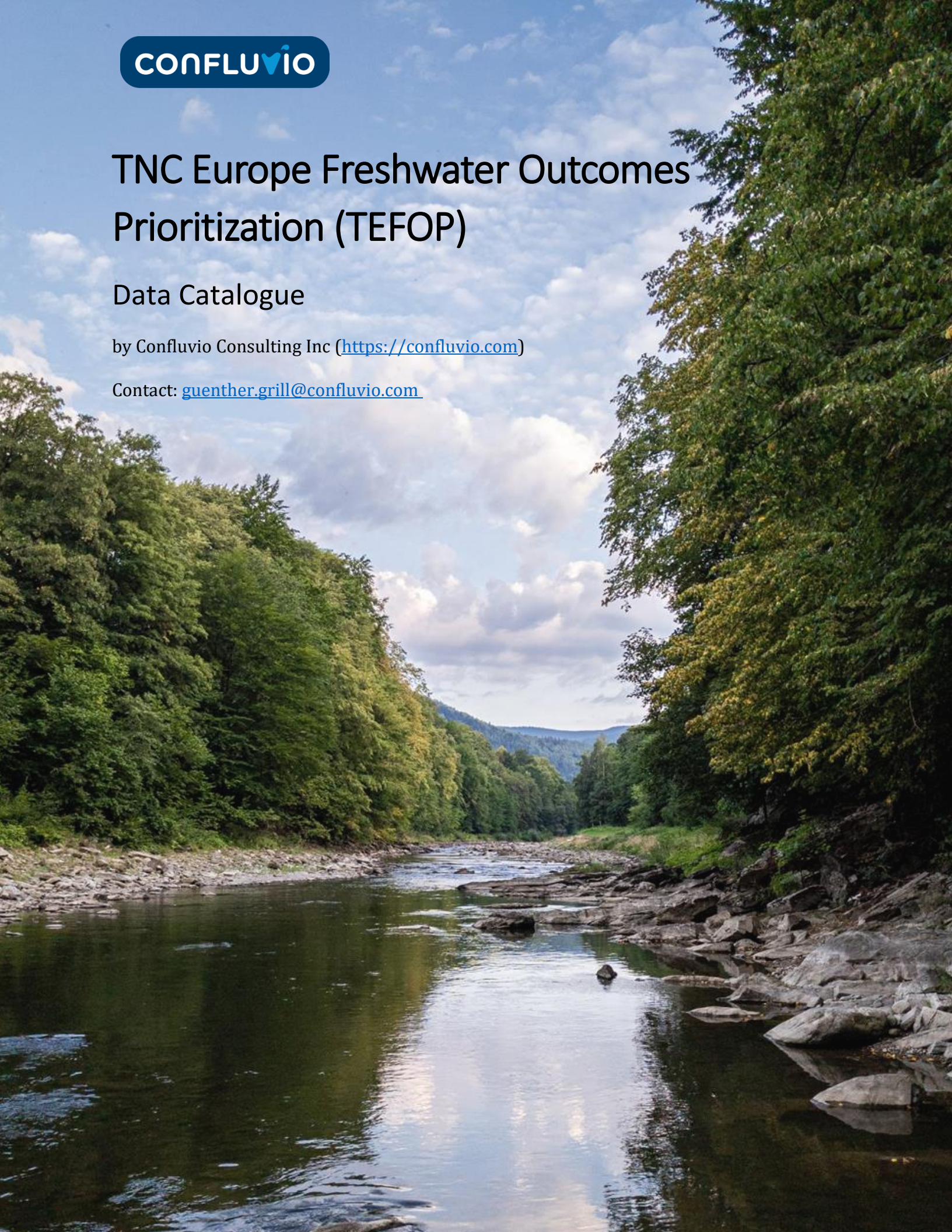


TNC Europe Freshwater Outcomes Prioritization (TEFOP)

Data Catalogue

by Confluvio Consulting Inc (https://confluvio.com)

Contact: guenther.grill@confluvio.com

TNC Prioritization Tool Layer List (Version 1.0)

(click hyperlinked ID to jump to individual information sheet)

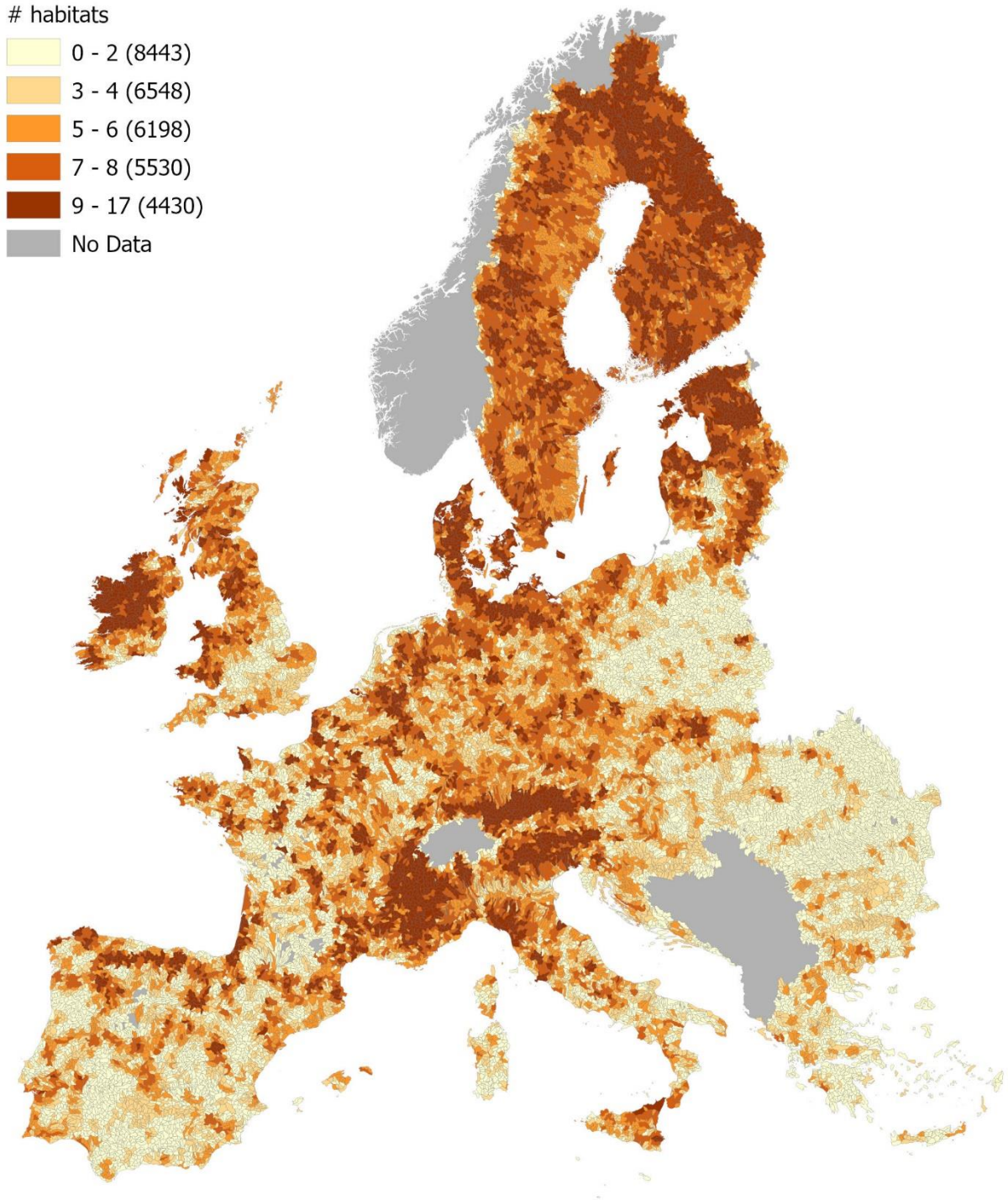
ID	Indicator Group	Layer Name	Sub-group	Field Name
100	Biodiversity	Freshwater Habitat Diversity	Habitat	bi_hb_ab
105	Biodiversity	Freshwater Species Rarity Weighted Richness Index	Rarity Weighted Richness Index	bi_raf_c
106	Biodiversity	Terrestrial Species Rarity Weighted Richness Index	Rarity Weighted Richness Index	bi_rat_c
110	Biodiversity	Freshwater Species Diversity – All	Freshwater Species	bi_an_ab
112	Biodiversity	Terrestrial Species Diversity – All	Terrestrial Species	bi_at_ab
115	Biodiversity	Freshwater Species Diversity – Threatened	Freshwater Species	bi_tn_ab
117	Biodiversity	Terrestrial Species Diversity – Threatened	Terrestrial Species	bi_tt_ab
120	Biodiversity	Freshwater Species Diversity – Endemic	Freshwater Species	bi_en_ab
122	Biodiversity	Terrestrial Species Diversity – Endemic	Terrestrial Species	bi_et_ab
125	Biodiversity	Freshwater Species Diversity - Decreasing Trend	Freshwater Species	bi_dn_ab
127	Biodiversity	Terrestrial Species Diversity - Decreasing Trend	Terrestrial Species	bi_dt_ab
150	Biodiversity	Fish Species Diversity	Fish Species	bi_af_ab
155	Biodiversity	Fish Species Diversity – Threatened	Fish Species	bi_tf_ab
160	Biodiversity	Fish Species Diversity – Endemic	Fish Species	bi_ef_ab
165	Biodiversity	Fish Species Diversity – Decreasing Trend	Fish Species	bi_df_ab
175	Biodiversity	Invasive Alien Species - Freshwater	Habitat	bi_iv_ix
180	Biodiversity	Bird Species Diversity	Bird Species	bi_ab_ab
185	Biodiversity	Threatened Bird Species Diversity	Bird Species	bi_tb_ab
190	Biodiversity	Freshwater Key Biodiversity Areas	Habitat	kb_fw_sp
210	Current State	Natural Discharge	Climate Baseline	d_m3_pyr
215	Current State	Aridity Potential	Climate Baseline	ar_ph_sa
217	Current State	Drought Frequency Probability	Climate Baseline	dr_fp_sa
220	Current State	Water Exploitation Index	Development Pressure	we_av_sa
222	Current State	Groundwater Depletion	Development Pressure	gw_pq_sa
223	Current State	Recharge Zone Habitats	Land Use / Cover	rw_pa_sp
224	Current State	Groundwater with Poor Chemical Status due to Agriculture	Water Quality	gw_pc_sa
225	Current State	Average Probability of Failing Good Ecological Status	Water Quality	ge_pf_sa
230	Current State	Erosion in Croplands	Water Quality	cl_cu_ty
235	Current State	Nitrogen Stream Concentration	Water Quality	n_sch_sa
240	Current State	Phosphorus Stream Concentration	Water Quality	p_sch_sa

245	Current State	Water Temperature in Local Streams	Climate Baseline	tm_sh_sa
247	Current State	100-year Flood Extent	Climate Baseline	fl_rs_sp
250	Current State	Population Density	Development Pressure	rw_pp_dn
252	Current State	Gross Domestic Product	Development Pressure	dp_ud_sa
254	Current State	Irrigated Area Extent	Development Pressure	ir_pc_sp
256	Current State	AMBER Barrier Density	Connectivity	am_br_dn
257	Current State	Current Hydropower	Connectivity	hp_cu_pc
258	Current State	Degree of Flow Alteration	Connectivity	dor_pva
260	Current State	Human Footprint Index	Development Pressure	hf_ix_s9
265	Current State	Artificial Surfaces (% Area)	Land Use / Cover	lc_pr_s1
270	Current State	Agricultural Area (% Area)	Land Use / Cover	lc_pr_s2
275	Current State	Forest and Semi-Natural Areas (% Area)	Land Use / Cover	lc_pr_s3
280	Current State	Wetland (% Area)	Land Use / Cover	lc_pr_s4
285	Current State	Water Bodies (% Area)	Land Use / Cover	lc_pr_s5
290	Current State	Extended Wetland Extent Including Water Areas	Land Use / Cover	wl_se_sp
292	Current State	Riparian Zones - Observable	Land Use / Cover	rw_ro_sp
293	Current State	Riparian Zones - Potential	Land Use / Cover	rw_rp_sp
295	Current State	Protected Areas (Local)	Land Use / Cover	pa_pc_sp
300	Future Threats	Aridity Potential Future	Climate Risks	ar_pf_sa
305	Future Threats	Projected Change in Drought Frequency	Climate Risks	dr_rs_sa
310	Future Threats	Erosion in Cropland (Future Relative Change)	Climate Risks	cl_fu_rn
315	Future Threats	Phosphorus Stream Concentration Future Change	Threats to Water Quality	p_scf_sa
320	Future Threats	Nitrogen Stream Concentration Future Change	Threats to Water Quality	n_scf_sa
325	Future Threats	Local Stream Water Temperature Change	Climate Risks	tm_sf_sa
327	Future Threats	Future Flood Recurrence	Climate Risks	fl_50_sa
330	Future Threats	Development Potential Index	Development Threats	dp_nh_sa
335	Future Threats	Planned Hydropower	Development Threats	hp_pl_pc
bar	Additional Layers	Amber Barrier Types	-	aux_amb_bar
riv	Additional Layers	Ecrins River Network	-	aux_riv_net
wdpa	Additional Layers	WDPA Protected Areas	-	aux_wdp_dat
teco	Additional Layers	Terrestrial Ecoregion Types	-	aux_tec_dat
Cities	Additional Layers	Potential for Nature-based Solutions	-	aux_cities_dat

Spain Case Study Layer List (Version 1.0)

ID	Indicator Group	Layer Name	Sub-group	Field Name
130	Biodiversity	Freshwater Habitat Diversity	Habitat	sp_ch_ab
135	Biodiversity	Freshwater Species Diversity	Freshwater Species	sp_fw_ab
136	Biodiversity	Community Interest Freshwater Species Diversity	Freshwater Species	sp_cf_ab
137	Biodiversity	Community Interest Partial Freshwater Species Diversity	Terrestrial Species	sp_cp_ab
138	Biodiversity	Community Interest Non-Freshwater Species Diversity	Terrestrial Species	sp_cn_ab
140	Biodiversity	Endemic Species Diversity	Freshwater Species	sp_ed_ab
145	Biodiversity	Critically Endangered Species Diversity	IUCN Red List Species	sp_cr_ab
146	Biodiversity	Endangered Species Diversity	IUCN Red List Species	sp_en_ab
147	Biodiversity	Near Threatened Species Diversity	IUCN Red List Species	sp_nt_ab
148	Biodiversity	Vulnerable Species Diversity	IUCN Red List Species	sp_vu_ab
176	Biodiversity	Invasive Freshwater Species	Freshwater Species	sp_iv_ab
221	Current State	Water Exploitation	Development Pressure	sp_ex_mx
226	Current State	Alluvial Aquifer and Wetland Extent	Land Use / Cover	sp_aw_sp
227	Current State	Average Ecological Status	Water Quality	sp_ec_av

Freshwater Habitat Diversity



Indicator group	**Biodiversity**	**Metric ID** 100	Back to Layer List

Layer name Freshwater Habitat Diversity

Sub-group	Habitat	**Field name**	bi_hb_ab

Description

The data for this layer is sourced from the Article 17 - Habitats Directive Database. Article 17 - Habitats Directive ensures the protection and conservation of 200 rare and characteristic habitat types. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10-kilometer resolution. The freshwater habitats considered in this data layer were those belonging to either the "freshwater habitats" or "bogs, mires, and fens" habitat groups in the database.

Processing Steps

The habitat distributions in the Article 17 - Habitats Directive Database were downloaded from the data sources specified below. The habitat distributions belonging to either the "freshwater habitats" or "bogs, mires, and fens" habitat groups were selected and exported from the database. These individual habitat distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the freshwater habitat diversity count within the HydroBASIN was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification

Data Uncertainties

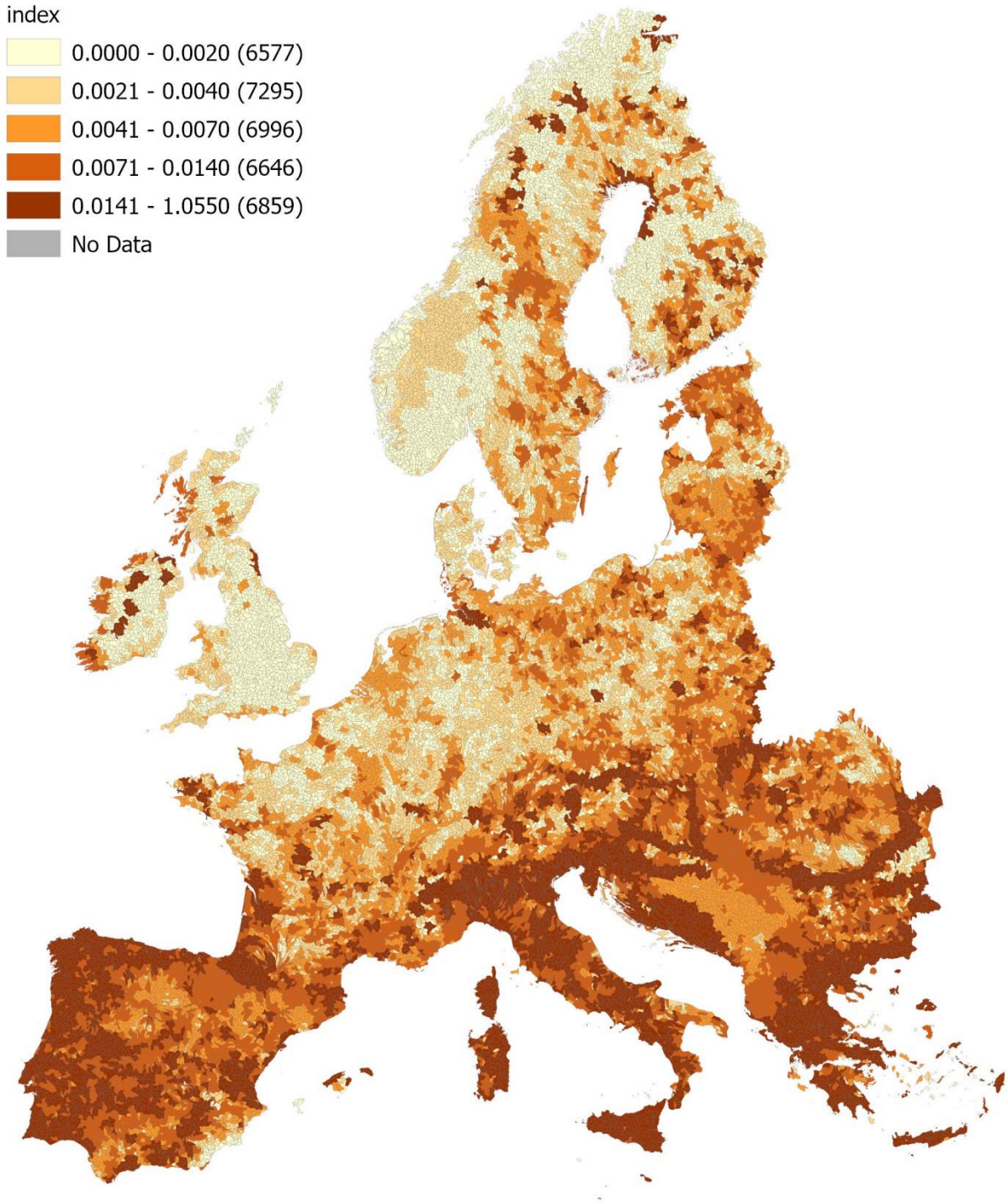
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources

Article 17 - Habitats Directive Database

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Freshwater Species Rarity Weighted Index



Indicator group	**Biodiversity**	**Metric ID** 105	Back to Layer List

Layer name Freshwater Species Rarity Weighted Richness Index

Sub-group	Rarity Weighted Richness Index	**Field name**	bi_raf_c

Description

This layer provides the rarity weighted richness index (RWRI) for freshwater species data primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. This included a total of 369 species, belonging to 8 taxonomic groups (amphibians: 50, arthropods: 23, fish: 155, mammals: 21, molluscs: 12, reptiles: 13, vascular plants: 84, and non-vascular plants: 11). Species with smaller ranges are favored in the index while species that inhabit a broad geographic range are disfavored. RWRI favors species with small ranges to identify areas that contribute a relatively high proportion of their range. Catchments with high scoring index values indicate an area that has a large number of species and/or that the catchment contains, on average, species with small ranges.

Processing Steps

Freshwater species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. The distributions for freshwater species were exported from the database. Each species received a weighted value based on the inverse number of intersected catchments. For each catchment, the weighted value for each species in a catchment was summed to provide the RWRI value. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of Article 17 species was selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing was conducted by taking the max value from either data source.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest thousandths decimal place.

Data Uncertainties

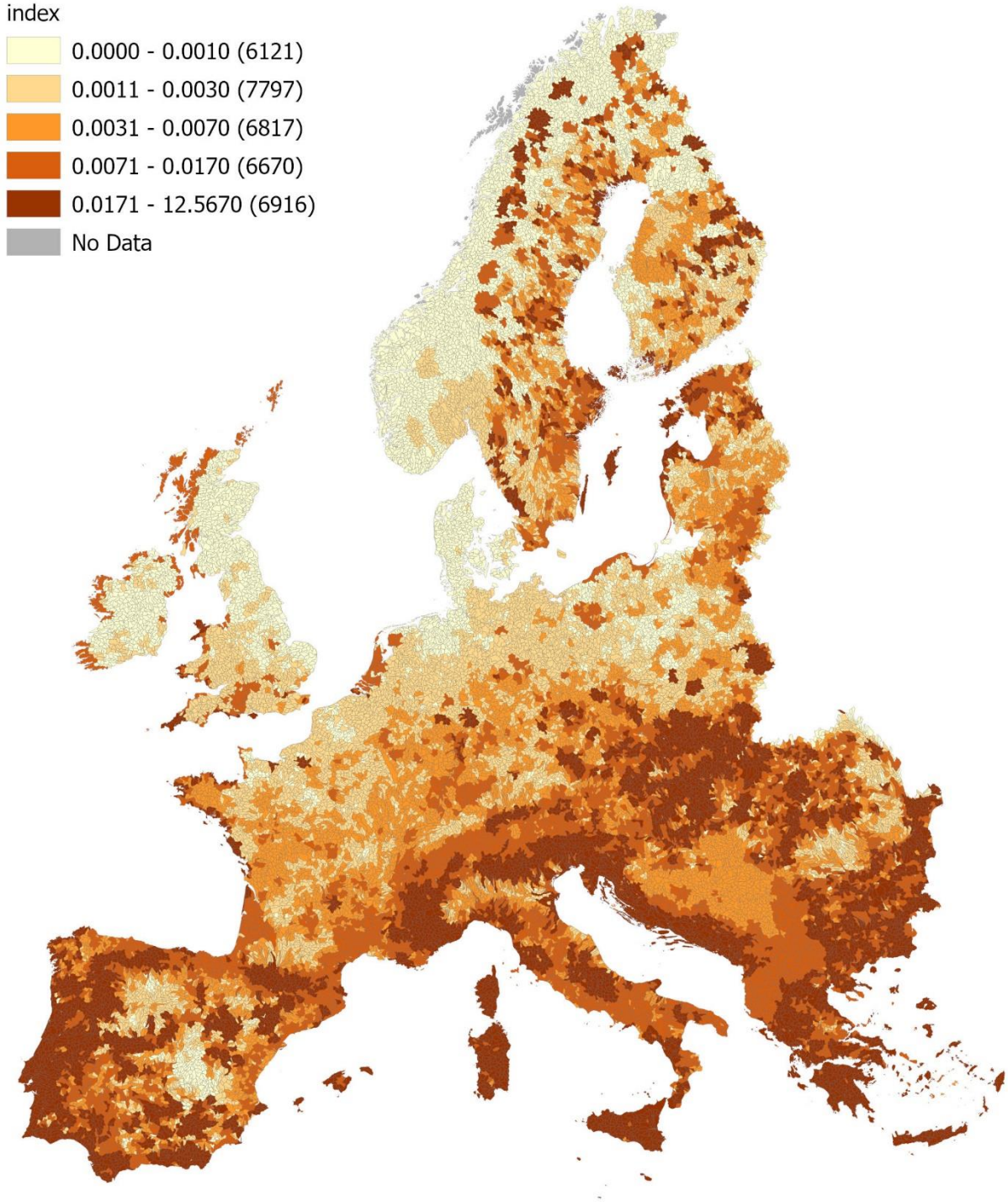
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
Integrated Biodiversity Assessment Tool (IBAT)
Abell et al. (2010)

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Terrestrial Species Rarity Weighted Index



Indicator group	**Biodiversity**	Metric ID 106	Back to Layer List

Layer name Terrestrial Species Rarity Weighted Richness Index

Sub-group Rarity Weighted Richness Index **Field name** bi_rat_c

Description

This layer provides the rarity weighted richness index (RWRI) for terrestrial species data primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. This included a total of 818 species, belonging to 7 taxonomic groups (amphibians: 16, arthropods: 100, mammals: 78, molluscs: 14, reptiles: 82, and vascular plants: 502, non-vascular plants: 26). Species with smaller ranges are favored in the index while species that inhabit a broad geographic range are disfavored. RWRI favors species with small ranges to identify areas that contribute a relatively high proportion of their range. Catchments with high scoring index values indicate an area that has a large number of species and/or that the catchment contains, on average, species with small ranges.

Processing Steps

Terrestrial species in the Article 17 - Habitats Directive Database were determined by removing species identified by the MERLIN project as freshwater species and querying the GBIF database for terrestrial species using the remaining Article 17 species. Species with a GBIF habitat tag of only terrestrial were retained (n = 223). Due to challenges in the availability of habitat associations for all species, additional species with no habitat tag were assumed to be terrestrial (n = 595). These species with no habitat tag may contain some unlabeled marine or freshwater species. However, the presence of non-terrestrial species within this group of species is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments. The distributions for these species were exported from the Article 17 database. Each species received a weighted value based on the inverse number of intersected catchments. For each catchment, the weighted value for each species in a catchment was summed to provide the RWRI value. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of Article 17 species was selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing was conducted by taking the max value from either data source.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest thousandths decimal place.

Data Uncertainties

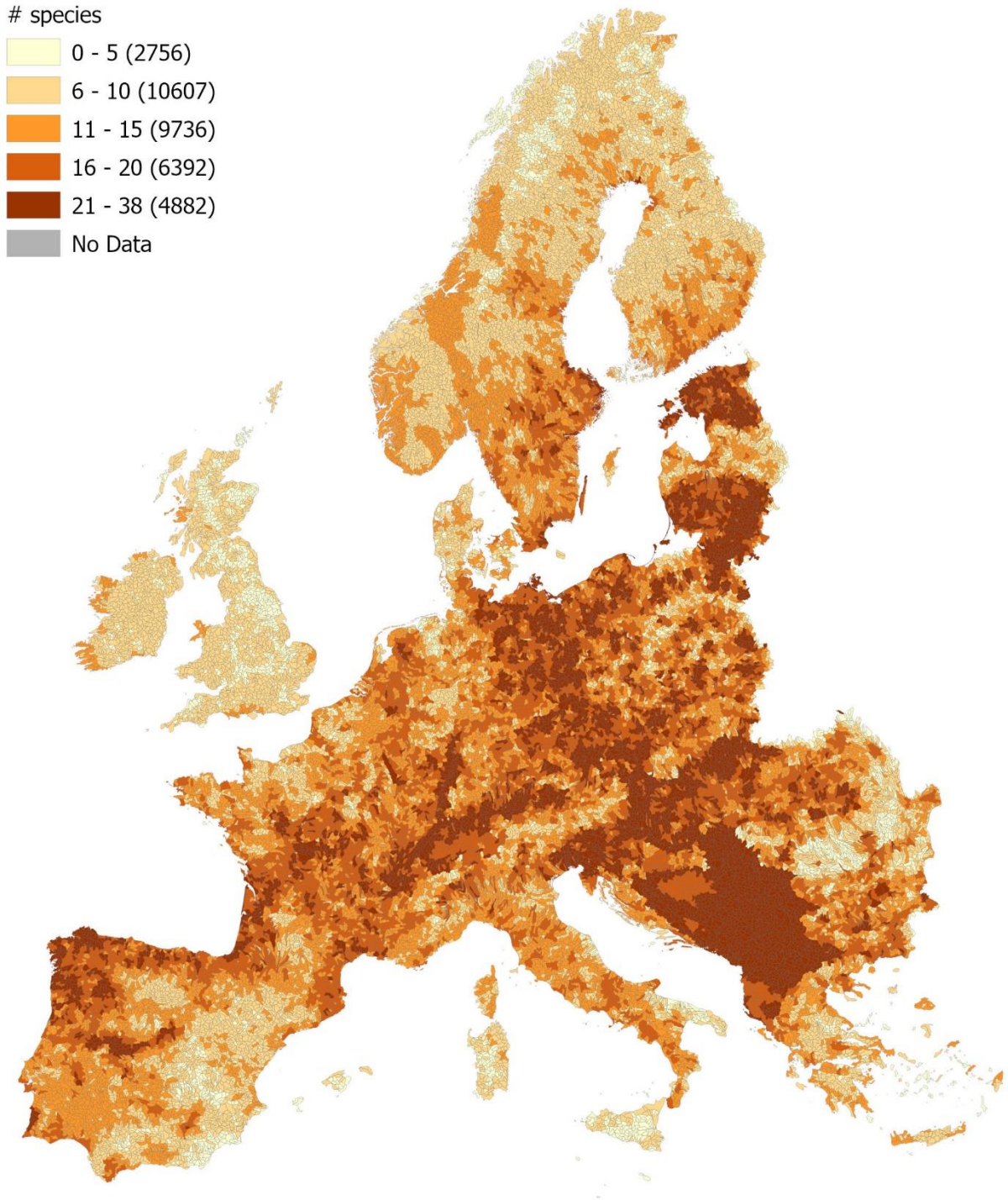
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.
- Due to the method for selecting terrestrial species described above, there may be some non-terrestrial species considered in this layer. However, the presence of non-terrestrial species within this layer is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments.

Data Sources

Article 17 - Habitats Directive Database
Integrated Biodiversity Assessment Tool (IBAT)
Abell et al. (2010)
GBIF

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Freshwater Species Diversity - All



Indicator group	**Biodiversity**	**Metric ID** 110	Back to Layer List

Layer name Freshwater Species Diversity - All

Sub-group Freshwater Species **Field name** bi_an_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater species (excluding fish) covered under the habitats directive that were determined to be linked to freshwater habitats based on expert opinion. This selection included a total of 214 species, belonging to 7 taxonomic groups (amphibians: 50, arthropods: 23, mammals: 21, molluscs: 12, reptiles: 13, vascular plants: 84, and non-vascular plants: 11).

