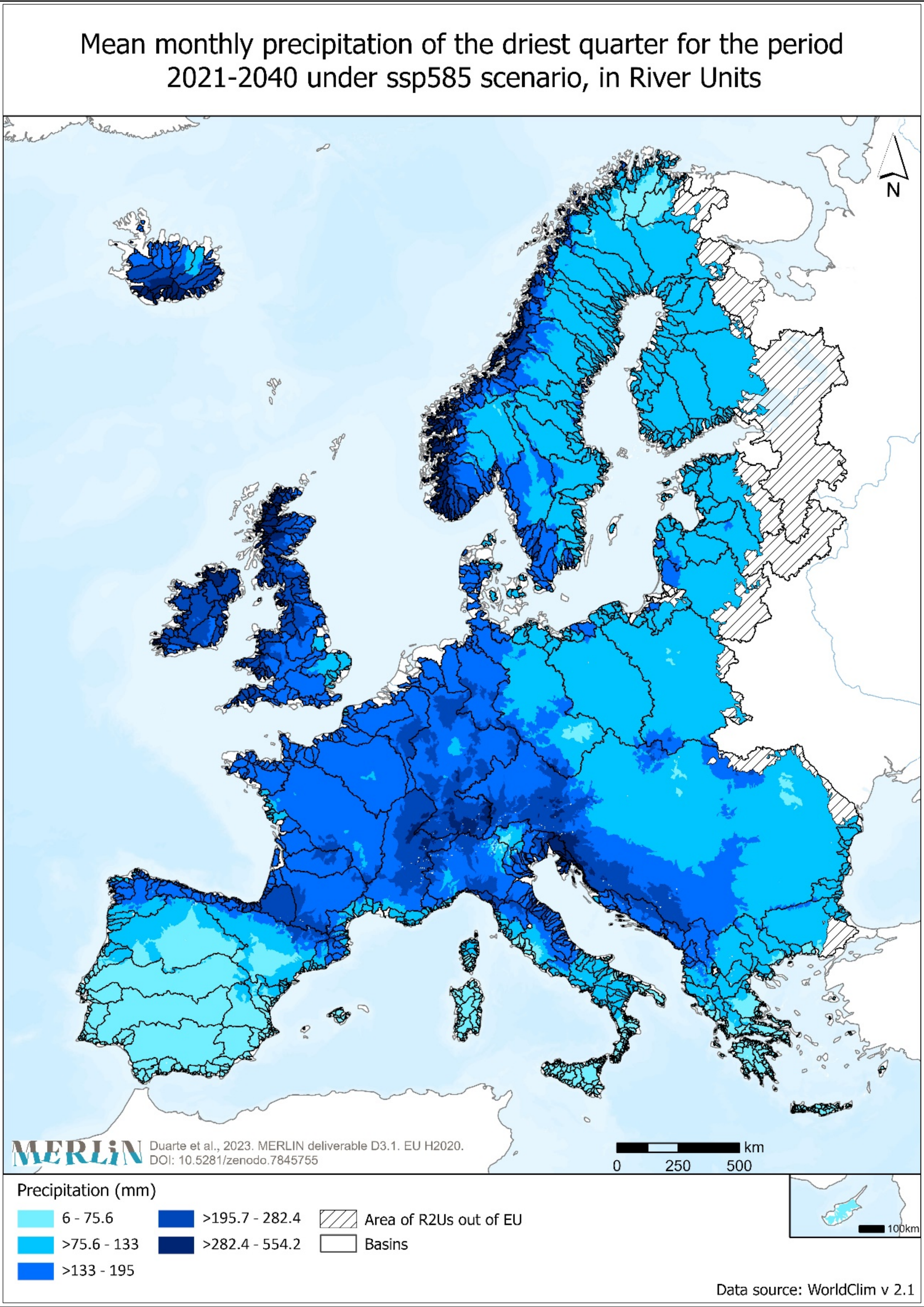
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO17 value per R2U for the time period 1970-2000. BIO17 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/worldclim21.html – Fick, S.E. and R.J. Hijmans, 2017. WorldClim 2: new 1km spatial resolution climate surfaces for global land areas. International Journal of Climatology 37 (12): 4302-4315. CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean monthly precipitation of the driest quarter for the period 2021-2040 under ssp370 scenario, in River Units



Summary	This bioclimatic variable is the mean monthly precipitation of the driest quarter in the time period 2021-2040 under ssp370 scenario (BIO17). Values of BIO17 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023

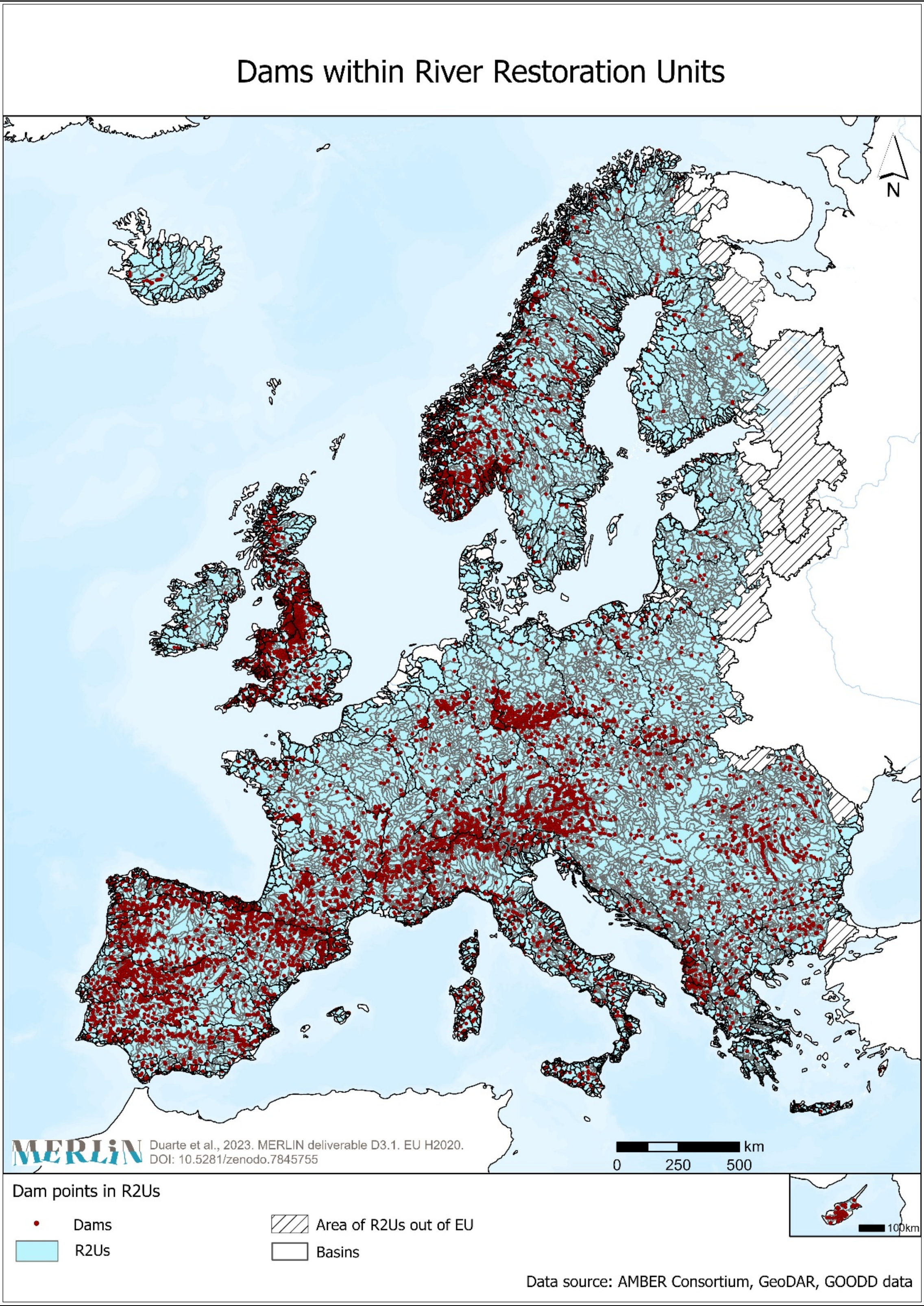
	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average BIO17 value per R2U for the time period 2021-2040 under ssp370 scenario. BIO17 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

Title	Mean monthly precipitation of the driest quarter for the period 2021-2040 under ssp585 scenario, in River Units
	
Summary	This bioclimatic variable is the mean monthly precipitation of the driest quarter in the time period 2021-2040 under ssp585 scenario (BIO17). Values of BIO17 have been given to River Restoration Units using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0

	Responsible: School of Agriculture, University of Lisbon
Description	The average BIO17 value per R2U for the time period 2021-2040 under ssp585 scenario. BIO17 from WorldClim version 2.1 in 2.5 minutes spatial resolution. Values are in mm.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Bioclimatic data: – https://worldclim.org/data/cmip6/cmip6_clim2.5m.html CMIP6, SSPs: – https://confluence.ecmwf.int/display/CKB/CMIP6%3A+Global+climate+projections#CMIP6: Globalclimateprojections-SharedSocioeconomicPathway(SSP)Experiments
Limitation	No limitation

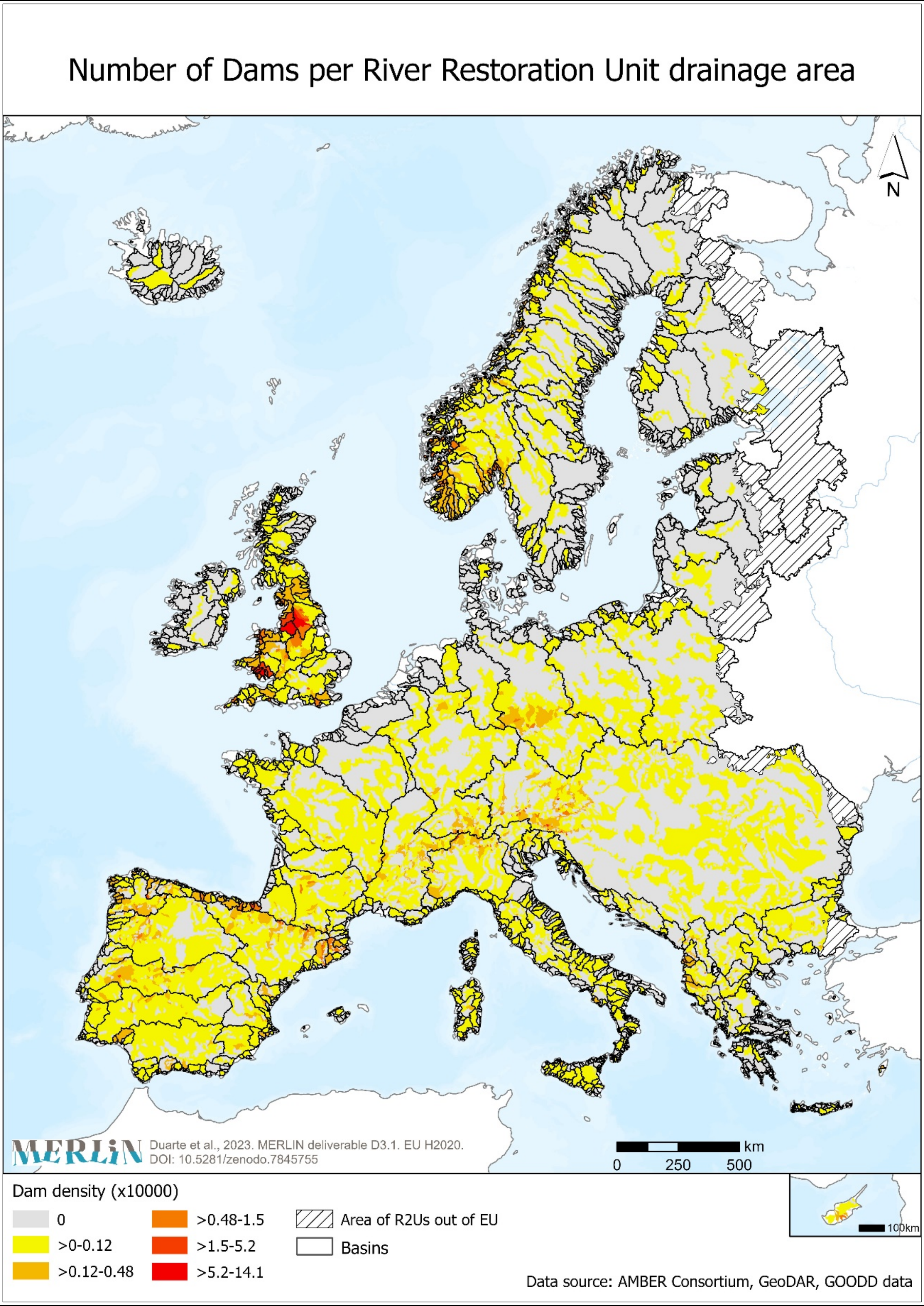
River connectivity and hydrological alterations

Title	Dams within River Restoration Units



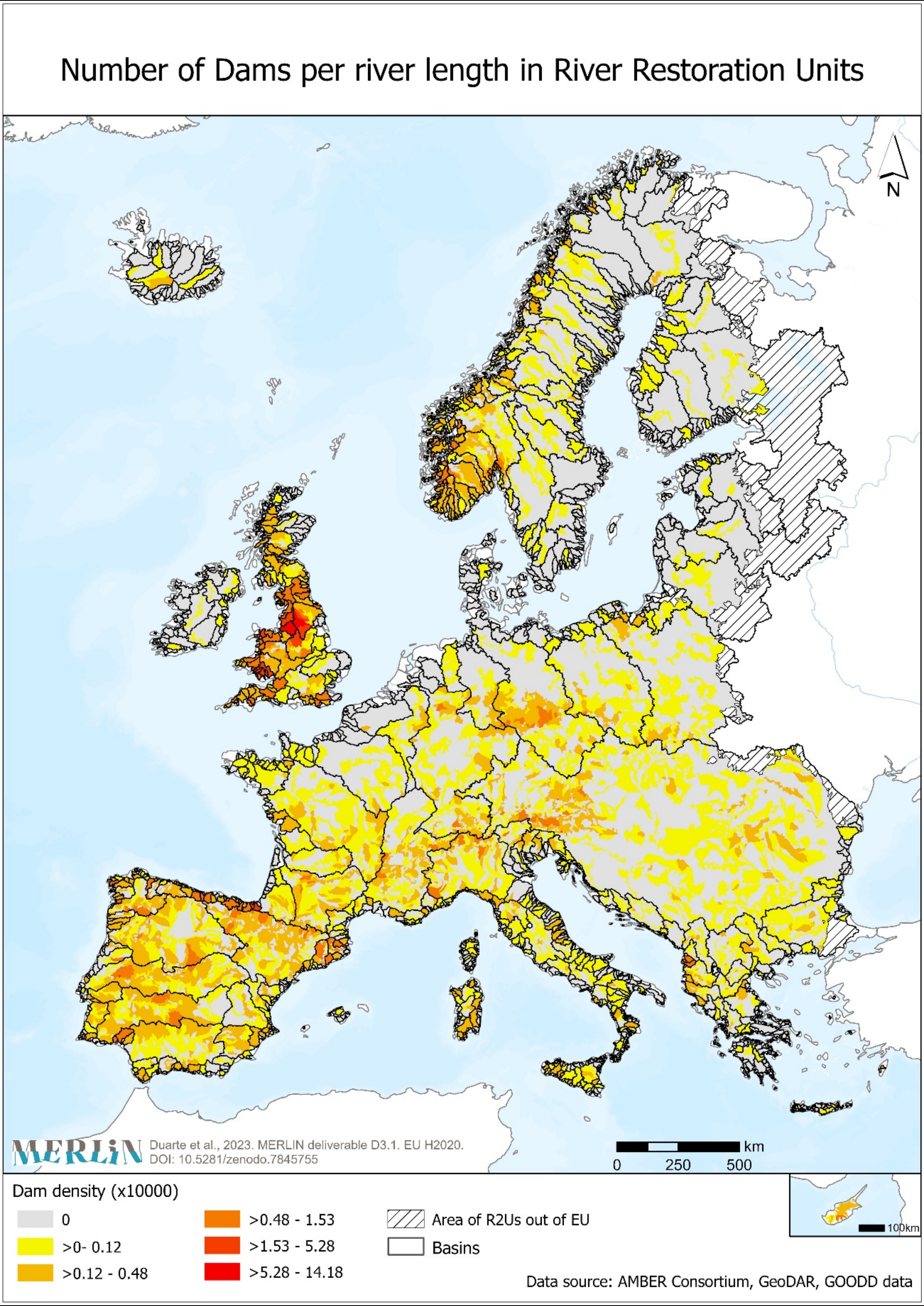
Summary	Geographical location of the compiled barriers higher than 5 meters. Creation date: March 2023 Spatial Resolution: R2Us Version: 3.0.0

	Responsible: School of Agriculture, University of Lisbon
Description	Location of the compiled barriers higher than 5 meters.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) – AMBER Consortium (2020). The AMBER Barrier Atlas. A Pan-European database of artificial instream barriers. Version 1.0 June 29th 2020. https://amber.international/european-barrier-atlas/ – De Jager, Alfred; Vogt, Jürgen (2007): Rivers and Catchments of Europe - Catchment Characterisation Model (CCM). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/fe1878e8-7541-4c66-8453-afdae7469221 – Mulligan, M., van Soesbergen, A. & Sáenz, L. GOODD, a global dataset of more than 38,000 georeferenced dams. Sci Data 7, 31 (2020). https://doi.org/10.1038/s41597-020-0362-5 – Wang, J., Walter, B. A., Yao, F., Song, C., Ding, M., Maroof, A. S., Zhu, J., Fan, C., Xin, A., McAlister, J. M., Sikder, S., Sheng, Y., Allen, G. H., Crétaux, J.-F., and Wada, Y. (2021). GeoDAR: Georeferenced global dam and reservoir dataset for bridging attributes and geolocations, Earth System Science Data Discussions, 1-52. https://doi.org/10.5194/essd-2021-58
Limitation	No limitation

Title	Number of Dams per River Rerstoration Unit drainage area
	
Summary	Dams density per 1 km area in river units. Creation date: March 2023 Spatial Resolution: R2Us Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	Density of the compiled barriers higher than 5 meters per 1km river area
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) – AMBER Consortium (2020). The AMBER Barrier Atlas. A Pan-European database of artificial instream barriers. Version 1.0 June 29th 2020. https://amber.international/european-barrier-atlas/ – De Jager, Alfred; Vogt, Jürgen (2007): Rivers and Catchments of Europe - Catchment Characterisation Model (CCM). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/fe1878e8-7541-4c66-8453-afdae7469221 – Mulligan, M., van Soesbergen, A. & Sáenz, L. GOODD, a global dataset of more than 38,000 georeferenced dams. Sci Data 7, 31 (2020). https://doi.org/10.1038/s41597-020-0362-5 – Wang, J., Walter, B. A., Yao, F., Song, C., Ding, M., Maroof, A. S., Zhu, J., Fan, C., Xin, A., McAlister, J. M., Sikder, S., Sheng, Y., Allen, G. H., Crétaux, J.-F., and Wada, Y. (2021). GeoDAR: Georeferenced global dam and reservoir dataset for bridging attributes and geolocations, Earth System Science Data Discussions, 1-52. https://doi.org/10.5194/essd-2021-58
Limitation	No limitation

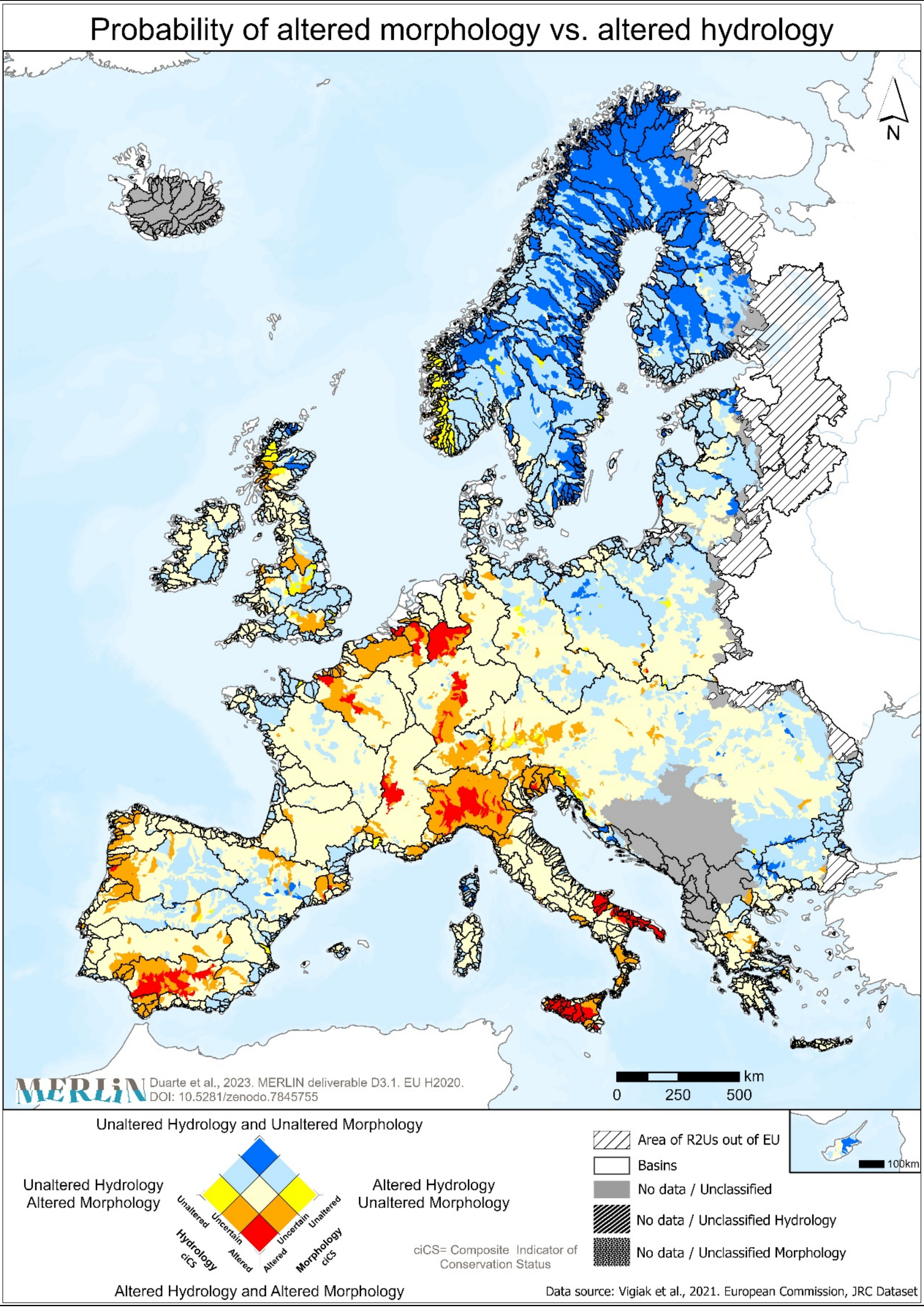
Title	Number of Dams per river length in River Rerstoration Unit



Summary	Dams density per 1 km river length in River Restoration units. Creation date: March 2023 Spatial Resolution: R2Us Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