Processing Steps

The species distributions in the Article 17 - Habitats Directive Database were downloaded from the data source specified below. Freshwater species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. The distributions for species related to freshwater were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the freshwater species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding down to the nearest fifth.

Data Uncertainties

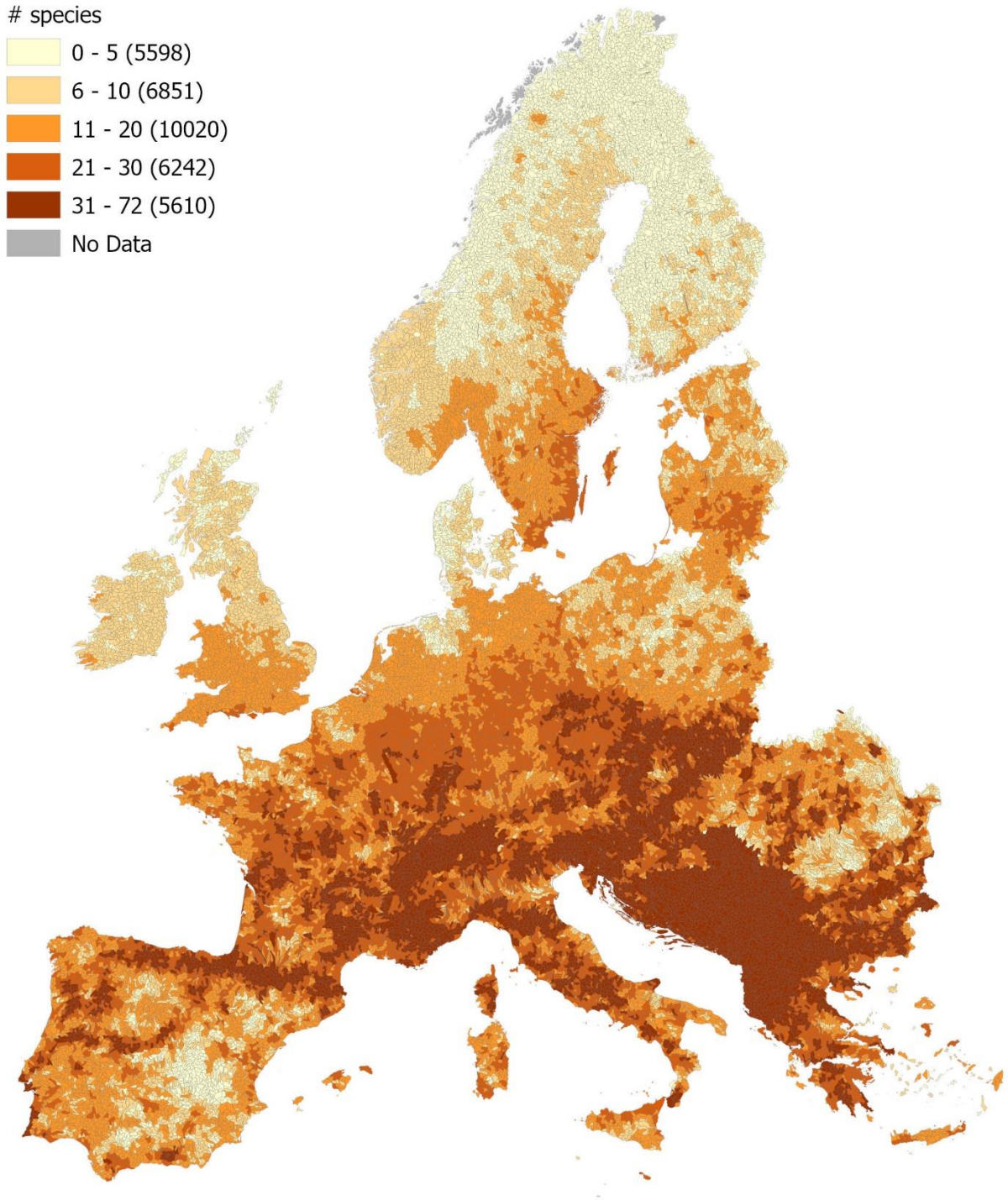
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Terrestrial Species Diversity - All



Indicator group	**Biodiversity**	**Metric ID** 112	Back to Layer List

Layer name Terrestrial Species Diversity - All

Sub-group Terrestrial Species **Field name** bi_at_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers terrestrial species covered under the habitats directive that were determined to be terrestrial species based on the GBIF database. This included a total of 818 species, belonging to 7 taxonomic groups (amphibians: 16, arthropods: 100, mammals: 78, molluscs: 14, reptiles: 82, and vascular plants: 502, non-vascular plants: 26).

Processing Steps

Terrestrial species in the Article 17 - Habitats Directive Database were determined by removing species identified by the MERLIN project as freshwater species and querying the GBIF database for terrestrial species using the remaining Article 17 species. Species with a GBIF habitat tag of only terrestrial were retained (n = 223). Due to challenges in the availability of habitat associations for all species, additional species with no habitat tag were assumed to be terrestrial (n = 595). These species with no habitat tag may contain some unlabeled marine or freshwater species. However, the presence of non-terrestrial species within this group of species is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments. The distributions for terrestrial species were selected and exported from the Article 17 database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the terrestrial species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest fifth.

Data Uncertainties

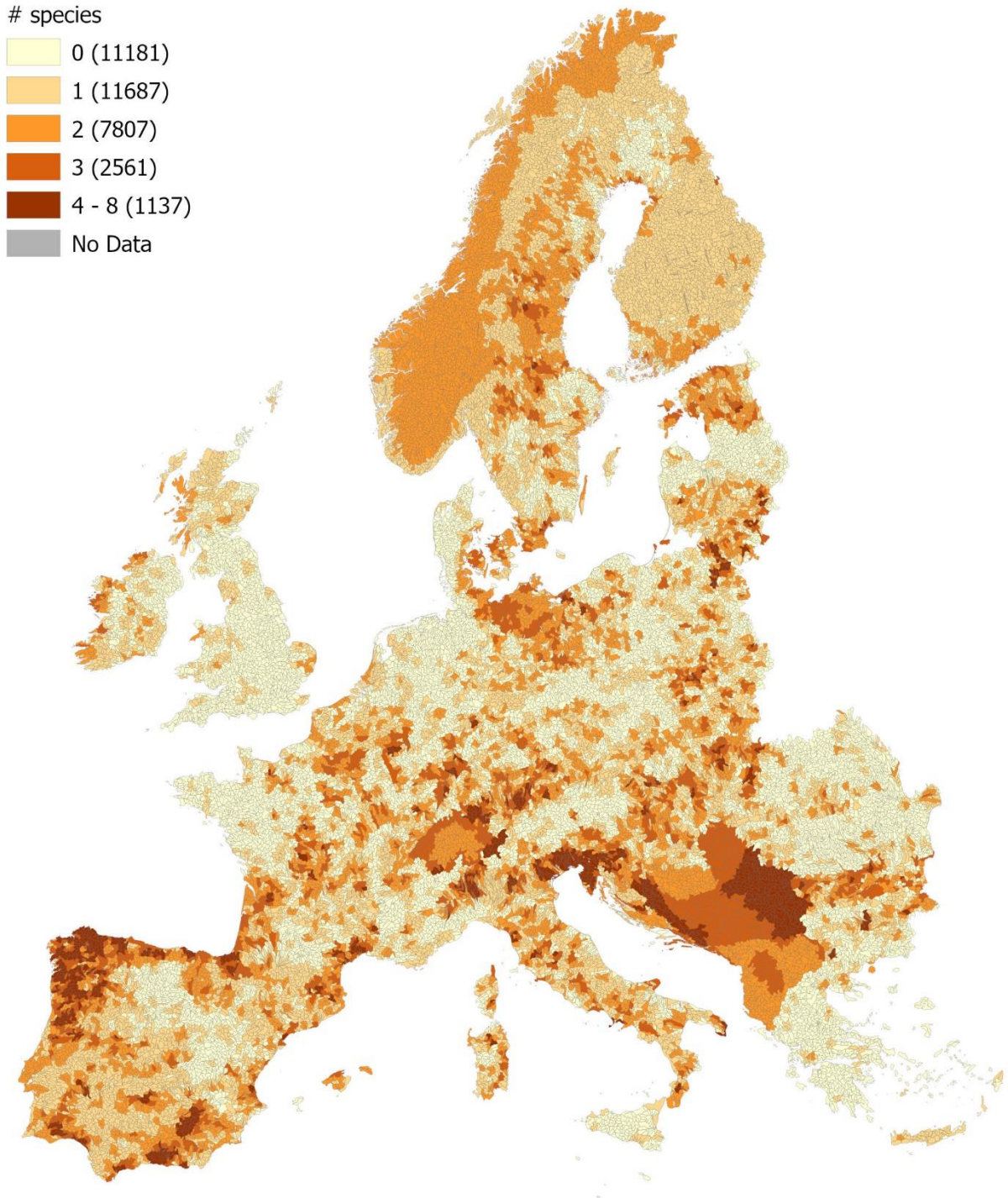
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.
- Due to the method for selecting terrestrial species described above, there may be some non-terrestrial species considered in this layer. However, the presence of non-terrestrial species within this layer is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments.

Data Sources

Article 17 - Habitats Directive Database
Integrated Biodiversity Assessment Tool (IBAT)
GBIF

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Freshwater Species Diversity - Threatened



Indicator group **Biodiversity** **Metric ID** 115 Back to Layer List

Layer name Freshwater Species Diversity - Threatened

Sub-group Freshwater Species **Field name** bi_tn_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater species (excluding fish) covered under the habitats directive that were determined to be linked to freshwater habitats based on expert opinion, and have an IUCN Red List status of either critically endangered (CR), endangered (EN), or vulnerable (VU). This selection included a total of 66 species, belonging to 7 taxonomic groups (amphibians: 11, arthropods: 6, mammals: 4, molluscs: 8, reptiles: 4, vascular plants: 31, and non-vascular plants: 2).

Processing Steps

Freshwater species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. Threatened status of the freshwater species was determined from the IUCN European Red List. The distributions for threatened species were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of threatened Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

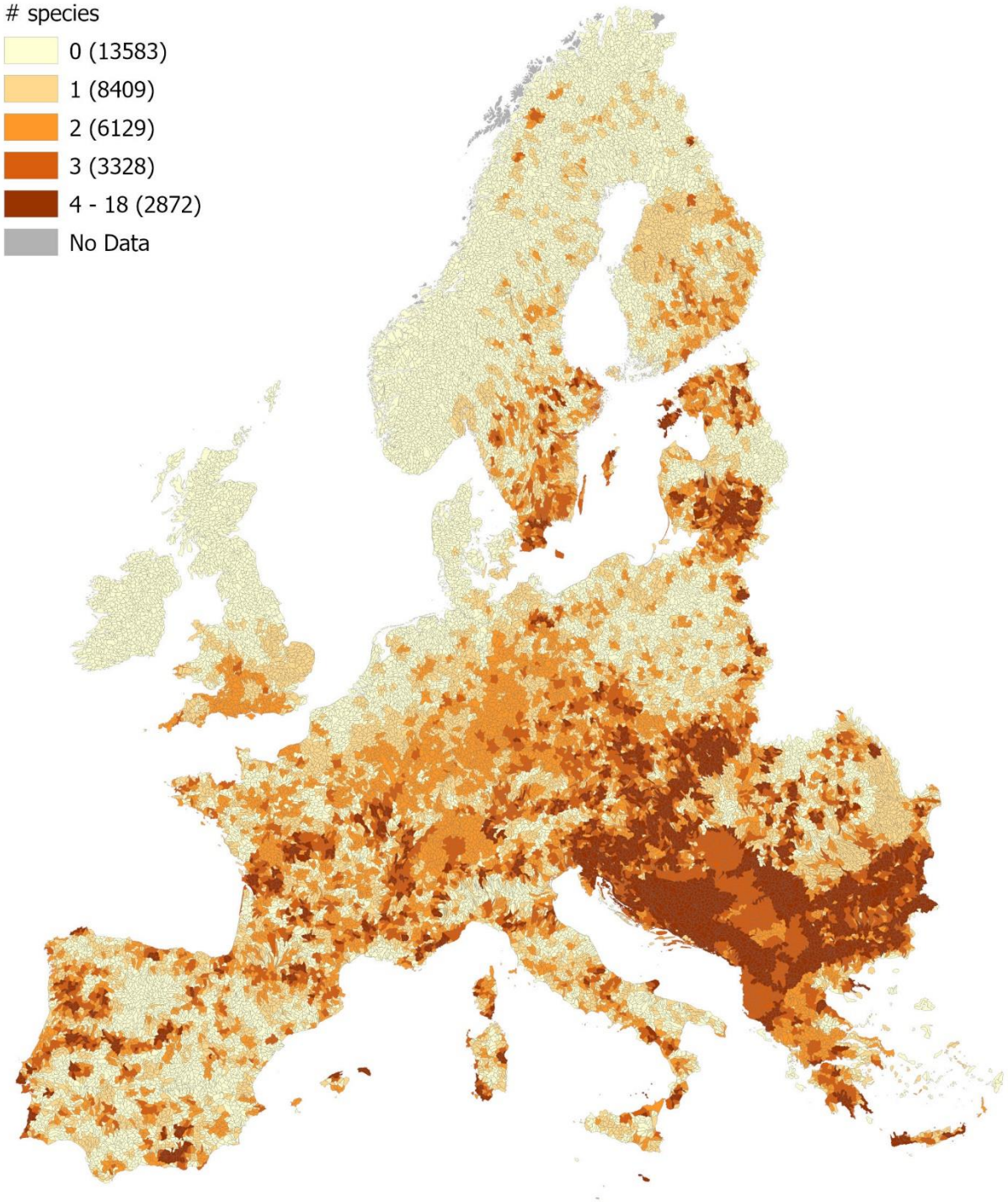
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Terrestrial Species Diversity - Threatened



Indicator group	**Biodiversity**	**Metric ID**	Back to Layer List

Layer name Terrestrial Species Diversity - Threatened

Sub-group	Terrestrial Species	**Field name**	bi_tt_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers terrestrial species covered under the habitats directive that were determined to be terrestrial species based on the GBIF database, and have an IUCN Red List status of either critically endangered (CR), endangered (EN), or vulnerable (VU). This selection included a total of 308 species, belonging to 7 taxonomic groups (amphibians: 7, arthropods: 21, mammals: 16, molluscs: 7, reptiles: 16, and vascular plants: 233, non-vascular plants: 8).

Processing Steps

Terrestrial species in the Article 17 - Habitats Directive Database were determined by removing species identified by the MERLIN project as freshwater species and querying the GBIF database for terrestrial species using the remaining Article 17 species. Species with a GBIF habitat tag of only terrestrial were retained (n = 223). Due to challenges in the availability of habitat associations for all species, additional species with no habitat tag were assumed to be terrestrial (n = 595). These species with no habitat tag may contain some unlabeled marine or freshwater species. However, the presence of non-terrestrial species within this group of species is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments. Threatened status of the terrestrial species was determined from the IUCN European Red List. The distributions for threatened species were selected and exported from the Article 17 database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of threatened Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

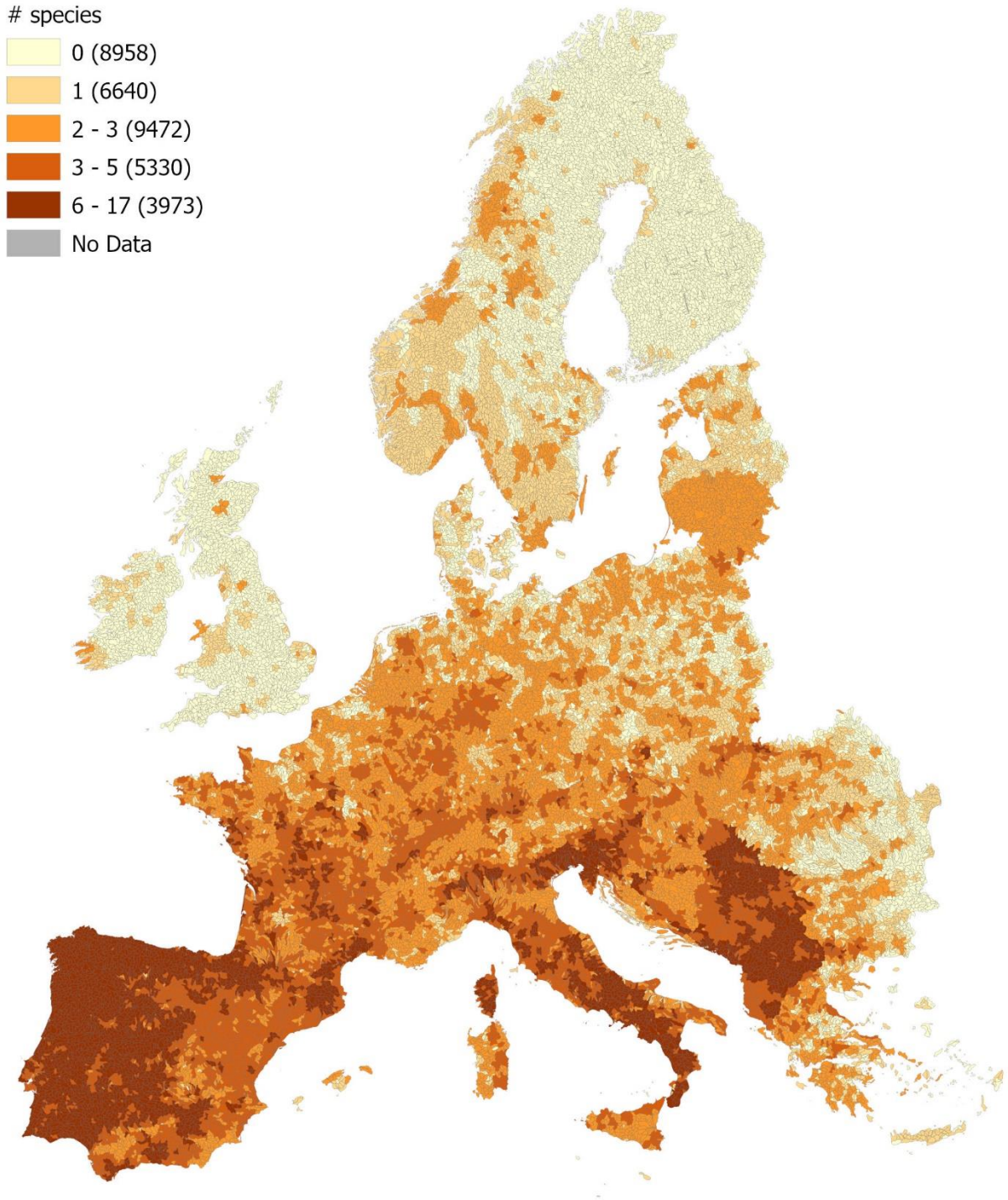
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.
- Due to the method for selecting terrestrial species described above, there may be some non-terrestrial species considered in this layer. However, the presence of non-terrestrial species within this layer is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)
GBIF

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Freshwater Species Diversity - Endemic



Indicator group	**Biodiversity**	**Metric ID** 120	Back to Layer List

Layer name Freshwater Species Diversity - Endemic

Sub-group Freshwater Species **Field name** bi_en_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater species (excluding fish) covered under the habitats directive that are linked to freshwater habitats, based on expert opinion, and indicated as endemic at the pan-European level. The pan-European level is defined as including all European countries, European parts of Turkey and the European part of Russia up to the Ural. Additionally, this includes the entire Black sea basin, the northern Caspian sea basin and hence the northern Caucasus in general. This selection criteria included a total of 109 species, belonging to 7 taxonomic groups (amphibians: 36, arthropods: 5, mammals: 2, molluscs: 7, reptiles: 7, vascular plants: 49, and non-vascular plants: 3).

Processing Steps

Freshwater species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. Endemic status of the freshwater species was determined from the IUCN European Red List. The distributions for endemic species related to freshwater were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the freshwater species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of endemic Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

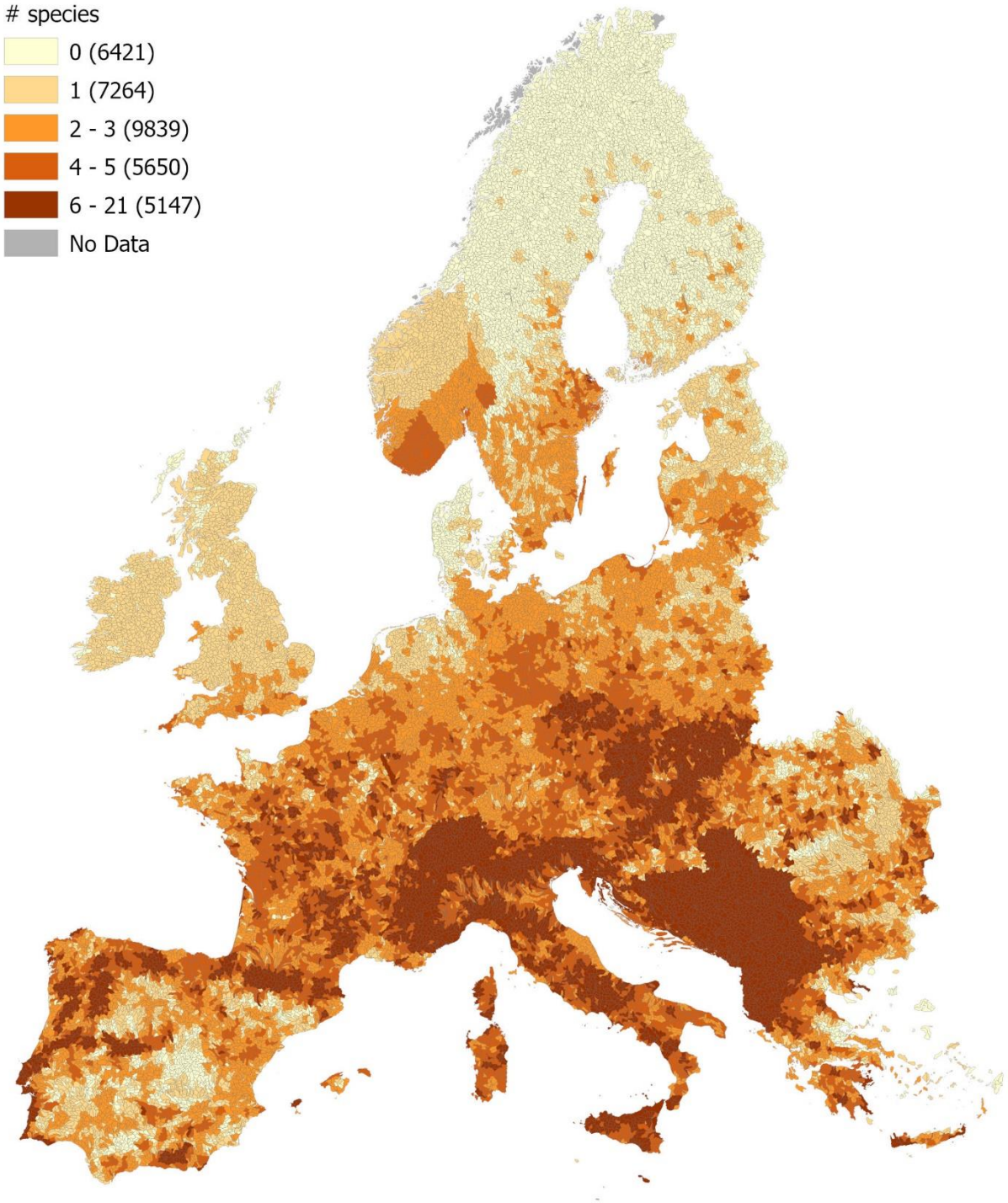
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Terrestrial Species Diversity - Endemic



Indicator group	**Biodiversity**	**Metric ID** 122	Back to Layer List

Layer name: Terrestrial Species Diversity - Endemic

Sub-group Terrestrial Species **Field name** bi_et_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers terrestrial species covered under the habitats directive that are terrestrial species based on the GBIF database, and indicated as endemic at the pan-European level. The pan-European level is defined as including all European countries, European parts of Turkey and the European part of Russia up to the Ural. Additionally, this includes the entire Black sea basin, the northern Caspian sea basin and hence the northern Caucasus in general. This selection criteria included a total of 436 species, belonging to 6 taxonomic groups (amphibians: 8, arthropods: 20, mammals: 16, molluscs: 7, reptiles: 44, and vascular plants: 341).

Processing Steps

Terrestrial species in the Article 17 - Habitats Directive Database were determined by removing species identified by the MERLIN project as freshwater species and querying the GBIF database for terrestrial species using the remaining Article 17 species. Species with a GBIF habitat tag of only terrestrial were retained (n = 223). Due to challenges in the availability of habitat associations for all species, additional species with no habitat tag were assumed to be terrestrial (n = 595). These species with no habitat tag may contain some unlabeled marine or freshwater species. However, the presence of non-terrestrial species within this group of species is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments. Endemic status of the terrestrial species was determined from the IUCN European Red List. The distributions for endemic species were selected and exported from the Article 17 database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the terrestrial species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of endemic Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

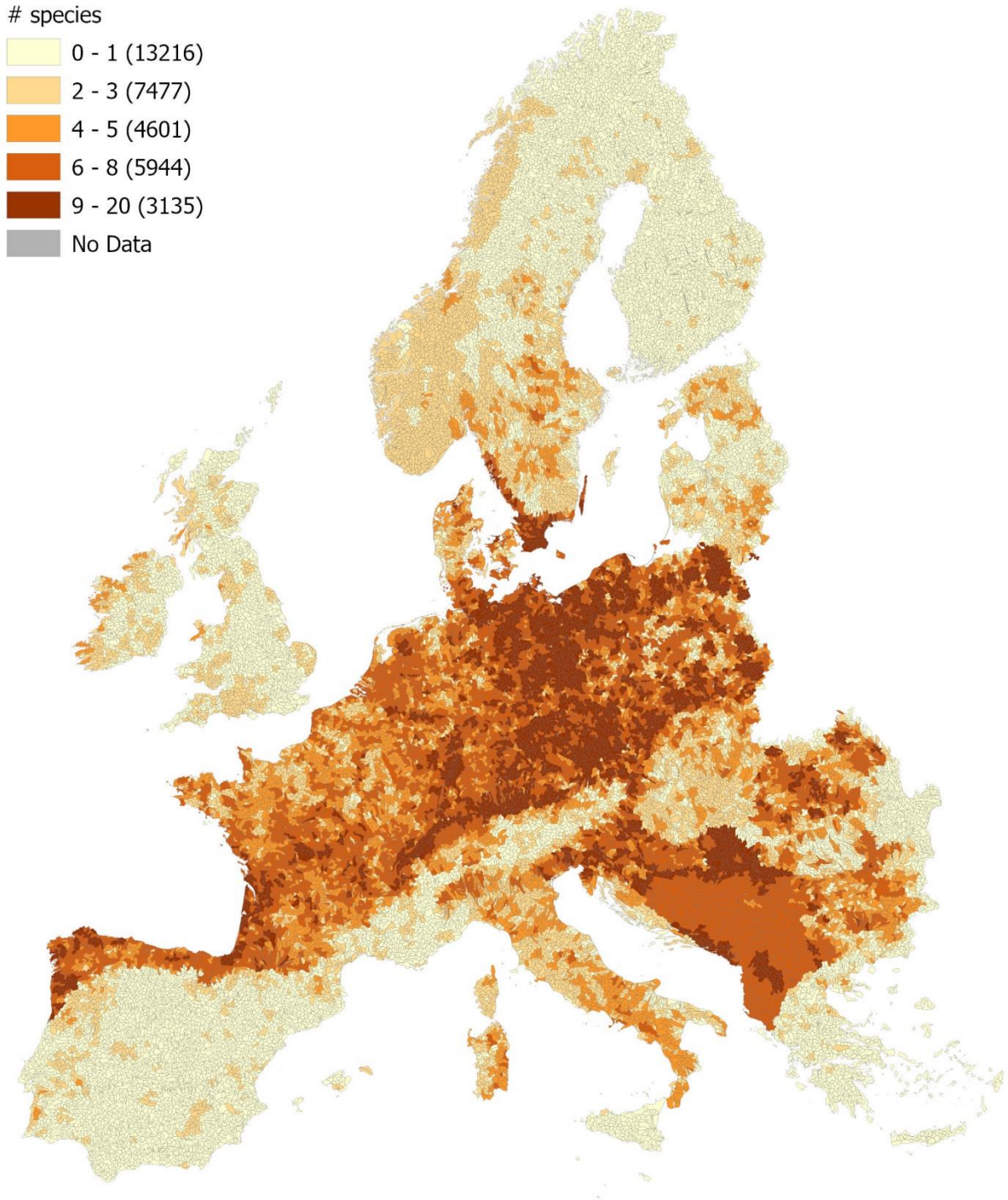
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.
- Due to the method for selecting terrestrial species described above, there may be some non-terrestrial species considered in this layer. However, the presence of non-terrestrial species within this layer is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)
GBIF

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Freshwater Species Diversity - Decreasing Trend



Indicator group	**Biodiversity**	Metric ID 125	Back to Layer List

Layer name Freshwater Species Diversity - Decreasing Trend

Sub-group Freshwater Species **Field name** bi_dn_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater species (excluding fish) covered under the habitats directive that are linked to freshwater habitats, based on expert opinion, and have a decreasing population trend in the Habitats Directive Database (in data gap areas population trends status is sourced from the IUCN Red List Spatial Data). This selection included a total of 94 species, belonging to 7 taxonomic groups (amphibians: 26, arthropods: 14, mammals: 8, molluscs: 7, reptiles: 2, vascular plants: 33, and non-vascular plants: 4).

Processing Steps

The species distributions in the Article 17 - Habitats Directive Database were downloaded from the data source specified below. Freshwater species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. The distributions for species related to freshwater with a decreasing population trend were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the freshwater species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, species were selected in the IUCN Red List Spatial Data that had a decreasing trend status from the EU Red List Species and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

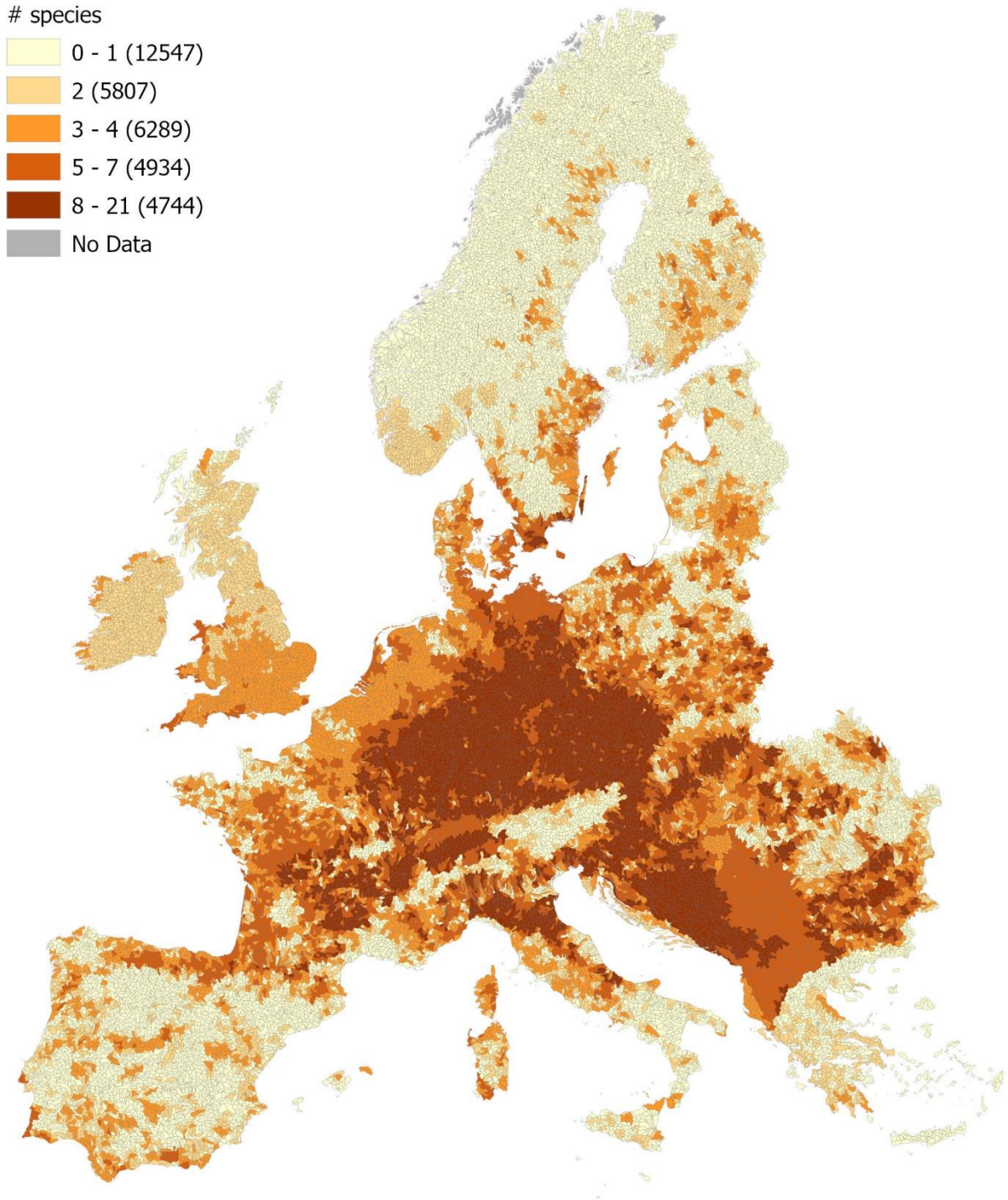
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Terrestrial Species Diversity - Decreasing Trend



Indicator group **Biodiversity** **Metric ID** 127 Back to Layer List

Layer name Terrestrial Species Diversity - Decreasing Trend

Sub-group Terrestrial Species **Field name** bi_dt_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers terrestrial species covered under the habitats directive that are terrestrial species based on the GBIF database, and have a decreasing population trend in the Habitats Directive Database (in data gap areas population trends status is sourced from the IUCN Red List). This selection included a total of 182 species, belonging to 6 taxonomic groups (amphibians: 5, arthropods: 26, mammals: 25, reptiles: 15, vascular plants: 101, non-vascular plants: 10).

Processing Steps

Terrestrial species in the Article 17 - Habitats Directive Database were determined by removing species identified by the MERLIN project as freshwater species and querying the GBIF database for terrestrial species using the remaining Article 17 species. Species with a GBIF habitat tag of only terrestrial were retained (n = 223). Due to challenges in the availability of habitat associations for all species, additional species with no habitat tag were assumed to be terrestrial (n = 595). These species with no habitat tag may contain some unlabeled marine or freshwater species. However, the presence of non-terrestrial species within this group of species is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments. The distributions for terrestrial species with a decreasing population trend were selected and exported from the Article 17 database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the terrestrial species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, species were selected in the IUCN Red List Spatial Data that had a decreasing trend status from the EU Red List Species and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

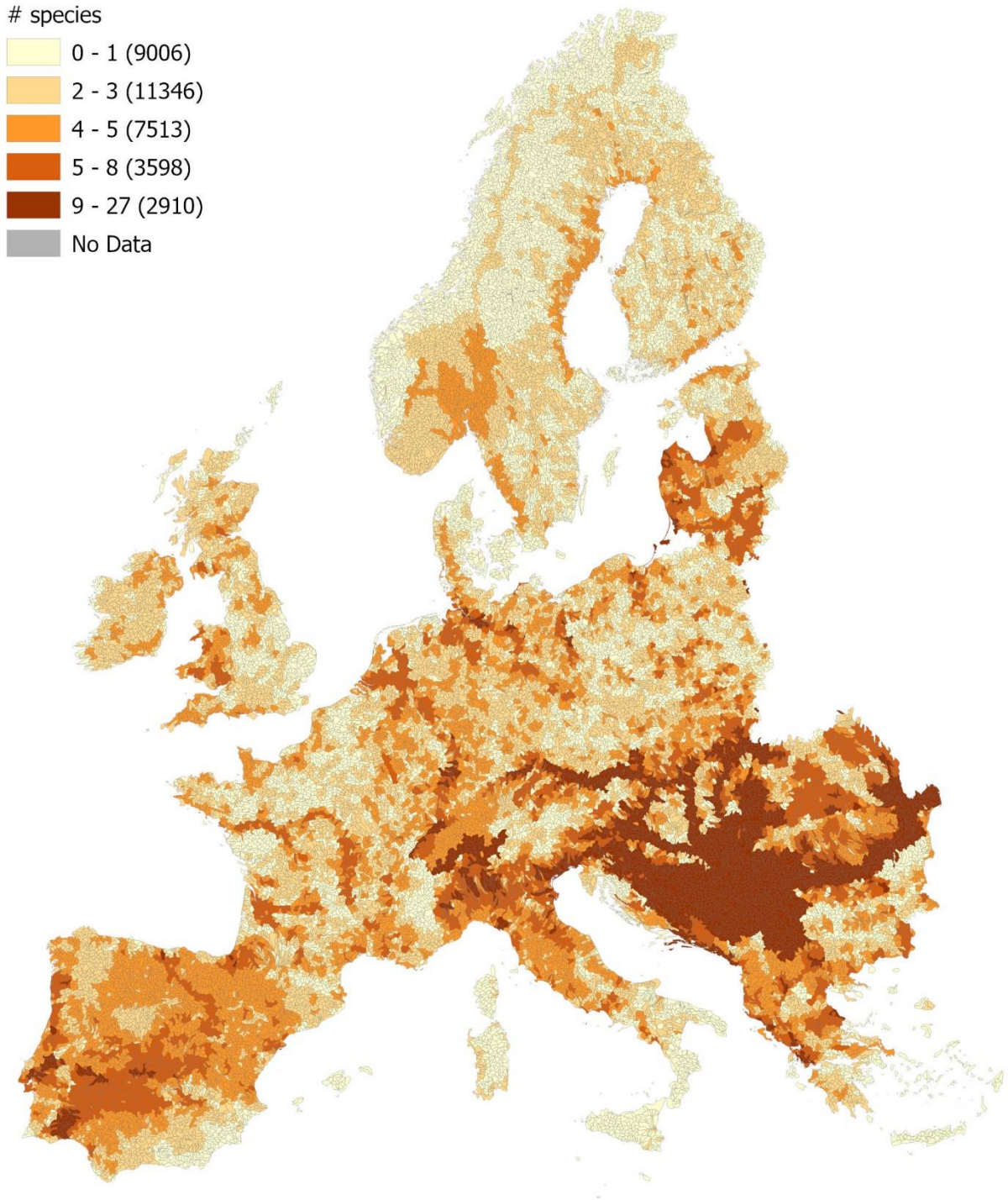
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
-Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.
-Due to the method for selecting terrestrial species described above, there may be some non-terrestrial species considered in this layer. However, the presence of non-terrestrial species within this layer is likely small due to the systematic removal of species identified as freshwater in two separate databases, the removal of marine species identified in the GBIF database, and the limited spatial overlap between marine species and the study area catchments.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)
GBIF

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Fish Species Diversity - All



Indicator group	**Biodiversity**	**Metric ID** 150	Back to Layer List
Layer name	Fish Species Diversity - All		
Sub-group	Fish Species	**Field name**	bi_af_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater fish species covered under the habitats directive that were determined to be linked to freshwater habitats based on expert opinion. This selection included a total of 155 fish species

Processing Steps

Freshwater fish species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. The distributions for freshwater fish species were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the fish species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

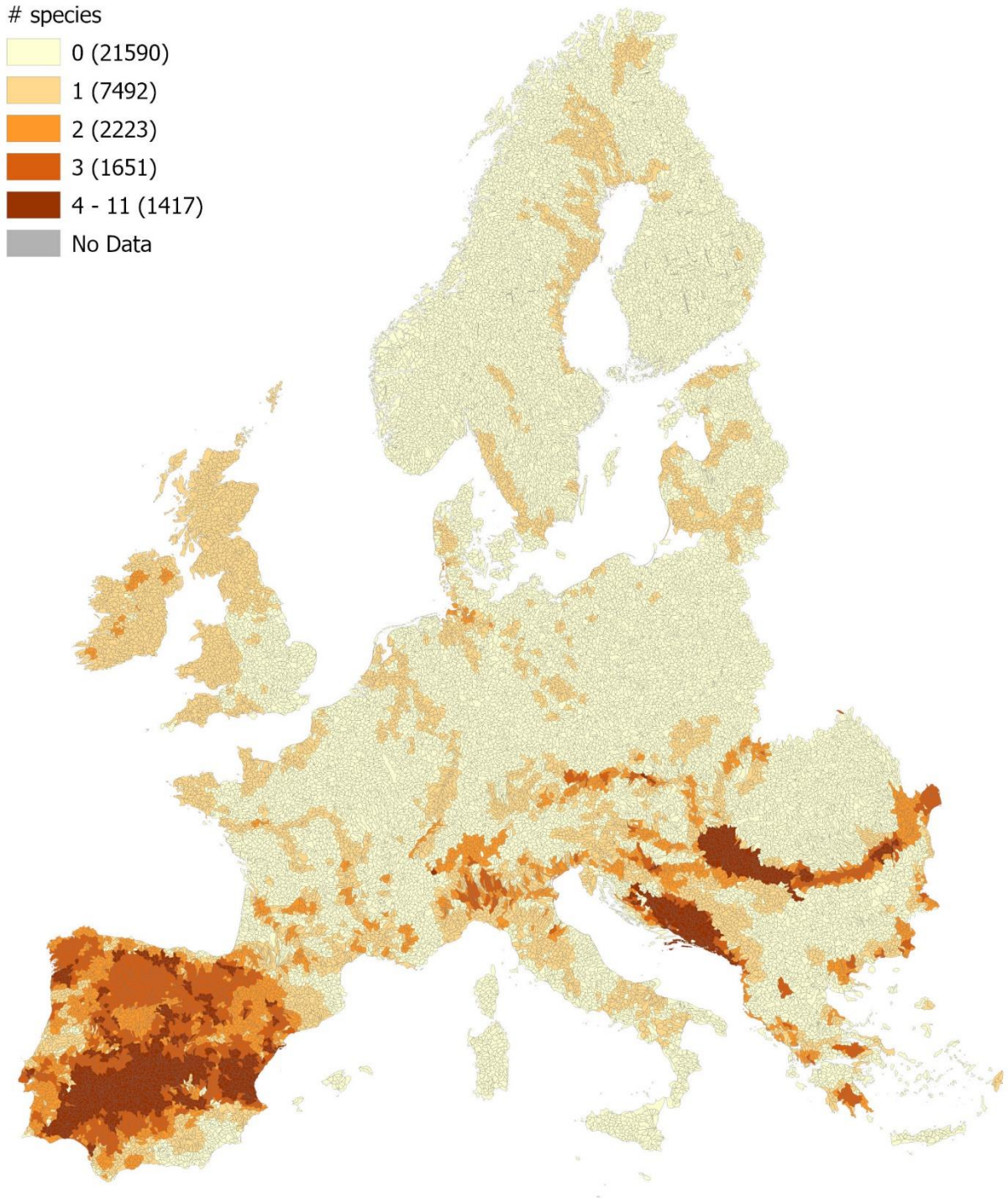
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Fish Species Diversity - Threatened



Indicator group	**Biodiversity**	**Metric ID** 155	Back to Layer List

Layer name Fish Species Diversity - Threatened

Sub-group Fish Species **Field name** bi_tf_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater fish species covered under the habitats directive that were determined to be linked to freshwater habitats based on expert opinion, and have an IUCN Red List status of either critically endangered (CR), endangered (EN), or vulnerable (VU). This selection included a total of 85 fish species.

Processing Steps

Freshwater fish species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. Threatened status of the freshwater fish species was determined from the IUCN European Red List. The distributions for threatened fish species related to freshwater were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the freshwater fish species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of threatened Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

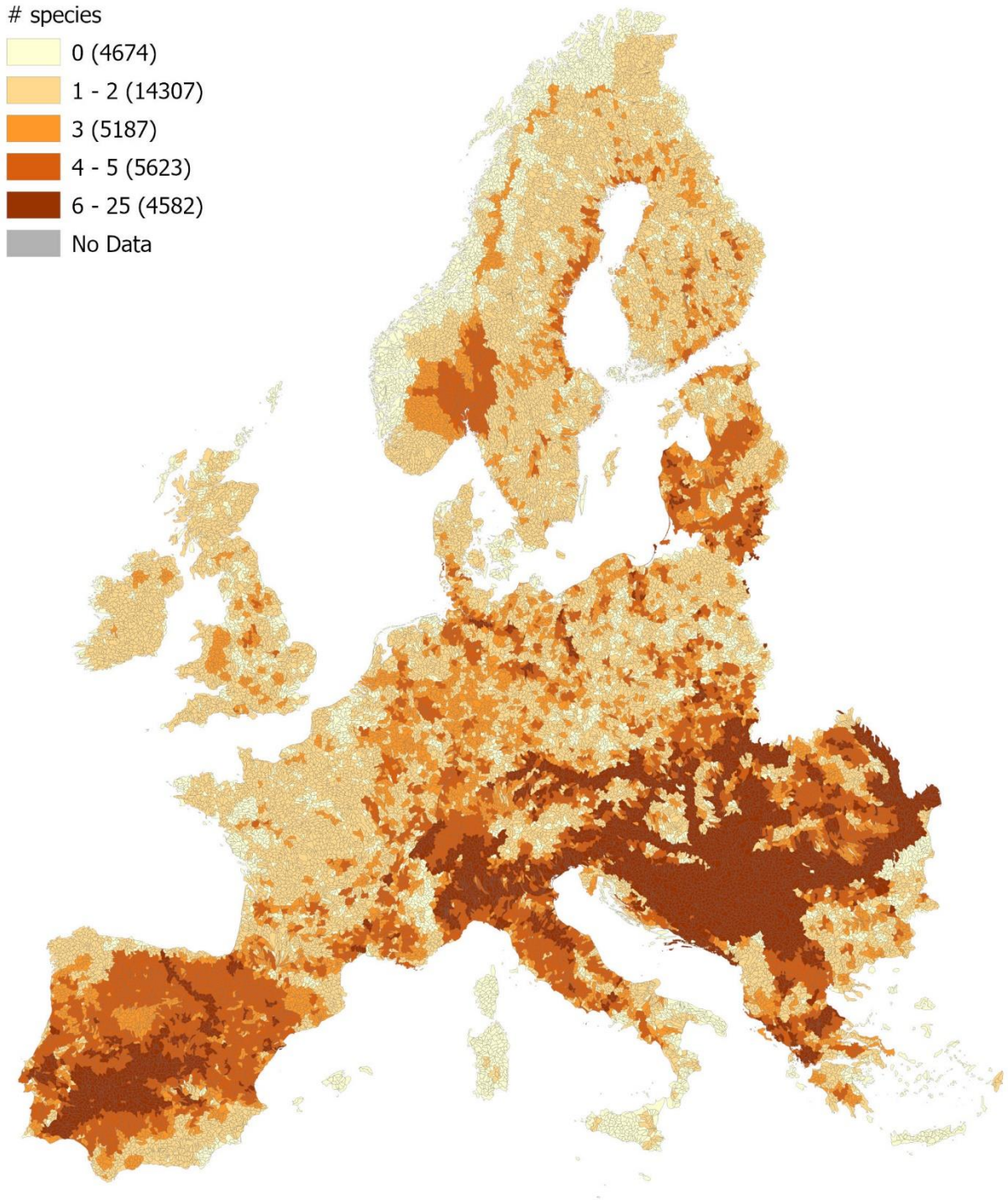
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Fish Species Diversity - Endemic



Indicator group	**Biodiversity**	**Metric ID** 160	Back to Layer List

Layer name Fish Species Diversity - Endemic

Sub-group	Fish Species	**Field name**	bi_ef_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater fish species covered under the habitats directive that are linked to freshwater habitats, based on expert opinion, and indicated as endemic at the pan-European level. The pan-European level is defined as including all European countries, European parts of Turkey and the European part of Russia up to the Ural. Additionally, this includes the entire Black sea basin, the northern Caspian sea basin and hence the northern Caucasus in general. This selection criteria included a total of 140 fish species.

Processing Steps

Freshwater fish species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. Endemic status of the fish species was determined from the IUCN European Red List. The distributions for endemic species were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the fish species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, the list of endemic Article 17 species were selected in the IUCN Red List Spatial Data and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

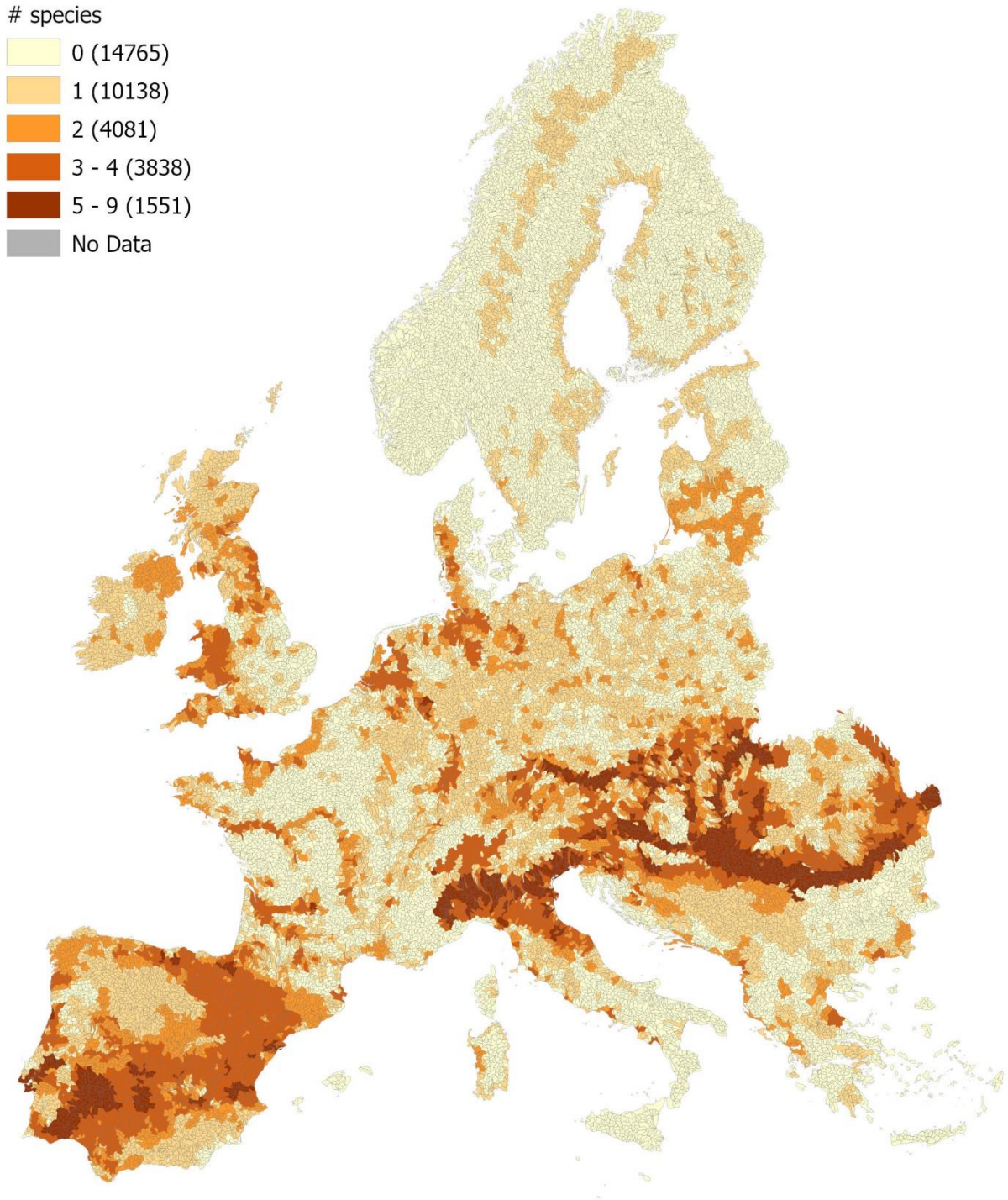
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Fish Species Diversity - Decreasing Trend



Indicator group	**Biodiversity**	**Metric ID** 165	Back to Layer List

Layer name Fish Species Diversity - Decreasing Trend

Sub-group Fish Species **Field name** bi_df_ab

Description

The data for this layer is primarily sourced from the Article 17 - Habitats Directive Database with data gaps being supplemented by the IUCN Red List Spatial Data. Article 17 - Habitats Directive ensures the protection and conservation of over 1000 plant and animal species. EU member states are required to report on habitats and species covered under Article 17. The presence of habitats and species are reported on a grid with a 10 kilometer resolution. This data layer considers freshwater species (excluding fish) covered under the habitats directive that are linked to freshwater habitats, based on expert opinion, and have a decreasing population trend in the Habitats Directive Database (in data gap areas population trends status is sourced from the IUCN Red List Spatial Data). This selection included a total of 94 species, belonging to 7 taxonomic groups (amphibians: 26, arthropods: 14, mammals: 8, molluscs: 7, reptiles: 2, vascular plants: 33, and non-vascular plants: 4).

Processing Steps

The species distributions in the Article 17 - Habitats Directive Database were downloaded from the data source specified below. Freshwater species in the Article 17 - Habitats Directive Database were determined through collaboration with the MERLIN project. The distributions for species related to freshwater with a decreasing population trend were selected and exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the freshwater species diversity count within the HydroBASIN was increased by one. Data gaps exist in the Habitats Directive Database for EU non-member states. In these gap areas, species were selected in the IUCN Red List Spatial Data that had a decreasing trend status from the EU Red List Species and the same process described above was applied to data gap catchments. Additionally, transition basins between the two data sources were manually identified and smoothing of these transition basins was carried out by taking the max value in the catchment from either the Article 17 data or the IUCN data.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

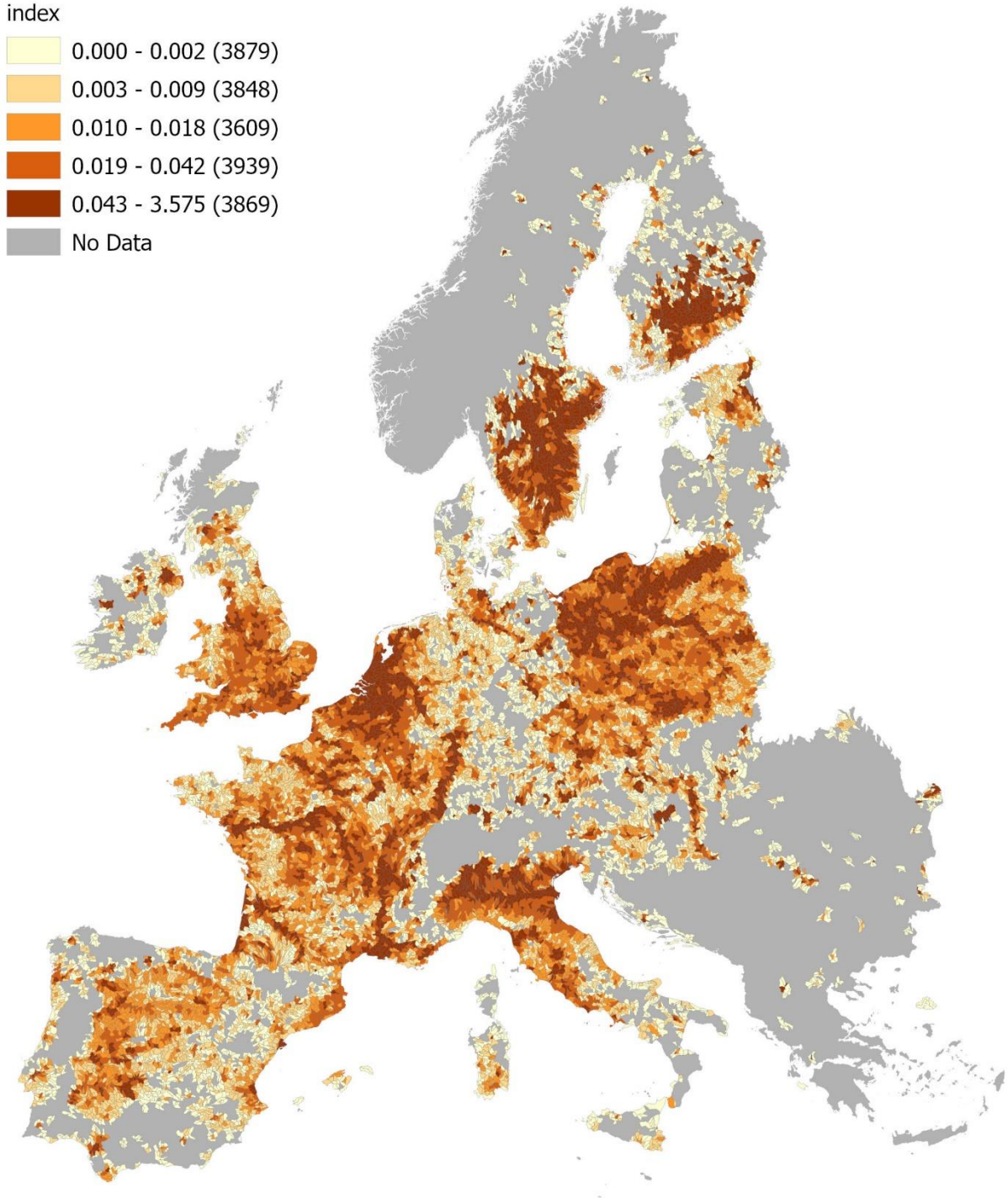
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.
- Data gap areas described above were filled with values from coarser resolution data, resulting in greater uncertainty in the values for data gap areas.

Data Sources

Article 17 - Habitats Directive Database
European Red List Species
Integrated Biodiversity Assessment Tool (IBAT)

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Invasive Alien Species - Freshwater



Indicator group	**Biodiversity**	**Metric ID** 175	Back to Layer List

Layer name Invasive Alien Species - Freshwater

Sub-group Habitat **Field name** bi_iv_ix

Description

This data was sourced from the EU Ecosystem Assessment - Invasive Alien Species Indicator. The Invasive Alien Species Indicator quantifies the cumulative and relative pressure from invasive alien species on terrestrial and freshwater ecosystems. The data is reported on a 10 kilometer resolution grid covering 8 ecosystem types: cropland, forest, freshwater, grassland, heathland, sparse, terrestrial, and urban. For this layer, only the freshwater ecosystem values were assessed. The cumulative pressure by the 49 invasive alien species of Union concern on freshwater ecosystems were mapped as a unitless index corresponding to the relative extent of freshwater ecosystems negatively affected by invasive alien species.

Processing Steps

The Invasive Alien Species Indicator was downloaded from the data source below. A union was conducted between the IAS indicator polygons for water ecosystems and the level 10 HydroBASIN catchments. A spatial average of the index values was conducted by weighting the index values based on the overlapping area in each HydroBASIN.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest thousandths decimal place.

Data Uncertainties

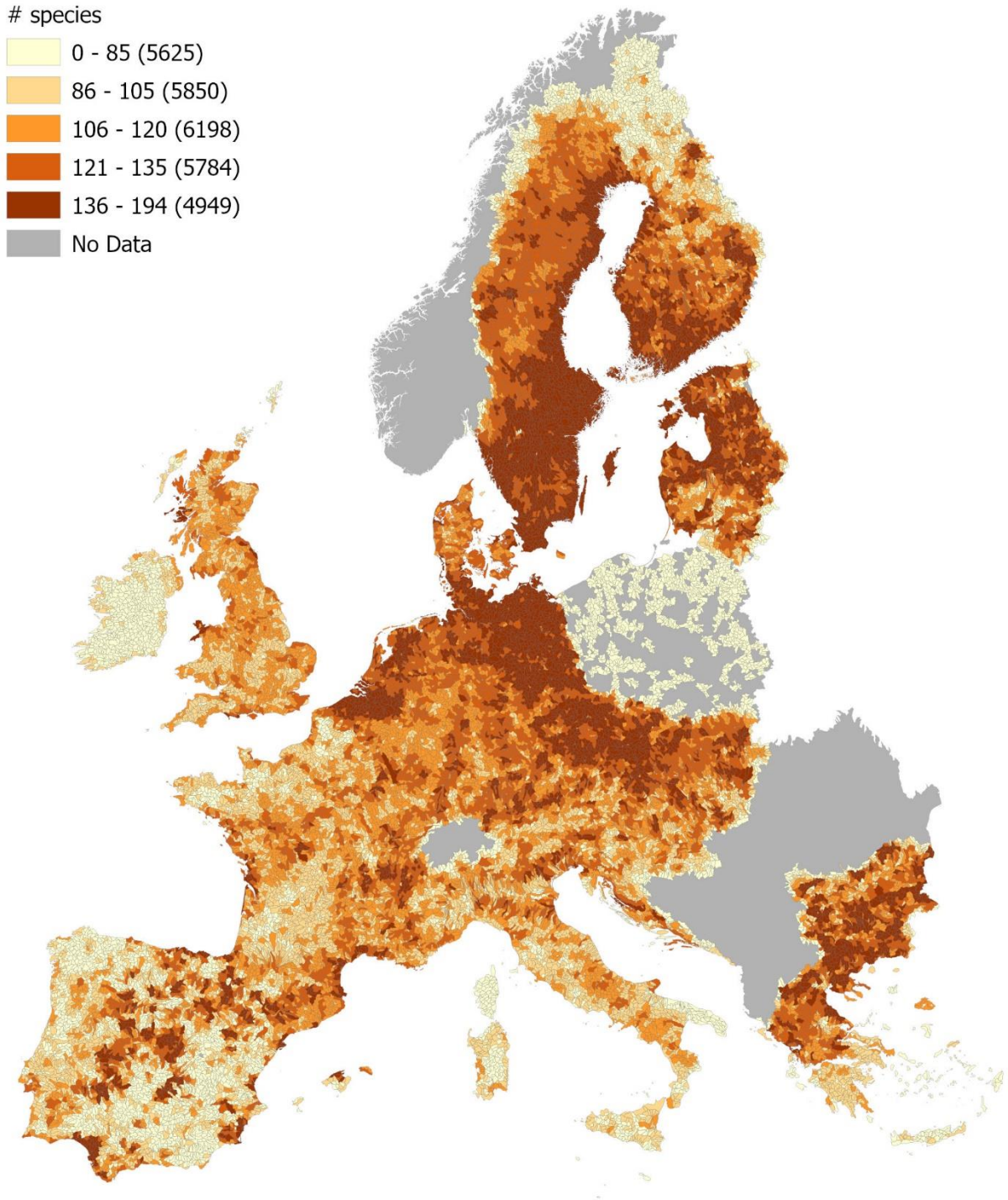
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources

EU Ecosystem Assessment - Invasive Alien Species
Mapping and assessment of ecosystems and their services: An EU wide ecosystem assessment

Temporal coverage 2017 **Spatial resolution** 10km x 10km grid

Bird Species Diversity - All



Indicator group	**Biodiversity**	**Metric ID** 180	Back to Layer List

Layer name Bird Species Diversity

Sub-group	Bird Species	**Field name**	bi_ab_ab

Description

The data for this layer is sourced from the Article 12 - Birds Directive Database. The Article 12 database includes 500 wild bird species naturally occurring in the European Union that are protected in various ways. EU member states are required to report on the status and trends of bird species within their borders that are included in the Birds Directive. These species distributions and trend statuses are collated into the Birds Directive Database and reported on a 10 kilometer resolution grid.