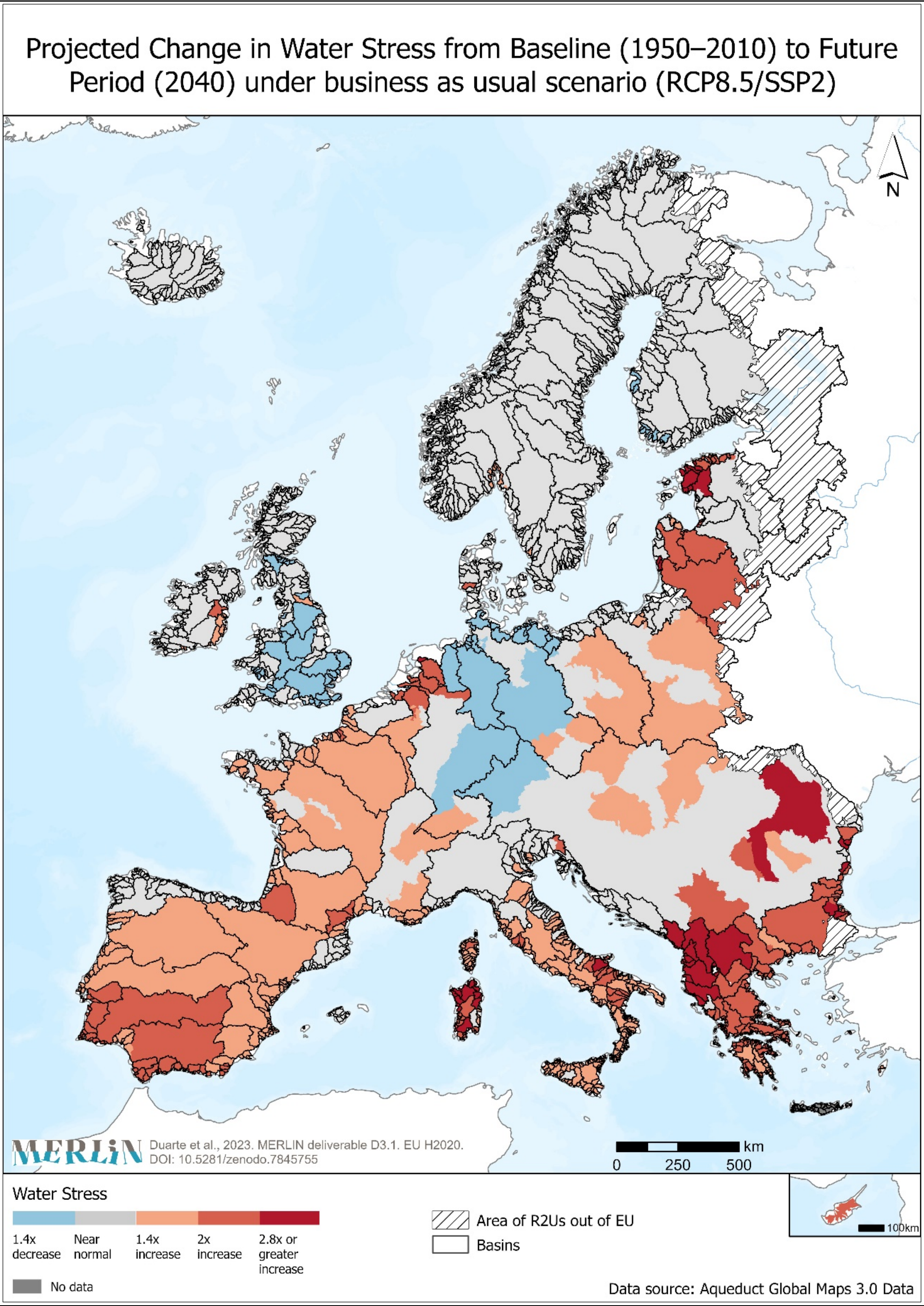
Description	Density of the compiled barriers higher than 5 meters per 1km river area
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) – AMBER Consortium (2020). The AMBER Barrier Atlas. A Pan-European database of artificial instream barriers. Version 1.0 June 29th 2020. https://amber.international/european-barrier-atlas/ – De Jager, Alfred; Vogt, Jürgen (2007): Rivers and Catchments of Europe - Catchment Characterisation Model (CCM). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/fe1878e8-7541-4c66-8453-afdae7469221 – Mulligan, M., van Soesbergen, A. & Sáenz, L. GOODD, a global dataset of more than 38,000 georeferenced dams. Sci Data 7, 31 (2020). https://doi.org/10.1038/s41597-020-0362-5 – Wang, J., Walter, B. A., Yao, F., Song, C., Ding, M., Maroof, A. S., Zhu, J., Fan, C., Xin, A., McAlister, J. M., Sikder, S., Sheng, Y., Allen, G. H., Crétaux, J.-F., and Wada, Y. (2021). GeoDAR: Georeferenced global dam and reservoir dataset for bridging attributes and geolocations, Earth System Science Data Discussions, 1-52. https://doi.org/10.5194/essd-2021-58
Limitation	No limitation

Title	Status on the hydrological and morphological alterations

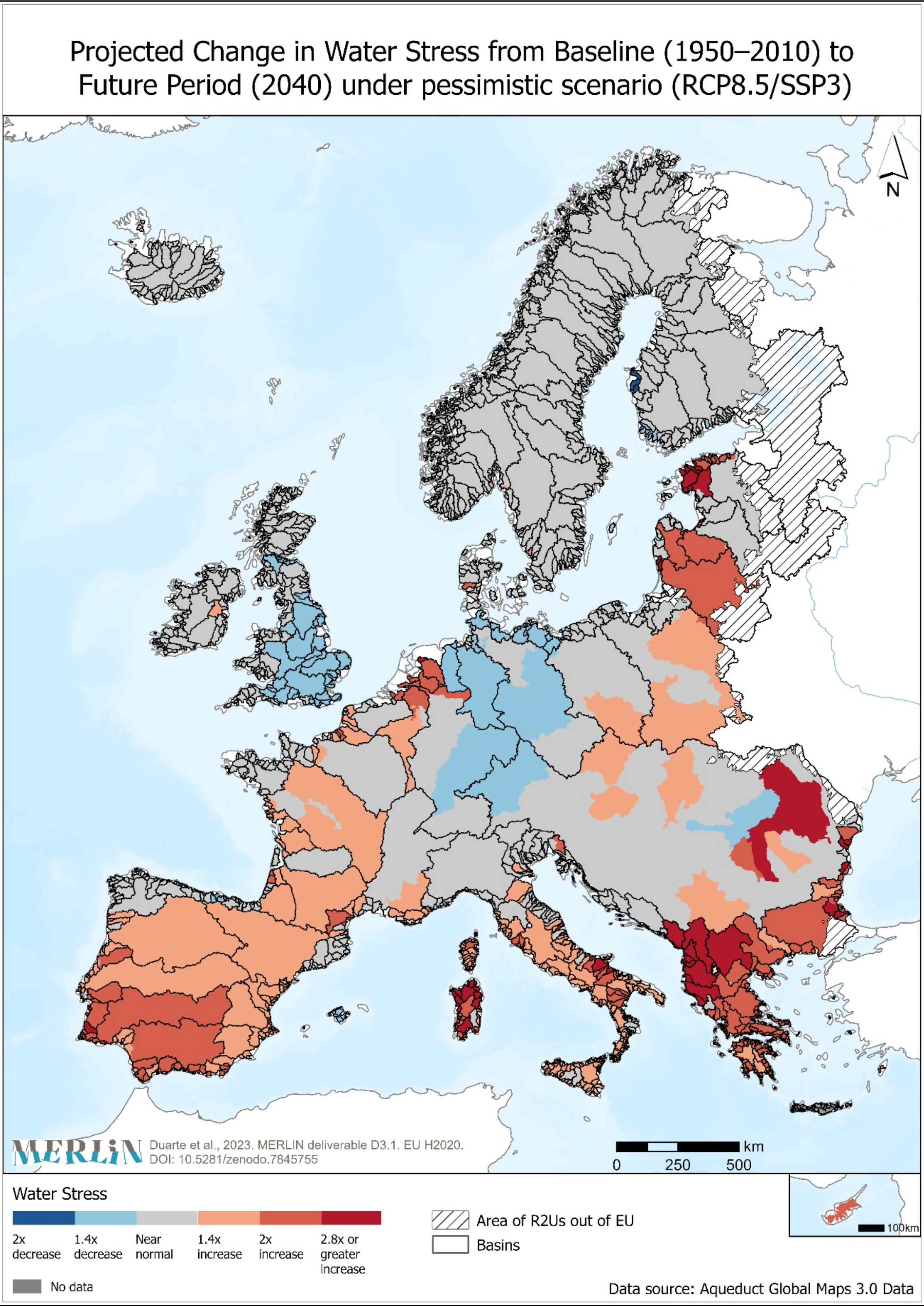


Summary	Integration of the status of hydrological alterations and morphological alterations of R2Us. Creation Date: March 2023 Resolution: R2U Version: 3.0 Responsible: School of Agriculture, University of Lisbon

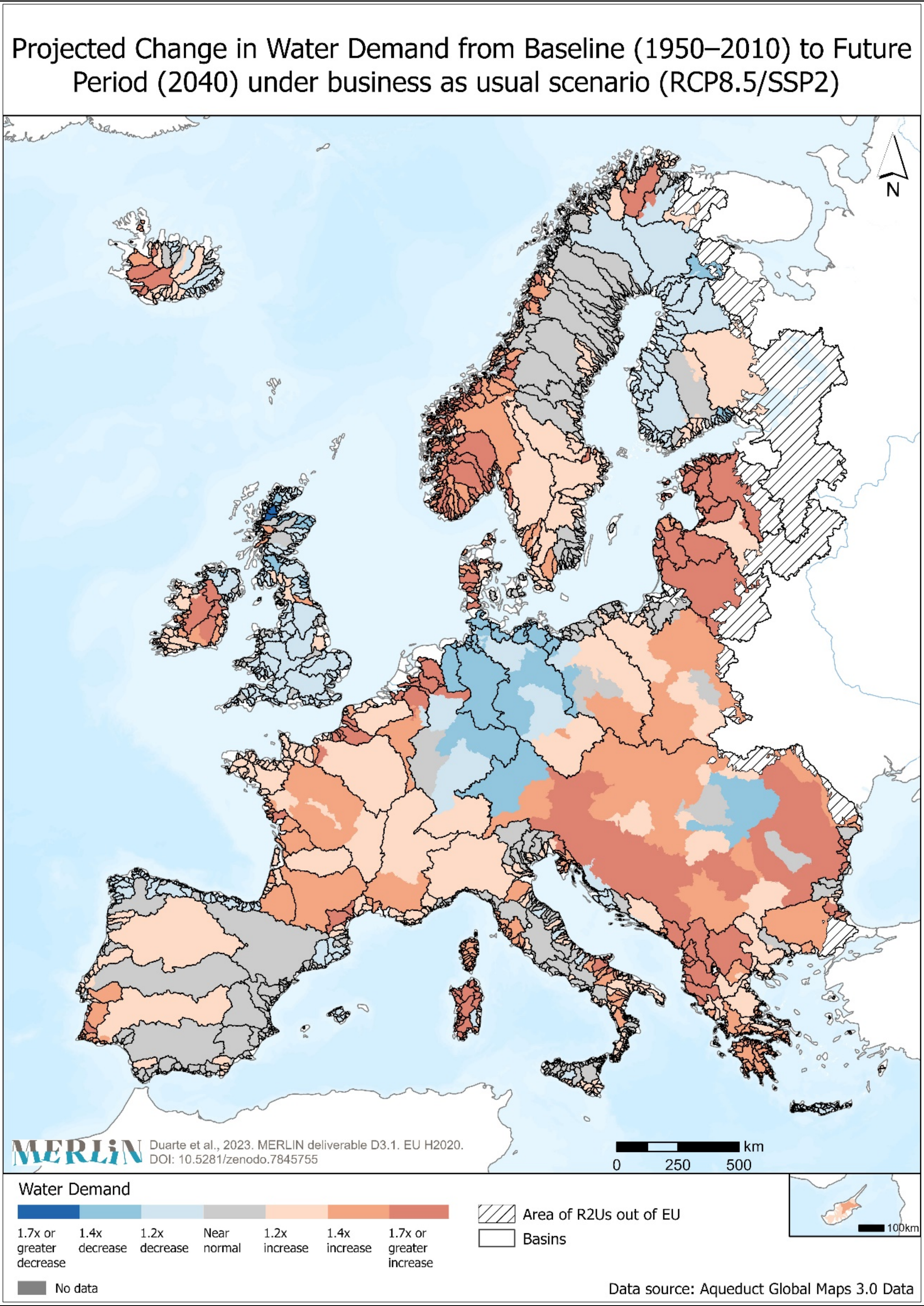
Description	Using the Vigiak et al. (2021) outputs concerning the probability of failing the Good Ecological Status and the method developed by Carrao et al. (2020) we established the Composite Indicator of Conservation Status (ciCS) for both the probability of having hydrological and morphological alteration, dividing the results into three classes: Unaltered, Uncertain and Altered. Here, the results for these two parameters were integrated using a diamond legend.
Credits	– River Restoration Units – R2U (Developed by ISA_UL under the MERLIN project, unpublished) – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2
Limitation	No limitations https://data.jrc.ec.europa.eu/access-rights/no-limitations Reuse is authorised, provided the source is acknowledged. The reuse policy of the European Commission is implemented by a Decision of 12 December 2011

Title	Projected Change in Water Stress from Baseline (1950–2010) to Future Period (2040) under business as usual scenario (RCP8.5/SSP2)
	
Summary	The Aqueduct 3.0 Water Risk Projections include the indicators of change in water stress, projected for the coming decades under scenarios of climate and economic growth. Creation date: March 2023 Spatial Resolution: R2Us

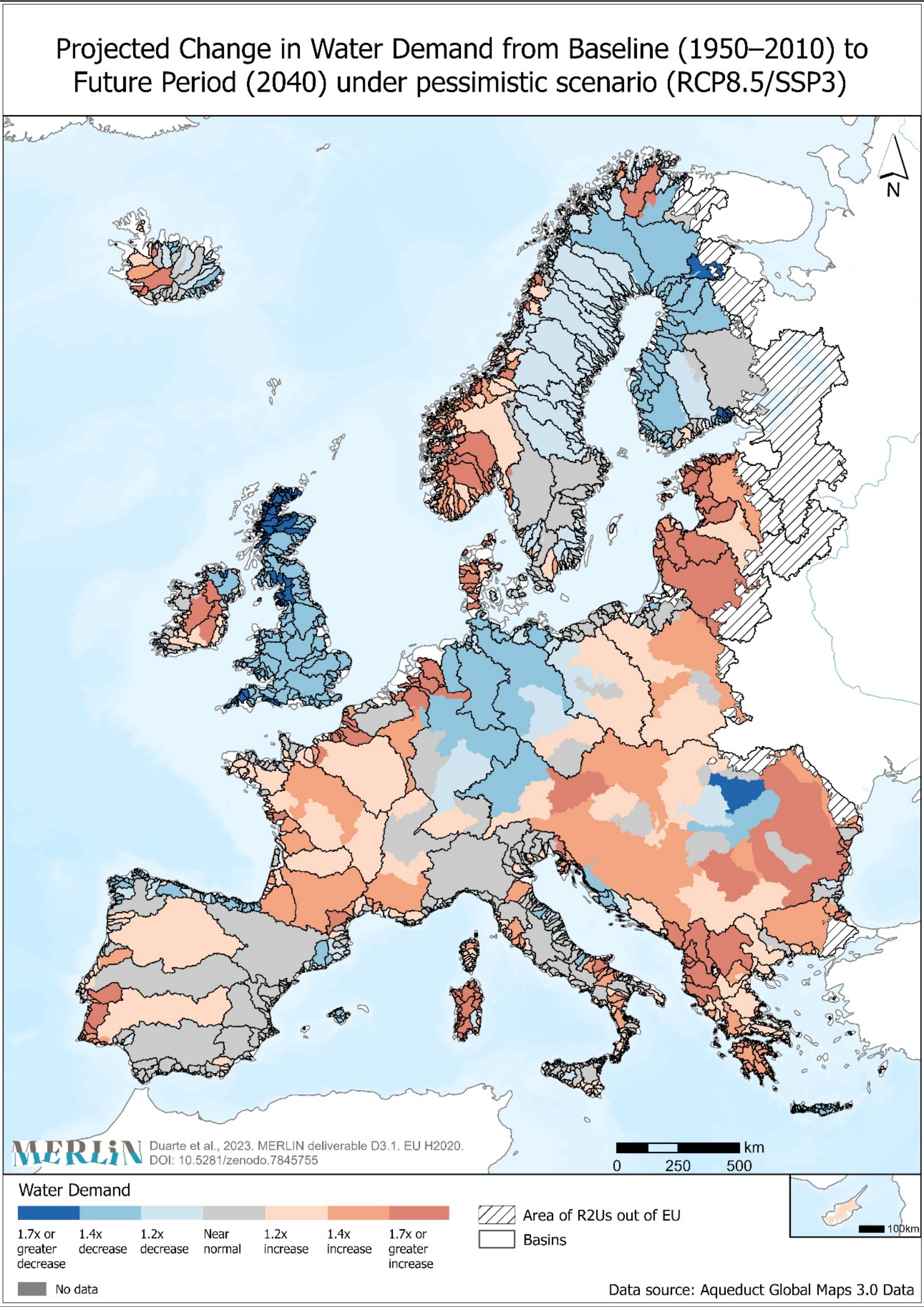
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The Aqueduct 3.0 Water Risk Projection used is centered on 2040 for the climate scenario RCP8.5, and the socioeconomic pathways SSP2. Authors derived estimates from general circulation models (GCMs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) and mixed-effects regression models based on projected socioeconomic variables from the International Institute for Applied Systems Analysis (IIASA)'s Shared Socioeconomic Pathways (SSP) database. Full documentation is available online at: http://www.wri.org/publication/aqueduct-water-stress-projections The "business as usual" scenario (SSP2 RCP8.5) represents a world with stable economic development and steadily rising global carbon emissions, with CO_2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Aqueduct 3.0 data: – https://www.wri.org/data/aqueduct-global-maps-30-data Aqueduct 3.0 technical note: – Luck, M., M. Landis, F. Gassert. 2015. "Aqueduct Water Stress Projections: Decadal Projections of Water Supply and Demand Using CMIP5 GCMs." Technical Note. Washington, D.C.: World Resources Institute. Available online at: wri.org/publication/aqueduct-water-stress-projections
Limitation	No limitation

Title	Projected Change in Water Stress from Baseline (1950–2010) to Future Period (2040) under pessimistic scenario (RCP8.5/SSP2)
	
Summary	The Aqueduct 3.0 Water Risk Projections include the indicators of change in water stress, projected for the coming decades under scenarios of climate and economic growth. Creation date: March 2023 Spatial Resolution: R2Us

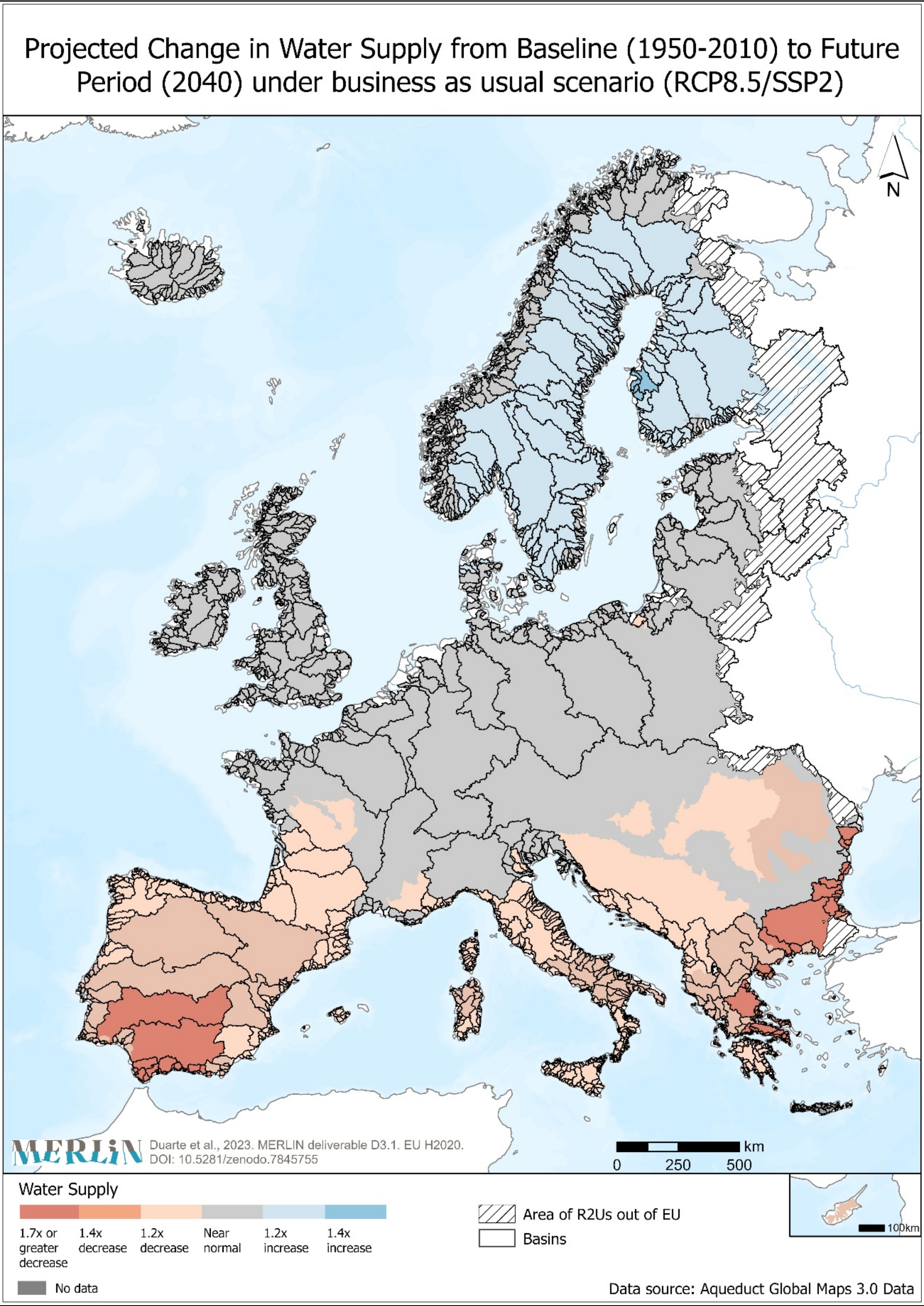
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The Aqueduct 3.0 Water Risk Projection used is centered on 2040 for the climate scenario RCP8.5, and the socioeconomic pathways SSP3. Authors derived estimates from general circulation models (GCMs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) and mixed-effects regression models based on projected socioeconomic variables from the International Institute for Applied Systems Analysis (IIASA)'s Shared Socioeconomic Pathways (SSP) database. Full documentation is available online at: http://www.wri.org/publication/aqueduct-water-stress-projections The "pessimistic" scenario (SSP3 RCP8.5) represents a fragmented world with uneven economic development, higher population growth, lower GDP growth, and a lower rate of urbanization, all of which potentially affect water usage; and steadily rising global carbon emissions, with CO2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Aqueduct 3.0 data: – https://www.wri.org/data/aqueduct-global-maps-30-data Aqueduct 3.0 technical note: – Luck, M., M. Landis, F. Gassert. 2015. "Aqueduct Water Stress Projections: Decadal Projections of Water Supply and Demand Using CMIP5 GCMs." Technical Note. Washington, D.C.: World Resources Institute. Available online at: wri.org/publication/aqueduct-water-stress-projections
Limitation	No limitation

Title	Projected Change in Water Demand from Baseline (1950–2010) to Future Period (2040) under business as usual scenario (RCP8.5/SSP2).
	
Summary	The Aqueduct 3.0 Water Risk Projections include the indicators of change in water demand, projected for the coming decades under scenarios of climate and economic growth. Creation date: March 2023 Spatial Resolution: R2Us

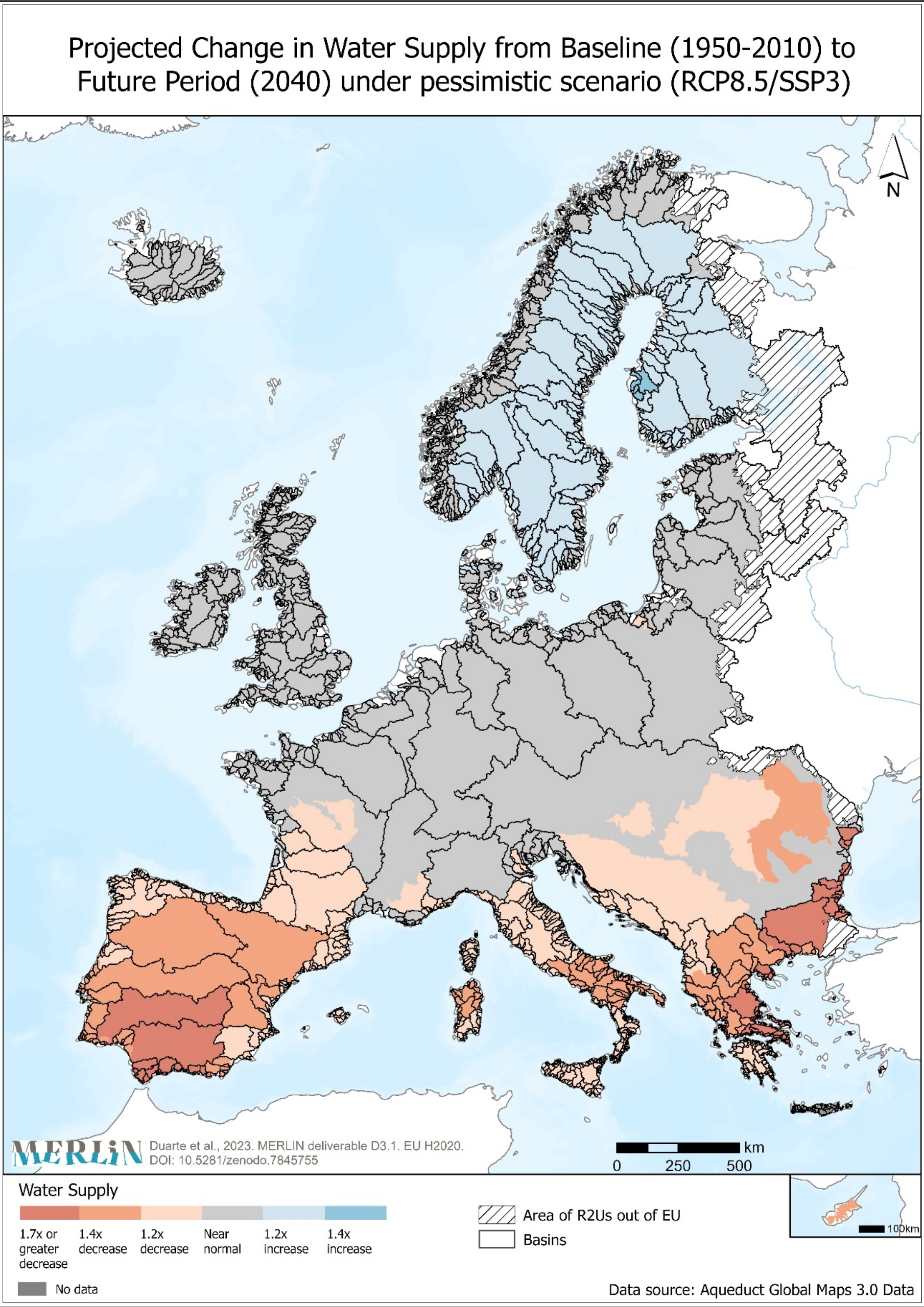
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The Aqueduct 3.0 Water Risk Projection used is centered on 2040 for the climate scenario RCP8.5, and the socioeconomic pathways SSP2. Authors derived estimates from general circulation models (GCMs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) and mixed-effects regression models based on projected socioeconomic variables from the International Institute for Applied Systems Analysis (IIASA)'s Shared Socioeconomic Pathways (SSP) database. Full documentation is available online at: http://www.wri.org/publication/aqueduct-water-stress-projections The "business as usual" scenario (SSP2 RCP8.5) represents a world with stable economic development and steadily rising global carbon emissions, with CO2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Aqueduct 3.0 data: – https://www.wri.org/data/aqueduct-global-maps-30-data Aqueduct 3.0 technical note: – Luck, M., M. Landis, F. Gassert. 2015. "Aqueduct Water Stress Projections: Decadal Projections of Water Supply and Demand Using CMIP5 GCMs." Technical Note. Washington, D.C.: World Resources Institute. Available online at: wri.org/publication/aqueduct-water-stress-projections
Limitation	No limitation

Title	Projected Change in Water Demand from Baseline (1950–2010) to Future Period (2040) under pessimistic scenario (RCP8.5/SSP3).
	