Processing Steps

The distributions of birds species in the Article 12 - Birds Directive Database were downloaded from the data sources specified below. All bird species in the Article 12 - Birds Directive Database were determined to be related to at least one freshwater-related habitat through collaboration with the MERLIN project. The data was tidied by removing non-native bird species and combining sub-species into one species. Individual species distributions were then exported from the database and intersected with the HydroBASINS level 10 catchments. For each intersection, the species diversity count within the HydroBASIN was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest fifth.

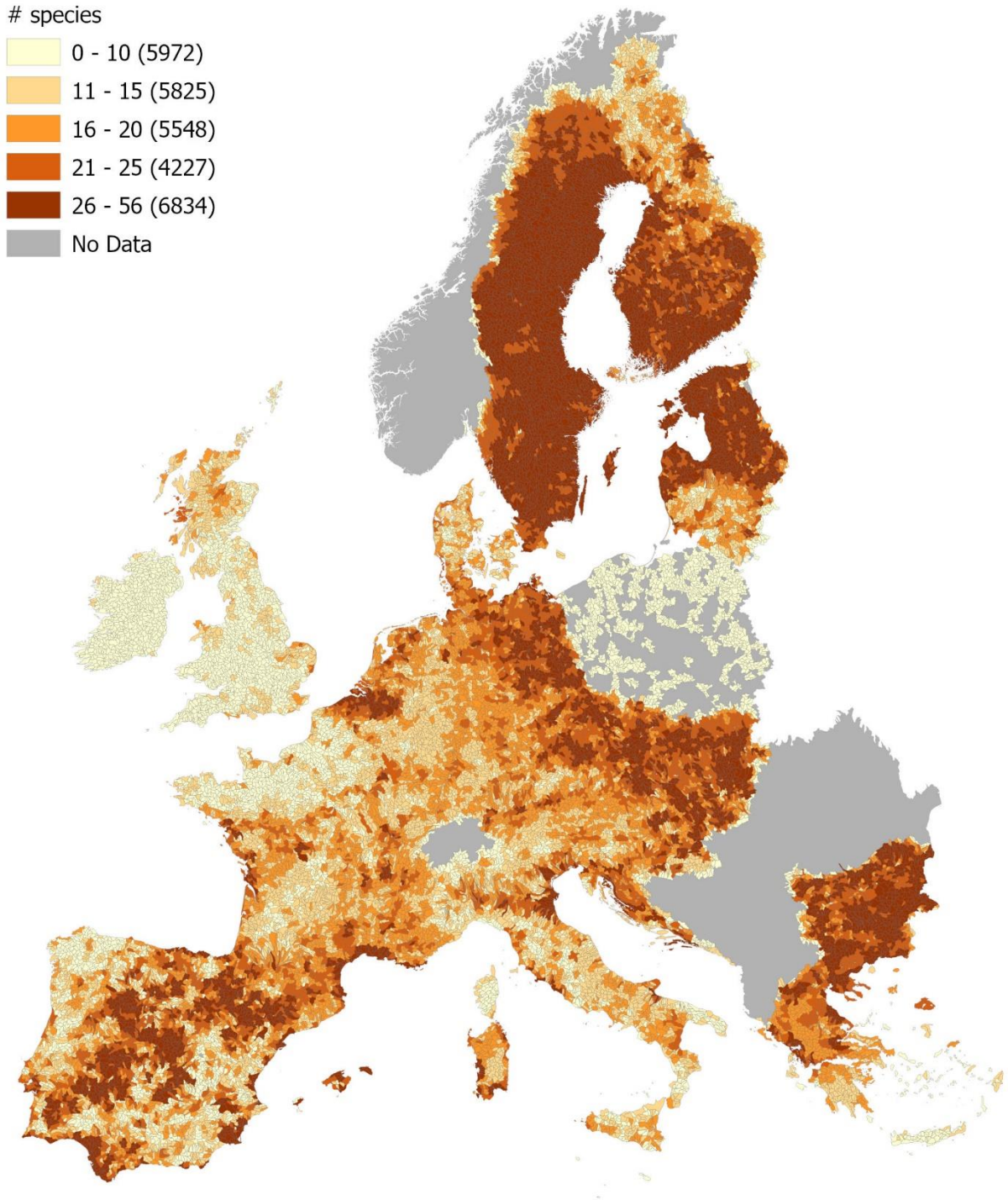
Data Uncertainties

- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources Article 12 - Birds Directive Database

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Bird Species Diversity - Threatened



Indicator group	**Biodiversity**	**Metric ID** 185	Back to Layer List

Layer name Bird Species Diversity - Threatened

Sub-group Bird Species **Field name** bi_tb_ab

Description

The data for this layer is sourced from the Article 12 - Birds Directive Database. The Article 12 database includes 500 wild bird species naturally occurring in the European Union that are protected in various ways. EU member states are required to report on the status and trends of bird species within their borders that are included in the Birds Directive. These species distributions and trend statuses are collated into the Birds Directive Database and reported on a 10 kilometer resolution grid. The Birds Directive also includes five annexes that provide additional designations for certain species. Annex 1 of the Birds Directive identifies 194 species and sub-species that are particularly threatened. For the survival of the species listed under annex 1, member states are required to designate special protection areas for these species.

Processing Steps

The distributions of birds species in the Article 12 - Birds Directive Database were downloaded from the data sources specified below. All bird species in the Article 12 - Birds Directive Database were determined to be related to at least one freshwater-related habitat through collaboration with the MERLIN project. The data was tidied by removing non-native bird species and combining sub-species into one species. The bird species included under annex I were selected and individual species distributions were exported from the database. These individual species distributions were intersected with the HydroBASINS level 10 catchments and for each intersection, the species diversity count within the HydroBASIN was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest fifth.

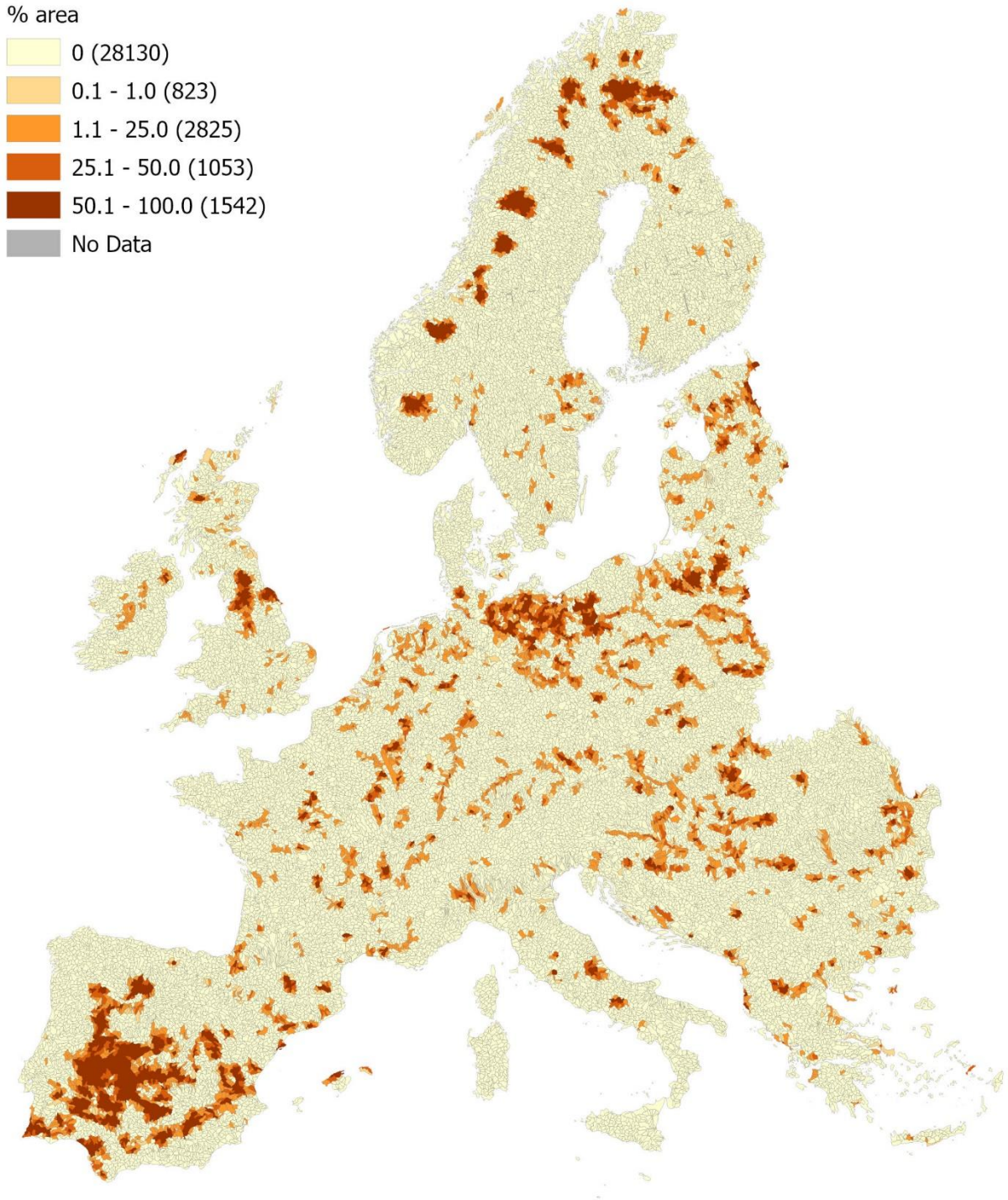
Data Uncertainties

- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources Article 12 - Birds Directive Database

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Freshwater Key Biodiversity Areas



Indicator group	**Biodiversity**	**Metric ID** 190	Back to Layer List
Layer name	Freshwater Key Biodiversity Areas		
Sub-group	Habitat	**Field name**	kb_fw_sp

Description

Key Biodiversity Areas (KBAs) programme is a network of sites that contribute significantly to the global persistence of biodiversity. KBAs are designated based on the best available scientific data and globally standarised criteria. Currently there are over 15,000 KBAs globally. Sites qualify as a global KBA if they meet one or more of 11 criteria, based on quantitative thresholds, in 5 categories: threatened biodiversity, geographically restricted biodiversity, ecological integrity, biological processes, and irreplaceability. The KBA criteria can be applied to species and ecosystems in terrestrial, freshwater, and marine environments. This data layer considers freshwater KBAs in Europe.

Processing Steps

The data was downloaded from the data source below. A selection of the freshwater KBAs was conducted by querying the KBA database for KBAs with the freshwater label. A union was then created between the KBA polygons and the level 10 HydroBASIN catchments. The percent area of freshwater related KBAs in each HydroBASIN was then calculated.

Data Normalization

Categorical data breaks were determined using quantile classification with manual modification to create easily interpretable and meaningful classification breaks.

Data Uncertainties

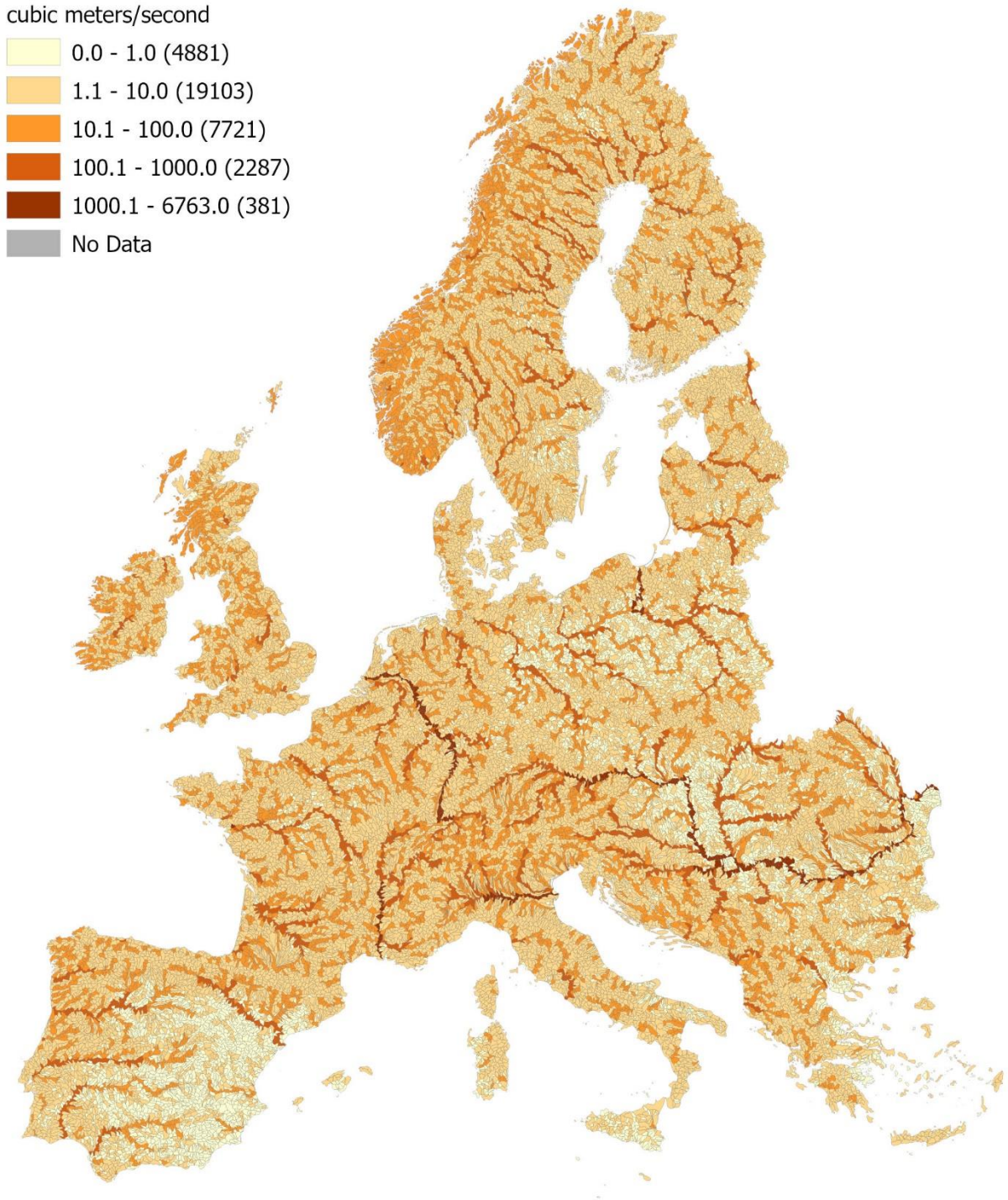
- Source data comes in polygon format delineating KBA area. Data processing involved calculating the percent area of KBAs in each catchment resulting in low data uncertainty for this layer.

Data Sources

Integrated Biodiversity Assessment Tool (IBAT)
Key Biodiversity Area Database

Temporal coverage	2022	**Spatial resolution**	NA

Natural Discharge



Indicator group	**Current State**	**Metric ID** 210	Back to Layer List

Layer name Natural Discharge

Sub-group	Climate Baseline	**Field name**	d_m3_pyr

Description

The data was sourced from WaterGap, a state-of-the-art global integrated water balance model. Discharge and runoff estimates are based on long-term (1971–2000) average 'naturalized' discharge and runoff values (Döll et al. 2003, model version 2.2 as of 2014). The WaterGAP data were spatially downscaled from their original 0.5 degree pixel resolution (50km at the equator) to the 15 arc-second (~500m) resolution of the HydroSHEDS river network using geo-statistical techniques (Lehner and Grill 2013). Preliminary tests against approximately 3000 global gauging stations indicate a good overall correlation for the long-term averages, but also reveal larger uncertainties, in particular in the minimum and maximum statistics, for areas that are dominated by snow, glaciers, wetlands, and (semi-)arid conditions.

Processing Steps

The natural discharge data is available at the level 10 HydroBASIN scale as part of HydroATLAS and as such no data processing was required.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable classification breaks based on orders of magnitude. Manual breaks were informed by natural breaks and quantile classification.

Data Uncertainties

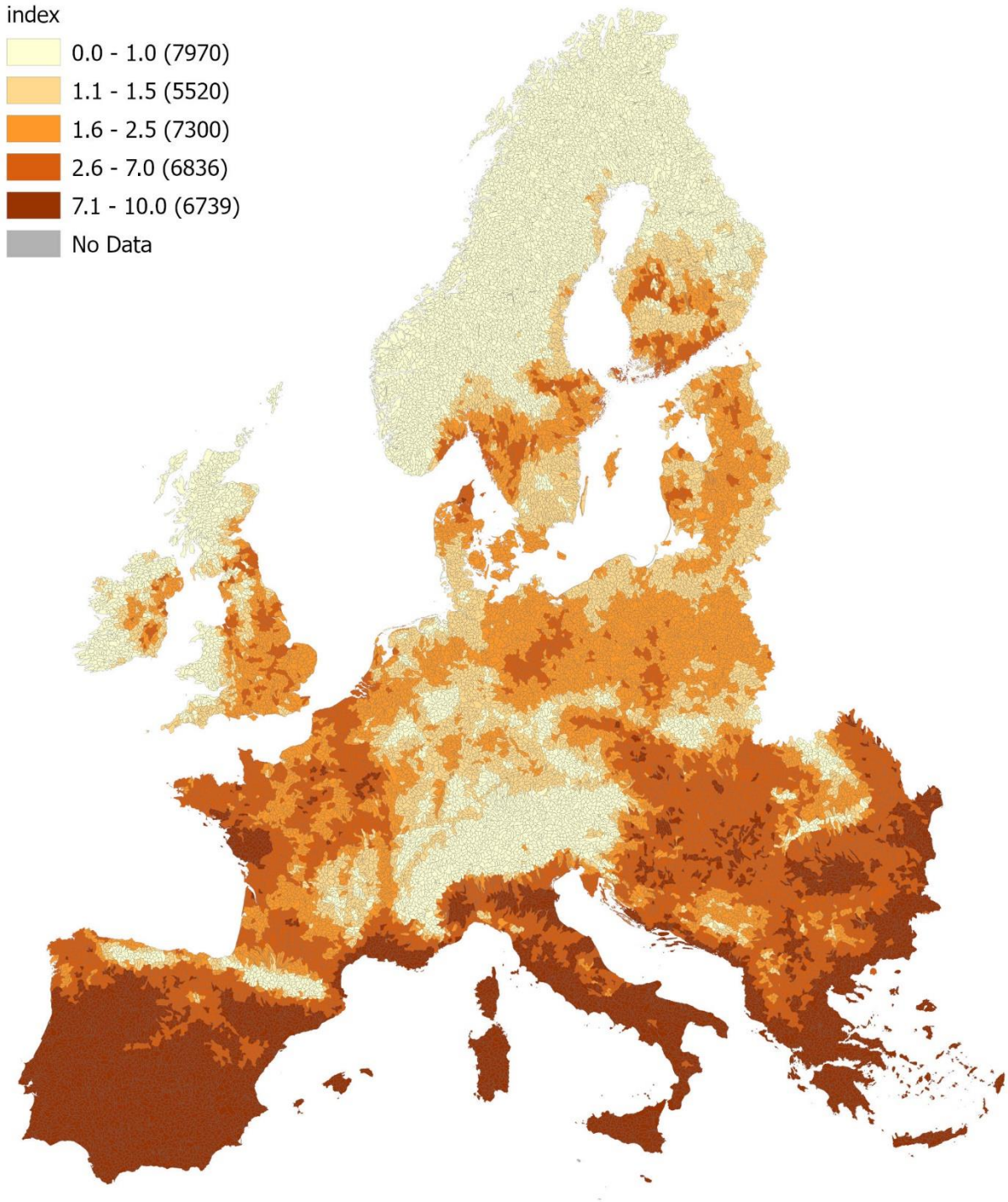
- The source data from this layer was downscaled from 0.5 degree resolution to 500m resolution and validated with 73 discharge gauges. The long-term annual average discharge values showed a very strong correlation (R^2 = 0.982) with discharge gauges. However, some results for smaller streams contained significant errors and the model has a tendency to overestimate low flows (Lehner & Grill, 2013).

Data Sources

HydroATLAS
WaterGap
Döll et al. 2003

Temporal coverage	1971 - 2000 long term average	**Spatial resolution**	0.5 degree grid

Aridity Potential



Indicator group	**Current State**	**Metric ID** 215	Back to Layer List
Layer name	Aridity Potential		
Sub-group	Climate Baseline	**Field name**	ar_ph_sa

Description

Aridity potential is calculated as the monthly mean values of the ratio between potential evapotranspiration and precipitation over 1971 - 2000. Potential evapotranspiration is the modelled evapotranspiration when there is abundant water. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The aridity potential index data was downloaded from the data source below. The aridity potential data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the aridity potential values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest 0.5.

Data Uncertainties

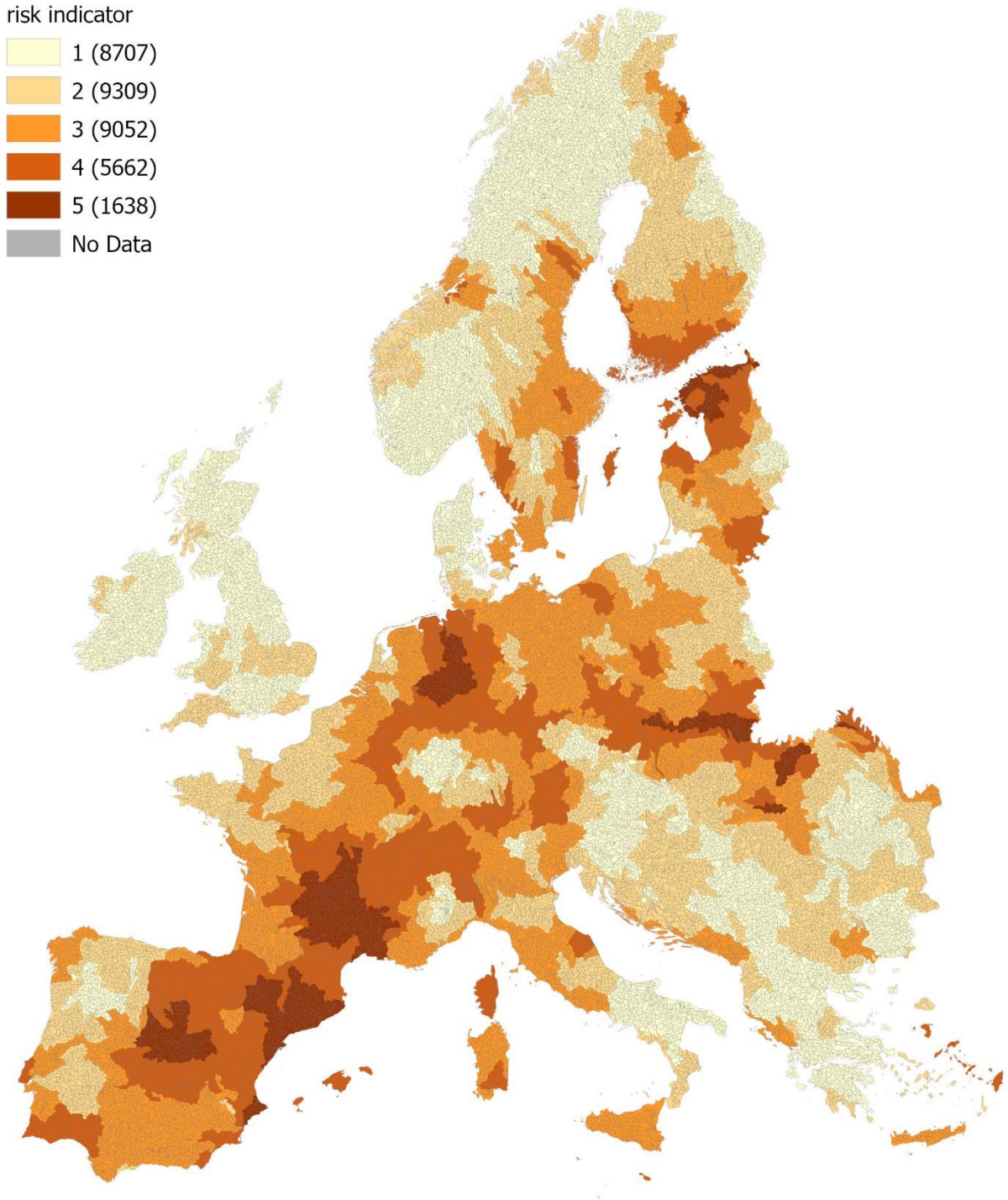
- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources

Copernicus - Hydrology-related climate impact indicators

Temporal coverage	1971 - 2000 long term average	**Spatial resolution**	E-HYPE catchments

Drought Frequency Probability



Indicator group	**Current State**	**Metric ID** 217	Back to Layer List
Layer name	Drought Frequency Probability		
Sub-group	Climate Baseline	**Field name**	dr_fp_sa

Description

The Standardised Precipitation-Evapotranspiration Index (SPEI) is a multi-scalar drought index used to detect, monitor, and analyze droughts. The SPEI is advantaged over other drought indices due the multi-scalar nature of the index allowing for identification of different drought types and impacts in the context of global warming. The SPEI provides global drought information in near-real time at a spatial resolution of 1 degree and a monthly temporal resolution. The SPEI data was processed following the methods outlined in the water risk filter. The data was calculated using a relative frequency approach, which creates a ratio of the number of months when the SPEI index indicates events of moderate drought magnitude compared to the total number of months over a given time period. This data layer considers monthly SPEI index values from August 2011 – July 2021.

Processing Steps

The Standardized Precipitation-Evapotranspiration Index (SPEI) was downloaded from the data source below. The SPEI data was processed following the steps used by the Water Risk Filter data layer of the same name. A raster was created for the ratio of months were the SPEI index was less than or equal to -1 out of the total number of months from August 2011 - July 2021. The ratio raster was converted to polygon and intersected with HydroBASIN level 7 polygons to match the spatial resolution used by the Water Risk Filter. With the intersection of the two files, the area-weighted average of the SPEI values was calculated for each level 7 HydroBASIN catchment and converted to a risk indicator score (SPEI <= 0.2: 1, 0.2 < SPEI <=0.4: 2, 0.4 < SPEI <= 0.6: 3, 0.6 < SPEI <= 0.8: 4, SPEI > 0.8: 5). The HydroBASIN level 7 values were then applied to the level 10 HydroBASIN catchments to match the spatial resolution used for other data layers in the TNC prioritization tool.

Data Normalization

Categorical data breaks were determined using the range of values for the risk indicator score.

Data Uncertainties

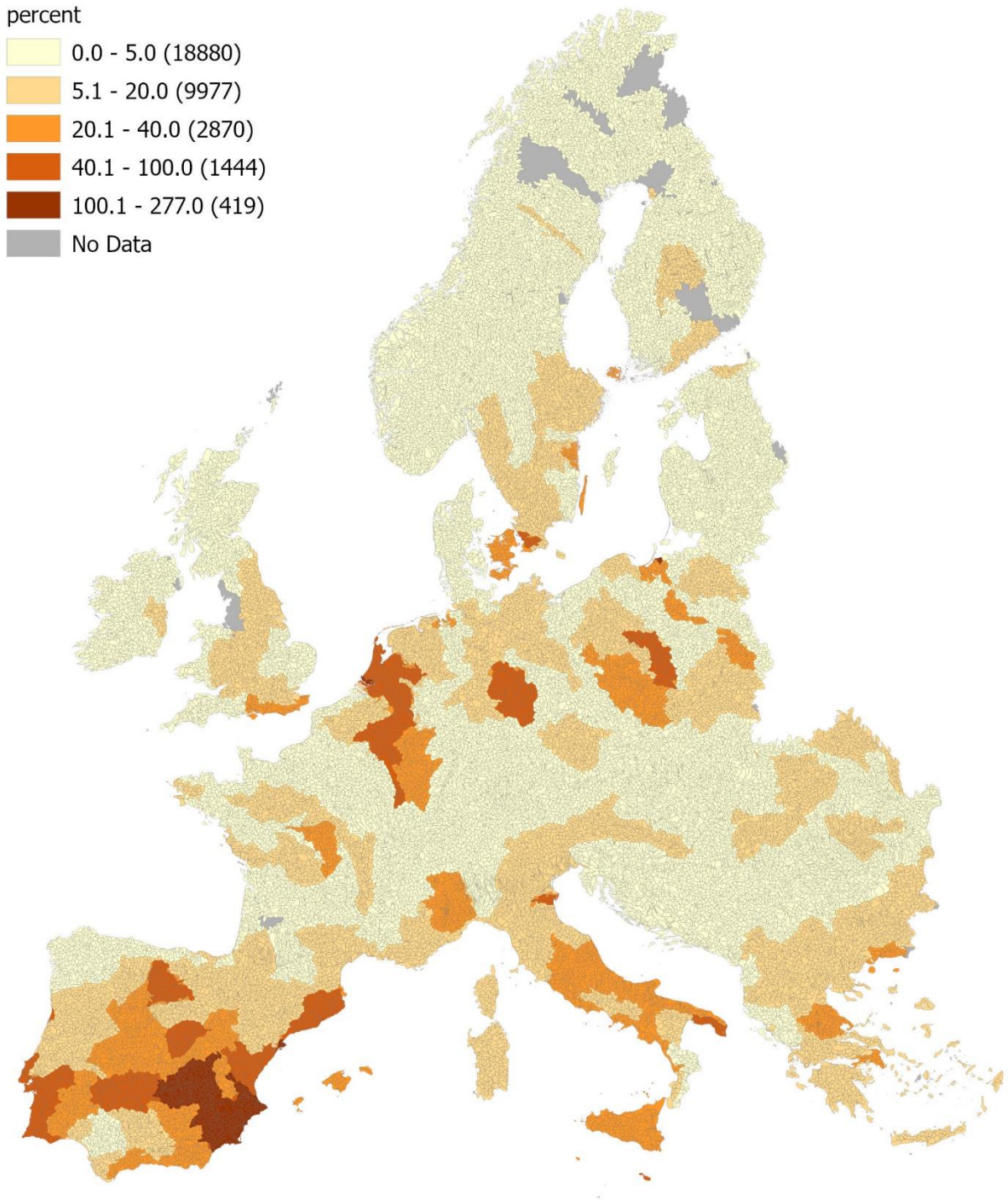
- The SPEI source data is provided at a spatial resolution of 1 degree. This large discrepancy between the source data resolution and the average area of HydroBASIN level 10 catchments (~150km^2) contributes to high data uncertainty for this layer.