Summary	The Aqueduct 3.0 Water Risk Projections include the indicators of change in water demand, projected for the coming decades under scenarios of climate and economic growth. Creation date: March 2023 Spatial Resolution: R2Us

	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The Aqueduct 3.0 Water Risk Projection used is centered on 2040 for the climate scenario RCP8.5, and the socioeconomic pathways SSP3. Authors derived estimates from general circulation models (GCMs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) and mixed-effects regression models based on projected socioeconomic variables from the International Institute for Applied Systems Analysis (IIASA)'s Shared Socioeconomic Pathways (SSP) database. Full documentation is available online at: http://www.wri.org/publication/aqueduct-water-stress-projections The "pessimistic" scenario (SSP3 RCP8.5) represents a fragmented world with uneven economic development, higher population growth, lower GDP growth, and a lower rate of urbanization, all of which potentially affect water usage; and steadily rising global carbon emissions, with CO2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Aqueduct 3.0 data: – https://www.wri.org/data/aqueduct-global-maps-30-data Aqueduct 3.0 technical note: – Luck, M., M. Landis, F. Gassert. 2015. “Aqueduct Water Stress Projections: Decadal Projections of Water Supply and Demand Using CMIP5 GCMs.” Technical Note. Washington, D.C.: World Resources Institute. Available online at: wri.org/publication/aqueduct-water-stress-projections
Limitation	No limitations

Title	Projected Change in Water Supply from Baseline (1950–2010) to Future Period (2040) under business as usual scenario (RCP8.5/SSP2)
	
Summary	The Aqueduct 3.0 Water Risk Projections include the indicators of change in water supply, projected for the coming decades under scenarios of climate and economic growth. Creation date: March 2023 Spatial Resolution: R2Us

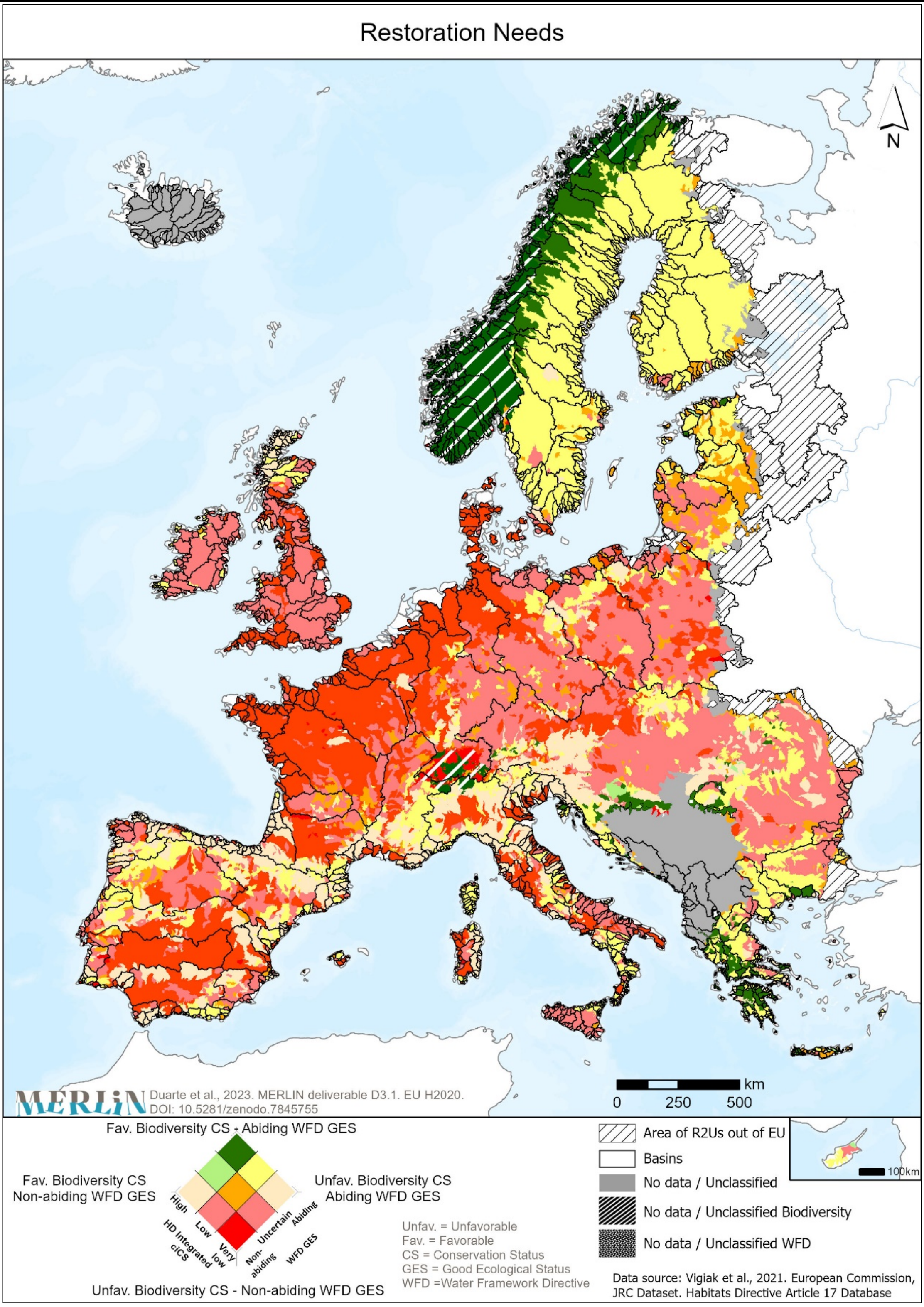
	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The Aqueduct 3.0 Water Risk Projection used is centered on 2040 for the climate scenario RCP8.5, and the socioeconomic pathways SSP2. Authors derived estimates from general circulation models (GCMs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) and mixed-effects regression models based on projected socioeconomic variables from the International Institute for Applied Systems Analysis (IIASA)'s Shared Socioeconomic Pathways (SSP) database. Full documentation is available online at: http://www.wri.org/publication/aqueduct-water-stress-projections The "business as usual" scenario (SSP2 RCP8.5) represents a world with stable economic development and steadily rising global carbon emissions, with CO_2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Aqueduct 3.0 data: – https://www.wri.org/data/aqueduct-global-maps-30-data Aqueduct 3.0 technical note: – Luck, M., M. Landis, F. Gassert. 2015. "Aqueduct Water Stress Projections: Decadal Projections of Water Supply and Demand Using CMIP5 GCMs." Technical Note. Washington, D.C.: World Resources Institute. Available online at: wri.org/publication/aqueduct-water-stress-projections
Limitation	No limitation

Title	Projected Change in Water Supply from Baseline (1950–2010) to Future Period (2040) under pessimistic scenario (RCP8.5/SSP3).
	
Summary	The Aqueduct 3.0 Water Risk Projections include the indicators of change in water supply, projected for the coming decades under scenarios of climate and economic growth. Creation date: March 2023 Spatial Resolution: R2Us

	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The Aqueduct 3.0 Water Risk Projection used is centered on 2040 for the climate scenario RCP8.5, and the socioeconomic pathways SSP3. Authors derived estimates from general circulation models (GCMs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) and mixed-effects regression models based on projected socioeconomic variables from the International Institute for Applied Systems Analysis (IIASA)'s Shared Socioeconomic Pathways (SSP) database. Full documentation is available online at: http://www.wri.org/publication/aqueduct-water-stress-projections The "pessimistic" scenario (SSP3 RCP8.5) represents a fragmented world with uneven economic development, higher population growth, lower GDP growth, and a lower rate of urbanization, all of which potentially affect water usage; and steadily rising global carbon emissions, with CO_2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Aqueduct 3.0 data: – https://www.wri.org/data/aqueduct-global-maps-30-data Aqueduct 3.0 technical note: – Luck, M., M. Landis, F. Gassert. 2015. “Aqueduct Water Stress Projections: Decadal Projections of Water Supply and Demand Using CMIP5 GCMs.” Technical Note. Washington, D.C.: World Resources Institute. Available online at: wri.org/publication/aqueduct-water-stress-projections
Limitation	No limitations

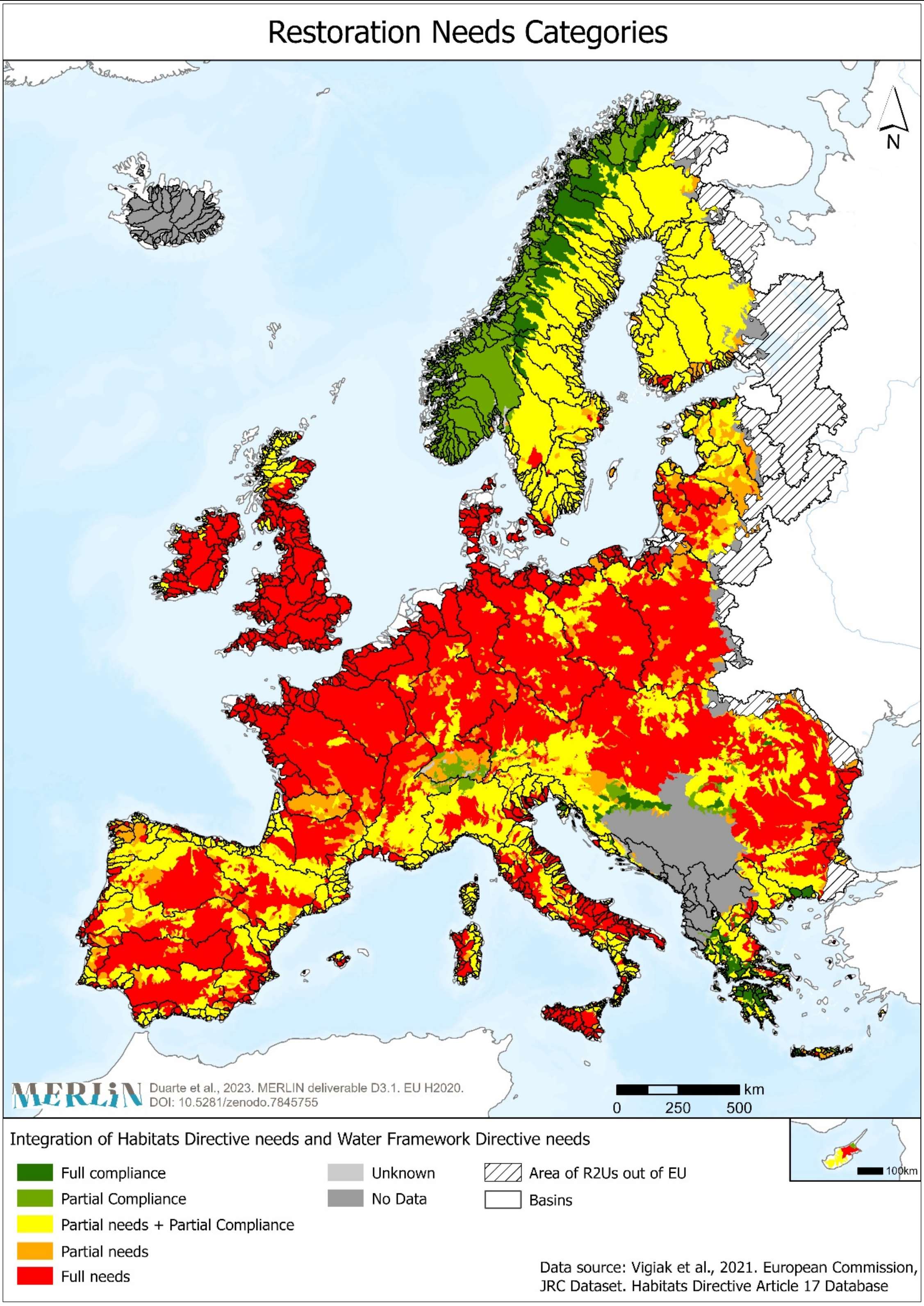
Restoration Needs

Title	Restoration Needs



Summary	Integration of the restoration needs according to the Habitats Directive and the restoration need based on the Water Framework Directive. Creation date: March 2023 Spatial Resolution: R2Us Version: 3.0.0

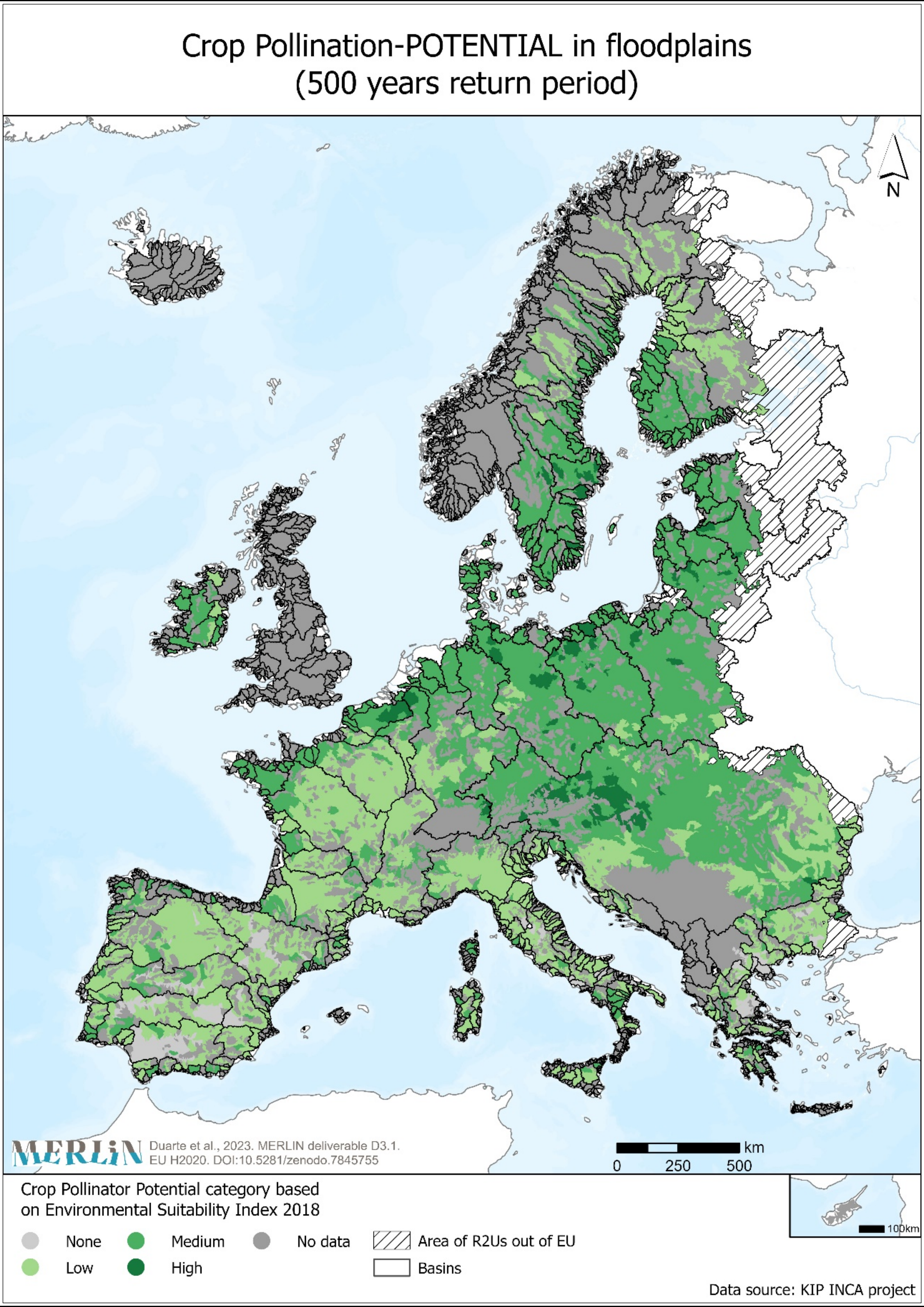
	Responsible: School of Agriculture, University of Lisbon
Description	The restoration needs were determined by integrating the non-abidance to both Habitats and Water Framework Directives at the R2U level, results portrayed respectively in maps from Figure 9 and Figure 13.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v.1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2 Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitations

Title	Simplified Restoration Needs per River Restoration Units
	
Summary	Simplified representation of the restoration needs. Creation date: March 2023 Spatial Resolution: R2Us Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	The symbology elements of the restoration needs map were grouped to provide a simplified visualisation of the restoration needs mapping output.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v.1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2 Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitations

Mapping restoration potential

Ecosystem services assessments indicator

Title	Crop Pollination-POTENTIAL in floodplains (500 years return period)
	
Summary	Crop Pollination -POTENTIAL (KIP INCA PROJECT) for the year 2018 average values per river restoration unit area calculated using zonal statistics. Creation Date: March 2023

	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average Crop Pollination- Potential value per river restoration unit area for the year 2018 According to INCA approach the ecosystem service potential represents the ecological side that quantifies what ecosystems can provide, independently whether there is a use or not. The pollination potential is expressed with a categorical variable (1=None, 2=low, 3=medium, 4=high). The assessment of pollination potential is based on an indicator of the environmental suitability to support wild insect pollinators. It integrates two different models: an Expert-Based Model for solitary bees and a Species Distribution Model for bumblebees.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem services data: – https://ecosystem-accounts.jrc.ec.europa.eu/
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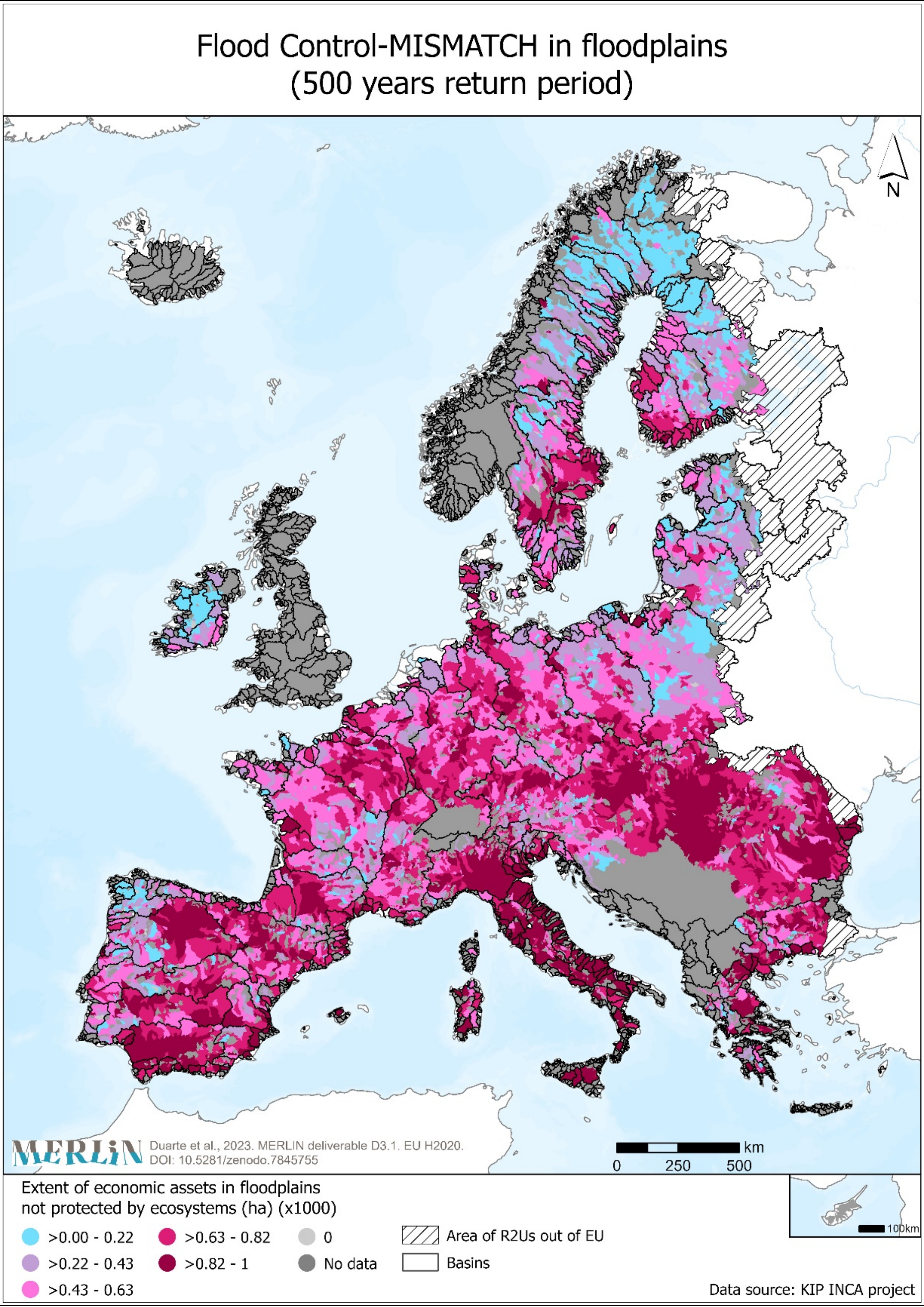
Title	Flood Control -MISMATCH in floodplains (500 years return period)
	