Data Sources

Standardized Precipitation-Evapotranspiration Index
Water Risk Filter

Temporal coverage	2011 - 2021	**Spatial resolution**	1 degree

Water Exploitation Index



Indicator group	**Current State**	**Metric ID** 220	Back to Layer List
Layer name	Water Exploitation Index		
Sub-group	Development Pressure	**Field name**	we_av_sa

Description

The Water Exploitation Index Plus (WEI+) is a measure of water use compared to renewable water resources. The WEI+ source data is presented in the quarterly average per river basin district, for the years 1990-2015, as defined in the European catchments and rivers network system (ECRINS). The data presented in this data layer is the average of the quarterly values in 2015. According to Raskin et al. (1997), WEI values above 20% indicate water scarcity and values above 40% indicate severe water scarcity.

Processing Steps

The water exploitation index plus (WEI+) data was downloaded from the data source below. The mean of the winter, spring, summer, and fall WEI+ values was calculated. The WEI+ polygons were then intersected with the level 10 HydroBASINS catchments and the areal proportion of WEI+ polygons within each HydroBASIN was determined. The areal proportion was used as a weight in calculating the spatially weighted average of annual mean WEI+ values for each HydroBASIN catchment.

Data Normalization

Categorical data breaks were determined based on the values provided by Raskin et al. (1997) for interpreting the water explotation index.

Data Uncertainties

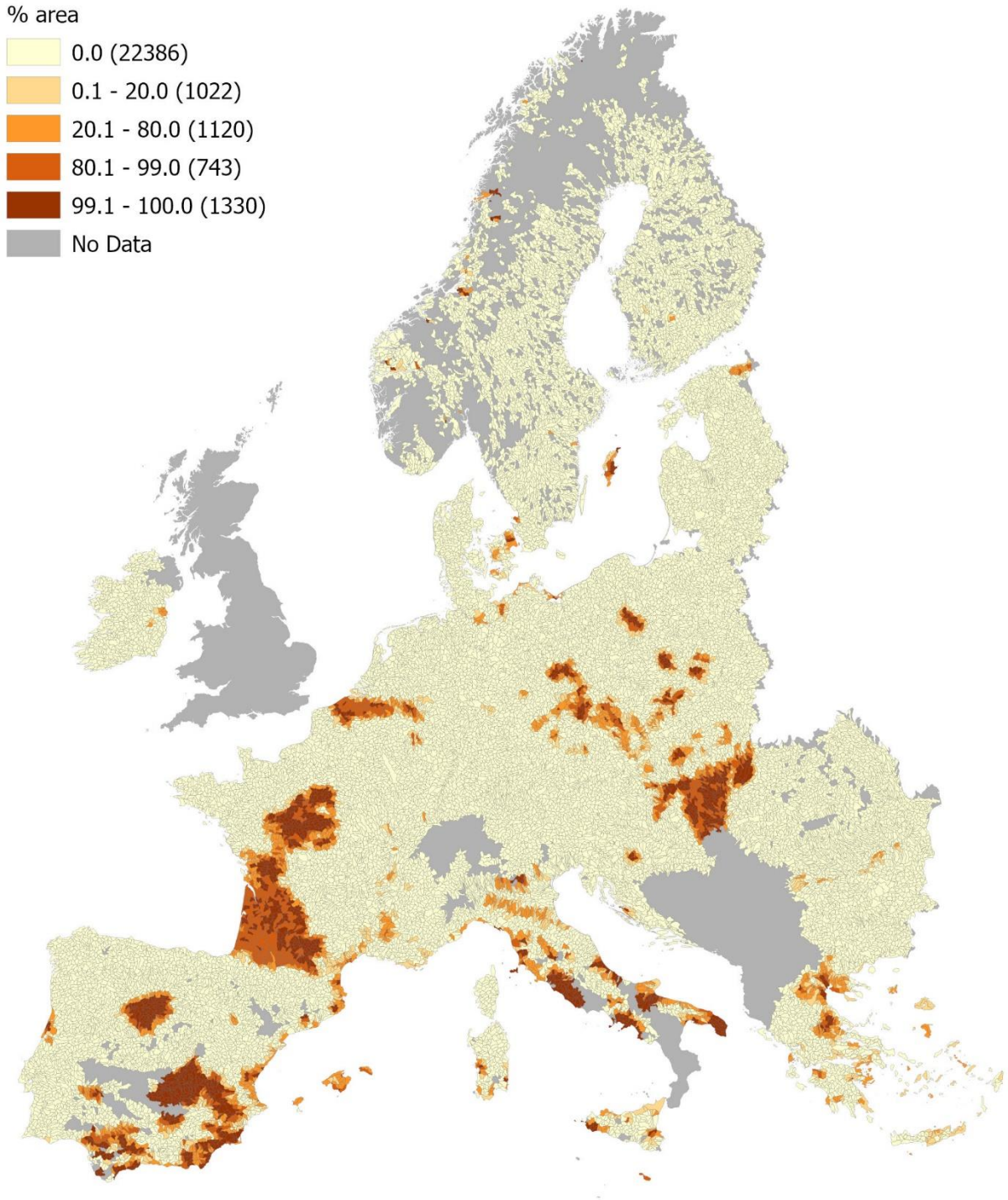
- The source data comes from the Water Framework Directive (WFD), which combines data from multiple sources for 180 river basins across Europe. Differences in the collection and preparation of the individual data sources create a source of uncertainty for this layer. However, the WFD provides reporting guidelines to participating countries to reduce disparities between data sources.

Data Sources

Water Exploitation Index Plus (WEI+)
Raskin et al. (1997)

Temporal coverage	2015	**Spatial resolution**	ECRINS natural sub-basins

Groundwater Depletion



Indicator group	**Current State**	**Metric ID** 222	Back to Layer List
Layer name	Groundwater Depletion		
Sub-group	Development Pressure	**Field name**	gw_pq_sa

Description

Provides the proportion of catchment area with poor quantitative status groundwater bodies. EU member states are required by the Water Framework Directive to designate separate groundwater bodies and ensure that each one achieves good chemical and quantitative status. Good quantitative is achieved by ensuring that the available groundwater is not reduced by the long-term annual average rate of abstraction.

Processing Steps

The data was downloaded from the data source below. The quantitative status data table was joined to the groundwater bodies polygons and converted to raster format with a 15 arc second resolution. The ratio of poor status raster cells compared to the total raster area in each catchment was computed providing the areal proportion of poor quantitative status ground water bodies in each catchment. Additionally, the proportion of no data in each catchment was calculated in the same manner and any catchment with greater than 50% no data area was assigned the no data value -9999.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest ones.

Data Uncertainties

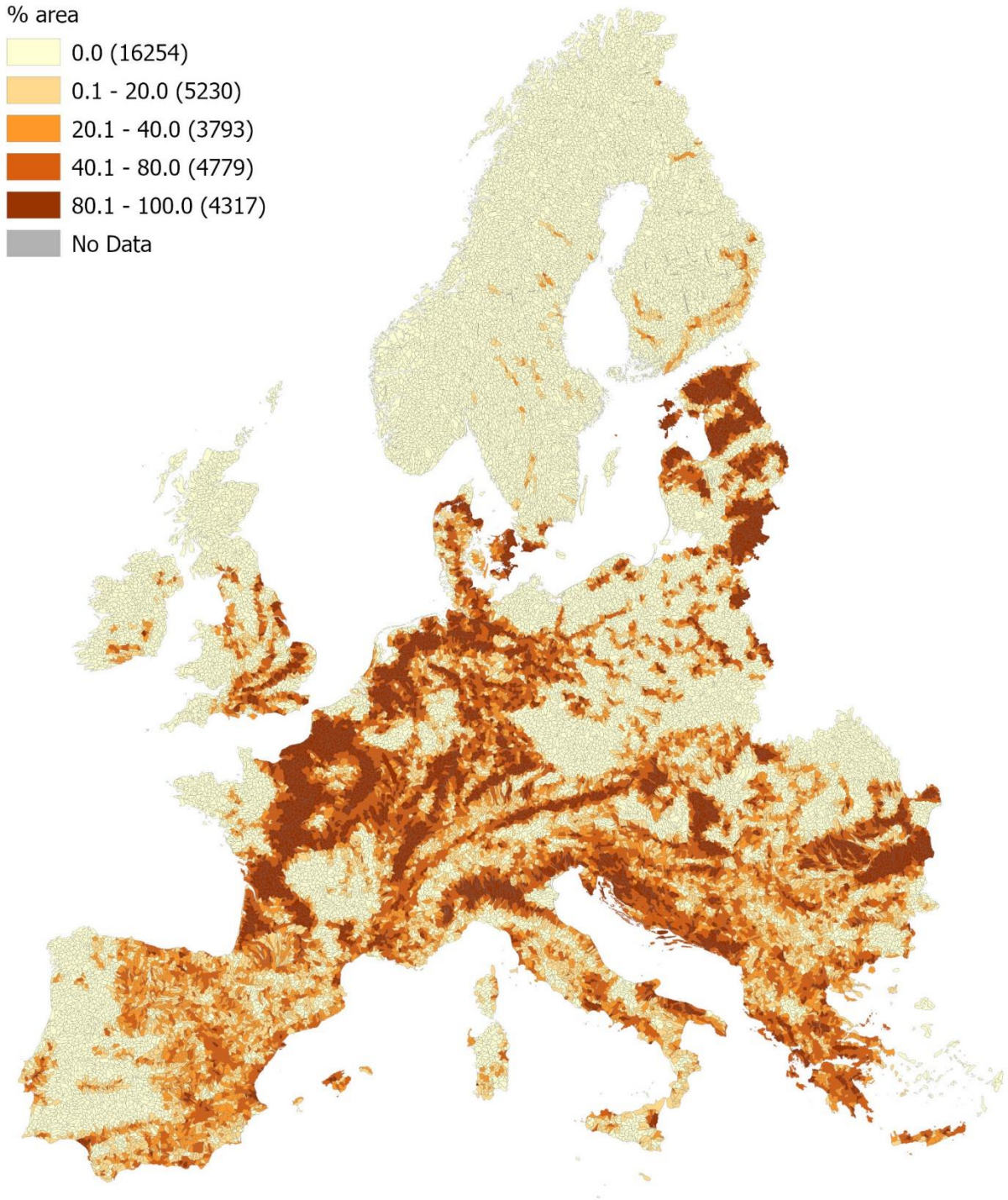
- The source data comes from the Water Framework Directive (WFD), which combines data from multiple sources for 180 river basins across Europe. Differences in the collection and preparation of the individual data sources create a source of uncertainty for this layer. However, the WFD provides reporting guidelines to participating countries to reduce disparities between data sources.

Data Sources

WISE Water Framework Directive Database

Temporal coverage	2016	**Spatial resolution**	WFD groundwater bodies

Recharge Zone Habitats



Indicator group	**Current State**	**Metric ID** 223	Back to Layer List

Layer name Recharge Zone Habitats

Sub-group	Land Use / Cover	**Field name**	rw_pa_sp

Description

The data comes from the International Hydrogeological Map of Europe, scale 1:1,500,000 (IHME1500), which is comprised 30 hydrogeological maps covering nearly the whole European continent. Contributions to the IHME1500 were compiled by hydrogeologists and experts from the International Association of Hydrogeologists. There are six generalized classes of potential groundwater resources in the IHME1500, with four grades of productivity in terms of general groundwater yield. Suggested uses for the data include scientific purposes, large-scale regional planning, and detailed hydrogeological mapping.

Processing Steps

The data was downloaded from the data source below. The data was first projected to match the coordinate system of the HydroBASIN catchments. A selection of the highly productive aquifers was conducted and a union was created between the highly productive aquifer polygons and the level 10 HydroBASIN catchments. The percent area of highly productive aquifers in each HydroBASIN was then calculated.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest tens.

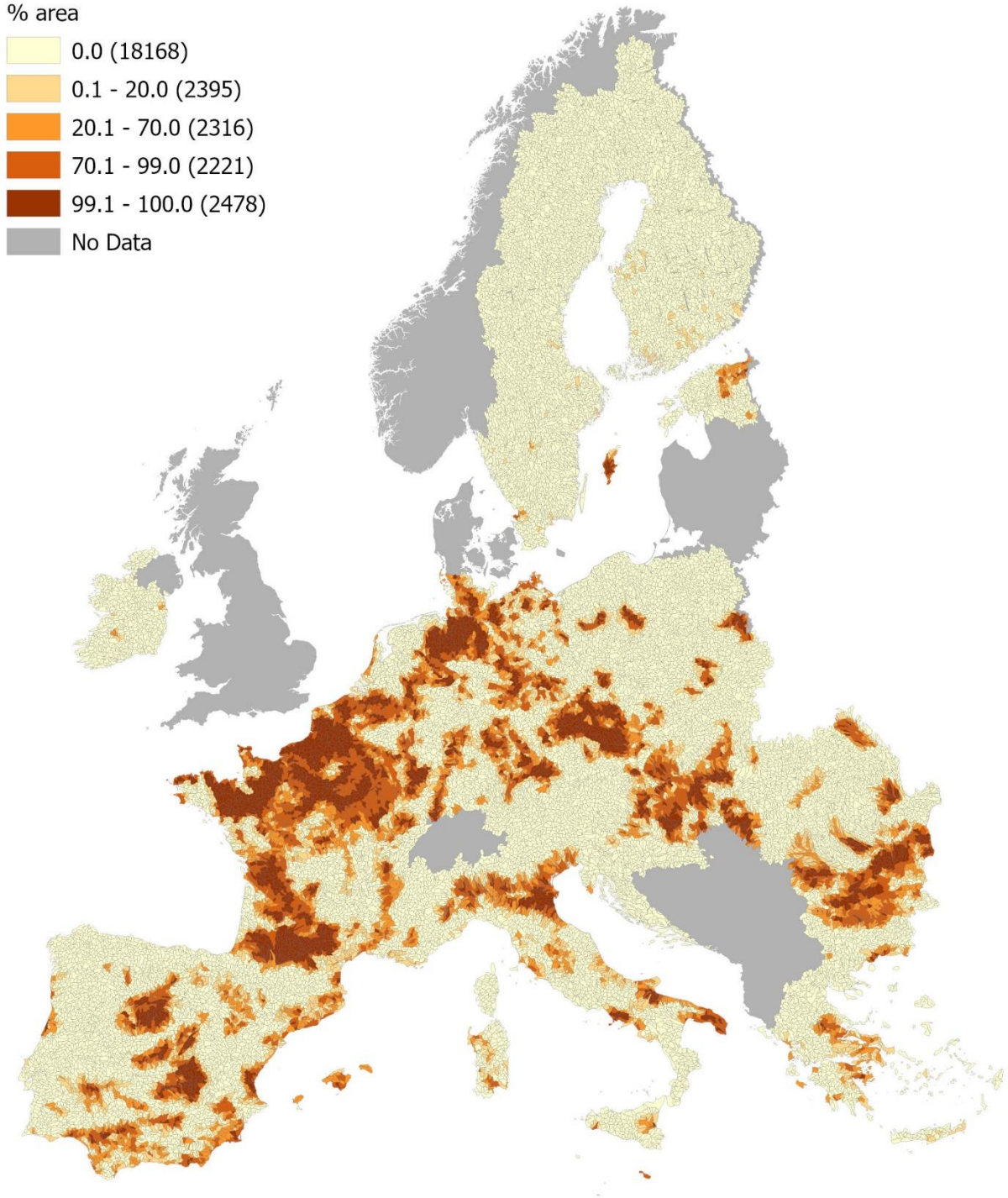
Data Uncertainties

- The small scale (i.e., coarse resolution) of the source data increases data uncertainty for this layer.

Data Sources IHME1500 - International Hydrogeological Map of Europe 1:1,500,000

Temporal coverage	2013	**Spatial resolution**	1:1,500,000

Groundwater with Poor Chemical Status due to Agriculture



Indicator group	**Current State**	**Metric ID** 224	Back to Layer List

Layer name Groundwater with Poor Chemical Status due to Agriculture

Sub-group	Water Quality	**Field name**	gw_pc_sa

Description

Provides the proportion of catchment area with poor chemical status groundwater bodies affected significantly by diffuse agricultural pollution. EU member states are required by the Water Framework Directive to designate separate groundwater bodies and ensure that each one achieves good chemical and quantitative status. Good groundwater chemical status is assessed based on four criteria: concentrations of pollutant must not exceed standards set for ground water, absence of saline intrusions, pollution levels must not impact ecological or chemical status of surface waters, and pollution levels must not cause significant damage to ecosystems that directly on the groundwater body.

Processing Steps

The data was downloaded from the data source below. The polygon data for poor chemical status ground water bodies were converted to raster format with a 15 arc second resolution. The ratio of poor status raster cells compared to the total raster area in each catchment was calculated providing the areal proportion of poor chemical groundwater bodies in each catchment. Areas of no data were visually assessed from the map figure provided from the data source below and countries indicated to have no data in the figure were set to have no data in the output layer.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest ones.

Data Uncertainties

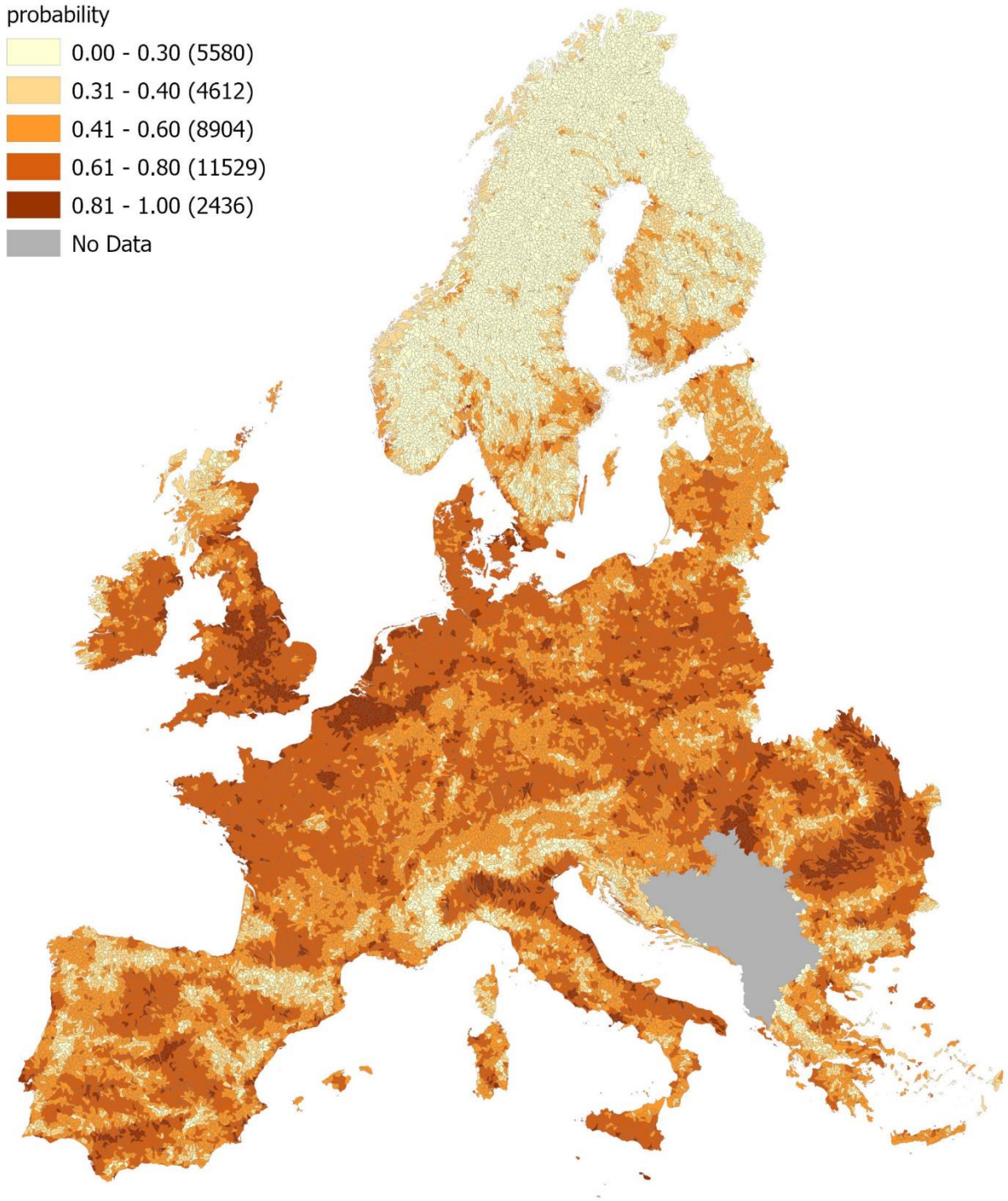
- The source data comes from the Water Framework Directive (WFD), which combines data from multiple sources for 180 river basins across Europe. Differences in the collection and preparation of the individual data sources create a source of uncertainty for this layer. However, the WFD provides reporting guidelines to participating countries to reduce disparities between data sources.

Data Sources

Diffuse pollution from agriculture causing poor chemical status in groundwater bodies in the EU-27

Temporal coverage	2016	**Spatial resolution**	WFD groundwater bodies

Average Probability of Failing Good Ecological Status



Indicator group	**Current State**	**Metric ID** 225	Back to Layer List

Layer name Average Probability of Failing Good Ecological Status

Sub-group	Water Quality	**Field name**	ge_pf_sa

Description

The dataset produced by Vigiak et al. (2021) presents the probability for river conditions to fail to achieve good ecological status, as defined in the water framework directive. These probability estimates were modelled using logistic regression based on data from 2010 - 2015, collected during the second reporting round of River Basin Management Plans of the Water Framework Directive and a series of European water pressure indicators. The probability is expressed as a fraction for the condition to occur.

Processing Steps

The data was downloaded from the below sources. The CCM 2.1 catchment areas were intersected with the level 10 HydroBASIN catchments. The intersection of the two polygon layers was used to determine the areal proportion of CCM 2.1 catchments within each HydroBASIN. The areal proportion was used as a weight for the probability of failing good ecological status values in calculating the spatial weighted average for each HydroBASIN. Additionally, a narrow band of catchments at the eastern border of the study area were outside the area covered by the data. These no data catchments were filled using the values from the catchment with the nearest centroid that had data values.

Data Normalization

Categorical data breaks were determined using quantile classification with manual adjustment to create easily interpretable and meaningful classification breaks.

Data Uncertainties

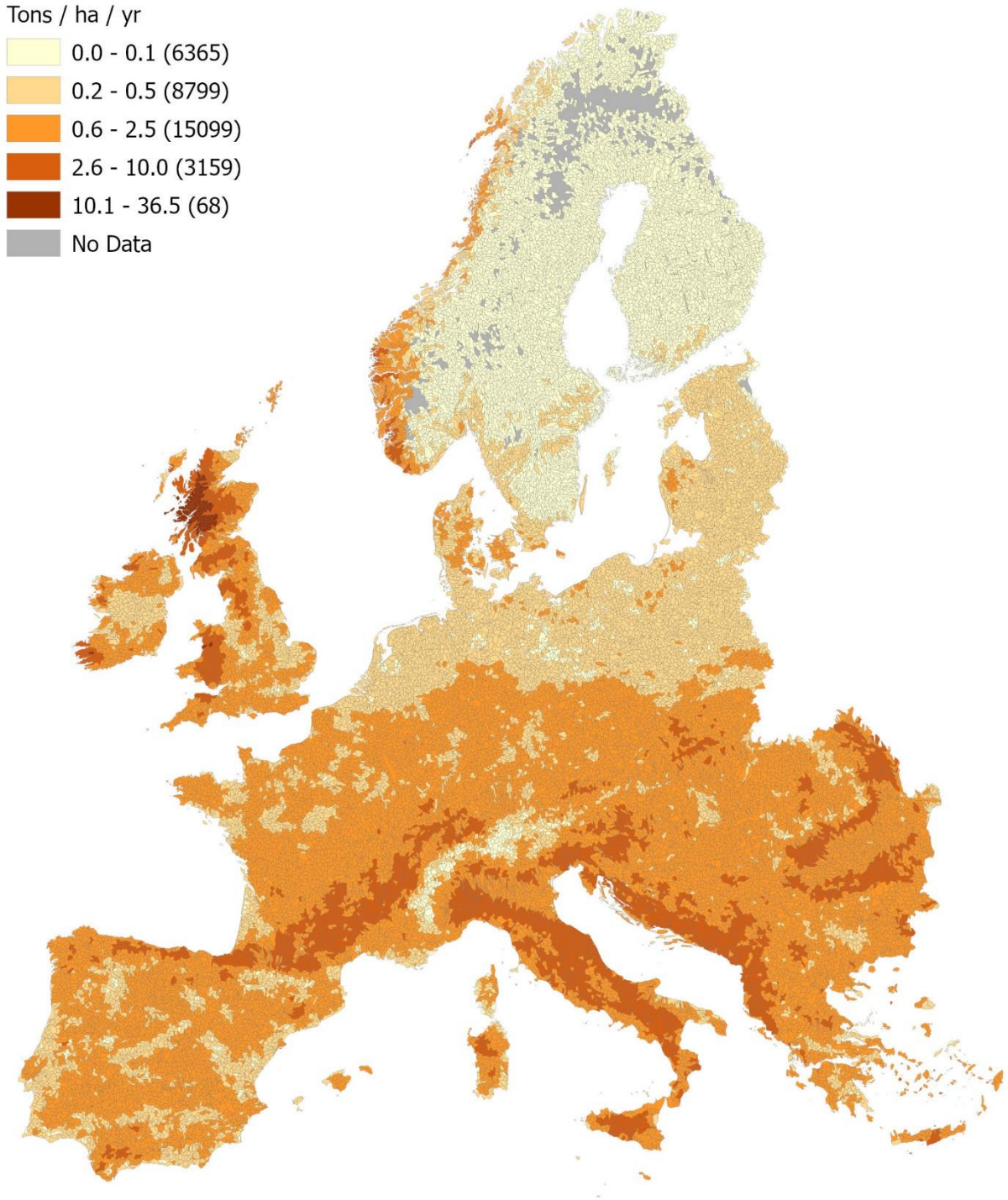
- Validation of the source data indicated moderate model performance (for details see Vigiak et al. 2021), contributing to reduced data certainty for this layer.
- Comparisons between the source data and reported values indicated more rivers as achieving good ecological status than reported by countries, particularly in Sweden and Latvia. However, the occurrence of good ecological status appears to be underpredicted in Romania and Ireland. For further details, see Vigiak et al. (2021).

Data Sources

Vigiak et al. 2021
Water Pressure Indicators

Temporal coverage	2010–2015 reporting period	**Spatial resolution**	CCM2 catchments

Erosion in Cropland



Indicator group	**Current State**	**Metric ID** 230	Back to Layer List
Layer name	Erosion in Croplands		
Sub-group	Water Quality	**Field name**	cl_cu_ty

Description

The data is sourced from the Revised-Universal-Soil-Loss-Equation-based Global Soil Erosion Modelling (GloSEM) 1.3 dataset, which provides soil erosion caused by water at a high spatial resolution (100m x 100m). GloSEM erosion estimates were produced with a global potential soil erosion model, using a combination of remote sensing, GIS modelling and census data. The model considers land-cover and management, rainfall-runoff erosivity, soil erodibility, terrain slope, and conservation support-practices as environmental factors when calculating soil erosion. The soil erosion estimates by the GLoSEM model show high agreement with European regional soil erosion models providing confidence in the validity of these estimates.

Processing Steps

The cropland erosion and cropland fraction data were downloaded from the data source provided below. Cropland erosion values were corrected by multiplying the erosion values by a true area pixel grid. The true-area corrected cropland erosion values were then multiplied by the cropland fraction raster. The sum of the cropland erosion values in each level 10 HydroBASIN was then calculated and normalized by the level 10 HydroBASIN catchment area.

Data Normalization

Categorical data breaks were determined using the geometric interval classification with rounding to the nearest 0.5.

Data Uncertainties

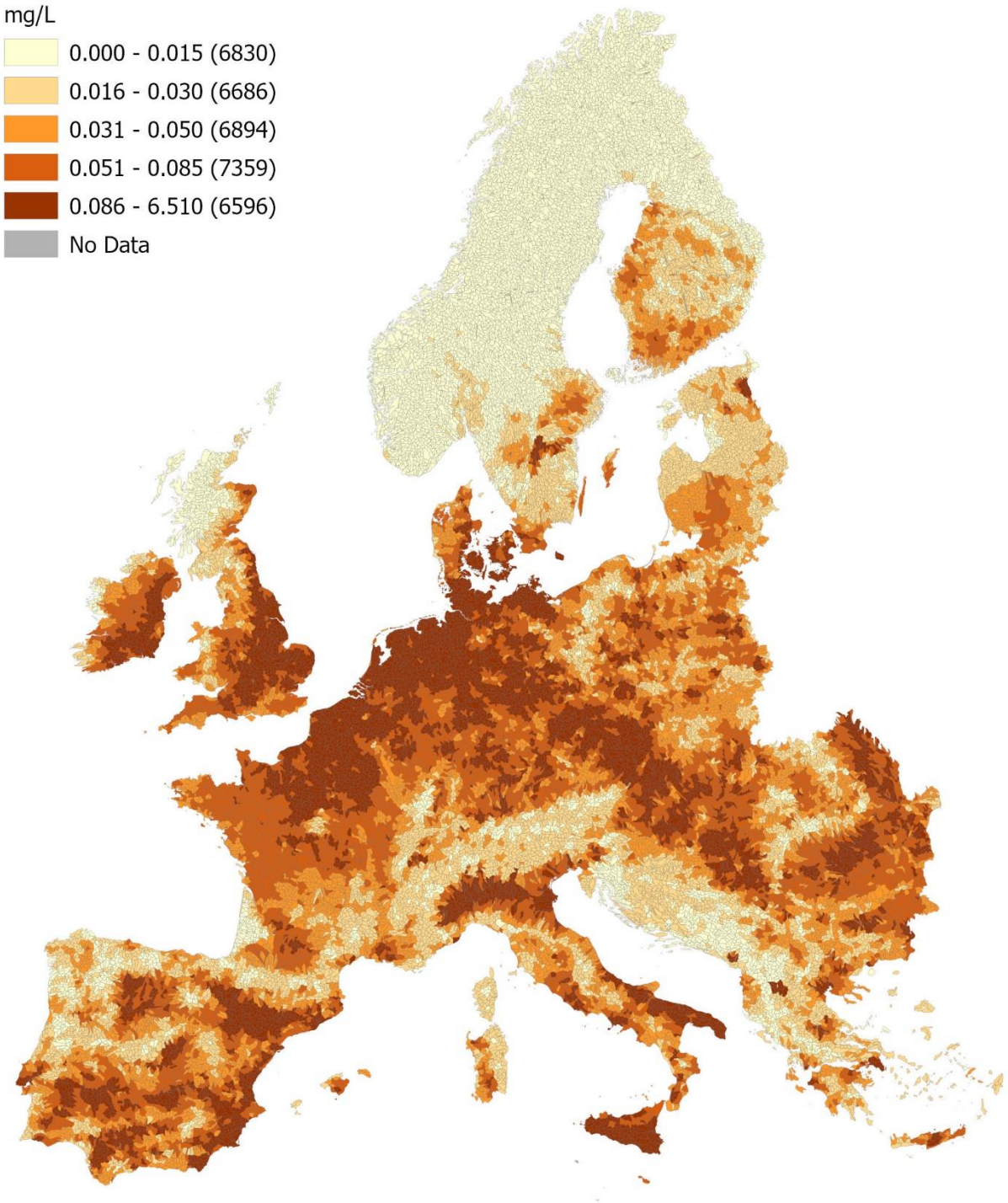
- Source data for this layer has a high spatial resolution of 100-meters. The high resolution of the source data relative to the average HydroBASIN level 10 catchment area (~150km^2) contributes to low data uncertainty for this layer.
- The source data was assessed to have high agreement with independent regional studies, contributing to low data uncertainty for this layer (see Borrelli et al. (2022) for details).

Data Sources

Borrelli et al. (2022)

Temporal coverage	2019	**Spatial resolution**	100m grid

Nitrogen Stream Concentration



Indicator group	**Current State**	**Metric ID** 235	Back to Layer List

Layer name Nitrogen Stream Concentration

Sub-group Water Quality **Field name** n_sch_sa

Description

Nitrogen concentration is the mass of nitrogen divided by the volume of water. The indicator is calculated as the annual mean value of total nitrogen concentration, from a local stream averaged over 1971 - 2000. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The nitrogen concentration data was downloaded from the data source below. The nitrogen concentration data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the nitrogen concentration values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest 0.005.

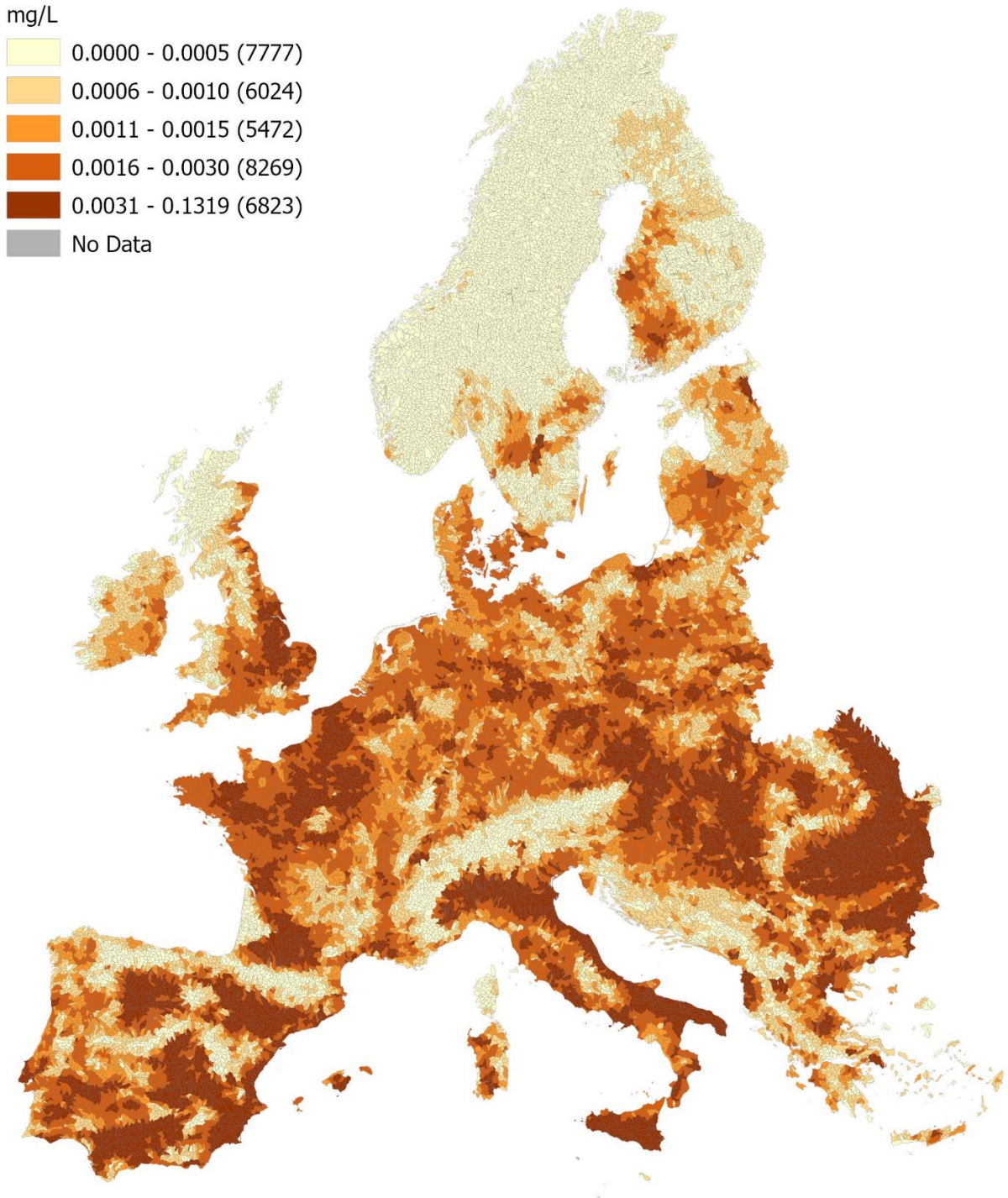
Data Uncertainties

- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources Copernicus - Hydrology-related climate impact indicators

Temporal coverage 1971 - 2000 long term average **Spatial resolution** E-HYPE catchments

Phosphorus Stream Concentration



Indicator group	**Current State**	**Metric ID** 240	Back to Layer List

Layer name Phosphorus Stream Concentration

Sub-group	Water Quality	**Field name**	p_sch_sa

Description

Phosphorus concentration is the mass of phosphorus divided by the volume of water. The indicator is calculated as the annual mean value of total phosphorus concentration, from a local stream averaged over 1971 - 2000. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The phosphorus concentration data was downloaded from the data source below. The phosphorus concentration data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the phosphorus concentration values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest 0.0005.

Data Uncertainties

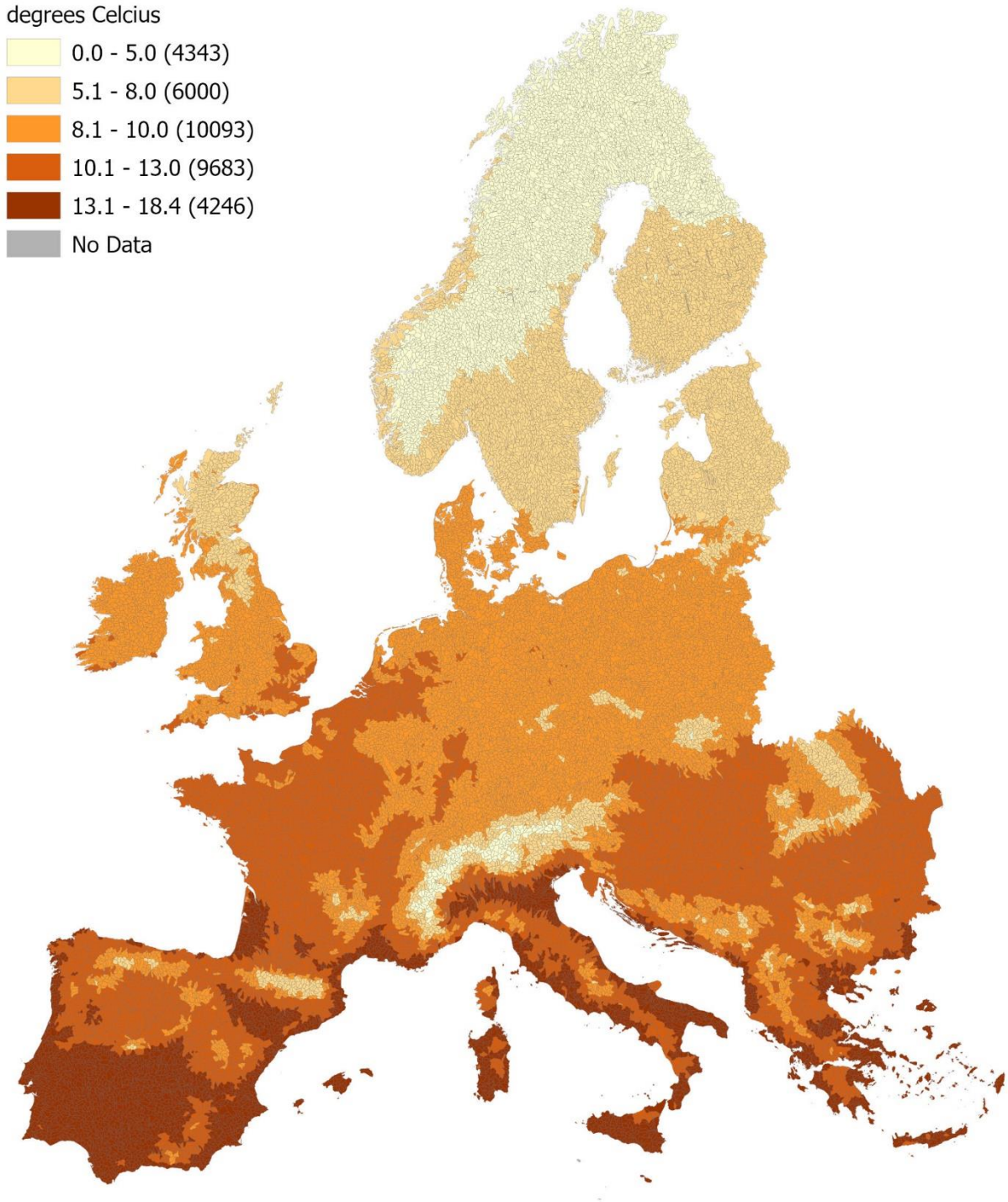
- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources

Copernicus - Hydrology-related climate impact indicators

Temporal coverage	1971 - 2000 long term average	**Spatial resolution**	E-HYPE catchments

Water Temperature in Local Streams



Indicator group	**Current State**	**Metric ID** 245	Back to Layer List

Layer name Water Temperature in Local Streams

Sub-group	Climate Baseline	**Field name**	tm_sh_sa

Description

Water temperature is the simulated water temperature in local streams. The indicator is calculated as mean annual values of water temperature from 1971 - 2000. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The water temperature data was downloaded from the data source below. The water temperature data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the water temperature values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined using the natural breaks classification with rounding to the nearest ones.

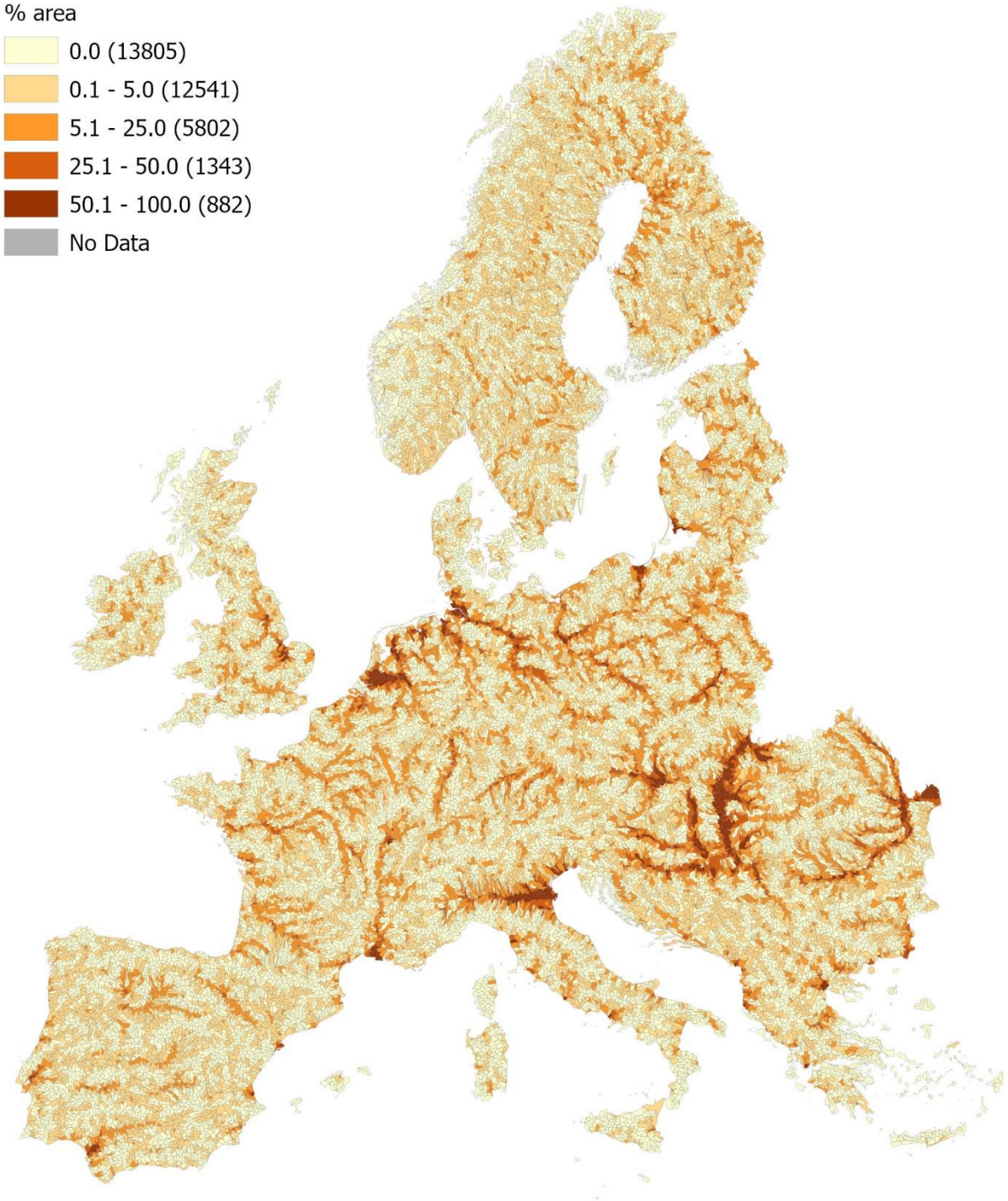
Data Uncertainties

- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources Copernicus - Hydrology-related climate impact indicators

Temporal coverage	1971 - 2000 long term average	**Spatial resolution**	E-HYPE catchments

100-year Flood Extent



Indicator group	**Current State**	**Metric ID** 247	Back to Layer List
Layer name	100-year Flood Extent		
Sub-group	Climate Baseline	**Field name**	fl_rs_sp

Description

The data for this layer is sourced from the River flood hazard maps for Europe and the Mediterranean Basin region, which depicts flood prone areas for river flood events. The flood hazard maps were produced from daily river flow data for the years 1990 - 2016 from the LISFLOOD hydrological model. Frequency distributions, peak discharge, and flood hydrographs were produced from this data to simulate flooding. Suggested uses for this data include assessing the exposure of population and economic assets to river floods, and performing flood risk assessments. However, note that the source data is based on JRC elaborations and is not an official flood hazard map.

Processing Steps

The flood risk extent for the 100 year return period and water body extent data were downloaded from the data sources below. The water bodies data was used to remove permanent water bodies from the flood risk extent data. The flood risk extent was then converted to a binary (presence/absence) raster and the percent of flooded area for each level 10 HydroBASIN catchment was calculated.

Data Normalization

Categorical data breaks were determined manually to create meaningful class breaks. Manual breaks were informed by a combination of quantile and natural breaks classification.

Data Uncertainties

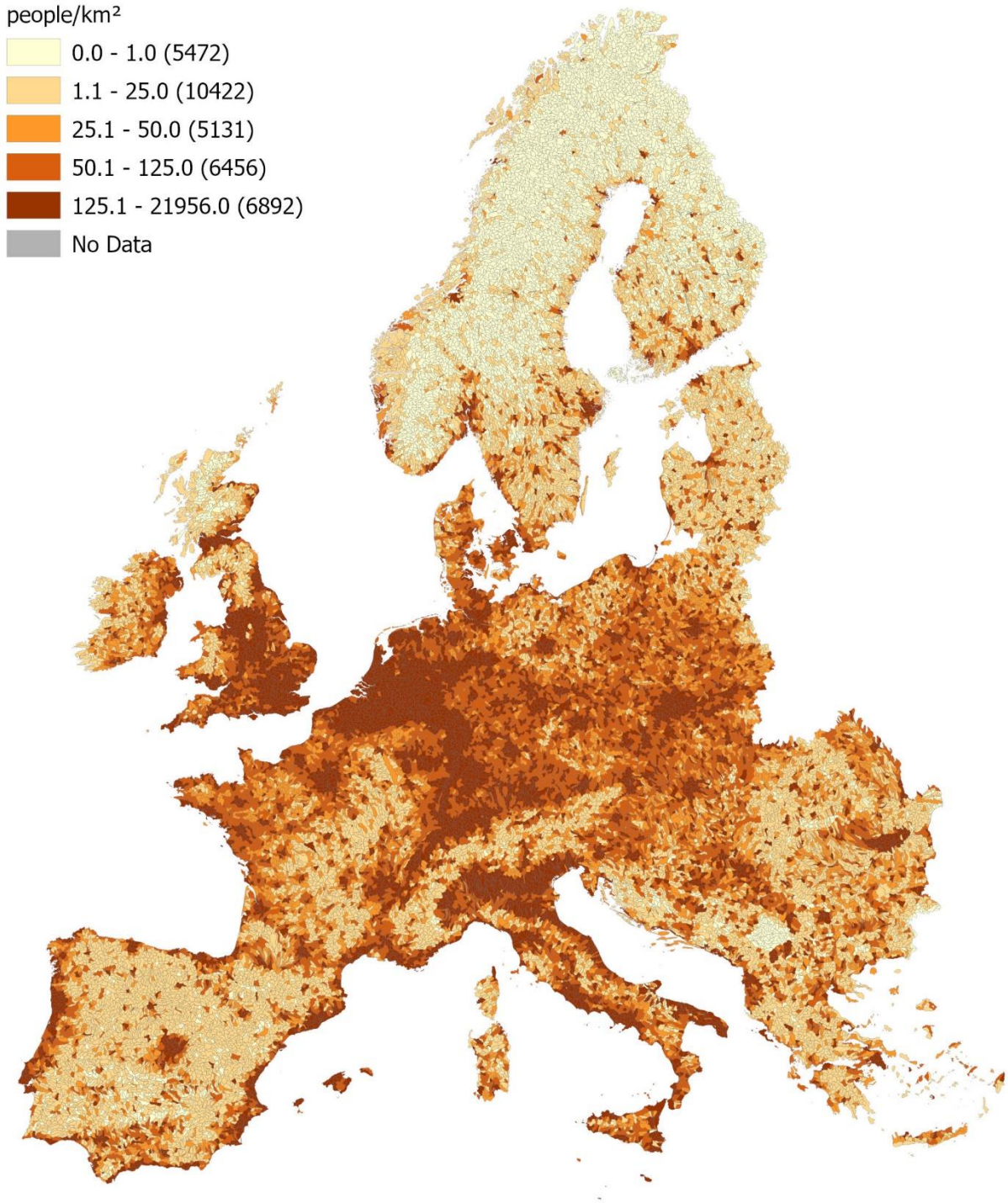
- Validation of the modelled source data determined that the 1-in-100 year return period map can identify on average two thirds of the reference flood extent (Dottori et al., 2022).
- Flood extent in flood prone areas is often overestimated (Dottori et al., 2022).
- Modelled source data does not consider flood defences, which likely contributes to overestimations in lowland areas (Dottori et al., 2022).

Data Sources

River flood hazard maps for Europe and the Mediterranean Basin region
Dottori et al., 2022

Temporal coverage	1990 - 2016	**Spatial resolution**	100m

Population Density



Indicator group	**Current State**	**Metric ID** 250	Back to Layer List
Layer name	Population Density		
Sub-group	Development Pressure	**Field name**	rw_pp_dn

Description

The data for this layer was sourced from the WorldPop population counts Constrained Individual countries 2020 UN adjusted datasets. These datasets provide an estimate for the total number of people per raster grid cell with a spatial resolution of 100 metres. Population estimates were calculated using top-down estimation modelling, where by administration unit-based census and projection population counts are disaggregated to create high resolution grid cell-based population counts. The disaggregation uses a random forest modelling approach and high resolution spatial data (e.g., building footprints and settlement data) to distribute the population counts throughout the high resolution grid. The estimates of population counts were adjusted to match United Nations national population estimates (UN 2019).

Processing Steps

The WorldPop - Constrained Individual countries 2020 UN adjusted datasets for each European country was downloaded from the data source below. A mosaic grid was created by combining all of the individual grids to create a Europe wide grid of population counts. The sum of the raster cells in each HydroBASIN catchment was calculated to determine the estimated total number of people in each catchment. Population density was then calculated by dividing the estimated total number of people in the catchment by the catchment area, measured in square kilometres.

Data Normalization

Categorical data breaks were determined using the quantile classification with rounding to the nearest 25 to make easily interpretable class breaks.

Data Uncertainties

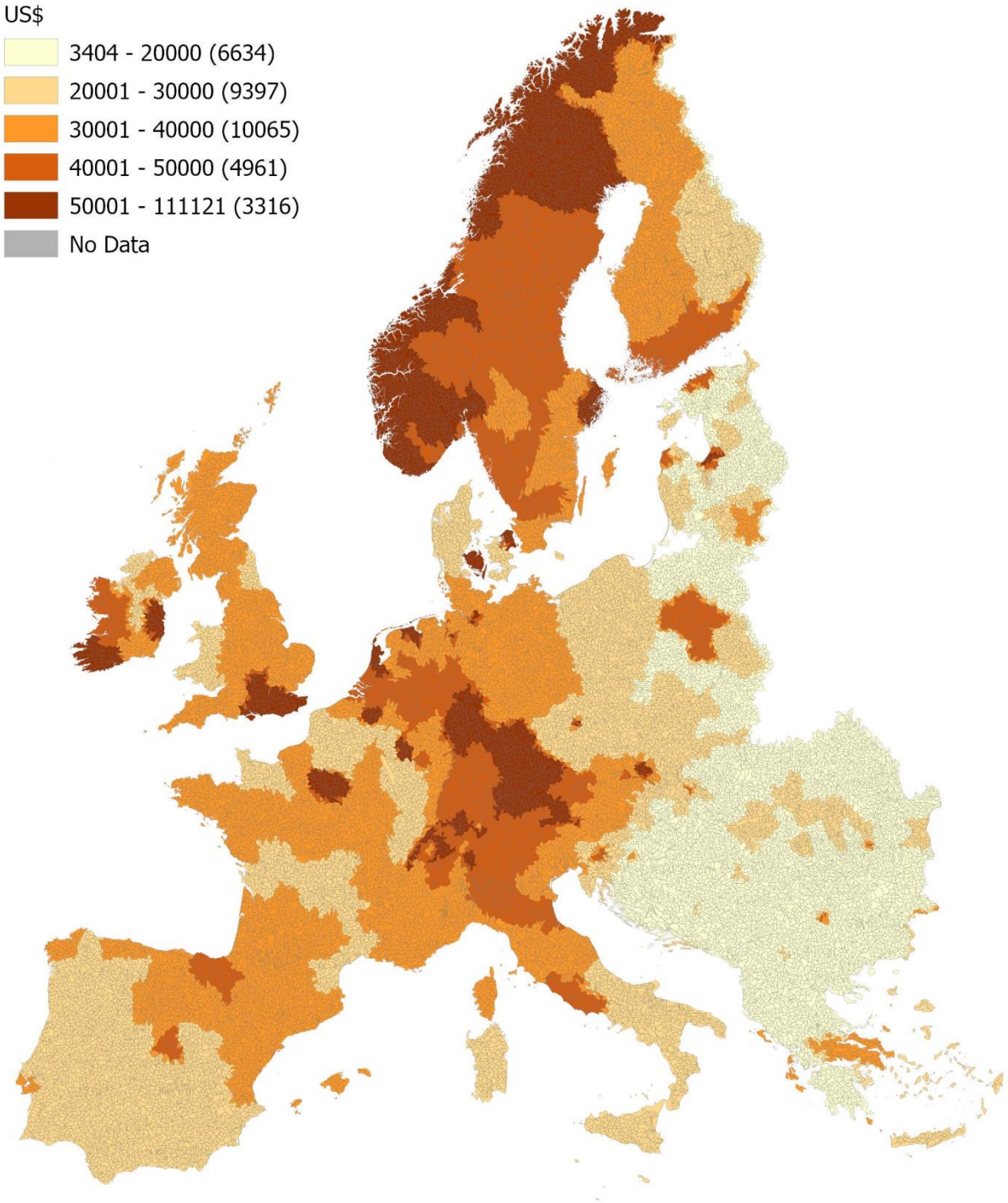
- The high resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2), contributes to low data uncertainty for this layer.
- Validation of the processed data was carried out by comparing summed population values within a country to the reported country population total. Processed population sums had high levels of agreement with reported country total population values, contributing to low data uncertainty for this layer.

Data Sources

WorldPop
Lloyd et al. 2019

Temporal coverage	2020	**Spatial resolution**	100m grid

Gross Domestic Product



Indicator group	**Current State**	**Metric ID** 52	Back to Layer List
Layer name	Gross Domestic Product		
Sub-group	Development Pressure	**Field name**	dp_ud_sa

Description

Provides the average GDP per capita in each HydroBASIN. The data comes from the Gross Domestic Product Purchasing Power Parity dataset published by Kummu et al. (2018). GDP per capita is provided for sub-national administrative units expressed as 2011 international US dollars. The dataset has a global extent with a 5 arc-min spatial resolution and is offered as an annual time series from 1990-2015. The values presented in this data layer are for 2015.

Processing Steps

The average GDP per capita is available at the level 10 HydroBASIN scale as part of HydroATLAS and as such no data processing was required.

Data Normalization

Categorical data breaks were determined using natural breaks classification with rounding to the nearest 10,000 to make easily interpretable class breaks.

Data Uncertainties

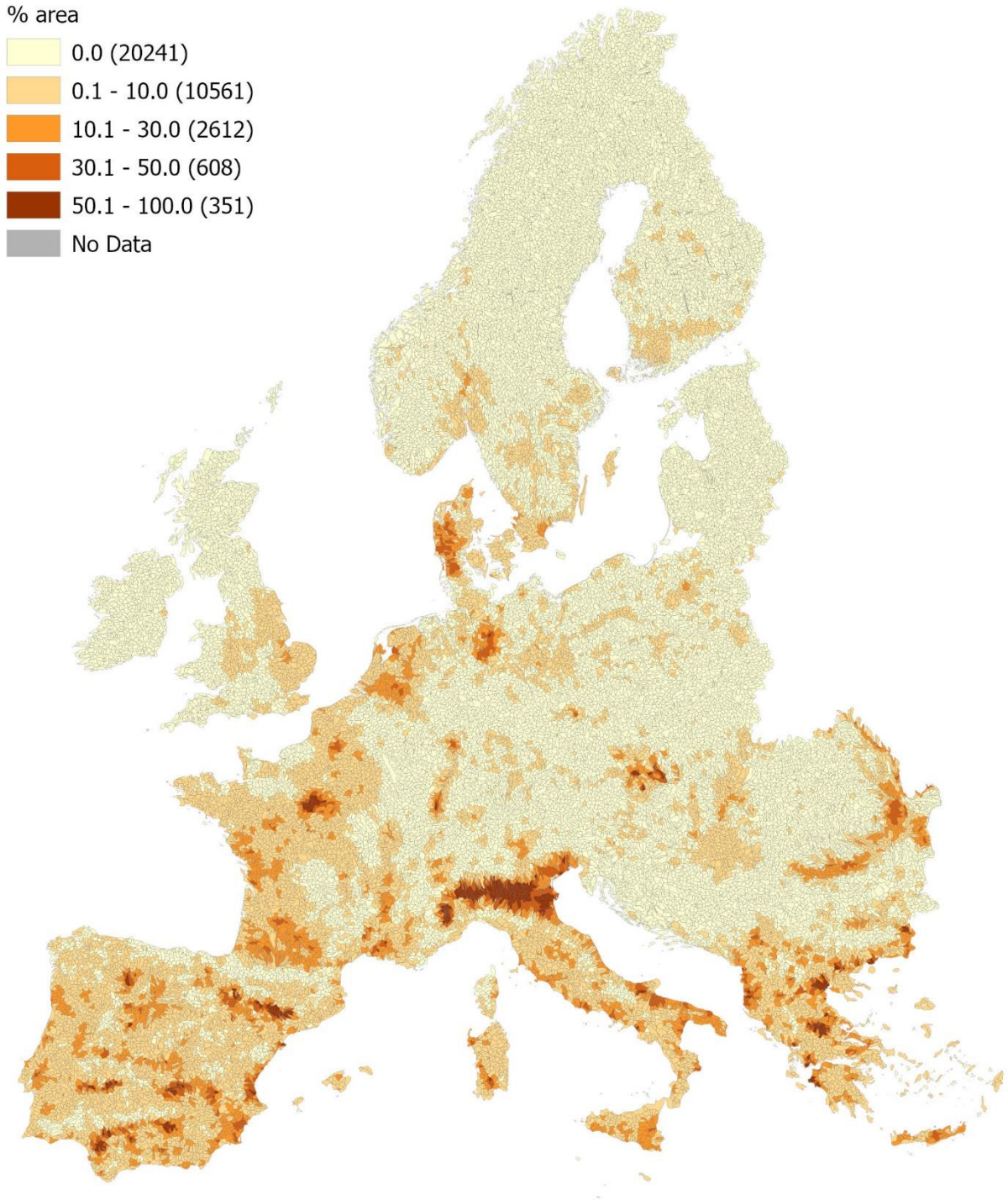
- The coarse resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2), increases the data uncertainty for this layer.