Summary	Flood Control -MISMATCH (KIP INCA PROJECT) for the year 2018 average values considering floodplains of 500 years return period per river restoration unit area calculated using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	The average Flood Control -MISMATCH value per river restoration unit area for the year 2018. According to INCA approach the flood control unmet demand (MISMATCH) quantifies the part of the demand (economic assets) that is not covered by natural control by ecosystems. The service demanding areas (SDA) for flood control are defined as the economic assets located in floodplains. For the mapping of the economic assets, the artificial surfaces (Label 1 in CLC with grid code [111–142] and TeleAtlas roads) and agricultural areas (Label 1 CLC with grid code [211–244]) were used. As floodplains, are considered those defined by the flood hazard maps at the EU level for the maximum return period available, which is 500 years.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem services data: – https://ecosystem-accounts.jrc.ec.europa.eu/
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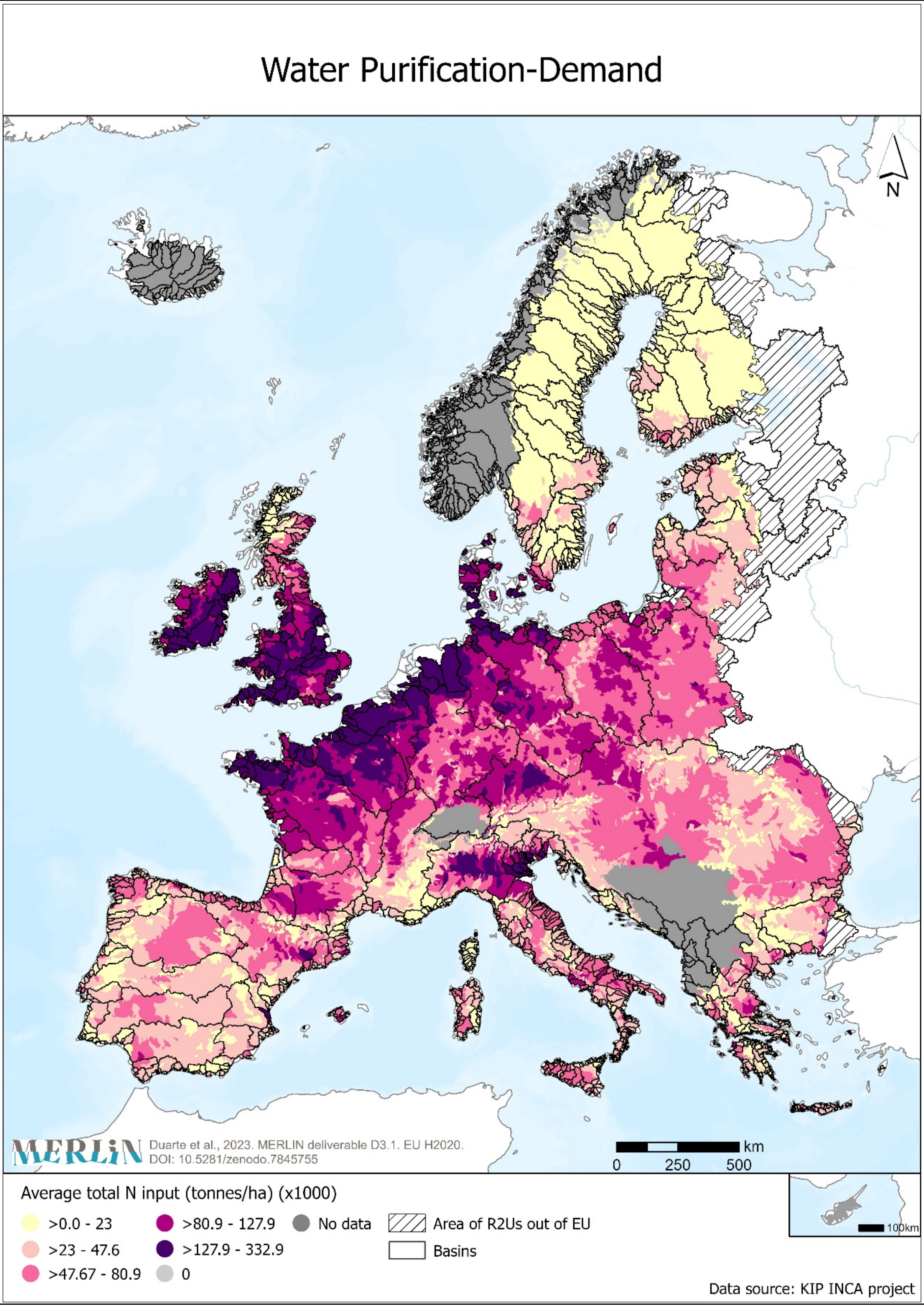
Title	Water Purification-DEMAND
	
Summary	Water Purification-DEMAND (KIP INCA PROJECT) for the year 2012 per river restoration unit area. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0

	Responsible: School of Agriculture, University of Lisbon
Description	The Water Purification-DEMAND value per river restoration unit area for the year 2012 Total N input (tonne/ha). According to INCA approach the ecosystem service demand is the socio-economic side of ecosystem services that can entail economic sectors (such as agriculture, manufacturing, utility suppliers), households and (when we deal with overarching environmental targets such as climate change and biodiversity loss) the global society.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem services data: – https://ecosystem-accounts.jrc.ec.europa.eu/
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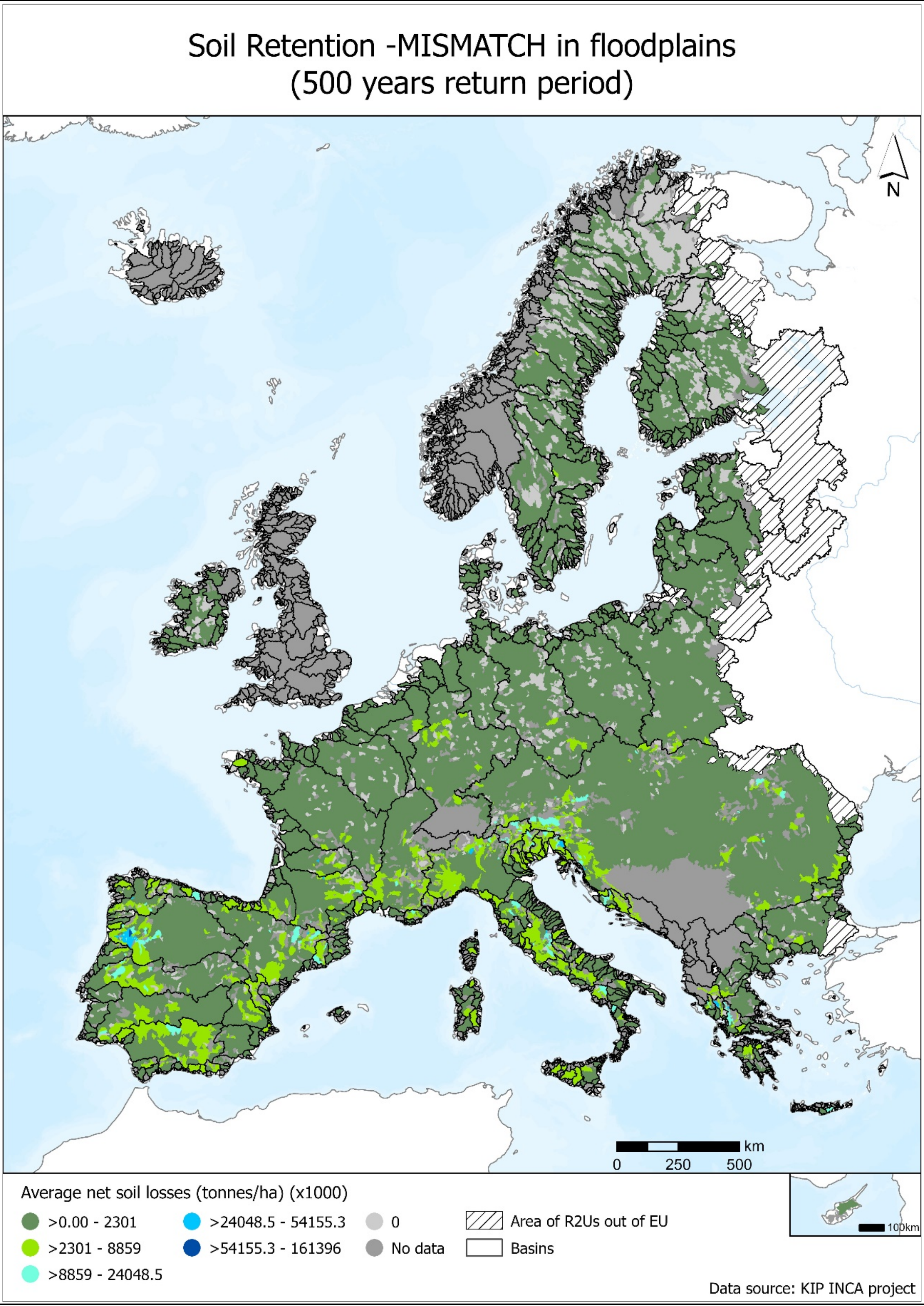
Title	Soil Retention -MISMATCH in floodplains (500 years return period)
	
Summary	Soil Retention -MISMATCH (KIP INCA PROJECT) for the year 2018 average values considering floodplains of 500 years return period per river restoration unit calculated using zonal statistics. Creation Date: March 2023

	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average Soil Retention -MISMATCH value per river restoration unit area for the year 2018 Net soil losses (tonnes/ha). According to INCA approach, where the soil erosion rate exceeds the soil formation rate, the protective role of vegetation is not enough, leading to the degradation of the ecosystem condition. In this case, the net soil losses represent the ES unmet demand for soil retention. This is calculated as the difference between the soil erosion and soil formation rates.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem services data: – https://ecosystem-accounts.jrc.ec.europa.eu/
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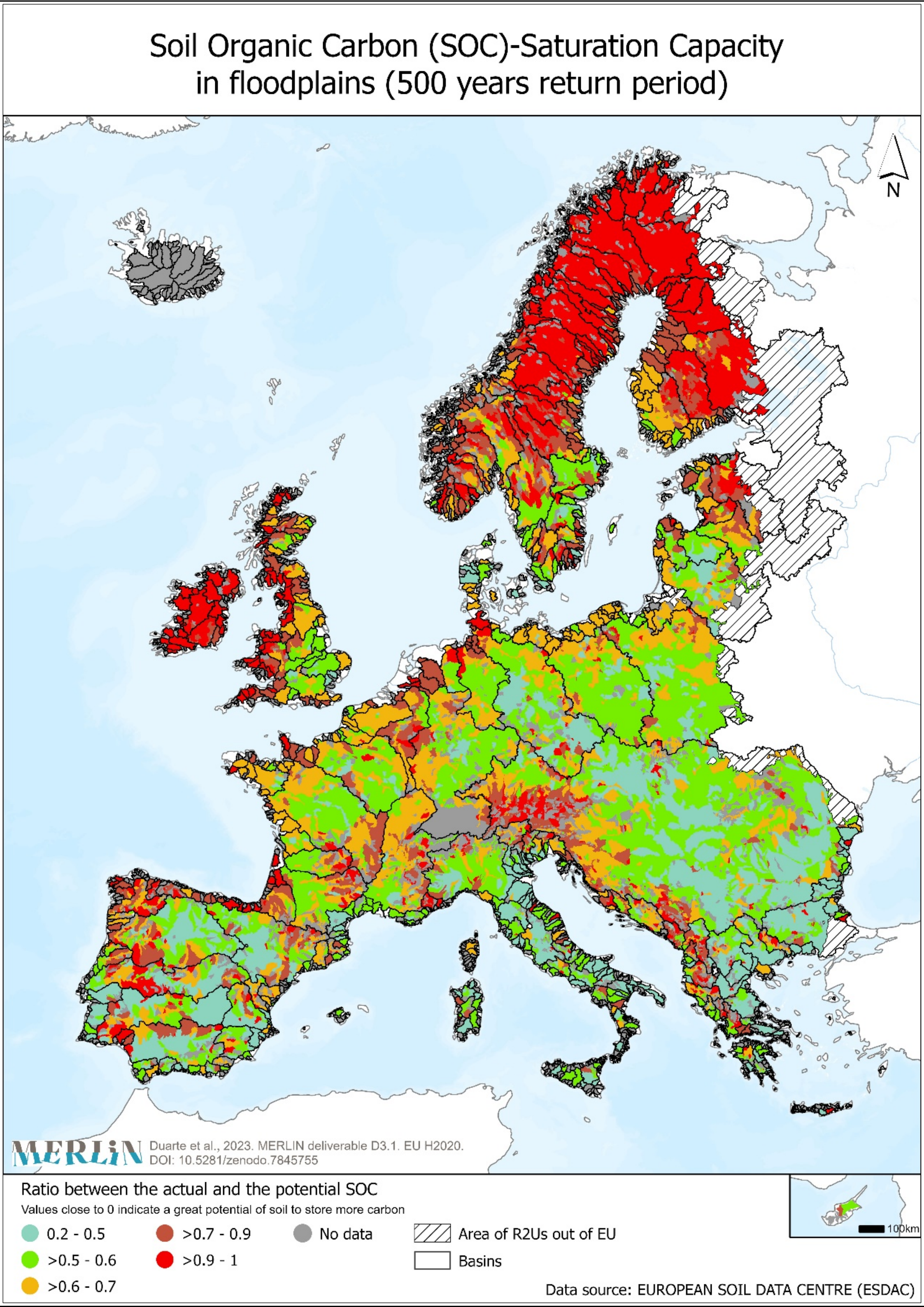
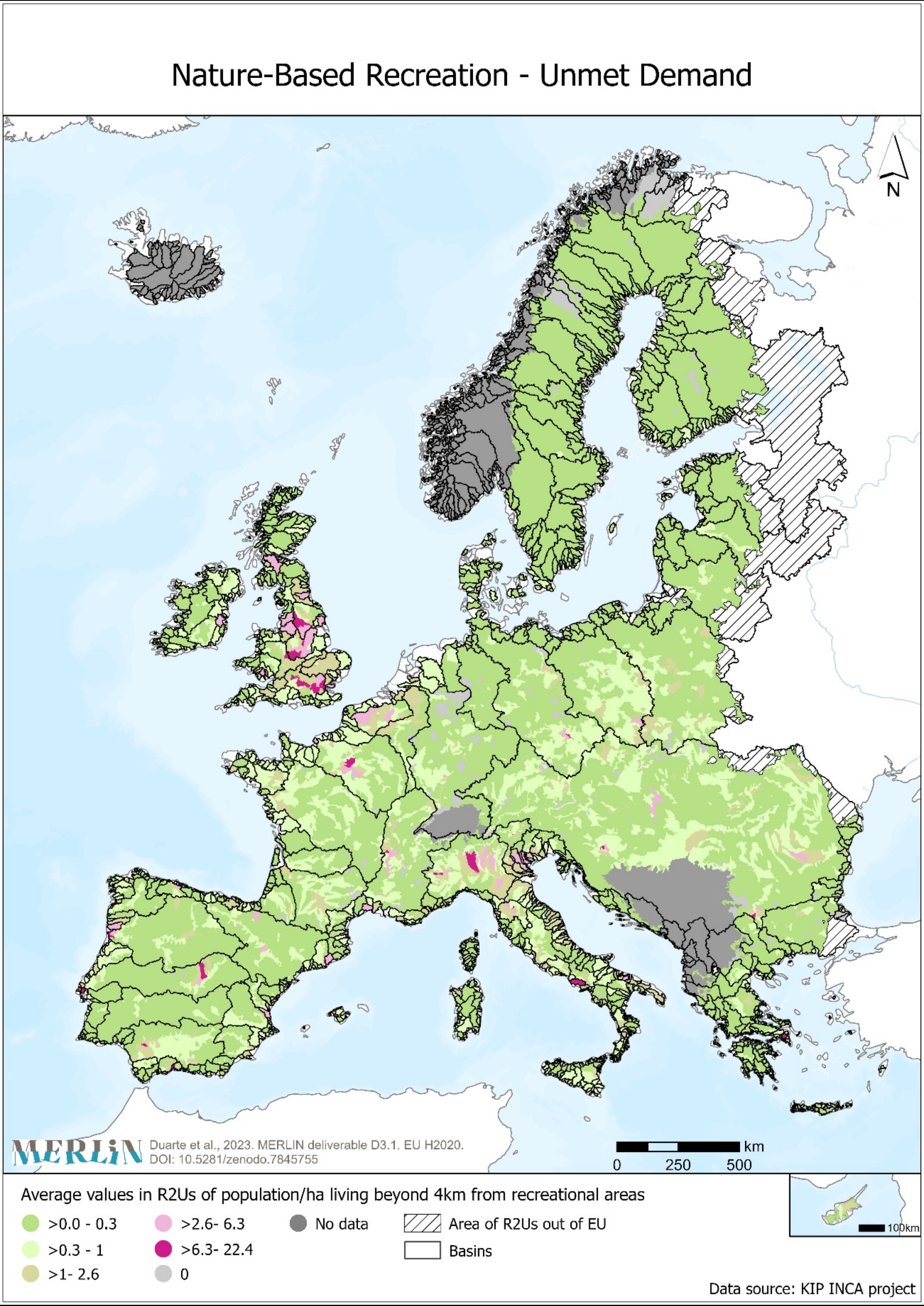
Title	Soil Organic Carbon (SOC) - Saturation Capacity in floodplains 500 years return period
	
Summary	The map shows the Soil Organic Carbon (SOC) saturation capacity average values considering floodplains of 500 years return period. The average SOC values have been given to river restoration unit areas using zonal statistics. Creation Date: March 2023 Resolution: R2U (output resolution)

	Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The average SOC value per river restoration unit area for the year 2016 The SOC is expressed as the ratio between the actual and the potential SOC stock in each pixel. Values close to 0 indicate a great potential of soil to store more carbon. The actual SOC stock was derived from the Pan-European simulation using the biogeochemical CENTURY model (a detailed explanation can be found in the references below). The associated data can be found in ESDAC: "Pan-European SOC stock of agricultural soils" The potential SOC stock was obtained by simulating a grassland land use without nitrogen limitation, since it was considered a good scenario for SOC accumulation. The scenario set-up was analogous to that described in Lugato et al (2014b, see below) for the grassland land use, namely 'AR_GR_LUC'. However, to obtain a potential SOC stock, the model was ran for 2000 years with repeated actual climate, in order to reach an equilibrium condition. The simulation involved only the agricultural soils, according to the Corine Land Cover. A value of 1 was arbitrarily attributed to forest soils.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) SOC data: – https://esdac.jrc.ec.europa.eu/content/soil-organic-carbon-saturation-capacity – Lugato, E., Panagos, P., Bampa, F., Jones, A., Montanarella, L. A new baseline of organic carbon stock in European agricultural soils using a modelling approach (2014a) Global Change Biology, 20 (1), pp. 313-326. – Lugato, E., Bampa, F., Panagos, P., Montanarella, L., Jones, A. Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices (2014b) Global Change Biology, 20 (11), pp. 3557-3567.
Limitation	No limitation

Title Nature-based Recreation – Unmet Demand



Summary Nature-Based Recreation- UNMET DEMAND (KIP INCA PROJECT) for the year 2018 per river restoration unit area calculated using zonal statistics.
Creation Date: September 2023
Resolution: R2U (output resolution)
Version: 3.0.0
Responsible: School of Agriculture, University of Lisbon

Description	The average value of Nature-Based Recreation- UNMET DEMAND for the year 2018 per river restoration unit. The Nature-based recreation is a “cultural ecosystem service defined as the biophysical characteristics or qualities of ecosystems that are viewed, observed, experienced or enjoyed in a passive, or active, way by people”. Data used expresses the amount of population per hectare that lives beyond 4 km from recreational areas.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem services data: – https://ecosystem-accounts.jrc.ec.europa.eu/
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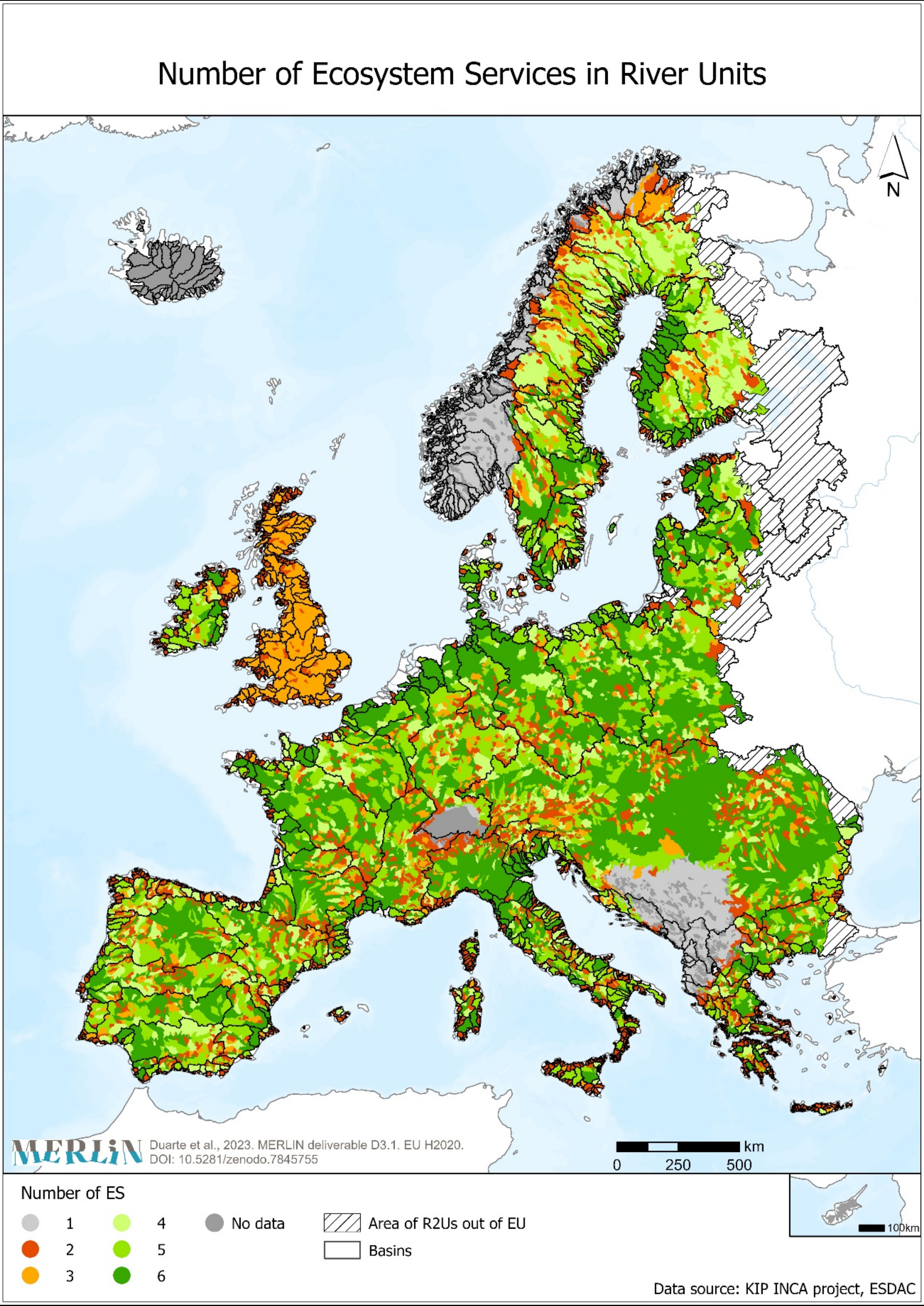
Title	Ecosystem Services Assessment Indicator in River Units
	