Data Sources

HydroATLAS
Kummu et al. (2018)

Temporal coverage	2015	**Spatial resolution**	5 arc-min

Irrigated Area Extent



Indicator group	**Current State**	**Metric ID** 254	Back to Layer List

Layer name Irrigated Area Extent

Sub-group	Development Pressure	**Field name**	ir_pc_sp

Description

The data was sourced from the Historical Irrigation Dataset (HID), which depicts the extent of area equipped for irrigation (AEI) for 1900 to 2005 in 5 arc-minute resolution. Eight gridded versions of time series data were created by combining subnational irrigation statistics for this period from various sources with datasets on the extent of cropland and pasture to produce spatial data of irrigation extent. Different rules were applied to maximize consistency of the gridded products to subnational irrigation statistics or to historical cropland and pasture data sets. The dataset used here includes results for the year 2005.

Processing Steps

The irrigated area extent is available at the level 10 HydroBASIN scale as part of HydroATLAS and as such no data processing was required.

Data Normalization

Categorical data breaks were determined using natural breaks classification with rounding to the nearest 10 to make easily interpretable class breaks.

Data Uncertainties

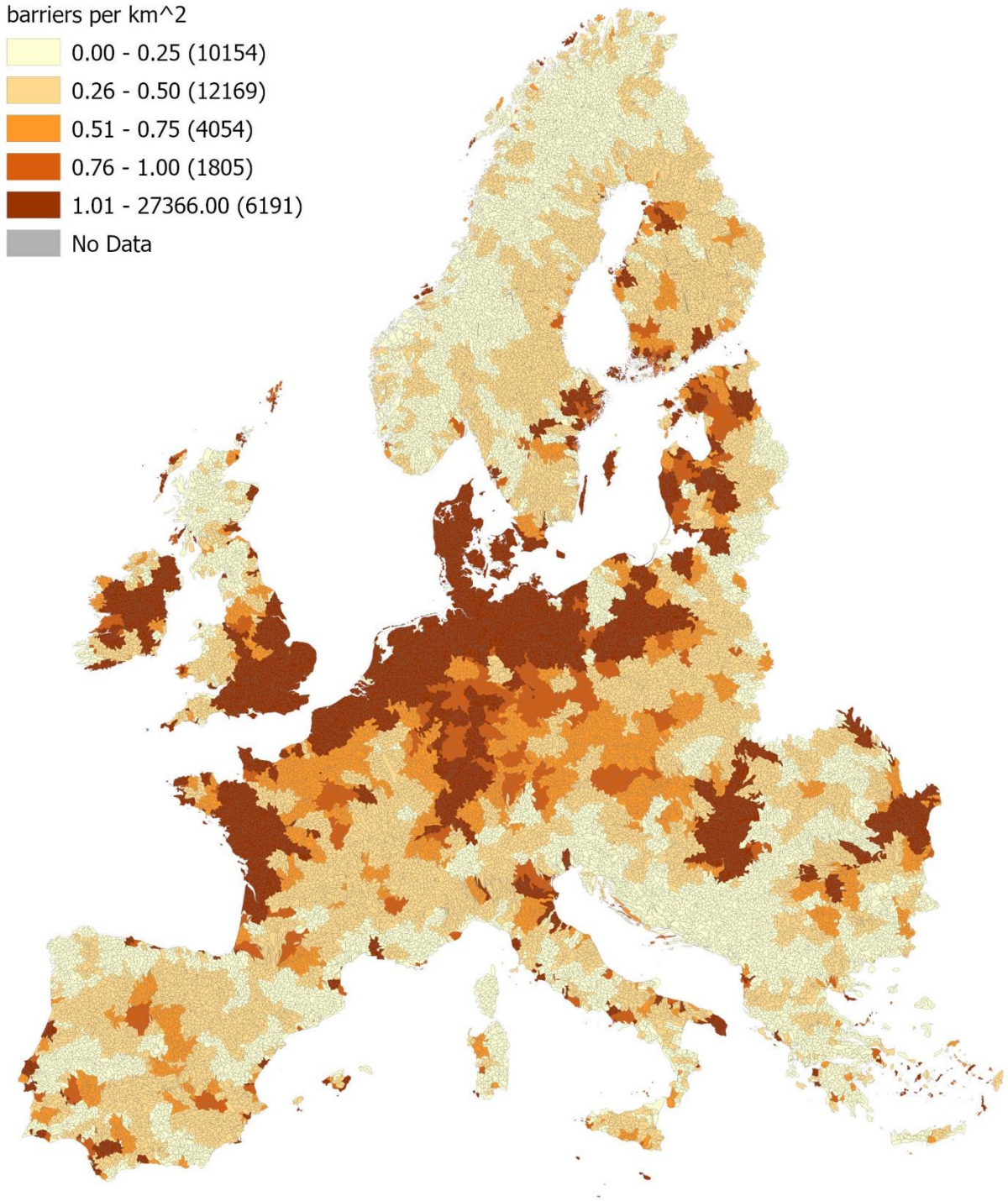
- The coarse resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2), increases the data uncertainty for this layer.

Data Sources

HydroATLAS
Historical Irrigation Dataset (HID)

Temporal coverage	2005	**Spatial resolution**	5 arc-min

Amber Barrier Density



Indicator group	**Current State**	**Metric ID** 256	Back to Layer List

Layer name AMBER Barrier Density

Sub-group Connectivity **Field name** am_br_dn

Description

The data for this layer was sourced from the AMBER Barrier Atlas. The AMBER Barrier Atlas contains barrier records for 629,955 unique barriers throughout Europe. This collection of barriers was collected from 120 databases across 36 countries. The barriers are categorized into 8 groups: dam, weir, sluice, ramp/bed sill, ford, culvert, other, and unknown. The number barriers in the database underestimates the actual number of barriers that were found during groundtruthing. To account for this, the AMBER project produced a random forest regression model using 11 variables of anthropogenic and environmental predictors to model barrier density throughout Europe. The model was able to account for barrier under-reporting throughout southern Europe, the Danube basin, the Baltic area and Ireland. However, the model also underestimated the extent of river fragmentation in Europe. Despite limitations, the modelled barrier densities were generally consistent with field corrected values and showed similar patterns across europe and in data poor areas (e.g., Danube and the Balkans).

Processing Steps

The data was downloaded from the Figshare repository specified below. The European Catchments and Rivers Network System (ECRINS) catchment polygons with modelled barrier density values were converted to a raster with a spatial resolution of 500 meters. The average value of the raster cells in each HydroBASIN catchment was then calculated to provided the average barrier density.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks.

Data Uncertainties

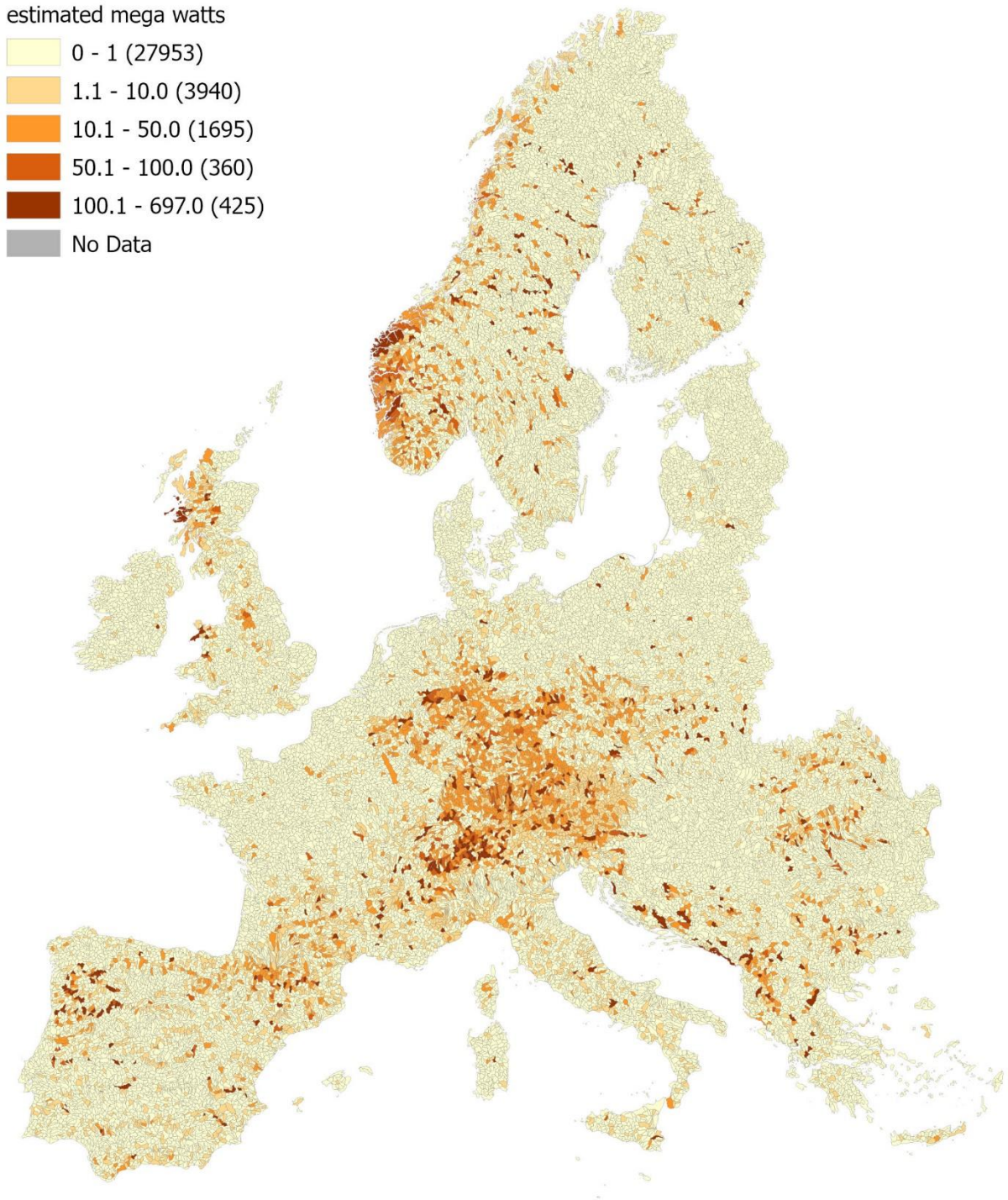
- Barrier densities were created from a random forest regression model. The model was generally consistent with field corrected values; however, the model underestimated the number of barriers in small sub-catchments, the number of barriers in flat areas of France and Poland, and the extent of river fragmentation in Europe. For further details, see Belleti et al. (2020).

Data Sources

AMBER project
AMBER Barrier Atlas
AMBER Data Figshare
Belletti et al. (2020)

Temporal coverage 2018 **Spatial resolution** NA

Hydropower


estimated mega watts
0 - 1 (27953)
1.1 - 10.0 (3940)
10.1 - 50.0 (1695)
50.1 - 100.0 (360)
100.1 - 697.0 (425)
No Data

Indicator group	**Current State**	**Metric ID** 257	Back to Layer List
Layer name	Hydropower		
Sub-group	Connectivity	**Field name**	hp_cu_pc

Description

This data is sourced from the hydropower dam inventory conducted as part of the Hydropower pressure on European rivers: The story in numbers report. The inventory was compiled from global and European dam databases and included all existing, planned, and under construction hydropower dams that generate >1 MW. Small hydropower dams that generate between 0.1 and 1 MW were considered where possible. The inventory distinguished hydropower plants into 5 categories based on installed power (0.1 - 1, 1 - < 10, 10 - < 50, 50 - < 100, > 100). Hydropower dams with less than 10 MW are considered small, between 10 MW and 50 MW are considered medium-sized, and 50 MW or larger are considered large. This data layer considers the existing and under construction hydropower dams from the inventory.

Processing Steps

Operating and under implementation hydropower dams were selected from the inventory. Each dam was assigned a value at the midpoint of the range indicated for the dam. Dams with an installed capacity greater than 100 MW were assigned 150. A spatial join was then conducted to sum the installed power of the planned dams in each HydroBASIN catchment.

Data Normalization

Categorical data breaks were determined based on the hydropower plant size categories defined by the data source.

Data Uncertainties

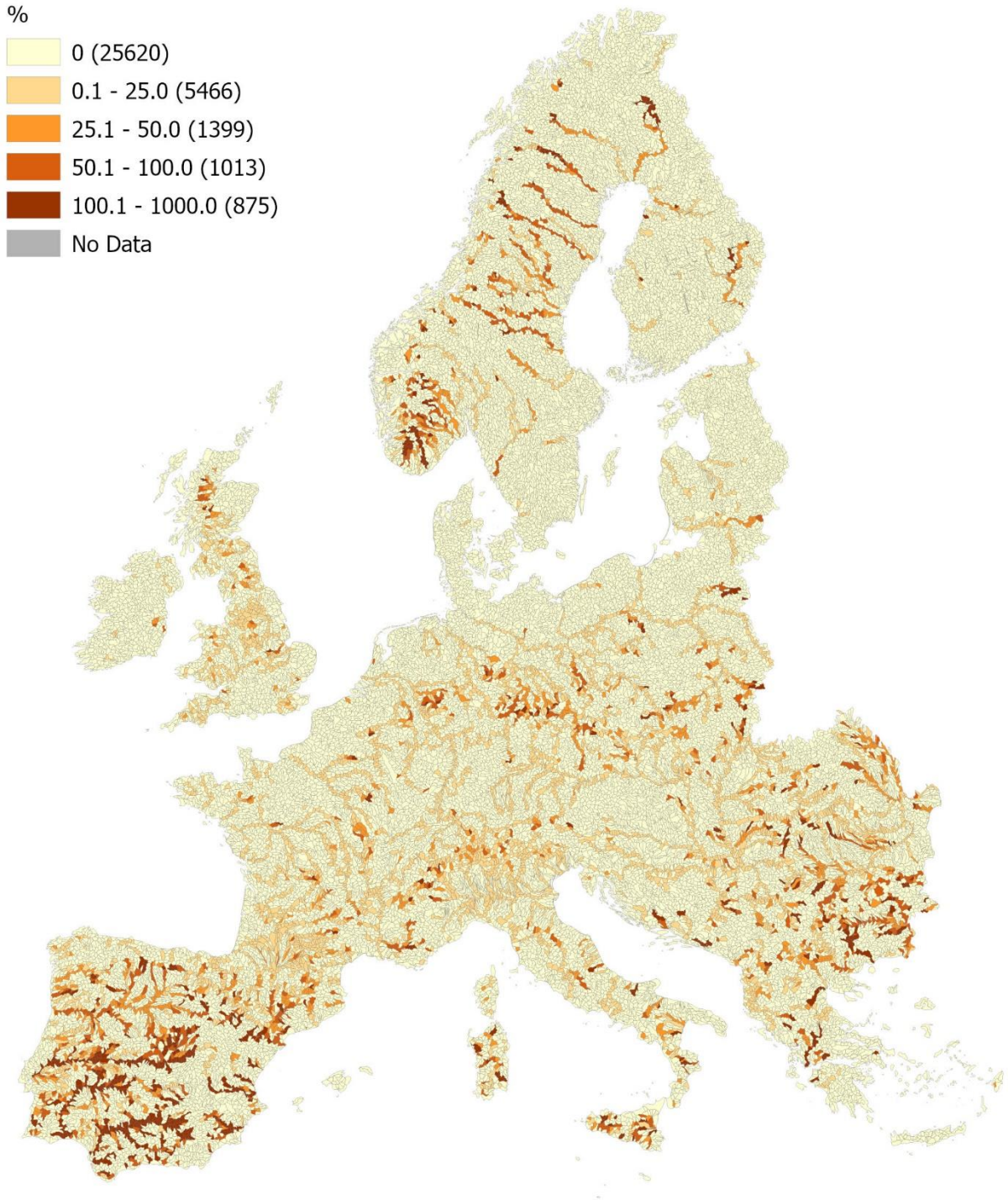
- Layer values are provided as an aggregate sum of the estimated mega watts of hydropower dams in a catchment. Due to the aggregation, a catchment value could be due to a single large dam or many small dams. These scenarios may have distinct ecological implications that can no longer be discerned from the aggregate value, increasing data uncertainty for this layer.

Data Sources

Hydropower pressure on European rivers: The story in numbers, 2019 © EuroNatur, Fluvius, GEOTA, RiverWatch, WWF.

Temporal coverage	2019	**Spatial resolution**	NA

Degree of Flow Alteration



Indicator group	**Current State**	**Metric ID** 258	Back to Layer List
Layer name	Degree of Flow Alteration		
Sub-group	Connectivity	**Field name**	dor_pva

Description

The Degree of Regulation (DOR) provides an index of how strongly a dam or set of dams can affect the natural flow regime of downstream river reaches. DOR for a river reach is calculated as the percent ratio between the total reservoir storage volume of all dams on or upstream of the reach and the the total annual discharge volume available at the reach. A high DOR value indicates an increased probability that substantial flow volumes can be stored throughout a given year and released at later times. A DOR value of 100% means that the entire annual flow can be stored, and values larger than 100% indicate multi-year storage capacities. Note that DOR values were capped at a maximum of 1000% assuming that higher estimates are likely outliers or errors.

Processing Steps

The locations of barriers to water flow were acquired from a pre-release version of the Global Dam Watch Database. A raster of the sum of barrier storage capacity was created. Flow accumulation was then calculated with the HydroSHEDS 15 arc second flow direction raster using the barrier storage capacity raster as a weight raster. An additional raster of HydroBASIN level 10 discharge values was created using the catchment pour points. The storage capacity and discharge rasters were then used to calculate a raster with DOR values. The average value of the DOR raster cells in each catchment was then calculated. DOR values were then capped at 1000.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks. Manual breaks were informed by natural breaks and quantile classification.

Data Uncertainties

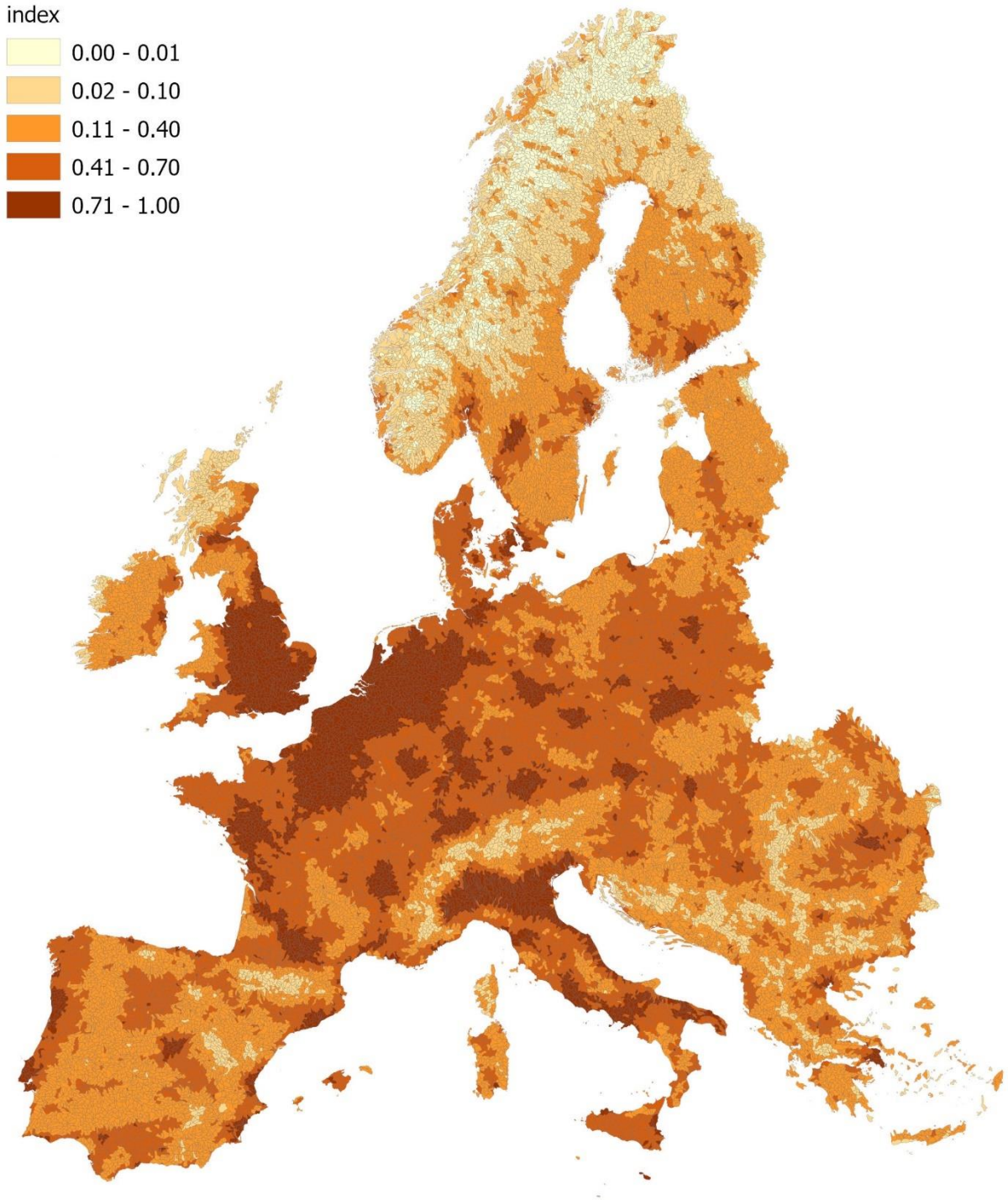
- DOR is calculated using the total potential storage volume for a given dam. The actual volume of water being stored at a given dam may be less than the total storage volume, which may result in actual flow alteration differing from the values presented in this layer.

Data Sources

Global Dam Watch
Global Dam Watch Database
HydroSHEDS

Temporal coverage	2022	**Spatial resolution**	NA

Human Modification Index



Indicator group	**Current State**	**Metric ID** 260	Back to Layer List
Layer name	Human Modification Index		
Sub-group	Development Pressure	**Field name**	hf_ix_s9

Description

The data for this layer is sourced from Human Modification Index layers created by Theobald et al. (2020). The data represents the relative human influence on the land's surface. The human modification index provides a contemporary (~2017) estimate of human modification that includes stressors covering themes of built-up areas, agriculture, energy production, mining, transportation, biological harvesting, human intrusions, natural system modifications, and pollution.

Processing Steps

The 300-meter resolution human modification index rasters for 2017 corresponding to the study area were merged into a single raster. The average of the raster cell values in each HydroBASIN catchment was then calculated.

Data Normalization

Categorical data breaks were determined following the thresholds provided by Kennedy et al. (2019).

Data Uncertainties

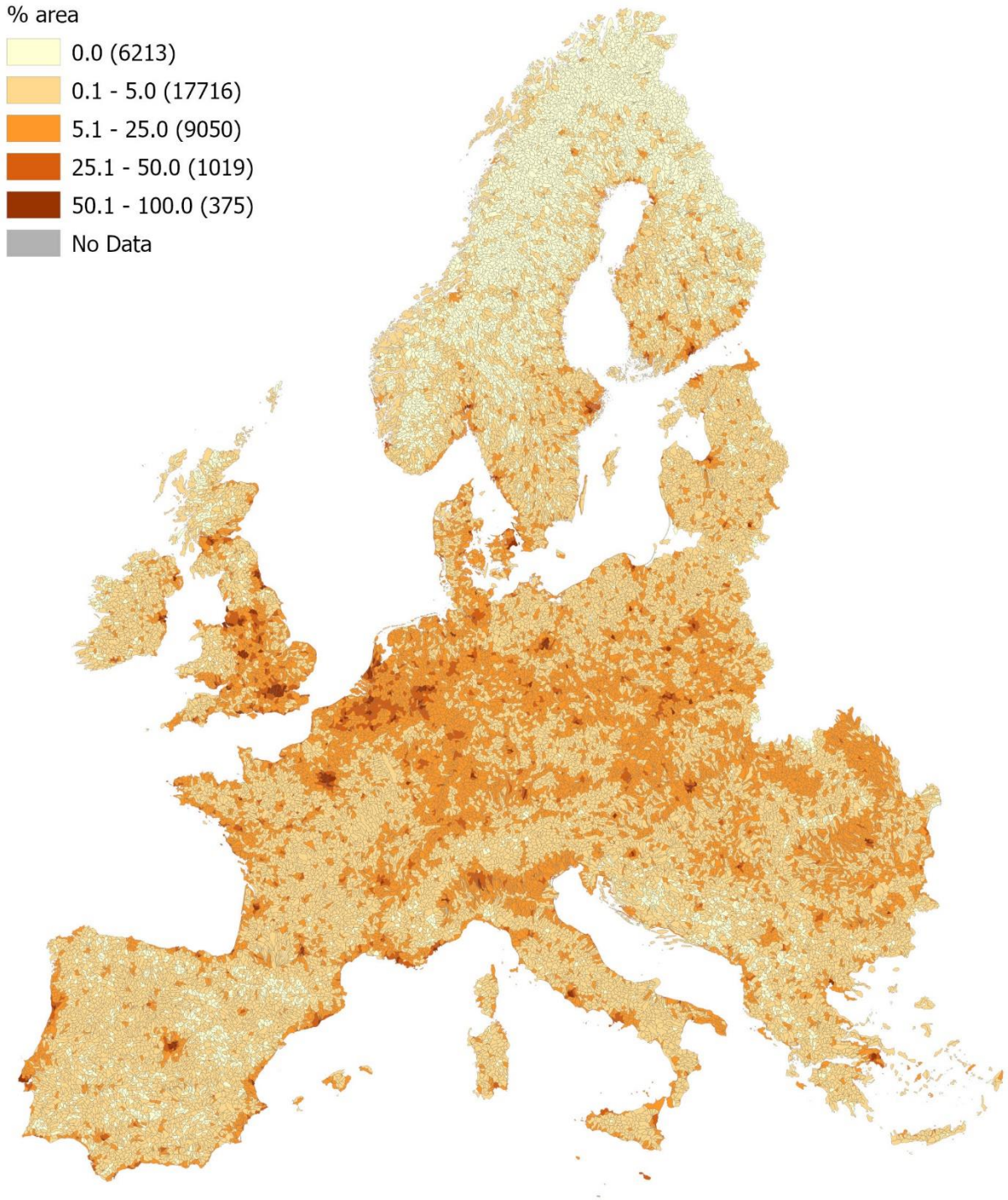
- The source data is provided at a high spatial resolution of 300 meters, relative to the average area of HydroBASIN level 10 catchments (~150km^2), contributing to low data uncertainty for this layer.
- Strong agreement was found between the data source layer and a validation dataset (r = 0.783), contributing to low data uncertainty for this layer. See Theobald et al. (2020) for further details on data source validation.

Data Sources

HydroATLAS
Venter et al. 2016

Temporal coverage	2009	**Spatial resolution**	5 arc-minute grid

Artificial Surfaces



Indicator group **Current State** **Metric ID** 265 Back to Layer List

Layer name Artificial Surfaces

Sub-group Land Use / Cover **Field name** lc_pr_s1

Description

The CORINE Land Cover database contains 44 land cover classes grouped into 5 main land cover / use groups. The database is updated every 6 years, with the current data from 2018. Ortho-corrected satellite images with a high spatial resolution provide the spatial and thematic basis of the mapping data. A combination of manual photo-interpretation and semi-automated processes are used to create the land cover classifications, with a minimum mapping unit of 25 hectares. This layer considers the class 1 landcover category, artificial surfaces, which includes urban, industrial, commercial, transportation, mines, dumps, construction, and artificial non-agricultural areas.

Processing Steps

The CORINE land cover data was downloaded from the data source below. The land cover raster was reclassified to the CORINE level 1 classes. A binary (presence/absence) raster was created from the artificial surface land cover class. The binary raster was area corrected by multiplying by a grid of true pixel area measured in hectares. The sum of the artificial surface land cover class area was then calculated in each level 10 HydroBASIN catchment. The area of artificial surfaces in each level 10 HydroBASIN catchment was converted to percent area by dividing by the catchment area. Additionally, a narrow band of catchments at the eastern border of the study area were outside the area covered by the CORINE land cover raster. These no data catchments were filled using the values from the catchment with the nearest centroid that had data values.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks that are consistent across the land cover layers. Manual breaks were informed by natural breaks and quantile classification.