Summary	The number of different ecosystem services present in River Restoration Units. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	The number of unique ecosystem services present in River Restoration Units has been calculated using the “variety” type of overlay statistic of the cell statistic tool.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem services data: – https://esdac.jrc.ec.europa.eu/content/soil-organic-carbon-saturation-capacity – Lugato, E., Panagos, P., Bampa, F., Jones, A., Montanarella, L. A new baseline of organic carbon stock in European agricultural soils using a modelling approach (2014a) Global Change Biology, 20 (1), pp. 313-326. – Lugato, E., Bampa, F., Panagos, P., Montanarella, L., Jones, A. Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices (2014b) Global Change Biology, 20 (11), pp. 3557-3567. – https://ecosystem-accounts.jrc.ec.europa.eu/
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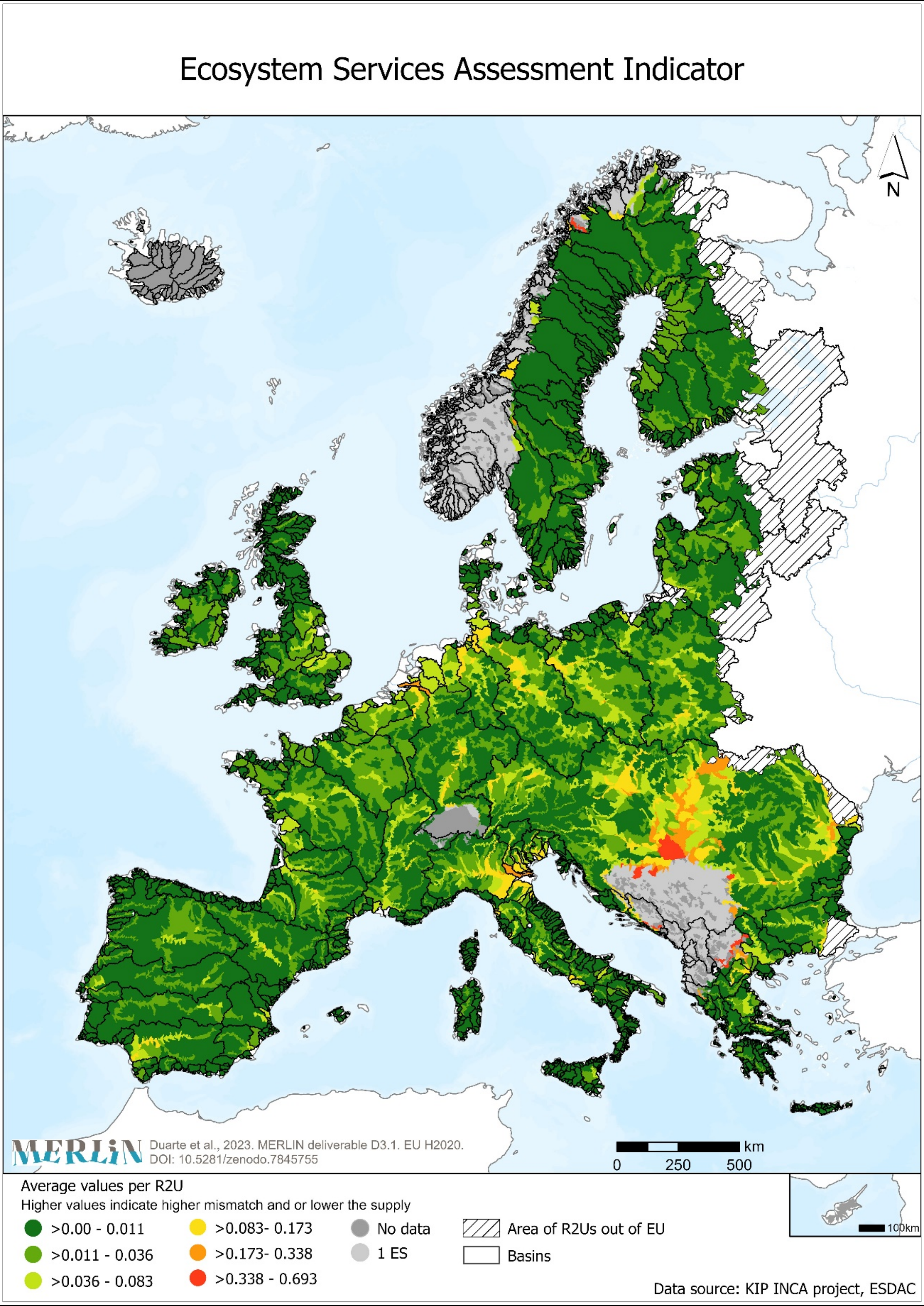
<table>
<tr><td>Title</td><td>Ecosystem Services Assessment Indicator in River Units</td></tr>
<tr><td></td><td>
</td></tr>
<tr><td>Summary</td><td>Average values of Ecosystem Services Assessment Indicator per River Restoration Units. Higher values indicate areas where we have increased unmet demand, meaning that there are no ecosystems to provide the ecosystem services that are needed by the ecosystem service demand. Higher values also indicate a decreased ecosystems’ service supply. ES</td></tr>
</table>

	supply quantifies what the ecosystem can provide irrespective whether there is an ES demand or not. Creation Date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	The Ecosystem Services Assessment Indicator synthesizes the average values per River Restoration Units of the mismatch of flood control, the demand for water purification, the mismatch of soil retention, the Soil Organic Carbon (SOC) saturation capacity, and the majority values of the potential of crop pollination. The values of each ecosystem services layer have been transformed into 0 to 1 scale using the raster calculator and fuzzy membership based on linear transformation. Values were inverted when necessary to maintain an equal negative signal in all ecosystem services layers. The values of each ecosystem service have been assigned to River Restoration Units using zonal statistics. To synthesize the Ecosystem Services Assessment Indicator the values of all ecosystem services layers have been summed using cell statistics, ignoring the No data cells in the calculation, divided by the number of ES present using the raster calculator. Average values of the Ecosystem Services Assessment Indicator were given to R2Us. Higher values indicate areas with less ES present or higher demand.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem services data: – https://esdac.jrc.ec.europa.eu/content/soil-organic-carbon-saturation-capacity – Lugato, E., Panagos, P., Bampa, F., Jones, A., Montanarella, L. A new baseline of organic carbon stock in European agricultural soils using a modelling approach (2014a) Global Change Biology, 20 (1), pp. 313-326. – Lugato, E., Bampa, F., Panagos, P., Montanarella, L., Jones, A. Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices (2014b) Global Change Biology, 20 (11), pp. 3557-3567. – https://ecosystem-accounts.jrc.ec.europa.eu/
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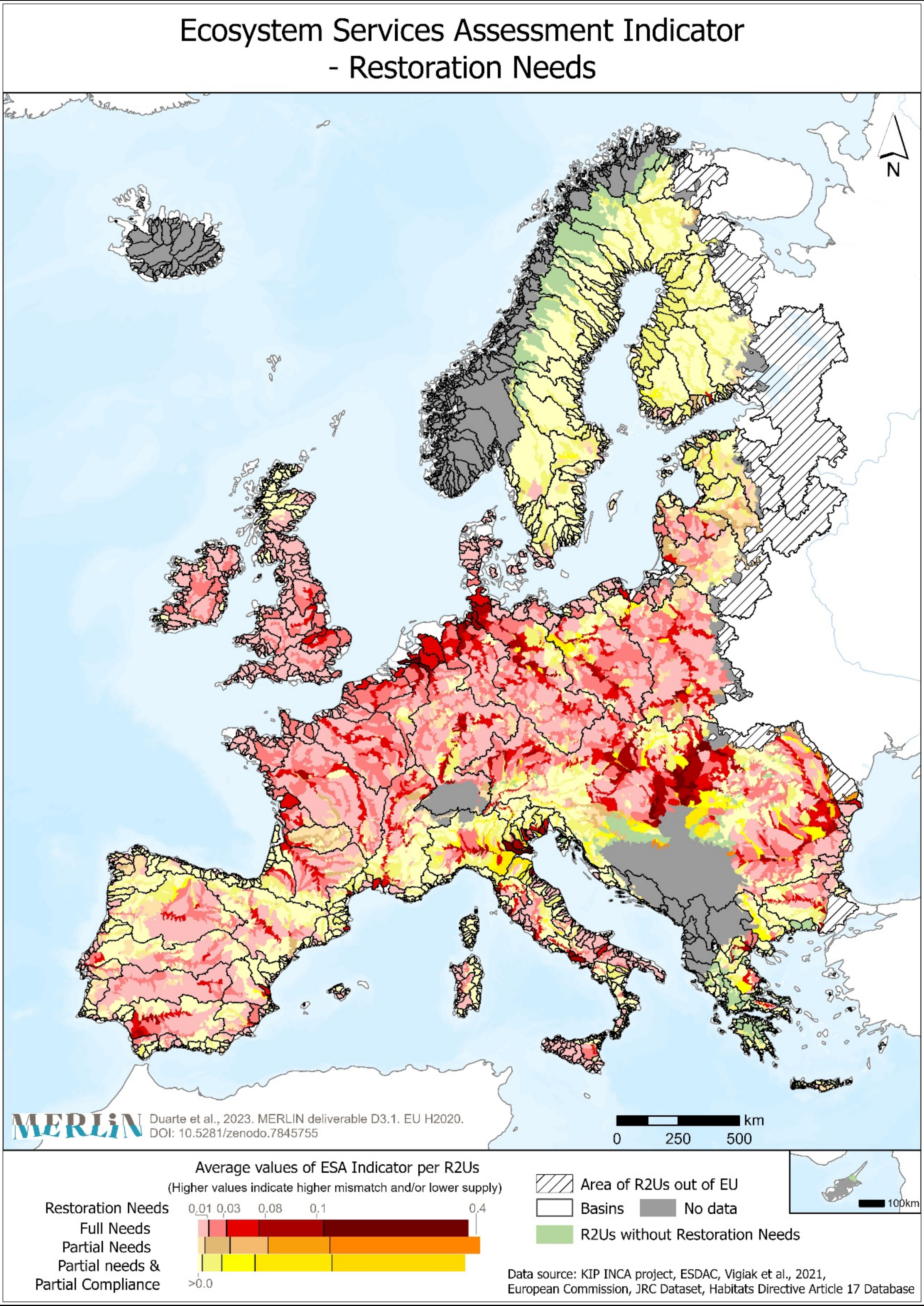
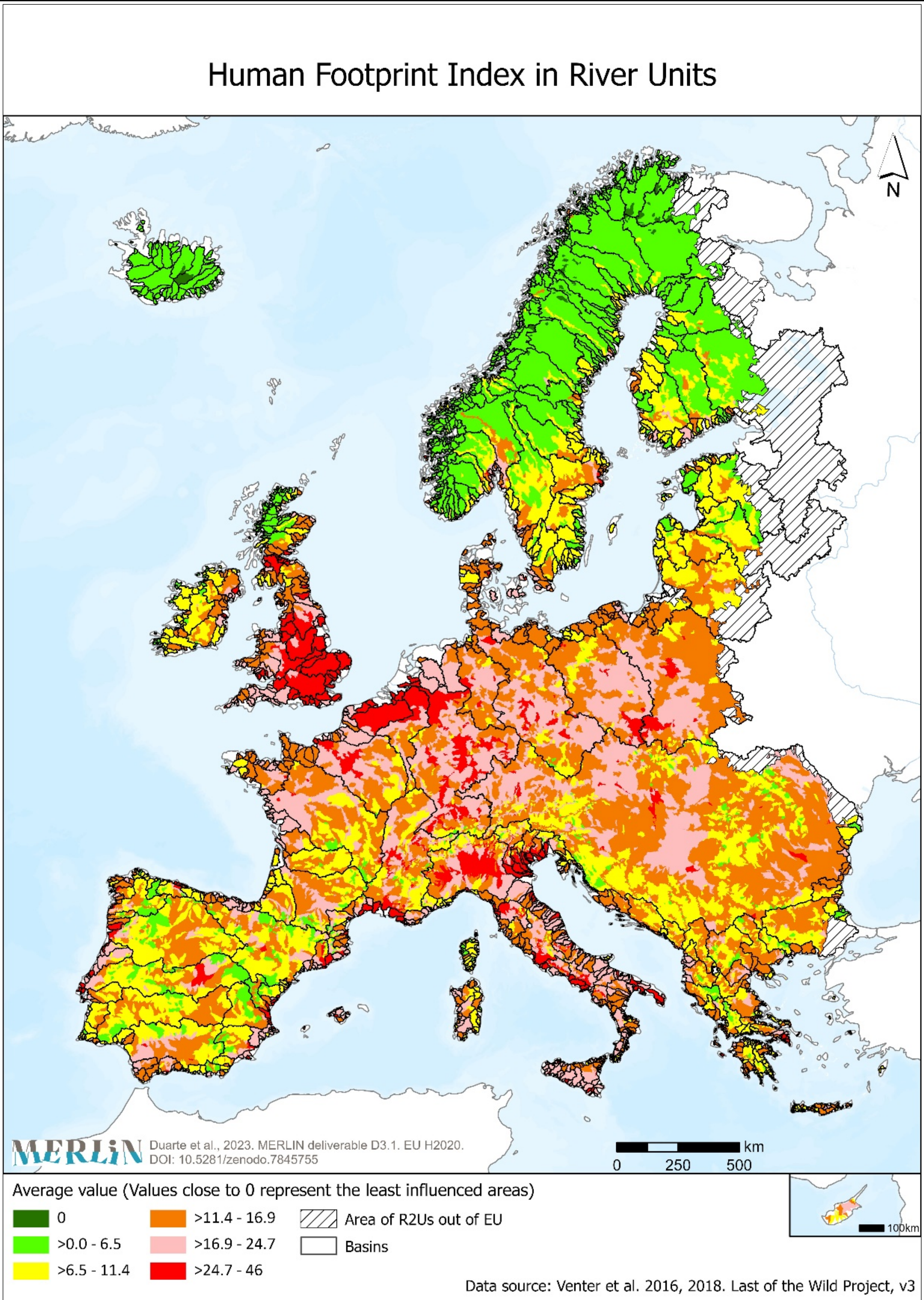
Title	Ecosystem Services Assessment Indicator – Restoration Needs
	
Summary	This map shows the average values of Ecosystem Services Assessment Indicator for different categories of restoration needs for each River Restoration Unit. Creation date: September 2023 Resolution: R2U (output resolution) Version: 3.0.0

	Responsible: School of Agriculture, University of Lisbon
Description	Integration of restoration needs and Ecosystem Services Assessment Indicator for each River Restoration Unit. Restoration Needs classes: "Full Needs" – not abiding by both directives (WFD, HD); "Partial needs" – not abiding just by one directive; “Partial Needs & Partial Compliance” –a mixed situation of abiding by one directive and not abiding by the other. Higher values indicate areas where we have increased unmet demand, meaning that there are no ecosystems to provide the ecosystem services that are needed by the ecosystem service demand. Higher values also indicate a decreased ecosystems’ service supply. ES supply quantifies what the ecosystem can provide irrespective whether there is an ES demand or not.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Water Framework Directive data: – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2 Ecosystem services data: – https://esdac.jrc.ec.europa.eu/content/soil-organic-carbon-saturation-capacity – Lugato, E., Panagos, P., Bampa, F., Jones, A., Montanarella, L. A new baseline of organic carbon stock in European agricultural soils using a modelling approach (2014a) Global Change Biology, 20 (1), pp. 313-326. – Lugato, E., Bampa, F., Panagos, P., Montanarella, L., Jones, A. Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices (2014b) Global Change Biology, 20 (11), pp. 3557-3567. – https://ecosystem-accounts.jrc.ec.europa.eu/ Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Constrains to restoration

Title	Human Footprint Index in River Units, 2005 Release (1995 – 2004)
	
Summary	The Global Human Footprint Index (HFI), v2 (1995 – 2004). Values of HFI have been given to to River Restoration Units using zonal statistics. Creation date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0

	Responsible: School of Agriculture, University of Lisbon
Description	The average of all HFI values within an R2U. The Global Human Footprint Dataset of the Last of the Wild Project, Version 2, 2005 (LWP-2) is the Human Influence Index (HII) normalized by biome and realm. The HII is a global dataset of 1-kilometer grid cells, created from nine global data layers covering human population pressure (population density), human land use and infrastructure (built-up areas, nighttime lights, land use/land cover), and human access (coastlines, roads, railroads, navigable rivers). The dataset in Clarke 1866 Geographic Coordinate System is produced by the Wildlife Conservation Society (WCS) and the Columbia University Center for International Earth Science Information Network (CIESIN).
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Global Human Footprint data: – https://sedac.ciesin.columbia.edu/data/set/wildareas-v2-human-footprint-geographic/metadata – Wildlife Conservation Society - WCS, and Center for International Earth Science Information Network – CIESIN – Columbia University. 2005. Last of the Wild Project, Version 2, 2005 (LWP-2): Global Human Footprint Dataset (Geographic). Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4M61H5F.
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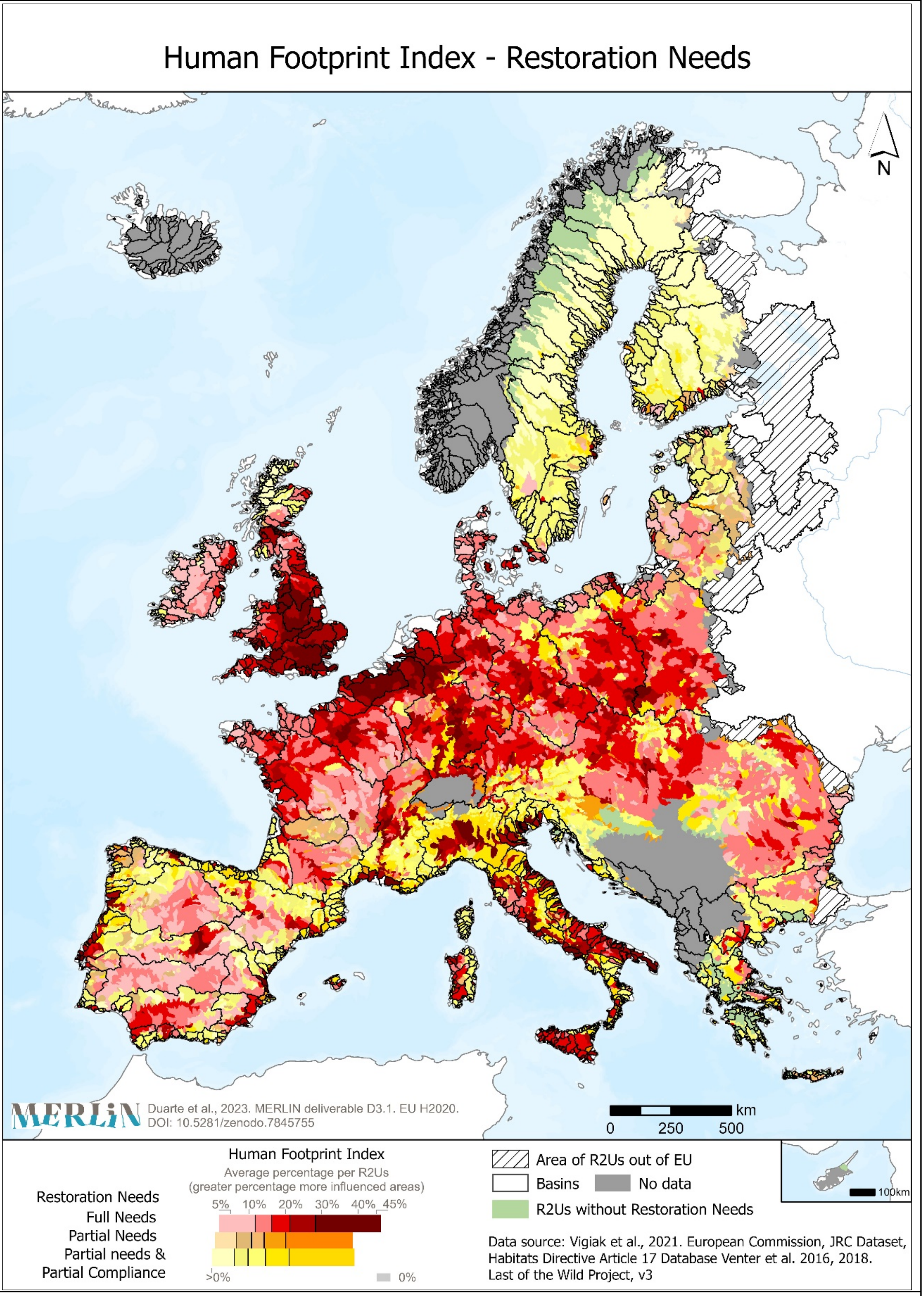
Title	Human Footprint Index – Restoration Needs
	
Summary	This map shows the average values of Human Footprint Index (HFI) for different categories of restoration needs for each River Restoration Unit. Creation date: September 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	Integration between the restoration needs and the Human Footprint Index (HFI) for each River Restoration Unit. Restoration Needs classes: "Full Needs" – not abiding by both directives (WFD, HD); "Partial needs" – not abiding just by one directive; "Partial Needs & Partial Compliance" –a mixed situation of abiding by one directive and not abiding by the other. Higher values indicate areas with higher commulative human pressure.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Water Framework Directive data: – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2 Global Human Footprint data: – https://sedac.ciesin.columbia.edu/data/set/wildareas-v2-human-footprint-geographic/metadata – Wildlife Conservation Society - WCS, and Center for International Earth Science Information Network – CIESIN – Columbia University. 2005. Last of the Wild Project, Version 2, 2005 (LWP-2): Global Human Footprint Dataset (Geographic). Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4M61H5F. Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
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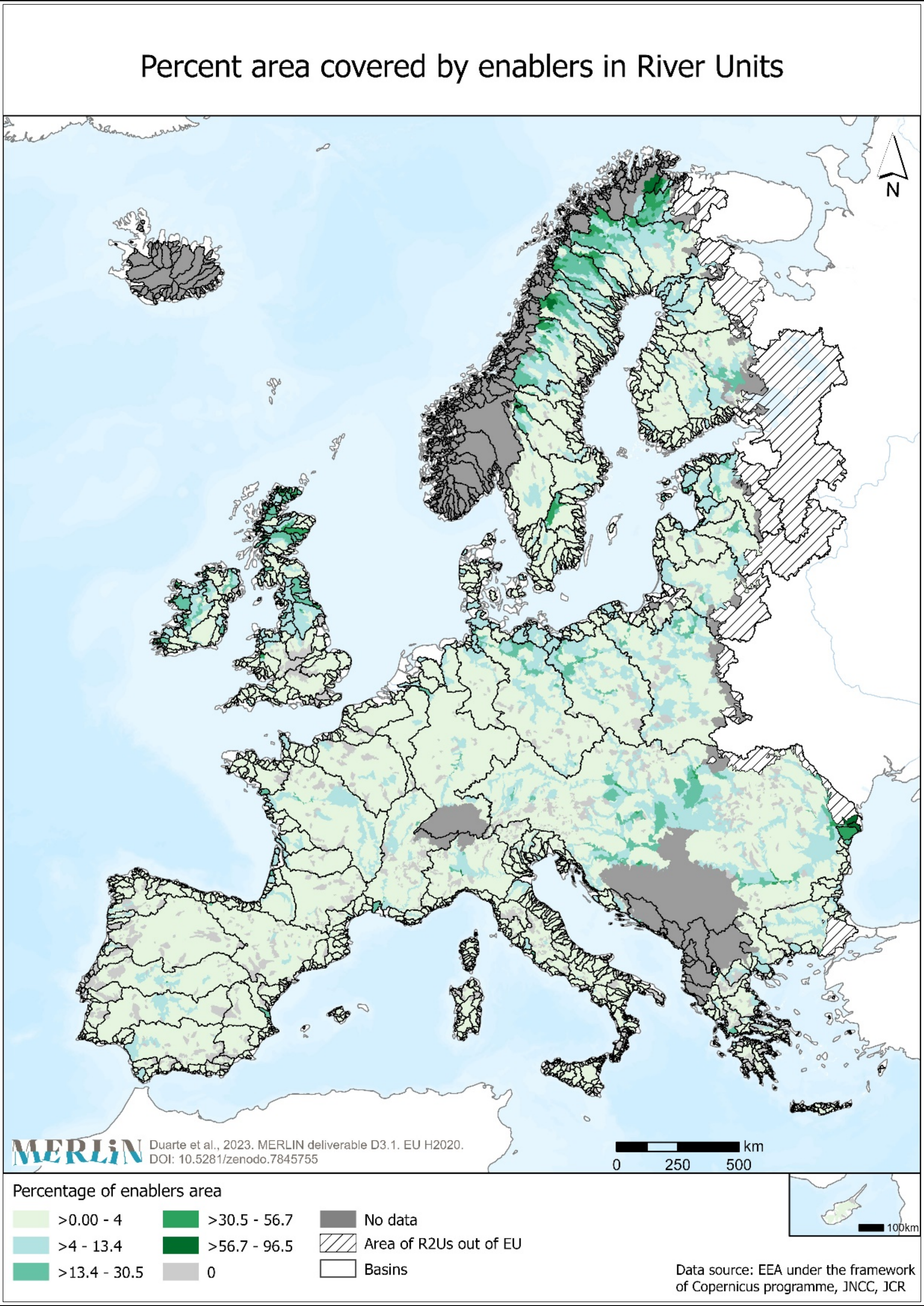
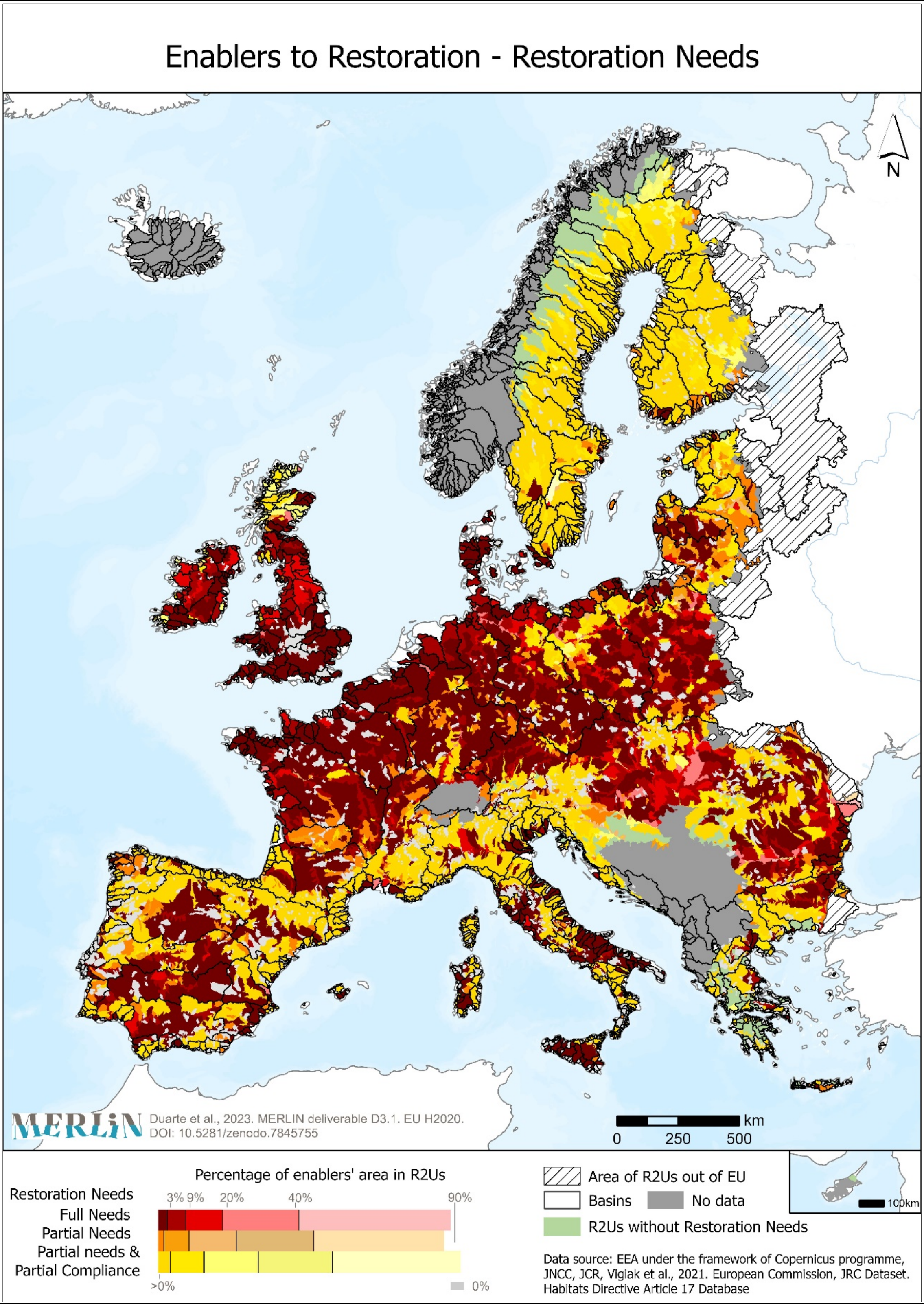
Enablers to restoration

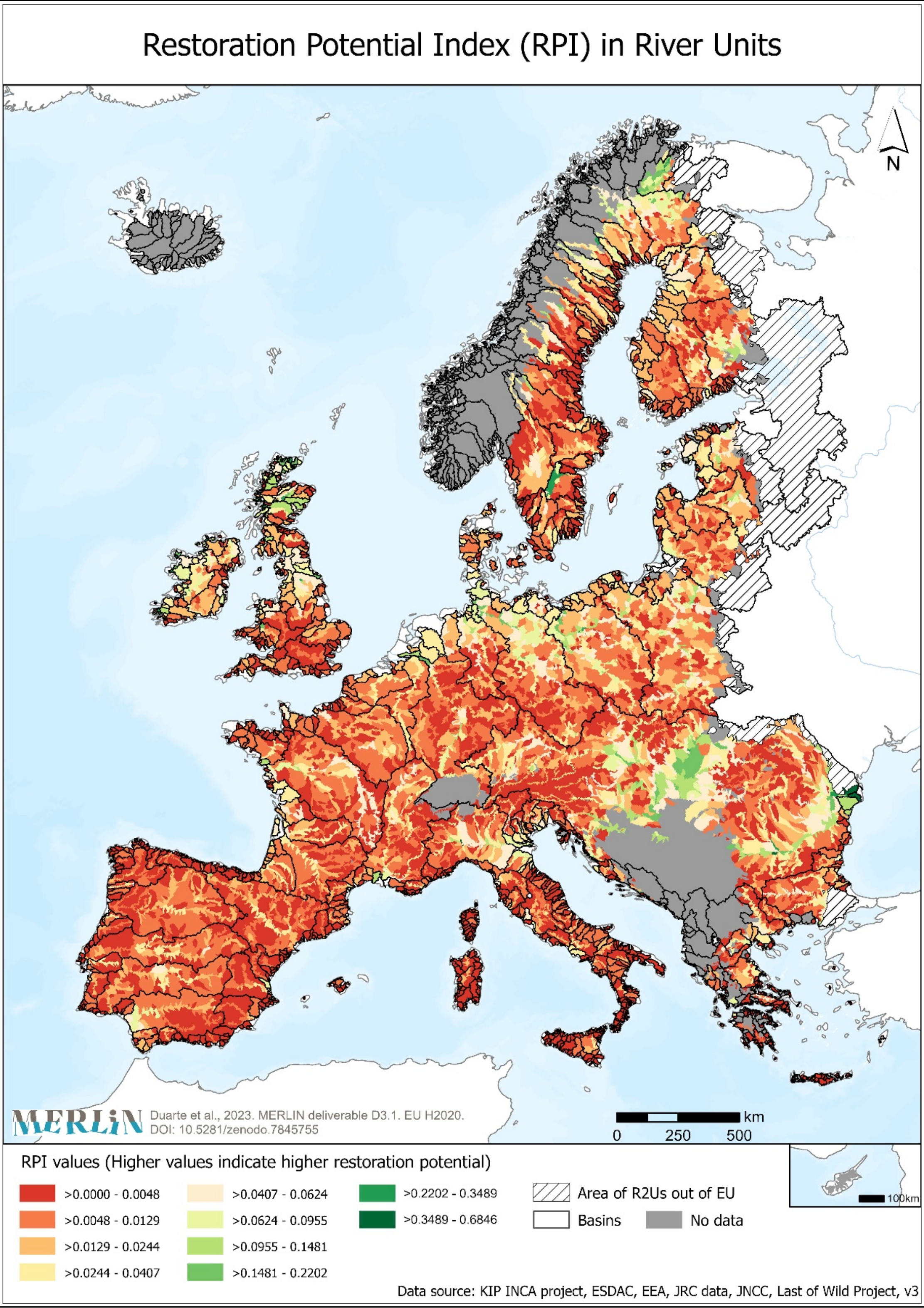
Title	Percentage of occurrence area of restoration enablers
	
Summary	Percentage of occurrence area of restoration enablers per river restoration unit. Creation date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	Percentage of area per river restoration unit where floodplains and/or wetlands are included in the Nature 2000 sites.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Floodplain data: – Dottori, Francesco; Alfieri, Lorenzo; Bianchi, Alessandra; Skoien, Jon; Salamon, Peter (2021): River flood hazard maps for Europe and the Mediterranean Basin region. European Commission, Joint Research Centre (JRC) [Dataset] doi: 10.2905/1D128B6C-A4EE-4858-9E34-6210707F3C81 PID: http://data.europa.eu/89h/1d128b6c-a4ee-4858-9e34-6210707f3c81 Nature 2000 data: – EEA under the framework of Copernicus programme, JNCC, JCR – https://jncc.gov.uk/our-work/uk-protected-area-datasets-for-download/
Limitation	No limitations

Title	Enablers to restoration – Restoration Needs
	
Summary	This map shows the average values of the enablers to restoration for different categories of restoration needs for each River Restoration Unit. Creation date: September 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	Integration between the restoration needs and the enablers to restoration for each River Restoration Unit. Restoration Needs classes: "Full Needs" – not abiding by both directives (WFD, HD); "Partial needs" – not abiding just by one directive; “Partial Needs & Partial Compliance” –a mixed situation of abiding by one directive and not abiding by the other. Higher values indicate areas with higher coverage of protected areas.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Water Framework Directive data: – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2 Floodplain data: – Dottori, Francesco; Alfieri, Lorenzo; Bianchi, Alessandra; Skoien, Jon; Salamon, Peter (2021): River flood hazard maps for Europe and the Mediterranean Basin region. European Commission, Joint Research Centre (JRC) [Dataset] doi: 10.2905/1D128B6C-A4EE-4858-9E34-6210707F3C81 PID: http://data.europa.eu/89h/1d128b6c-a4ee-4858-9e34-6210707f3c81 Nature 2000 data: – EEA under the framework of Copernicus programme, JNCC, JCR – https://jncc.gov.uk/our-work/uk-protected-area-datasets-for-download/ Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Restoration Potential Indicator

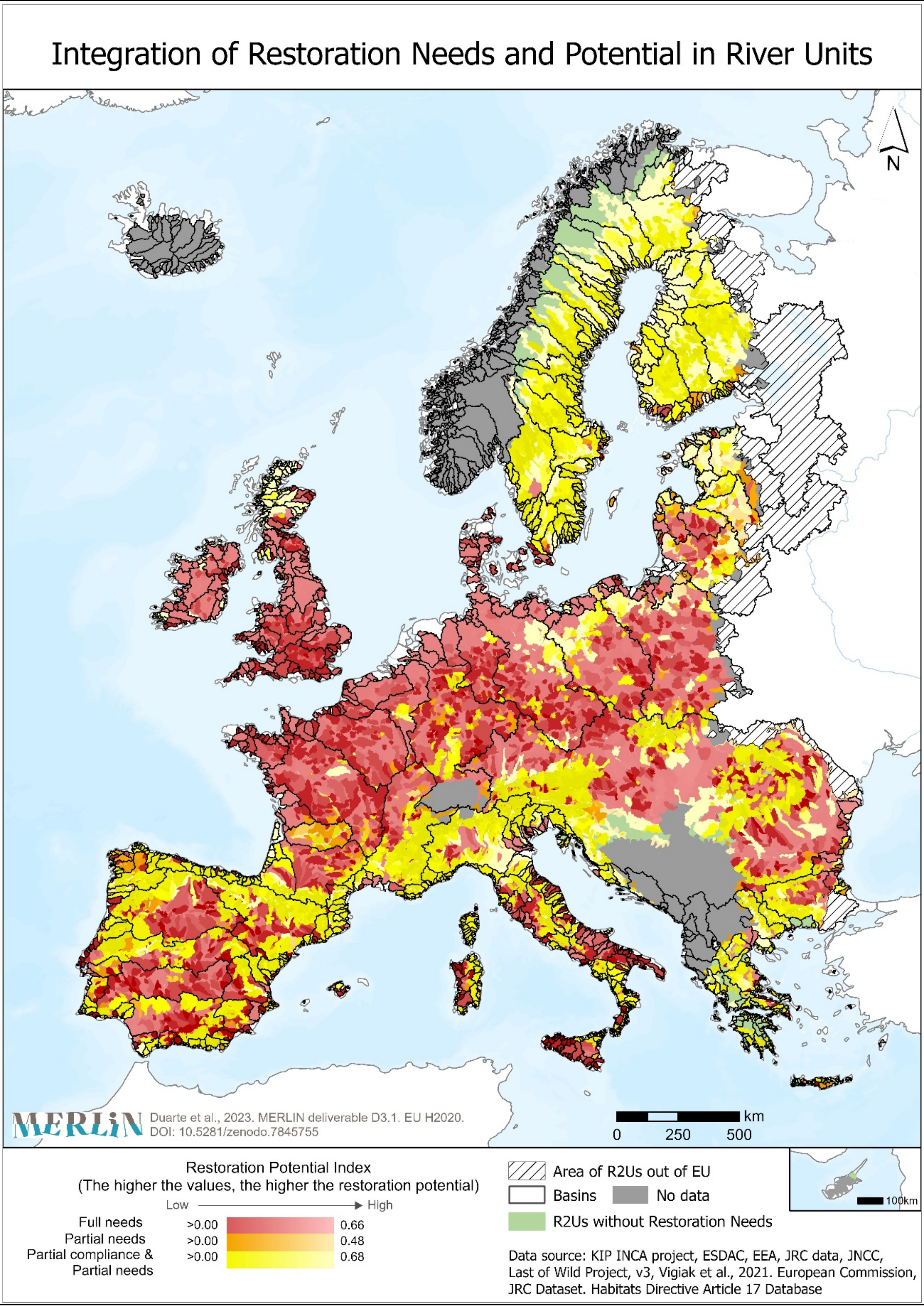
Title	Restoration Potential Indicator (RPI) in River Units
	
Summary	Values of the Restoration Potential Indicator per River Restoration Unit. Creation date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon

Description	Restoration Potential Indicator (RPI) values result from the integration of the Ecosystem Services co-benefits, the restoration constraints and the restoration enablers. RPI expresses the easiness of implementing restoration actions and the potential to obtain ES co-benefits from these actions.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Ecosystem Services data: – https://ecosystem-accounts.jrc.ec.europa.eu/ – https://esdac.jrc.ec.europa.eu/content/soil-organic-carbon-saturation-capacity – Lugato, E., Panagos, P., Bampa, F., Jones, A., Montanarella, L. A new baseline of organic carbon stock in European agricultural soils using a modelling approach (2014a) Global Change Biology, 20 (1), pp. 313-326. – Lugato, E., Bampa, F., Panagos, P., Montanarella, L., Jones, A. Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices (2014b) Global Change Biology, 20 (11), pp. 3557-3567. Global Human Footprint data: – https://sedac.ciesin.columbia.edu/data/set/wildareas-v2-human-footprint-geographic/metadata – Wildlife Conservation Society - WCS, and Center for International Earth Science Information Network – CIESIN – Columbia University. 2005. Last of the Wild Project, Version 2, 2005 (LWP-2): Global Human Footprint Dataset (Geographic). Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4M61H5F. Floodplain data: – Dottori, Francesco; Alfieri, Lorenzo; Bianchi, Alessandra; Skoien, Jon; Salamon, Peter (2021): River flood hazard maps for Europe and the Mediterranean Basin region. European Commission, Joint Research Centre (JRC) [Dataset] doi: 10.2905/1D128B6C-A4EE-4858-9E34-6210707F3C81 PID: http://data.europa.eu/89h/1d128b6c-a4ee-4858-9e34-6210707f3c81 Nature 2000 data: – EEA under the framework of Copernicus programme, JNCC, JCR – https://jncc.gov.uk/our-work/uk-protected-area-datasets-for-download/
Limitation	No limitation

Integration of restoration needs and restoration potential components

Restoration Potential versus areas of Restoration Needs

Title	Integration of Restoration Needs and Potential in River Units



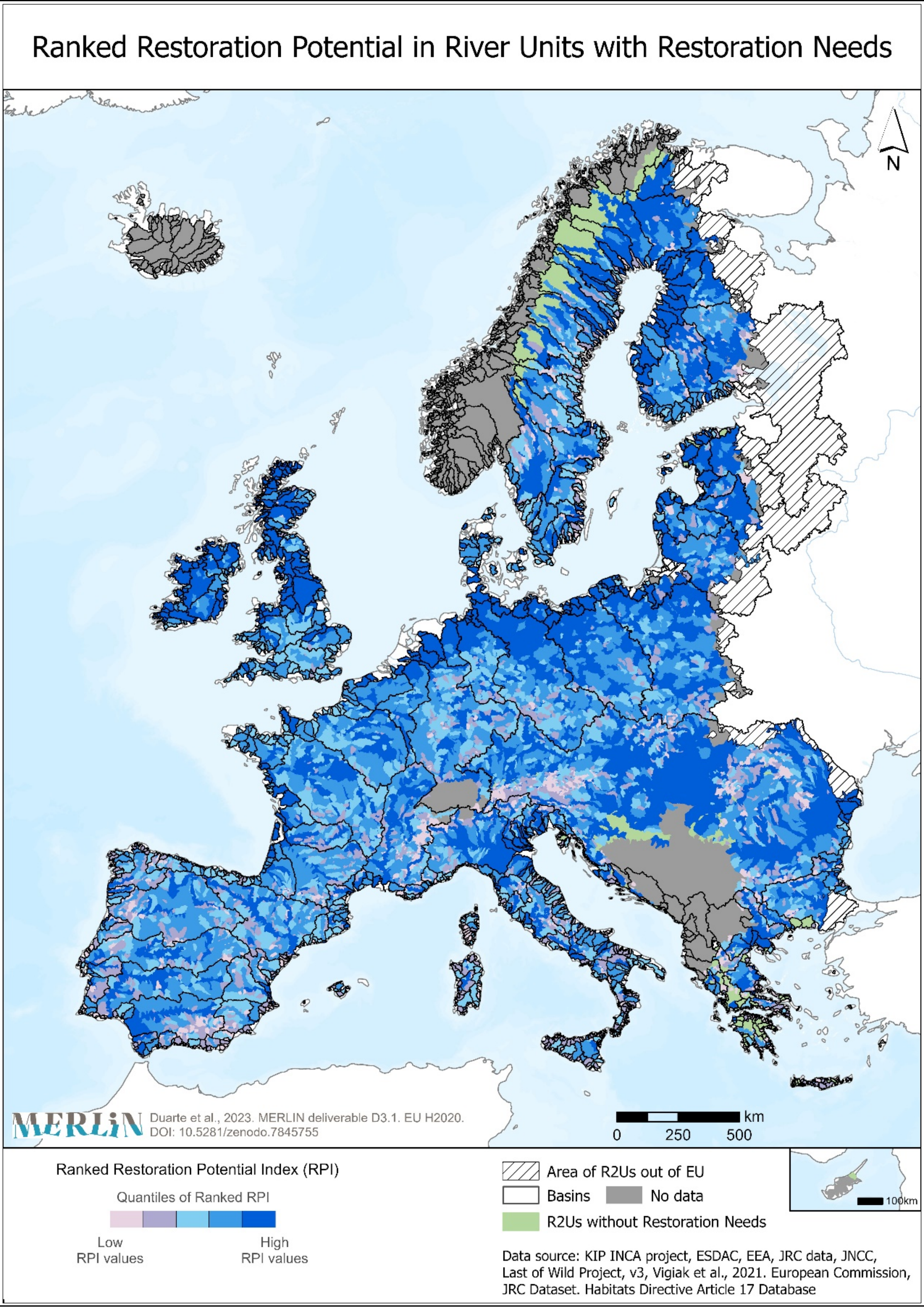
Summary	This map shows the average values of the Restoration Potential Index for different categories of restoration needs for each River Restoration Unit. Creation date: March 2023

	Resolution: R2U (output resolution) Version: 3.0.0 Responsible: School of Agriculture, University of Lisbon
Description	Integration between the restoration needs and Restoration Potential Index (RPI) for each River Restoration Unit. Restoration Needs classes: "Full Needs" – not abiding by both directives (WFD, HD); "Partial needs" – not abiding just by one directive; “Partial Needs & Partial Compliance” –a mixed situation of abiding by one directive and not abiding by the other. Higher RPI values indicate higher restoration potential.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Water Framework Directive data: – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2 Ecosystem Services data: – https://ecosystem-accounts.jrc.ec.europa.eu/ – https://esdac.jrc.ec.europa.eu/content/soil-organic-carbon-saturation-capacity – Lugato, E., Panagos, P., Bampa, F., Jones, A., Montanarella, L. A new baseline of organic carbon stock in European agricultural soils using a modelling approach (2014a) Global Change Biology, 20 (1), pp. 313-326. – Lugato, E., Bampa, F., Panagos, P., Montanarella, L., Jones, A. Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices (2014b) Global Change Biology, 20 (11), pp. 3557-3567. Global Human Footprint data: – https://sedac.ciesin.columbia.edu/data/set/wildareas-v2-human-footprint-geographic/metadata – Wildlife Conservation Society - WCS, and Center for International Earth Science Information Network – CIESIN – Columbia University. 2005. Last of the Wild Project, Version 2, 2005 (LWP-2): Global Human Footprint Dataset (Geographic). Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4M61H5F. Floodplain data: – Dottori, Francesco; Alfieri, Lorenzo; Bianchi, Alessandra; Skoien, Jon; Salamon, Peter (2021): River flood hazard maps for Europe and the Mediterranean Basin region. European Commission, Joint Research Centre (JRC) [Dataset] doi: 10.2905/1D128B6C-A4EE-4858-9E34-6210707F3C81 PID: http://data.europa.eu/89h/1d128b6c-a4ee-4858-9e34-6210707f3c81 Nature 2000 data:

	– EEA under the framework of Copernicus programme, JNCC, JCR – https://jncc.gov.uk/our-work/uk-protected-area-datasets-for-download/ Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Ranking of Restoration Potential in areas of Restoration Needs

Title	Restoration Needs with greatest Potential of Restoration.



Summary	This map shows the River Restoration Units in need for restoration with greatest restoration Potential. Creation date: March 2023 Resolution: R2U (output resolution) Version: 3.0.0

	Responsible: School of Agriculture, University of Lisbon
Description	The Restoration Potential Index (RPI) has been ranked and classified using the quantile classification method with 5 classes. The ranked RPI is shown in the River Restoration Units (R2U) where the restoration needs occur, enabling the prioritisation of R2U by their upside in terms of restoration potential. Thus providing a broad-scope guideline on where action and restoration policies should start to focus.
Credits	– River Restoration Units (R2U) developed under MERLIN project (unpublished) Habitats Directive data: – Article 17 Web Tool. 2022. Article 17 Web Tool. [online] Available at: https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-17> [Accessed 31 March 2022]. Water Framework Directive data: – Vigiak, Olga; Udias Moinelo, Angel; Pistocchi, Alberto; Zanni, Michela; Aloe, Alberto; Grizzetti, Bruna (2021): European River conditions: probability of failing to achieve good ecological status, or being impacted by nutrient and organic pollution (v. 1.0). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/35781807-e6c9-4c91-bbff-debd95f612e2 Ecosystem Services data: – https://ecosystem-accounts.jrc.ec.europa.eu/ – https://esdac.jrc.ec.europa.eu/content/soil-organic-carbon-saturation-capacity – Lugato, E., Panagos, P., Bampa, F., Jones, A., Montanarella, L. A new baseline of organic carbon stock in European agricultural soils using a modelling approach (2014a) Global Change Biology, 20 (1), pp. 313-326. – Lugato, E., Bampa, F., Panagos, P., Montanarella, L., Jones, A. Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices (2014b) Global Change Biology, 20 (11), pp. 3557-3567. Global Human Footprint data: – https://sedac.ciesin.columbia.edu/data/set/wildareas-v2-human-footprint-geographic/metadata – Wildlife Conservation Society - WCS, and Center for International Earth Science Information Network – CIESIN – Columbia University. 2005. Last of the Wild Project, Version 2, 2005 (LWP-2): Global Human Footprint Dataset (Geographic). Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4M61H5F. Floodplain data: – Dottori, Francesco; Alfieri, Lorenzo; Bianchi, Alessandra; Skoien, Jon; Salamon, Peter (2021): River flood hazard maps for Europe and the Mediterranean Basin region. European Commission, Joint Research Centre (JRC) [Dataset] doi: 10.2905/1D128B6C-A4EE-4858-9E34-6210707F3C81 PID: http://data.europa.eu/89h/1d128b6c-a4ee-4858-9e34-6210707f3c81 Nature 2000 data: – EEA under the framework of Copernicus programme, JNCC, JCR – https://jncc.gov.uk/our-work/uk-protected-area-datasets-for-download/

	Methodology: – Carrao, Hugo, Stefan Kleeschulte, Marco Trombetti, Dania Abdul Malak, Fernando Santos Martín, Adrián García Bruzón, Aurélien Carré, and Sophie Condé. Task 1.7.5.3: Green Infrastructure (Gi). Key Deliverable Kd2 – Green Infrastructure Analysis: Contribution to Wetlands. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020. – Carrao, Hugo, Stefan Kleeschulte, Sandra Naumann, McKenna Davis, Christoph Schröder, Dania Abdul Malak, and Sophie Conde. Contributions to Building a Coherent Trans-European Nature Network. What Is the Contribution of Gi to Improving the Conservation Status of Species of Community Interest and the Delivery of Ecosystem Services in Europe? Strengthening the Gi Network with a View to Enhance Its Multiple Benefits. Vienna, Austria: European Topic Centre on Urban, Land and Soil Systems, 2020.
Limitation	No limitation

Annex II – Habitats Directive tables

Habitats

Habitats_ID	Description	Group
7110	Active raised bogs	Bogs, mires & fens
7120	Degraded raised bogs still capable of natural regeneration	Bogs, mires & fens
7130	Blanket bogs	Bogs, mires & fens
7140	Transition mires and quaking bogs	Bogs, mires & fens
7150	Depressions on peat substrates of the Rhynchosporion	Bogs, mires & fens
7160	Fennoscandian mineral-rich springs and springfens	Bogs, mires & fens
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	Bogs, mires & fens
7220	Petrifying springs with tufa formation (Cratoneurion)	Bogs, mires & fens
7230	Alkaline fens	Bogs, mires & fens
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	Bogs, mires & fens
7310	Aapa mires	Bogs, mires & fens
7320	Palsa mires	Bogs, mires & fens
9080	Fennoscandian deciduous swamp woods	Forests
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	Forests
9370	Palm groves of Phoenix	Forests
91D0	Bog woodland	Forests
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	Forests
91F0	Riparian mixed forests of Quercus robur, Ulmus laevis and Ulmus minor, Fraxinus excelsior or Fraxinus angustifolia, along the great rivers (Ulmenion minoris)	Forests
92A0	Salix alba and Populus alba galleries	Forests
92B0	Riparian formations on intermittent Mediterranean water courses with Rhododendron ponticum, Salix and others	Forests
92C0	Platanus orientalis and Liquidambar orientalis woods (Platanion orientalis)	Forests
92D0	Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae)	Forests
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	Freshwater habitats
3120	Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean, with Isoetes spp.	Freshwater habitats
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	Freshwater habitats
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Freshwater habitats
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition — type vegetation	Freshwater habitats
3160	Natural dystrophic lakes and ponds	Freshwater habitats
3170	Mediterranean temporary ponds	Freshwater habitats
3180	Turloughs	Freshwater habitats
3190	Lakes of gypsum karst	Freshwater habitats
3210	Fennoscandian natural rivers	Freshwater habitats
3220	Alpine rivers and the herbaceous vegetation along their banks	Freshwater habitats
3230	Alpine rivers and their ligneous vegetation with Myricaria germanica	Freshwater habitats
3240	Alpine rivers and their ligneous vegetation with Salix elaeagnos	Freshwater habitats
3250	Constantly flowing Mediterranean rivers with Glaucium flavum	Freshwater habitats
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Freshwater habitats

Habitats_ID	Description	Group
3270	Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation	Freshwater habitats
3280	Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba	Freshwater habitats
3290	Intermittently flowing Mediterranean rivers of the Paspalo-Agrostidion	Freshwater habitats
31A0	Transylvanian hot-spring lotus beds	Freshwater habitats
32A0	Tufa cascades of karstic rivers of the Dinaric Alps	Freshwater habitats
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Grasslands
6440	Alluvial meadows of river valleys of the Cnidion dubii	Grasslands
6450	Northern boreal alluvial meadows	Grasslands
6460	Peat grasslands of Troodos	Grasslands
6540	Sub-Mediterranean grasslands of the Molinio-Hordeion secalini	Grasslands
4010	Northern Atlantic wet heaths with Erica tetralix	Heath & scrub
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	Heath & scrub

Species

Sps_ID	Species Name	Taxonomical Group	Directive
1188	*Bombina bombina*	Amphibians	Habitats Directive
1193	*Bombina variegata*	Amphibians	Habitats Directive
6997	*Bufotes viridis*	Amphibians	Habitats Directive
6284	*Epidalea calamita*	Amphibians	Habitats Directive
1203	*Hyla arborea*	Amphibians	Habitats Directive
1197	*Pelobates fuscus*	Amphibians	Habitats Directive
6981	*Pelophylax lessonae*	Amphibians	Habitats Directive
6938	*Pelophylax ridibundus*	Amphibians	Habitats Directive
1214	*Rana arvalis*	Amphibians	Habitats Directive
1209	*Rana dalmatina*	Amphibians	Habitats Directive
1213	*Rana temporaria*	Amphibians	Habitats Directive
1167	*Triturus carnifex*	Amphibians	Habitats Directive
1166	*Triturus cristatus*	Amphibians	Habitats Directive
1993	*Triturus dobrogicus*	Amphibians	Habitats Directive
4065	*Congeria kusceri*	Molluscs	Habitats Directive
1029	*Margaritifera margaritifera*	Molluscs	Habitats Directive
6988	*Microcondylaea bonellii*	Molluscs	Habitats Directive
1032	*Unio crassus*	Molluscs	Habitats Directive
5382	*Unio tumidiformis*	Molluscs	Habitats Directive
4056	*Anisus vorticulus*	Molluscs	Habitats Directive
1024	*Geomalacus maculosus*	Molluscs	Habitats Directive
5102	*Theodoxus prevostianus*	Molluscs	Habitats Directive
4064	*Theodoxus transversalis*	Molluscs	Habitats Directive
1014	*Vertigo angustior*	Molluscs	Habitats Directive
1015	*Vertigo genesii*	Molluscs	Habitats Directive
1013	*Vertigo geyeri*	Molluscs	Habitats Directive
1016	*Vertigo moulinsiana*	Molluscs	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
1048	*Aeshna viridis*	Arthropods	Habitats Directive
1066	*Apatura metis*	Arthropods	Habitats Directive
1045	*Coenagrion hylas*	Arthropods	Habitats Directive
2487	*Acipenser ruthenus*	Fish	Habitats Directive
5289	*Alburnus mento*	Fish	Habitats Directive
5085	*Barbus barbus*	Fish	Habitats Directive
2484	*Eudontomyzon mariae*	Fish	Habitats Directive
2485	*Eudontomyzon vladykovi*	Fish	Habitats Directive
2555	*Gymnocephalus baloni*	Fish	Habitats Directive
1105	*Hucho hucho*	Fish	Habitats Directive
1096	*Lampetra planeri*	Fish	Habitats Directive
1145	*Misgurnus fossilis*	Fish	Habitats Directive
2522	*Pelecus cultratus*	Fish	Habitats Directive
5339	*Rhodeus amarus*	Fish	Habitats Directive
6143	*Romanogobio kesslerii*	Fish	Habitats Directive
6145	*Romanogobio uranoscopus*	Fish	Habitats Directive
5329	*Romanogobio vladykovi*	Fish	Habitats Directive
6146	*Rutilus meidingeri*	Fish	Habitats Directive
5345	*Rutilus virgo*	Fish	Habitats Directive
5197	*Sabanejewia balcanica*	Fish	Habitats Directive
6147	*Telestes souffia*	Fish	Habitats Directive
1109	*Thymallus thymallus*	Fish	Habitats Directive
2011	*Umbra krameri*	Fish	Habitats Directive
1160	*Zingel streber*	Fish	Habitats Directive
1159	*Zingel zingel*	Fish	Habitats Directive
1353	*Canis aureus*	Mammals	Habitats Directive
1352	*Canis lupus*	Mammals	Habitats Directive
1337	*Castor fiber*	Mammals	Habitats Directive
1313	*Eptesicus nilssonii*	Mammals	Habitats Directive
5365	*Hypsugo savii*	Mammals	Habitats Directive
1334	*Lepus timidus*	Mammals	Habitats Directive
1355	*Lutra lutra*	Mammals	Habitats Directive
1358	*Mustela putorius*	Mammals	Habitats Directive
1331	*Nyctalus leisleri*	Mammals	Habitats Directive
1317	*Pipistrellus nathusii*	Mammals	Habitats Directive
1343	*Sicista betulina*	Mammals	Habitats Directive
1354	*Ursus arctos*	Mammals	Habitats Directive
1044	*Coenagrion mercuriale*	Arthropods	Habitats Directive
4045	*Coenagrion ornatum*	Arthropods	Habitats Directive
1070	*Coenonympha hero*	Arthropods	Habitats Directive
1071	*Coenonympha oedippus*	Arthropods	Habitats Directive
4046	*Cordulegaster heros*	Arthropods	Habitats Directive
1047	*Cordulegaster trinacriae*	Arthropods	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
1065	*Euphydryas aurinia*	Arthropods	Habitats Directive
1220	*Emys orbicularis*	Reptiles	Habitats Directive
1292	*Natrix tessellata*	Reptiles	Habitats Directive
1614	*Apium repens*	Vascular Plants	Habitats Directive
1762	*Arnica montana*	Vascular Plants	Habitats Directive
1916	*Artemisia laciniata*	Vascular Plants	Habitats Directive
1419	*Botrychium simplex*	Vascular Plants	Habitats Directive
4081	*Cirsium brachycephalum*	Vascular Plants	Habitats Directive
1887	*Coleanthus subtilis*	Vascular Plants	Habitats Directive
1902	*Cypripedium calceolus*	Vascular Plants	Habitats Directive
1898	*Eleocharis carniolica*	Vascular Plants	Habitats Directive
4096	*Gladiolus palustris*	Vascular Plants	Habitats Directive
6282	*Klasea lycopifolia*	Vascular Plants	Habitats Directive
1758	*Ligularia sibirica*	Vascular Plants	Habitats Directive
1725	*Lindernia procumbens*	Vascular Plants	Habitats Directive
1903	*Liparis loeselii*	Vascular Plants	Habitats Directive
1428	*Marsilea quadrifolia*	Vascular Plants	Habitats Directive
1670	*Myosotis rehsteineri*	Vascular Plants	Habitats Directive
1833	*Najas flexilis*	Vascular Plants	Habitats Directive
4093	*Rhododendron luteum*	Vascular Plants	Habitats Directive
1900	*Spiranthes aestivalis*	Vascular Plants	Habitats Directive
1545	*Trifolium saxatile*	Vascular Plants	Habitats Directive
1191	*Alytes obstetricans*	Amphibians	Habitats Directive
1046	*Gomphus graslinii*	Arthropods	Habitats Directive
1103	*Alosa fallax*	Fish	Habitats Directive
1099	*Lampetra fluviatilis*	Fish	Habitats Directive
1106	*Salmo salar*	Fish	Habitats Directive
1318	*Myotis dasycneme*	Mammals	Habitats Directive
1365	*Phoca vitulina*	Mammals	Habitats Directive
1349	*Tursiops truncatus*	Mammals	Habitats Directive
6216	*Hamatocaulis vernicosus*	Non Vascular Plants	Habitats Directive
1400	*Leucobryum glaucum*	Non Vascular Plants	Habitats Directive
1831	*Luronium natans*	Vascular Plants	Habitats Directive
6990	*Pelophylax bedriagae*	Amphibians	Habitats Directive
6954	*Pelophylax kurtmuelleri*	Amphibians	Habitats Directive
1208	*Rana graeca*	Amphibians	Habitats Directive
1171	*Triturus karelinii*	Amphibians	Habitats Directive
1038	*Leucorrhinia albifrons*	Arthropods	Habitats Directive
1035	*Leucorrhinia caudalis*	Arthropods	Habitats Directive
5040	*Acipenser gueldenstaedtii*	Fish	Habitats Directive
2488	*Acipenser stellatus*	Fish	Habitats Directive
5288	*Alburnus mandrensis*	Fish	Habitats Directive
5291	*Alburnus sarmaticus*	Fish	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
5290	*Alburnus schischkovi*	Fish	Habitats Directive
4125	*Alosa immaculata*	Fish	Habitats Directive
4127	*Alosa tanaica*	Fish	Habitats Directive
5265	*Barbus bergi*	Fish	Habitats Directive
5088	*Barbus cyclolepis*	Fish	Habitats Directive
5263	*Barbus strumicae*	Fish	Habitats Directive
2533	*Cobitis elongata*	Fish	Habitats Directive
2489	*Huso huso*	Fish	Habitats Directive
5347	*Sabanejewia bulgarica*	Fish	Habitats Directive
1316	*Myotis capaccinii*	Mammals	Habitats Directive
1042	*Leucorrhinia pectoralis*	Arthropods	Habitats Directive
1389	*Meesia longiseta*	Non Vascular Plants	Habitats Directive
1279	*Elaphe quatuorlineata*	Reptiles	Habitats Directive
2373	*Mauremys rivulata*	Reptiles	Habitats Directive
1516	*Aldrovanda vesiculosa*	Vascular Plants	Habitats Directive
4116	*Tozzia carpathica*	Vascular Plants	Habitats Directive
1192	*Alytes cisternasii*	Amphibians	Habitats Directive
6906	*Alytes dickhilleni*	Amphibians	Habitats Directive
1187	*Alytes muletensis*	Amphibians	Habitats Directive
6920	*Calotriton arnoldi*	Amphibians	Habitats Directive
6944	*Calotriton asper*	Amphibians	Habitats Directive
1172	*Chioglossa lusitanica*	Amphibians	Habitats Directive
1194	*Discoglossus galganoi*	Amphibians	Habitats Directive
1189	*Discoglossus pictus*	Amphibians	Habitats Directive
1205	*Hyla meridionalis*	Amphibians	Habitats Directive
1198	*Pelobates cultripes*	Amphibians	Habitats Directive
6945	*Pelophylax perezi*	Amphibians	Habitats Directive
1216	*Rana iberica*	Amphibians	Habitats Directive
5813	*Rana pyrenaica*	Amphibians	Habitats Directive
1174	*Triturus marmoratus*	Amphibians	Habitats Directive
5896	*Triturus pygmaeus*	Amphibians	Habitats Directive
1043	*Lindenia tetraphylla*	Arthropods	Habitats Directive
1060	*Lycaena dispar*	Arthropods	Habitats Directive
6155	*Achondrostoma arcasii*	Fish	Habitats Directive
1101	*Acipenser sturio*	Fish	Habitats Directive
1102	*Alosa alosa*	Fish	Habitats Directive
1133	*Anaecypris hispanica*	Fish	Habitats Directive
5262	*Barbus haasi*	Fish	Habitats Directive
1138	*Barbus meridionalis*	Fish	Habitats Directive
5303	*Cobitis calderoni*	Fish	Habitats Directive
5302	*Cobitis paludica*	Fish	Habitats Directive
5301	*Cobitis vettonica*	Fish	Habitats Directive
5318	*Cottus aturi*	Fish	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
5317	*Cottus hispaniolensis*	Fish	Habitats Directive
5926	*Iberochondrostoma lemmingii*	Fish	Habitats Directive
6930	*Iberochondrostoma oretanum*	Fish	Habitats Directive
1118	*Iberocypris palaciosi*	Fish	Habitats Directive
5281	*Luciobarbus bocagei*	Fish	Habitats Directive
6168	*Luciobarbus comizo*	Fish	Habitats Directive
5283	*Luciobarbus graellsii*	Fish	Habitats Directive
5284	*Luciobarbus guiraonis*	Fish	Habitats Directive
5285	*Luciobarbus microcephalus*	Fish	Habitats Directive
5286	*Luciobarbus sclateri*	Fish	Habitats Directive
5294	*Parachondrostoma arrigonis*	Fish	Habitats Directive
5292	*Parachondrostoma miegii*	Fish	Habitats Directive
5293	*Parachondrostoma turiense*	Fish	Habitats Directive
1095	*Petromyzon marinus*	Fish	Habitats Directive
5296	*Pseudochondrostoma duriense*	Fish	Habitats Directive
6149	*Pseudochondrostoma polylepis*	Fish	Habitats Directive
6162	*Pseudochondrostoma willkommii*	Fish	Habitats Directive
1153	*Valencia hispanica*	Fish	Habitats Directive
1301	*Galemys pyrenaicus*	Mammals	Habitats Directive
1338	*Microtus cabrerae*	Mammals	Habitats Directive
1356	*Mustela lutreola*	Mammals	Habitats Directive
4038	*Lycaena helle*	Arthropods	Habitats Directive
1036	*Macromia splendens*	Arthropods	Habitats Directive
1385	*Bruchia vogesiaca*	Non Vascular Plants	Habitats Directive
1391	*Riella helicophylla*	Non Vascular Plants	Habitats Directive
1398	*Sphagnum pylaesii*	Non Vascular Plants	Habitats Directive
1264	*Algyroides marchi*	Reptiles	Habitats Directive
5371	*Iberolacerta monticola*	Reptiles	Habitats Directive
1259	*Lacerta schreiberi*	Reptiles	Habitats Directive
1221	*Mauremys leprosa*	Reptiles	Habitats Directive
1658	*Centaurium somedanum*	Vascular Plants	Habitats Directive
1488	*Coronopus navasii*	Vascular Plants	Habitats Directive
1420	*Culcita macrocarpa*	Vascular Plants	Habitats Directive
1603	*Eryngium viviparum*	Vascular Plants	Habitats Directive
1662	*Galium viridiflorum*	Vascular Plants	Habitats Directive
1581	*Kosteletzkya pentacarpos*	Vascular Plants	Habitats Directive
1598	*Lythrum flexuosum*	Vascular Plants	Habitats Directive
1427	*Marsilea batardae*	Vascular Plants	Habitats Directive
1429	*Marsilea strigosa*	Vascular Plants	Habitats Directive
1879	*Micropyropsis tuberosa*	Vascular Plants	Habitats Directive
1865	*Narcissus asturiensis*	Vascular Plants	Habitats Directive
1864	*Narcissus bulbocodium*	Vascular Plants	Habitats Directive
1862	*Narcissus cyclamineus*	Vascular Plants	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
1867	*Narcissus longispathus*	Vascular Plants	Habitats Directive
1858	*Narcissus nevadensis*	Vascular Plants	Habitats Directive
1783	*Picris willkommii*	Vascular Plants	Habitats Directive
1742	*Plantago algarbiensis*	Vascular Plants	Habitats Directive
1501	*Sisymbrium cavanillesianum*	Vascular Plants	Habitats Directive
1625	*Soldanella villosa*	Vascular Plants	Habitats Directive
1426	*Woodwardia radicans*	Vascular Plants	Habitats Directive
6914	*Achondrostoma occidentale*	Fish	Habitats Directive
6156	*Achondrostoma oligolepis*	Fish	Habitats Directive
5295	*Iberochondrostoma almacai*	Fish	Habitats Directive
6151	*Iberochondrostoma lusitanicum*	Fish	Habitats Directive
5287	*Luciobarbus steindachneri*	Fish	Habitats Directive
1382	*Thamnobryum fernandesii*	Non Vascular Plants	Habitats Directive
4082	*Crepis pusilla*	Vascular Plants	Habitats Directive
1888	*Festuca duriotagana*	Vascular Plants	Habitats Directive
1580	*Frangula azorica*	Vascular Plants	Habitats Directive
1417	*Isoetes azorica*	Vascular Plants	Habitats Directive
1877	*Juncus valvatus*	Vascular Plants	Habitats Directive
1669	*Myosotis lusitanica*	Vascular Plants	Habitats Directive
1673	*Myosotis retusifolia*	Vascular Plants	Habitats Directive
1695	*Thymus camphoratus*	Vascular Plants	Habitats Directive
4052	*Odontopodisma rubripes*	Arthropods	Habitats Directive
5041	*Acipenser nudiventris*	Fish	Habitats Directive
5323	*Cottus transsilvaniae*	Fish	Habitats Directive
1998	*Romanichthys valsanicola*	Fish	Habitats Directive
5346	*Sabanejewia vallachica*	Fish	Habitats Directive
1617	*Angelica palustris*	Vascular Plants	Habitats Directive
1528	*Saxifraga hirculus*	Vascular Plants	Habitats Directive
2186	*Syringa josikaea*	Vascular Plants	Habitats Directive
2492	*Coregonus albula*	Fish	Habitats Directive
1912	*Gulo gulo*	Mammals	Habitats Directive
1037	*Ophiogomphus cecilia*	Arthropods	Habitats Directive
1383	*Dichelyma capillaceum*	Non Vascular Plants	Habitats Directive
1983	*Hamatocaulis lapponicus*	Non Vascular Plants	Habitats Directive
1940	*Alisma wahlenbergii*	Vascular Plants	Habitats Directive
1942	*Arctophila fulva*	Vascular Plants	Habitats Directive
1948	*Calamagrostis chalybaea*	Vascular Plants	Habitats Directive
1951	*Cinna latifolia*	Vascular Plants	Habitats Directive
1955	*Diplazium sibiricum*	Vascular Plants	Habitats Directive
5191	*Lycopodiella inundata*	Vascular Plants	Habitats Directive
1966	*Persicaria foliosa*	Vascular Plants	Habitats Directive
1968	*Primula nutans*	Vascular Plants	Habitats Directive
1969	*Primula scandinavica*	Vascular Plants	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
1972	*Ranunculus lapponicus*	Vascular Plants	Habitats Directive
1493	*Sisymbrium supinum*	Vascular Plants	Habitats Directive
1977	*Trisetum subalpestre*	Vascular Plants	Habitats Directive
5076	*Coregonus pollan*	Fish	Habitats Directive
5029	*Delphinapterus leucas*	Mammals	Habitats Directive
6305	*Pusa hispida*	Mammals	Habitats Directive
6992	*Pelophylax cerigensis*	Amphibians	Habitats Directive
6991	*Pelophylax cretensis*	Amphibians	Habitats Directive
1100	*Acipenser naccarii*	Fish	Habitats Directive
5269	*Alburnus vistonicus*	Fish	Habitats Directive
5268	*Alburnus volviticus*	Fish	Habitats Directive
2490	*Alosa macedonica*	Fish	Habitats Directive
5048	*Alosa vistonica*	Fish	Habitats Directive
5276	*Aphanius almiriensis*	Fish	Habitats Directive
1152	*Aphanius fasciatus*	Fish	Habitats Directive
5089	*Barbus euboicus*	Fish	Habitats Directive
5093	*Barbus macedonicus*	Fish	Habitats Directive
5094	*Barbus peloponnesius*	Fish	Habitats Directive
5254	*Barbus pergamonensis*	Fish	Habitats Directive
5095	*Barbus prespensis*	Fish	Habitats Directive
5256	*Barbus sperchiensis*	Fish	Habitats Directive
5312	*Cobitis arachthosensis*	Fish	Habitats Directive
5313	*Cobitis hellenica*	Fish	Habitats Directive
5310	*Cobitis meridionalis*	Fish	Habitats Directive
5311	*Cobitis puncticulata*	Fish	Habitats Directive
5306	*Cobitis punctilineata*	Fish	Habitats Directive
5307	*Cobitis stephanidisi*	Fish	Habitats Directive
5309	*Cobitis vardarensis*	Fish	Habitats Directive
5337	*Economidichthys pygmaeus*	Fish	Habitats Directive
5338	*Economidichthys trichonis*	Fish	Habitats Directive
6292	*Knipowitschia goerneri*	Fish	Habitats Directive
6293	*Knipowitschia milleri*	Fish	Habitats Directive
1117	*Ladigesocypris ghigii*	Fish	Habitats Directive
5282	*Luciobarbus graecus*	Fish	Habitats Directive
6263	*Pelasgus epiroticus*	Fish	Habitats Directive
6291	*Pelasgus laconicus*	Fish	Habitats Directive
5336	*Pelasgus marathonicus*	Fish	Habitats Directive
6264	*Pelasgus prespensis*	Fish	Habitats Directive
5279	*Pelasgus thesproticus*	Fish	Habitats Directive
5340	*Rhodeus meridionalis*	Fish	Habitats Directive
5330	*Romanogobio elimeius*	Fish	Habitats Directive
5344	*Rutilus panosi*	Fish	Habitats Directive
5342	*Rutilus prespensis*	Fish	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
5354	*Salmo pelagonicus*	Fish	Habitats Directive
5355	*Salmo peristericus*	Fish	Habitats Directive
1121	*Scardinius graecus*	Fish	Habitats Directive
1150	*Silurus aristotelis*	Fish	Habitats Directive
5332	*Squalius keadicus*	Fish	Habitats Directive
5335	*Telestes beoticus*	Fish	Habitats Directive
5334	*Telestes pleurobipunctatus*	Fish	Habitats Directive
5341	*Tropidophoxinellus hellenicus*	Fish	Habitats Directive
6289	*Tropidophoxinellus spartiaticus*	Fish	Habitats Directive
1992	*Valencia letourneuxi*	Fish	Habitats Directive
5356	*Zingel balcanicus*	Fish	Habitats Directive
1274	*Chalcides ocellatus*	Reptiles	Habitats Directive
6089	*Dolichophis jugularis*	Reptiles	Habitats Directive
1296	*Macrovipera schweizeri*	Reptiles	Habitats Directive
1239	*Podarcis milensis*	Reptiles	Habitats Directive
1896	*Phoenix theophrasti*	Vascular Plants	Habitats Directive
1732	*Veronica oetaea*	Vascular Plants	Habitats Directive
1196	*Discoglossus montalentii*	Amphibians	Habitats Directive
1190	*Discoglossus sardus*	Amphibians	Habitats Directive
1164	*Euproctus montanus*	Amphibians	Habitats Directive
1204	*Hyla sarda*	Amphibians	Habitats Directive
1162	*Cottus petiti*	Fish	Habitats Directive
6150	*Parachondrostoma toxostoma*	Fish	Habitats Directive
1158	*Zingel asper*	Fish	Habitats Directive
1384	*Riccia breidleri*	Non Vascular Plants	Habitats Directive
5912	*Archaeolacerta bedriagae*	Reptiles	Habitats Directive
1475	*Aconitum corsicum*	Vascular Plants	Habitats Directive
1607	*Angelica heterocarpa*	Vascular Plants	Habitats Directive
1832	*Caldesia parnassifolia*	Vascular Plants	Habitats Directive
1416	*Isoetes boryana*	Vascular Plants	Habitats Directive
5357	*Bombina pachypus*	Amphibians	Habitats Directive
6917	*Bufotes boulengeri*	Amphibians	Habitats Directive
6919	*Bufotes siculus*	Amphibians	Habitats Directive
1165	*Euproctus platycephalus*	Amphibians	Habitats Directive
5358	*Hyla intermedia*	Amphibians	Habitats Directive
6956	*Lissotriton italicus*	Amphibians	Habitats Directive
1186	*Proteus anguinus*	Amphibians	Habitats Directive
1206	*Rana italica*	Amphibians	Habitats Directive
1215	*Rana latastei*	Amphibians	Habitats Directive
1175	*Salamandrina terdigitata*	Amphibians	Habitats Directive
1041	*Oxygastra curtisii*	Arthropods	Habitats Directive
1120	*Alburnus albidus*	Fish	Habitats Directive
4124	*Alosa agone*	Fish	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
5086	*Barbus caninus*	Fish	Habitats Directive
1137	*Barbus plebejus*	Fish	Habitats Directive
5097	*Barbus tyberinus*	Fish	Habitats Directive
1140	*Chondrostoma soetta*	Fish	Habitats Directive
5304	*Cobitis bilineata*	Fish	Habitats Directive
1155	*Knipowitschia panizzae*	Fish	Habitats Directive
5962	*Protochondrostoma genei*	Fish	Habitats Directive
1114	*Rutilus pigus*	Fish	Habitats Directive
1136	*Rutilus rubilio*	Fish	Habitats Directive
5828	*Salmo fibreni*	Fish	Habitats Directive
1107	*Salmo marmoratus*	Fish	Habitats Directive
6148	*Squalius lucumonis*	Fish	Habitats Directive
5331	*Telestes muticellus*	Fish	Habitats Directive
1040	*Stylurus flavipes*	Arthropods	Habitats Directive
5370	*Emys trinacris*	Reptiles	Habitats Directive
1646	*Armeria helodes*	Vascular Plants	Habitats Directive
1498	*Brassica glabrescens*	Vascular Plants	Habitats Directive
1897	*Carex panormitana*	Vascular Plants	Habitats Directive
4092	*Elatine gussonei*	Vascular Plants	Habitats Directive
1502	*Erucastrum palustre*	Vascular Plants	Habitats Directive
1714	*Euphrasia marchesettii*	Vascular Plants	Habitats Directive
1415	*Isoetes malinverniana*	Vascular Plants	Habitats Directive
1941	*Arctagrostis latifolia*	Vascular Plants	Habitats Directive
1963	*Najas tenuissima*	Vascular Plants	Habitats Directive
1971	*Puccinellia phryganodes*	Vascular Plants	Habitats Directive
5328	*Romanogobio belingi*	Fish	Habitats Directive
2071	*Cerastium alsinifolium*	Vascular Plants	Habitats Directive
2217	*Pedicularis sudetica*	Vascular Plants	Habitats Directive
5060	*Coregonus fontanae*	Fish	Habitats Directive
5066	*Coregonus lucinensis*	Fish	Habitats Directive
5348	*Sabanejewia baltica*	Fish	Habitats Directive
1601	*Oenanthe conioides*	Vascular Plants	Habitats Directive
5046	*Alosa killarnensis*	Fish	Habitats Directive
5264	*Barbus carpathicus*	Fish	Habitats Directive
4119	*Ochyraea tatrensis*	Non Vascular Plants	Habitats Directive
6236	*Rhynchocypris percnurus*	Fish	Habitats Directive
2109	*Cochlearia polonica*	Vascular Plants	Habitats Directive
6343	*Aulopyge huegelii*	Fish	Habitats Directive
6344	*Chondrostoma knerii*	Fish	Habitats Directive
6345	*Chondrostoma phoxinus*	Fish	Habitats Directive
6902	*Cobitis dalmatina*	Fish	Habitats Directive
6904	*Cobitis jadovaensis*	Fish	Habitats Directive
6905	*Cobitis narentana*	Fish	Habitats Directive

Sps_ID	Species Name	Taxonomical Group	Directive
6897	*Delminichthys adspersus*	Fish	Habitats Directive
6898	*Delminichthys ghetaldii*	Fish	Habitats Directive
6894	*Delminichthys jadovensis*	Fish	Habitats Directive
6895	*Delminichthys krbavensis*	Fish	Habitats Directive
6899	*Phoxinellus alepidotus*	Fish	Habitats Directive
6900	*Phoxinellus dalmaticus*	Fish	Habitats Directive
6346	*Squalius microlepis*	Fish	Habitats Directive
6347	*Squalius svallize*	Fish	Habitats Directive
6896	*Telestes croaticus*	Fish	Habitats Directive
6967	*Telestes fontinalis*	Fish	Habitats Directive
6182	*Sympecma paedisca*	Arthropods	Habitats Directive
5080	*Coregonus trybomi*	Fish	Habitats Directive
A402	*Accipiter brevipes*	Birds	Birds Directive
A680	*Acrocephalus agricola*	Birds	Birds Directive
A298	*Acrocephalus arundinaceus*	Birds	Birds Directive
A679	*Acrocephalus dumetorum*	Birds	Birds Directive
A293	*Acrocephalus melanopogon*	Birds	Birds Directive
A296	*Acrocephalus palustris*	Birds	Birds Directive
A295	*Acrocephalus schoenobaenus*	Birds	Birds Directive
A297	*Acrocephalus scirpaceus*	Birds	Birds Directive
A168	*Actitis hypoleucos*	Birds	Birds Directive
A324	*Aegithalos caudatus*	Birds	Birds Directive
A247	*Alauda arvensis*	Birds	Birds Directive
A229	*Alcedo atthis*	Birds	Birds Directive
A054	*Anas acuta*	Birds	Birds Directive
A052	*Anas crecca*	Birds	Birds Directive
A053	*Anas platyrhynchos*	Birds	Birds Directive
A043	*Anser anser*	Birds	Birds Directive
A040	*Anser brachyrhynchus*	Birds	Birds Directive
A556-X	*Anser caerulescens*	Birds	Birds Directive
A042	*Anser erythropus*	Birds	Birds Directive
A666	*Anthus petrosus*	Birds	Birds Directive
A257	*Anthus pratensis*	Birds	Birds Directive
A259	*Anthus spinoletta*	Birds	Birds Directive
A226	*Apus apus*	Birds	Birds Directive
A405	*Aquila adalberti*	Birds	Birds Directive
A707	*Aquila fasciata*	Birds	Birds Directive
A404	*Aquila heliaca*	Birds	Birds Directive
A773	*Ardea alba*	Birds	Birds Directive
A028	*Ardea cinerea*	Birds	Birds Directive
A029	*Ardea purpurea*	Birds	Birds Directive
A024	*Ardeola ralloides*	Birds	Birds Directive
A169	*Arenaria interpres*	Birds	Birds Directive

Sps_ID	Species Name	Taxonomical Group	Directive
A222	*Asio flammeus*	Birds	Birds Directive
A221	*Asio otus*	Birds	Birds Directive
A059	*Aythya ferina*	Birds	Birds Directive
A061	*Aythya fuligula*	Birds	Birds Directive
A062	*Aythya marila*	Birds	Birds Directive
A060	*Aythya nyroca*	Birds	Birds Directive
A021	*Botaurus stellaris*	Birds	Birds Directive
A044-X	*Branta canadensis*	Birds	Birds Directive
A396	*Branta ruficollis*	Birds	Birds Directive
A025	*Bubulcus ibis*	Birds	Birds Directive
A067	*Bucephala clangula*	Birds	Birds Directive
A087	*Buteo buteo*	Birds	Birds Directive
A403	*Buteo rufinus*	Birds	Birds Directive
A144	*Calidris alba*	Birds	Birds Directive
A149	*Calidris alpina*	Birds	Birds Directive
A143	*Calidris canutus*	Birds	Birds Directive
A147	*Calidris ferruginea*	Birds	Birds Directive
A148	*Calidris maritima*	Birds	Birds Directive
A145	*Calidris minuta*	Birds	Birds Directive
A861	*Calidris pugnax*	Birds	Birds Directive
A146	*Calidris temminckii*	Birds	Birds Directive
A224	*Caprimulgus europaeus*	Birds	Birds Directive
A371	*Carpodacus erythrinus*	Birds	Birds Directive
A479	*Cecropis daurica*	Birds	Birds Directive
A268	*Cercotrichas galactotes*	Birds	Birds Directive
A288	*Cettia cetti*	Birds	Birds Directive
A138	*Charadrius alexandrinus*	Birds	Birds Directive
A136	*Charadrius dubius*	Birds	Birds Directive
A137	*Charadrius hiaticula*	Birds	Birds Directive
A734	*Chlidonias hybrida*	Birds	Birds Directive
A198	*Chlidonias leucopterus*	Birds	Birds Directive
A197	*Chlidonias niger*	Birds	Birds Directive
A031	*Ciconia ciconia*	Birds	Birds Directive
A030	*Ciconia nigra*	Birds	Birds Directive
A264	*Cinclus cinclus*	Birds	Birds Directive
A081	*Circus aeruginosus*	Birds	Birds Directive
A082	*Circus cyaneus*	Birds	Birds Directive
A083	*Circus macrourus*	Birds	Birds Directive
A084	*Circus pygargus*	Birds	Birds Directive
A289	*Cisticola juncidis*	Birds	Birds Directive
A859	*Clanga clanga*	Birds	Birds Directive
A064	*Clangula hyemalis*	Birds	Birds Directive
A349	*Corvus corone*	Birds	Birds Directive

Sps_ID	Species Name	Taxonomical Group	Directive
A122	*Crex crex*	Birds	Birds Directive
A480	*Cyanecula svecica*	Birds	Birds Directive
A038	*Cygnus cygnus*	Birds	Birds Directive
A036	*Cygnus olor*	Birds	Birds Directive
A239	*Dendrocopos leucotos*	Birds	Birds Directive
A869	*Dryobates minor*	Birds	Birds Directive
A026	*Egretta garzetta*	Birds	Birds Directive
A399	*Elanus caeruleus*	Birds	Birds Directive
A381	*Emberiza schoeniclus*	Birds	Birds Directive
A511	*Falco cherrug*	Birds	Birds Directive
A103	*Falco peregrinus*	Birds	Birds Directive
A099	*Falco subbuteo*	Birds	Birds Directive
A097	*Falco vespertinus*	Birds	Birds Directive
A125	*Fulica atra*	Birds	Birds Directive
A126	*Fulica cristata*	Birds	Birds Directive
A244	*Galerida cristata*	Birds	Birds Directive
A153	*Gallinago gallinago*	Birds	Birds Directive
A154	*Gallinago media*	Birds	Birds Directive
A123	*Gallinula chloropus*	Birds	Birds Directive
A002	*Gavia arctica*	Birds	Birds Directive
A003	*Gavia immer*	Birds	Birds Directive
A001	*Gavia stellata*	Birds	Birds Directive
A189	*Gelochelidon nilotica*	Birds	Birds Directive
A135	*Glareola pratincola*	Birds	Birds Directive
A217	*Glaucidium passerinum*	Birds	Birds Directive
A127	*Grus grus*	Birds	Birds Directive
A130	*Haematopus ostralegus*	Birds	Birds Directive
A075	*Haliaeetus albicilla*	Birds	Birds Directive
A131	*Himantopus himantopus*	Birds	Birds Directive
A251	*Hirundo rustica*	Birds	Birds Directive
A862	*Hydrocoloeus minutus*	Birds	Birds Directive
A894	*Hydroprogne caspia*	Birds	Birds Directive
A022	*Ixobrychus minutus*	Birds	Birds Directive
A233	*Jynx torquilla*	Birds	Birds Directive
A340	*Lanius excubitor*	Birds	Birds Directive
A459	*Larus cachinnans*	Birds	Birds Directive
A182	*Larus canus*	Birds	Birds Directive
A180	*Larus genei*	Birds	Birds Directive
A800	*Larus ichthyaetus*	Birds	Birds Directive
A187	*Larus marinus*	Birds	Birds Directive
A176	*Larus melanocephalus*	Birds	Birds Directive
A604	*Larus michahellis*	Birds	Birds Directive
A179	*Larus ridibundus*	Birds	Birds Directive

Sps_ID	Species Name	Taxonomical Group	Directive
A157	*Limosa lapponica*	Birds	Birds Directive
A156	*Limosa limosa*	Birds	Birds Directive
A291	*Locustella fluviatilis*	Birds	Birds Directive
A292	*Locustella luscinioides*	Birds	Birds Directive
A290	*Locustella naevia*	Birds	Birds Directive
A270	*Luscinia luscinia*	Birds	Birds Directive
A152	*Lymnocryptes minimus*	Birds	Birds Directive
A855	*Mareca penelope*	Birds	Birds Directive
A889	*Mareca strepera*	Birds	Birds Directive
A066	*Melanitta fusca*	Birds	Birds Directive
A767	*Mergellus albellus*	Birds	Birds Directive
A070	*Mergus merganser*	Birds	Birds Directive
A069	*Mergus serrator*	Birds	Birds Directive
A230	*Merops apiaster*	Birds	Birds Directive
A875	*Microcarbo pygmaeus*	Birds	Birds Directive
A073	*Milvus migrans*	Birds	Birds Directive
A262	*Motacilla alba*	Birds	Birds Directive
A261	*Motacilla cinerea*	Birds	Birds Directive
A608	*Motacilla citreola*	Birds	Birds Directive
A260	*Motacilla flava*	Birds	Birds Directive
A077	*Neophron percnopterus*	Birds	Birds Directive
A058	*Netta rufina*	Birds	Birds Directive
A158	*Numenius phaeopus*	Birds	Birds Directive
A159	*Numenius tenuirostris*	Birds	Birds Directive
A023	*Nycticorax nycticorax*	Birds	Birds Directive
A277	*Oenanthe oenanthe*	Birds	Birds Directive
A533	*Oenanthe pleschanka*	Birds	Birds Directive
A071	*Oxyura leucocephala*	Birds	Birds Directive
A094	*Pandion haliaetus*	Birds	Birds Directive
A323	*Panurus biarmicus*	Birds	Birds Directive
A621	*Passer italiae*	Birds	Birds Directive
A020	*Pelecanus crispus*	Birds	Birds Directive
A019	*Pelecanus onocrotalus*	Birds	Birds Directive
A170	*Phalaropus lobatus*	Birds	Birds Directive
A663	*Phoenicopterus roseus*	Birds	Birds Directive
A034	*Platalea leucorodia*	Birds	Birds Directive
A032	*Plegadis falcinellus*	Birds	Birds Directive
A140	*Pluvialis apricaria*	Birds	Birds Directive
A141	*Pluvialis squatarola*	Birds	Birds Directive
A007	*Podiceps auritus*	Birds	Birds Directive
A005	*Podiceps cristatus*	Birds	Birds Directive
A006	*Podiceps grisegena*	Birds	Birds Directive
A008	*Podiceps nigricollis*	Birds	Birds Directive

Sps_ID	Species Name	Taxonomical Group	Directive
A492	*Poecile montanus*	Birds	Birds Directive
A493	*Poecile palustris*	Birds	Birds Directive
A119	*Porzana porzana*	Birds	Birds Directive
A118	*Rallus aquaticus*	Birds	Birds Directive
A132	*Recurvirostra avosetta*	Birds	Birds Directive
A336	*Remiz pendulinus*	Birds	Birds Directive
A249	*Riparia riparia*	Birds	Birds Directive
A275	*Saxicola rubetra*	Birds	Birds Directive
A276	*Saxicola torquatus*	Birds	Birds Directive
A063	*Somateria mollissima*	Birds	Birds Directive
A857	*Spatula clypeata*	Birds	Birds Directive
A856	*Spatula querquedula*	Birds	Birds Directive
A193	*Sterna hirundo*	Birds	Birds Directive
A194	*Sterna paradisaea*	Birds	Birds Directive
A885	*Sternula albifrons*	Birds	Birds Directive
A457	*Strix nebulosa*	Birds	Birds Directive
A220	*Strix uralensis*	Birds	Birds Directive
A004	*Tachybaptus ruficollis*	Birds	Birds Directive
A228	*Tachymarptis melba*	Birds	Birds Directive
A397	*Tadorna ferruginea*	Birds	Birds Directive
A048	*Tadorna tadorna*	Birds	Birds Directive
A161	*Tringa erythropus*	Birds	Birds Directive
A166	*Tringa glareola*	Birds	Birds Directive
A164	*Tringa nebularia*	Birds	Birds Directive
A165	*Tringa ochropus*	Birds	Birds Directive
A163	*Tringa stagnatilis*	Birds	Birds Directive
A162	*Tringa totanus*	Birds	Birds Directive
A213	*Tyto alba*	Birds	Birds Directive
A142	*Vanellus vanellus*	Birds	Birds Directive
A892	*Zapornia parva*	Birds	Birds Directive
A893	*Zapornia pusilla*	Birds	Birds Directive

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Replies to reviewers' comments

Reviewers' comments	Reply
	As a general comment, we thank the evaluators for their valuable comments. These allowed us to rethink part of the results' presentation. We are now presenting a fully refurbished document, more informative (with full metadata for all maps), and with new maps and figures to increase interpretability. The text was also proofread, partially re-rewritten and augmented for increased clarity.
"D3.1 provides important new data about conditions for river restoration, and also recommendations for where to prioritise future restoration schemes. The latter aspect is queried, for the simple reason that this is a critically important debate, where the Merlin findings will resonate, and may have implications for many years down the line. e.g. Figs. 24-25 on p39-40 identify integrated Habitats Directive and WFD needs – these are very useful targeting maps. It is informative to see just how severe the problems are in NW Europe and particularly on the Biscay-Channel-North Sea axis. The maps seem to be comprehensive. In due course a web version could be helpful, providing several layers of information and more metadata on the various regions targeted for restoration measures. On p4 it is noted that in urbanised and dry areas, in particular, stakeholders are struggling to meet the objectives of overall directives, and they will be the most directly and indirectly impacted by future changes. This is a key statement.	Thank you for the kind comments. We agree that the deliverable shows a meaningful representation of the situation and hope that it may benefit future freshwater management.
The report goes on to use the Human Footprint Index (HFI, p8) as a proxy for all constraints to restoration. This can be challenged, and it has serious implications. How does this resolve with the issues of ecosystem services provision around human populations, and what conflicts are brought about e.g. negating these benefits by applying HFI as broad a filter that removes those locations as geographical priorities?	The Restoration Potential Index (RPI) has been calculated for all areas within the borders of the study area including urbanized and non-urbanized areas. By giving a rank to R2Us (new figure 45) it allowed the prioritization of areas in need of restoration by their upside in terms of potential benefits for both nature and society. To establish the restoration potential, the three components (Ecosystem Services Assessment Indicator, Enablers to restoration, and Constraints to restoration) have been equally used without applying weights or excluding areas. The HFI has been used to represent the constraints to restoration and it is counterbalanced by the other components within the RPI computation. The way it has been used does not affect the need for restoration. Urbanized areas generated by the current rapid, unplanned, and uncontrolled urbanization process that causes socio-cultural-economic, and environmental-related challenges have in fact less potential for ecological restoration. The way the HFI has been used does not create conflicts with the Ecosystem services, in other words, it does not negate the ecosystem services beneficial to human well-being and public health. We simply stress that areas, where human presence and infrastructures are more intense, will be those where implementing ecological restoration will face higher challenges. To assess the ecosystem services (ES) we have used ecosystem services supply (potential) that counts the ecosystem contribution irrespective of whether there is human presence or not, we have used the ES demand measuring the need for a specific ES by society, particular stakeholder groups or individuals, and the ES mismatch which applies when there are no ecosystems to provide the ES that are needed by the ES demand. Therefore, we made

	sure that ESA (Ecossystems Services Assessment) has been calculated taking into consideration the areas where there is the potential for ecosystems to provide, where there is demand and where there is unmet demand of particular ES-related to freshwater ecosystems. We acknowledge that highly altered areas will face more problems in implementing ecological restoration measures. All of this can be better interpreted by the maps below that crosses ESA and needs (Figure 37) and the next that shows the RPI rank on R2Us with restoration needs.
What are the social justice implications, e.g. issue of who pays, who benefits (D2.1)?	That is not considered in this report, since this is not a political report. For sure, someone can make an adequate and scientific analysis focused on the social justice implication of ecological restoration throughout Europe. MERLIN has tasks related to economic issues that can provide some content on this and determine where from that perspective it would be better to implement ecological restoration. In terms of benefits, improving significant parts of the system will lead to an overall improvement, thus a benefit to all directly or indirectly. In fact, one can argue that in a river system, improving the most upstream areas will inevitably lead to an improvement downstream.
To illustrate this, in Fig.34 p54, a potential conclusion for Britain (using RPI alone) might be that restoration would be targeted towards NW Scotland. Is that correct? (an accompanying normative question being whether that would be appropriate, in that very few people live nearby or visit)?	No, it is not correct. The ES assessment indicator shows (Figure 36) that, if we were to restore, the most upside in terms of ES is in the SE of the UK. The HFI index map shows that this particular area is where human pressure and infrastructures are one of the most intense across entire Europe. When looking at the enablers map there are hardly any sort of protected areas for freshwater-related areas here. Given all these 3 indicators we can say that it would be very good to restore the SE of the UK but the challenges to be faced are immense. To help with these interpretation issues we produced maps crossing every indicator supporting the RPI with the restoration needs. By looking at each component individually the interpretability is augmented. We also added a conceptual figure in the deliverable to simply describe how R2U were classified according to the RPI, and then we present the needs (and just the needs) crossed with RPI (Figure 45 above).
It is very important to consider what are the effects of the modelling (and future uptake) in terms of losses of potentials associated with screening out such high proportions of river basins, and not including certain types of locations within RPIs. An example is flood control as an unmet demand, p41.	The lack of data is not excluding or not including. RPI does not screen out or exclude, it integrates 3 parameters considered to be relevant when aiming to implement restoration measures. In terms of the ES assessment, it was done when at least information for 2 ecosystem services was available. So, although the information is not fully comprehensive throughout Europe for most Ecosystem Services, we had information on at least two services for most R2Us.
A further example is, what are the impacts in terms of connectivity e.g. for migratory fish, through heavily urbanised areas towards less heavily impacted areas?	While not fully following the comment, we can say that if barriers exist in those areas, they were confirmed and mapped. Other non-physical barriers were not considered in this work. For sure, urbanization may create some non-physical barriers (e.g. pollution, O2 depletion, etc.), but those are extremely species-specific and there are few papers supporting it. Nonetheless, the impacts of such pressures are embedded into the data structure, for instance in the Water Framework Directive data, specifically in the probability of not achieving the good ecological status goal.

Building on this, and referring now to Fig. 13, the WFD GES composite indictor of conservation status maps areas marked red showing the greatest need for restoration. This links with urbanisation and other major hydrogeomorphological alterations (most developed areas).	For sure, that is right. Areas with more urbanization are in need of restoration, and for several of these areas, if restored the potential co-benefits in terms of ES are very high. The RPI just provides a way of prioritizing restoration, it never states that areas in need should not be restored. To analyse in detail the impact of river connectivity on fish species one would require refined data on multiple species for the entire Europe, which we do not have. Restoration needs are ubiquitous throughout Europe.
Also perhaps relating to migratory species, on p. 31 what is the rationale for selected barriers higher than 5 metres? In many many rivers, such barriers would not be drowned out. Is this perhaps a pragmatic consideration? This matter was discussed at the [review] meeting and is primarily a matter of spatial resolution and accuracy of datasets for smaller weirs etc. This can be further highlighted in the methodology.	This is both a pragmatic consideration and a compromise to delivering something that is functionally accurate and relevant. Five main reasons to only use these barriers: 1) logistically it is easier to manage fewer barriers; but, more importantly, 2) these are the barriers where a significant fragmentation impact can be assumed; because 3) for most smaller barriers it is impossible to do position correction and the errors of placing a barrier in a different segment may be greater than non considering it; furthermore 4) several small barriers are outside of river networks when using the Catchment Characterisation and Modelling v2 (CCM2) dataset layers, meaning that at the CCM2 resolution of analysis, they are not fragmenting the network; finally, 5) small barriers are for the most part not complete barriers, at least not permanently, they usually possess some permeability for some species, some life stages and/or sizes, moreover, their permeability may even be asymmetrical depending on the direction of movement, passive or active. Using only dams above 5 m allowed us to: 1) verify all since they tend to be always visible using imagery, which is not the case with barriers with 1 m or half a meter for example; 2) be certain about being an instream barrier (several are not); and 3) data for lower than 5 m is only available in the amber database, which is recognizably not systematic across regions or countries, i.e., a problem for a European-wide analysis.
On P41 the following was not very clear: “Synthesizing the Ecosystem Services Assessment Indicator, we sum all ES using cell statistics”. What are the implications of extensive no-data cell areas? E.g. Norway, in extreme case, but also ca. 15% of Europe in crop pollinator case? What knock-on impacts are there for ES potential assessment? Does taking average per no. of ecosystem services per restoration unit seek to resolve this? If so I would suggest describing this more fully. Fig35 p56 - It is interesting that for e.g. central England, the RPI has relatively modest impact. However, I may be reading it wrongly. The key for Fig35 not the easiest to understand.	“Synthesizing the Ecosystem Services Assessment Indicator, we sum all ES using cell statistics” means that we have an average value considering the existing ES for each R2U (e.g., an R2U having only 2 ES present will have an average based on 2 values, while one with 5 has an average based on 5); and yes, it was the way to resolve the unsystematic lack of data associated to ES datasets. For example, because Norway is not part of the EU, it was fairly normal that data was missing for this country. For England, what we see on that map is the central part of England with an intermediate restoration potential. The map was redone for increased interpretability.
Some proof reading issues remain, e.g. Section 6 Part III Methods seem to be incomplete, and please check the key in Fig. 9. All four corner extremes of the square are marked Spp. with unfavourable status, habitats with favourable status (typographical error?).	All the document was proofread and some text altered or added for increased interpretability.
As noted above, the focus of this deliverable is extremely important, hence the challenge raised here. An excerpt from the GA serves to underline this point, for discussion: “Despite such innovative approaches and a multitude of implemented measures, restoration projects have fallen short in halting biodiversity loss and in recovering the functionality of the freshwater systems. Despite 20 years of WFD implementation, restoration measures in the River Basin Management Plans have not significantly enhanced the share of rivers and lakes in good	We think that the substance of this was clarified above.

status for various reasons: ... Third, restoration programmes frame the “needs of nature” before society or the economy.” During the review meeting, it was noted by the consortium that the partners are very aware of the above issues, and that the methods involve using very very large units. The topic has been discussed extensively between partners and they are very aware that it sends a strong message, particularly if the report and subsequent applications give high profile to the overview figures that integrate the HFI. On this basis, it is suggested that one option might be to present this element as a separate 'offshoot' in the report, rather than including the application of this filter as part of the core routemap leading to the final spatial priorities maps. Thank you again for taking the time to explore and discuss this matter during the meeting.	