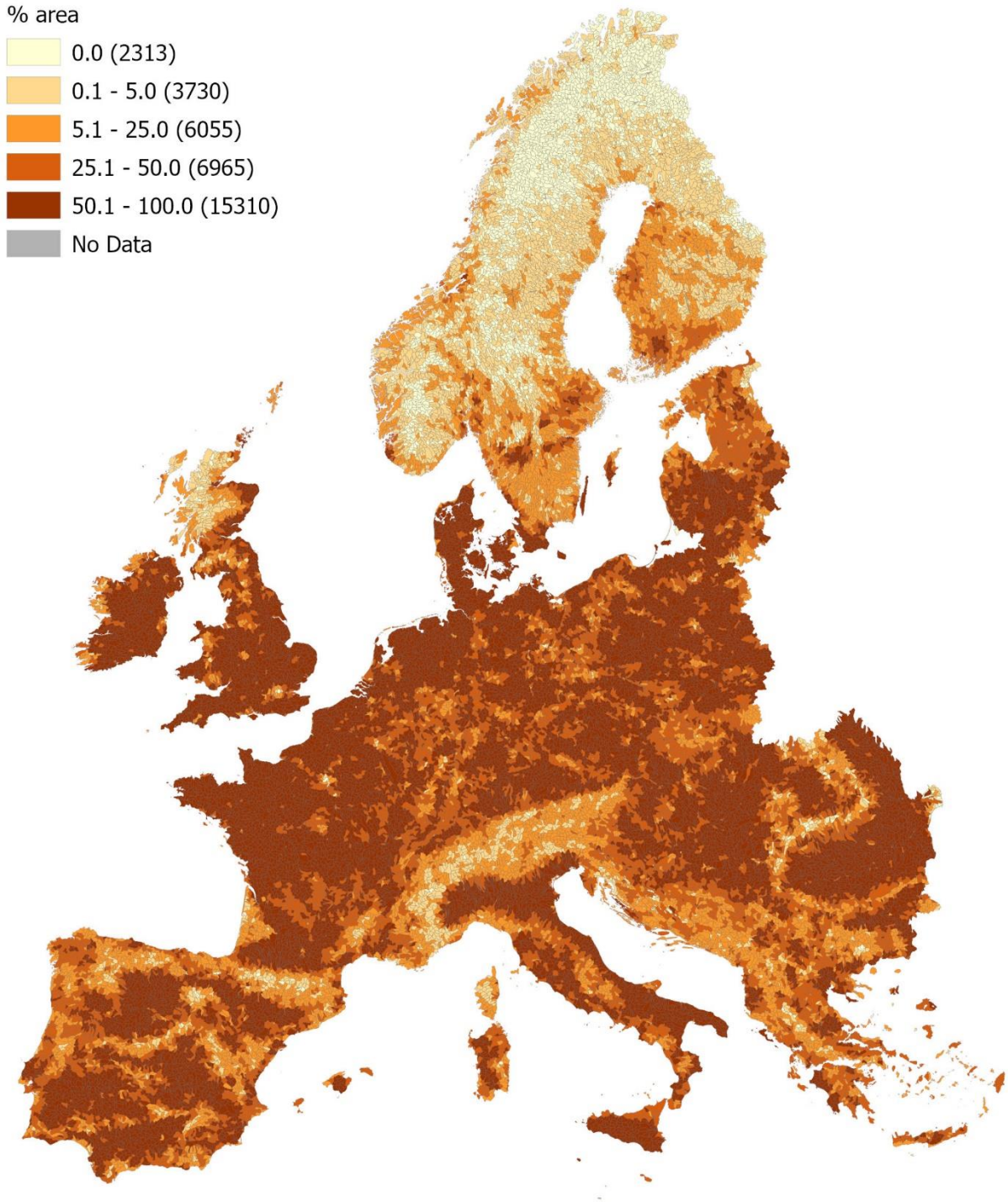
Data Uncertainties

- Source data for this layer has a high spatial resolution of 100-meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) results in low data uncertainty for this layer.
- The source landcover data was validated to have a high accuracy (above 85%) for all areas of the study area resulting in low data uncertainty for this layer.

Data Sources CORINE Land Cover

Temporal coverage 2018 **Spatial resolution** 100m grid

Agricultural Areas



Indicator group **Current State** **Metric ID** 270 Back to Layer List

Layer name Agricultural Area

Sub-group Land Use / Cover **Field name** lc_pr_s2

Description

The CORINE Land Cover database contains 44 land cover classes grouped into 5 main land cover / use groups. The database is updated every 6 years, with the current data from 2018. Ortho-corrected satellite images with a high spatial resolution provide the spatial and thematic basis of the mapping data. A combination of manual photo-interpretation and semi-automated processes are used to create the land cover classifications, with a minimum mapping unit of 25 hectares. This layer considers the class 2 landcover category, agricultural areas, which includes arable land, permanent crops, pastures, and heterogeneous agricultural areas.

Processing Steps

The CORINE land cover data was downloaded from the data source below. The land cover raster was reclassified to the CORINE level 1 classes. A binary (presence/absence) raster was created from the agricultural area land cover class. The binary raster was area corrected by multiplying by a grid of true pixel area measured in hectares. The sum of the agricultural land cover class area was then calculated in each level 10 HydroBASIN catchment. The area of agriculture in each level 10 HydroBASIN catchment was converted to percent area by dividing by the catchment area. Additionally, a narrow band of catchments at the eastern border of the study area were outside the area covered by the CORINE land cover raster. These no data catchments were filled using the values from the catchment with the nearest centroid that had data values.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks that are consistent across the land cover layers. Manual breaks were informed by natural breaks and quantile classification.

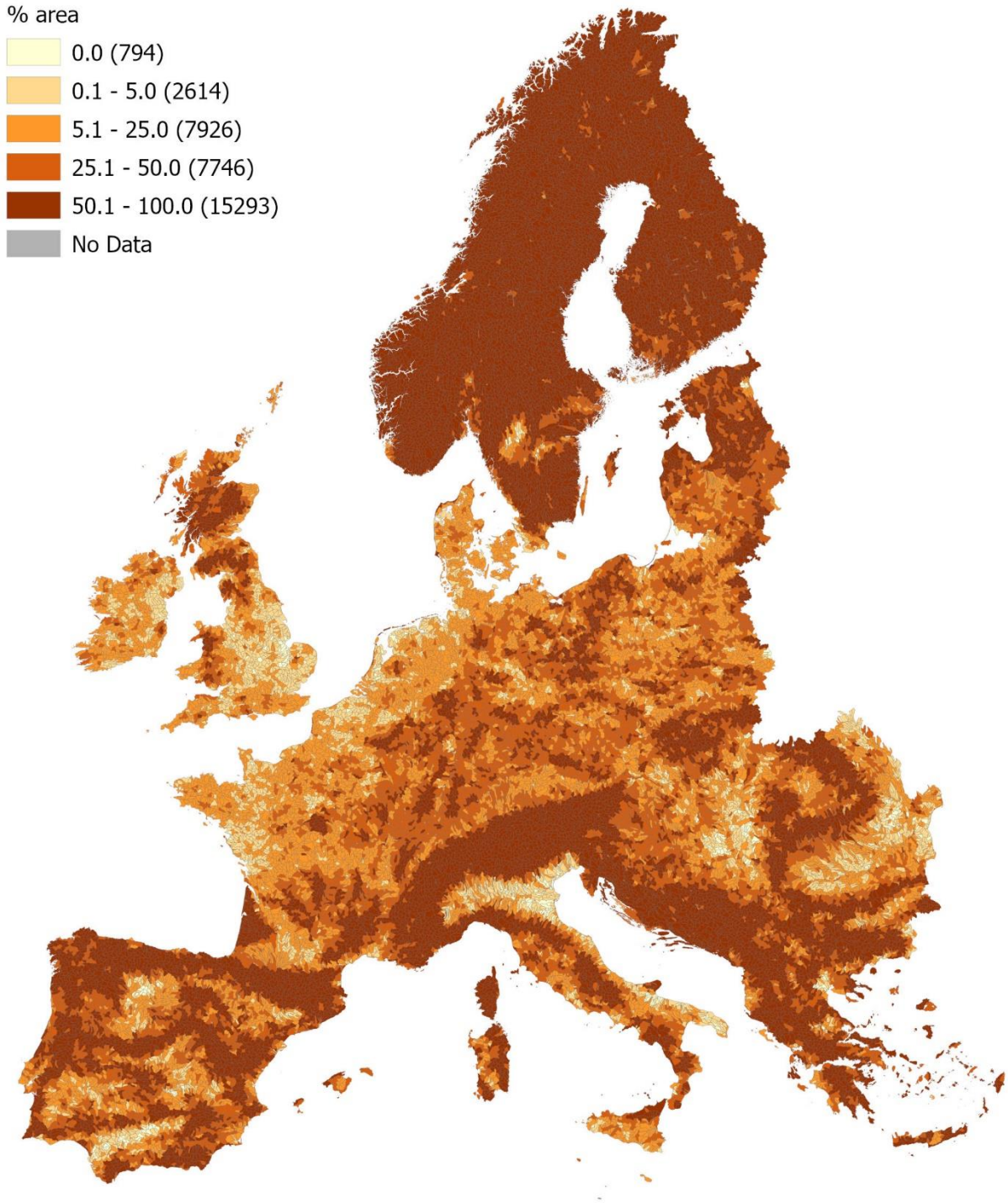
Data Uncertainties

- Source data for this layer has a high spatial resolution of 100-meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) results in low data uncertainty for this layer.
- The source landcover data was validated to have a high accuracy (above 85%) for all areas of the study area resulting in low data uncertainty for this layer.

Data Sources CORINE Land Cover

Temporal coverage 2018 **Spatial resolution** 100m grid

Forest and Semi-Natural Areas



Indicator group **Current State** **Metric ID** 275 Back to Layer List

Layer name Forest and Semi-Natural Areas

Sub-group Land Use / Cover **Field name** lc_pr_s3

Description

The CORINE Land Cover database contains 44 land cover classes grouped into 5 main land cover / use groups. The database is updated every 6 years, with the current data from 2018. Ortho-corrected satellite images with a high spatial resolution provide the spatial and thematic basis of the mapping data. A combination of manual photo-interpretation and semi-automated processes are used to create the land cover classifications, with a minimum mapping unit of 25 hectares. This layer considers the class 3 landcover category, forest and semi-natural areas, which includes forests, scrub and/or herbaceous associations, and open spaces with little or no vegetation.

Processing Steps

The CORINE land cover data was downloaded from the data source below. The land cover raster was reclassified to the CORINE level 1 classes. A binary (presence/absence) raster was created from the forest and semi-natural areas land cover class. The binary raster was area corrected by multiplying by a grid of true pixel area measured in hectares. The sum of the forest and semi-natural areas land cover class area was then calculated in each level 10 HydroBASIN catchment. The area of forest and semi-natural areas in each level 10 HydroBASIN catchment was converted to percent area by dividing by the catchment area. Additionally, a narrow band of catchments at the eastern border of the study area were outside the area covered by the CORINE land cover raster. These no data catchments were filled using the values from the catchment with the nearest centroid that had data values.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks that are consistent across the land cover layers. Manual breaks were informed by natural breaks and quantile classification.

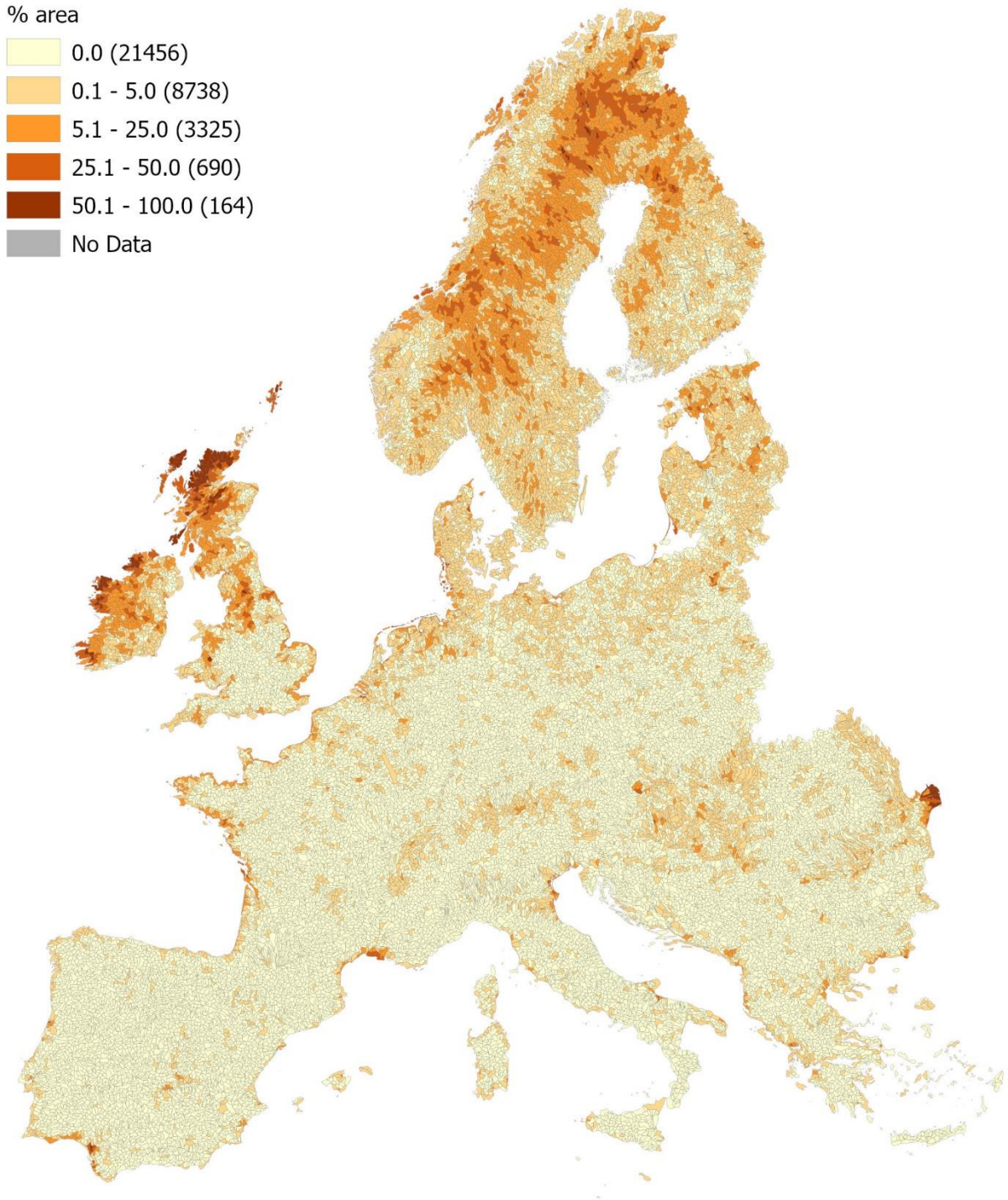
Data Uncertainties

- Source data for this layer has a high spatial resolution of 100-meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) results in low data uncertainty for this layer.
- The source landcover data was validated to have a high accuracy (above 85%) for all areas of the study area resulting in low data uncertainty for this layer.

Data Sources CORINE Land Cover

Temporal coverage 2018 **Spatial resolution** 100m grid

Wetlands


% area
0.0 (21456)
0.1 - 5.0 (8738)
5.1 - 25.0 (3325)
25.1 - 50.0 (690)
50.1 - 100.0 (164)
No Data

Indicator group	**Current State**	**Metric ID** 280	Back to Layer List
Layer name	Wetland		
Sub-group	Land Use / Cover	**Field name**	lc_pr_s4

Description

The CORINE Land Cover database contains 44 land cover classes grouped into 5 main land cover / use groups. The database is updated every 6 years, with the current data from 2018. Ortho-corrected satellite images with a high spatial resolution provide the spatial and thematic basis of the mapping data. A combination of manual photo-interpretation and semi-automated processes are used to create the land cover classifications, with a minimum mapping unit of 25 hectares. This layer considers the class 4 landcover category, wetlands, which includes inland wetlands and marine wetlands.

Processing Steps

The CORINE land cover data was downloaded from the data source below. The land cover raster was reclassified to the CORINE level 1 classes. A binary (presence/absence) raster was created from the wetland land cover class. The binary raster was area corrected by multiplying by a grid of true pixel area measured in hectares. The sum of the wetland land cover class area was then calculated in each level 10 HydroBASIN catchment. The area of wetlands in each level 10 HydroBASIN catchment was converted to percent area by dividing by the catchment area. Additionally, a narrow band of catchments at the eastern border of the study area were outside the area covered by the CORINE land cover raster. These no data catchments were filled using the values from the catchment with the nearest centroid that had data values.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks that are consistent across the land cover layers. Manual breaks were informed by natural breaks and quantile classification.

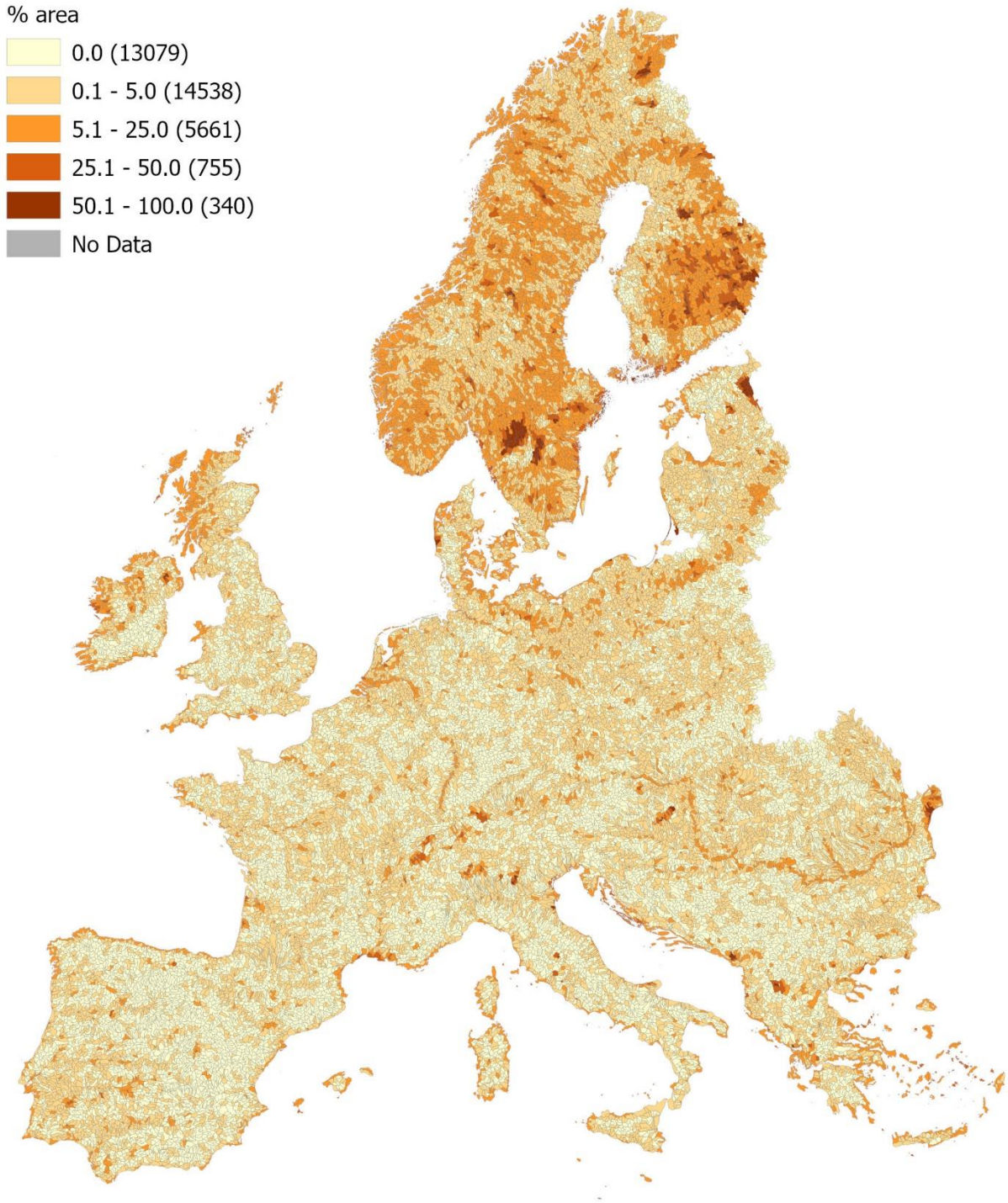
Data Uncertainties

- Source data for this layer has a high spatial resolution of 100-meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) results in low data uncertainty for this layer.
- The source landcover data was validated to have a high accuracy (above 85%) for all areas of the study area resulting in low data uncertainty for this layer.

Data Sources CORINE Land Cover

Temporal coverage	2018	**Spatial resolution**	100m grid

Water Bodies



Indicator group **Current State** **Metric ID** 285 Back to Layer List

Layer name Water Bodies

Sub-group Land Use / Cover **Field name** lc_pr_s5

Description

The CORINE Land Cover database contains 44 land cover classes grouped into 5 main land cover / use groups. The database is updated every 6 years, with the current data from 2018. Ortho-corrected satellite images with a high spatial resolution provide the spatial and thematic basis of the mapping data. A combination of manual photo-interpretation and semi-automated processes are used to create the land cover classifications, with a minimum mapping unit of 25 hectares. This layer considers the class 5 landcover category, water, which includes inland waters and marine waters.

Processing Steps

The CORINE land cover data was downloaded from the data source below. The land cover raster was reclassified to the CORINE level 1 classes. A binary (presence/absence) raster was created from the water land cover class. The binary raster was area corrected by multiplying by a grid of true pixel area measured in hectares. The sum of the water land cover class area was then calculated in each level 10 HydroBASIN catchment. The area of water in each level 10 HydroBASIN catchment was converted to percent area by dividing by the catchment area. Additionally, a narrow band of catchments at the eastern border of the study area were outside the area covered by the CORINE land cover raster. These no data catchments were filled using the values from the catchment with the nearest centroid that had data values.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks that are consistent across the land cover layers. Manual breaks were informed by natural breaks and quantile classification.

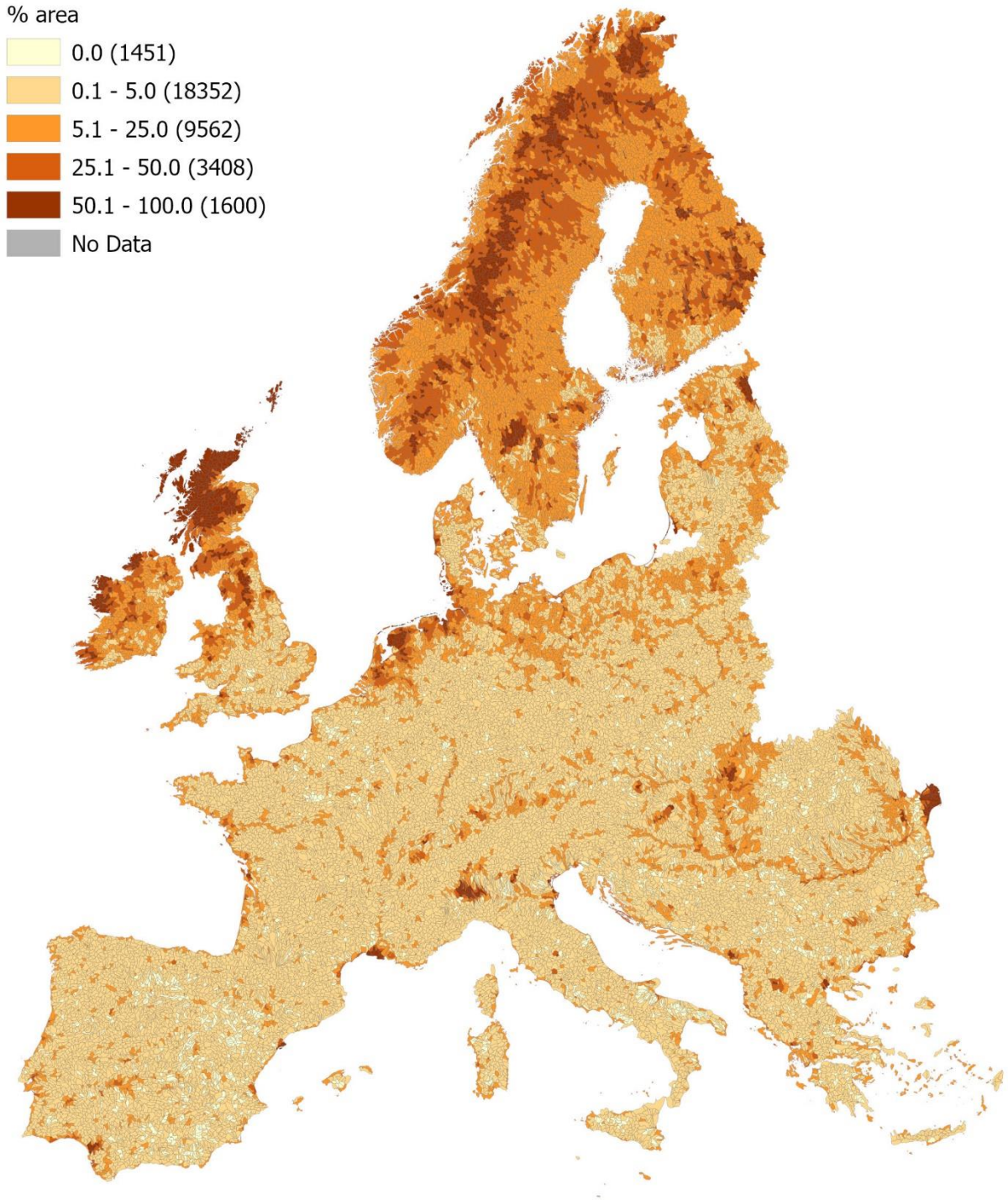
Data Uncertainties

- Source data for this layer has a high spatial resolution of 100-meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) results in low data uncertainty for this layer.
- The source landcover data was validated to have a high accuracy (above 85%) for all areas of the study area resulting in low data uncertainty for this layer.

Data Sources CORINE Land Cover

Temporal coverage 2018 **Spatial resolution** 100m grid

Extended Wetland Area Including Water



Indicator group	**Current State**	**Metric ID** 290	Back to Layer List
Layer name	Extended Wetland Extent Including Water Areas		
Sub-group	Land Use / Cover	**Field name**	wl_se_sp

Description

The source data for this layer presents wetland ecosystem extent in 2018 across Europe. The dataset includes 20 classes of wetlands, which includes inland and coastal wetlands as well as transitional ecosystems, such as riparian forests, wet grasslands, estuaries, or rice fields. The development of this dataset is in accordance with the definition of the Ramsar convention which builds on an ecosystem-based justification of an inclusive definition, delimitation and delineation of wetlands, looking at the "hydro-ecological" boundaries of this ecosystem (including their wetness and flow characteristics).

Processing Steps

The extended wetland dataset was downloaded from the data source below. The wetland raster was projected to match the coordinate system of the HydroBASIN catchments and resampled to a cell size of 50 metres.
The raster was then reclassified into wetland (value = 1) and non-wetland (value = 0) habitats. Zonal statistics was then used to determine the mean value in each HydroBASIN. The mean for each HydroBASIN catchment was then multiplied by 100 to convert the value to percent. A series of catchments along the eastern border of the study area were outside the coverage of the extended wetland raster and had no data values. These no data catchments were filled using the values from the catchment with the nearest centroid that had data values.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks that are consistent across the land cover layers. Manual breaks were informed by natural breaks and quantile classification.

Data Uncertainties

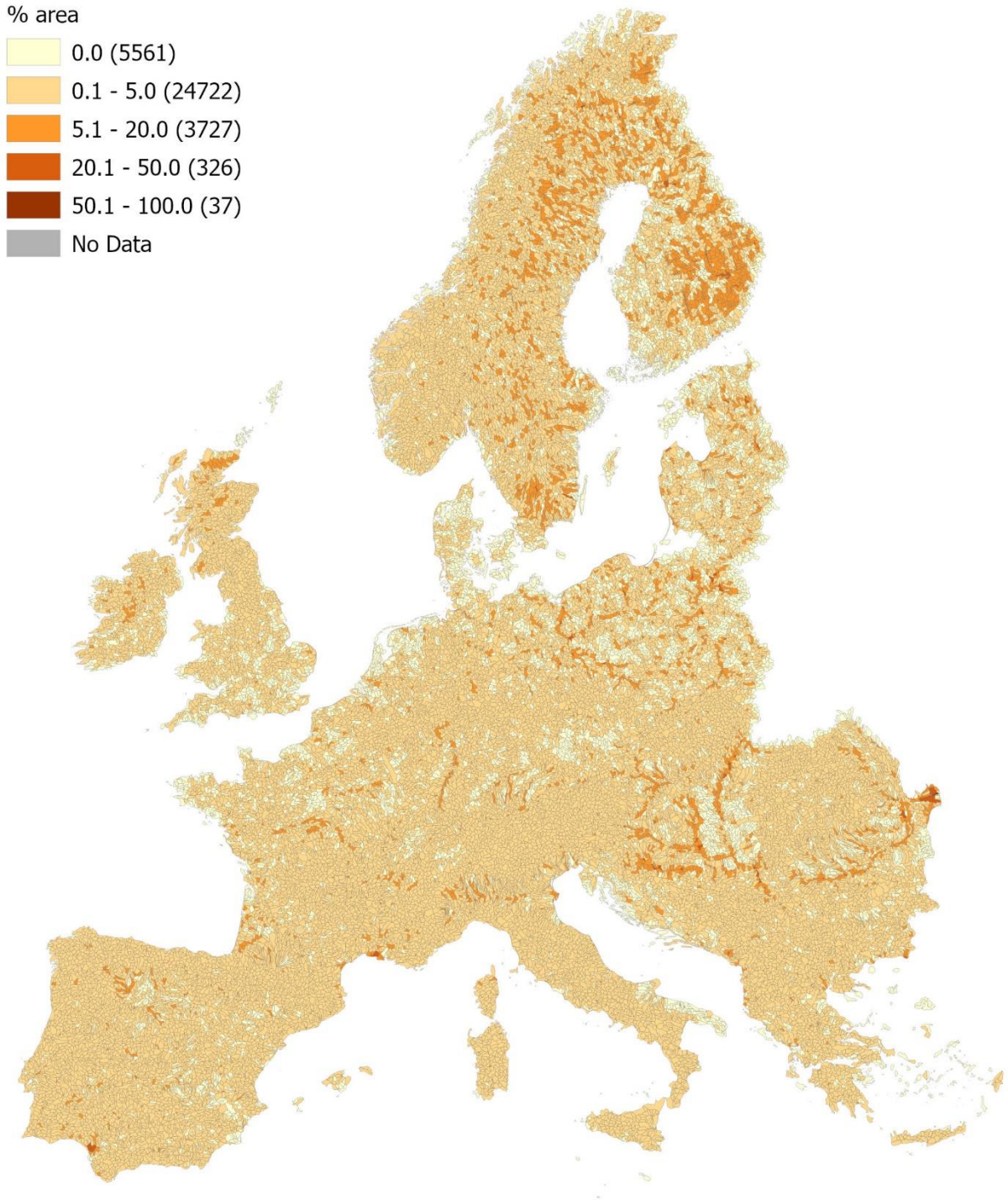
- Source data for this layer has a high spatial resolution of 100-meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) contributes to low data uncertainty for this layer.

Data Sources

Extended wetland ecosystem layer 2018 (raster 100m) version 1, Jul. 2021

Temporal coverage	2018	**Spatial resolution**	100m grid

Riparian Zones - Observable



Indicator group **Current State** **Metric ID** 292 Back to Layer List

Layer name Riparian Zones - Observable

Sub-group Land Use / Cover **Field name** rw_ro_sp

Description

The Observable Riparian Zone shows the observed extent of riparian features (often riparian vegetation, but including e.g. also riverbanks). The Copernicus delineation of observable riparian zones is based on riparian zone land cover and layers of vegetation, water, and soil. Classification is determined by a segmentation approach incorporating all input datasets. The output dataset is produced by combining the classifications from the input layers to produce a probability of encountering riparian features on the ground.

Processing Steps

The riparian zone delineations were downloaded from the data source provided below. The riparian zone data is provided in a series of delivery units that were first merged to create one riparian zone feature class for all of Europe. A union was created between the riparian zone polygons and the HydroBASIN catchment polygons. The percent area of observable riparian features in each HydroBASIN catchment was then calculated.

Data Normalization

Categorical data breaks were determined based on natural breaks with manual modification to create meaningful and easily interpretable class breaks that are consistent across the riparian zone layers.

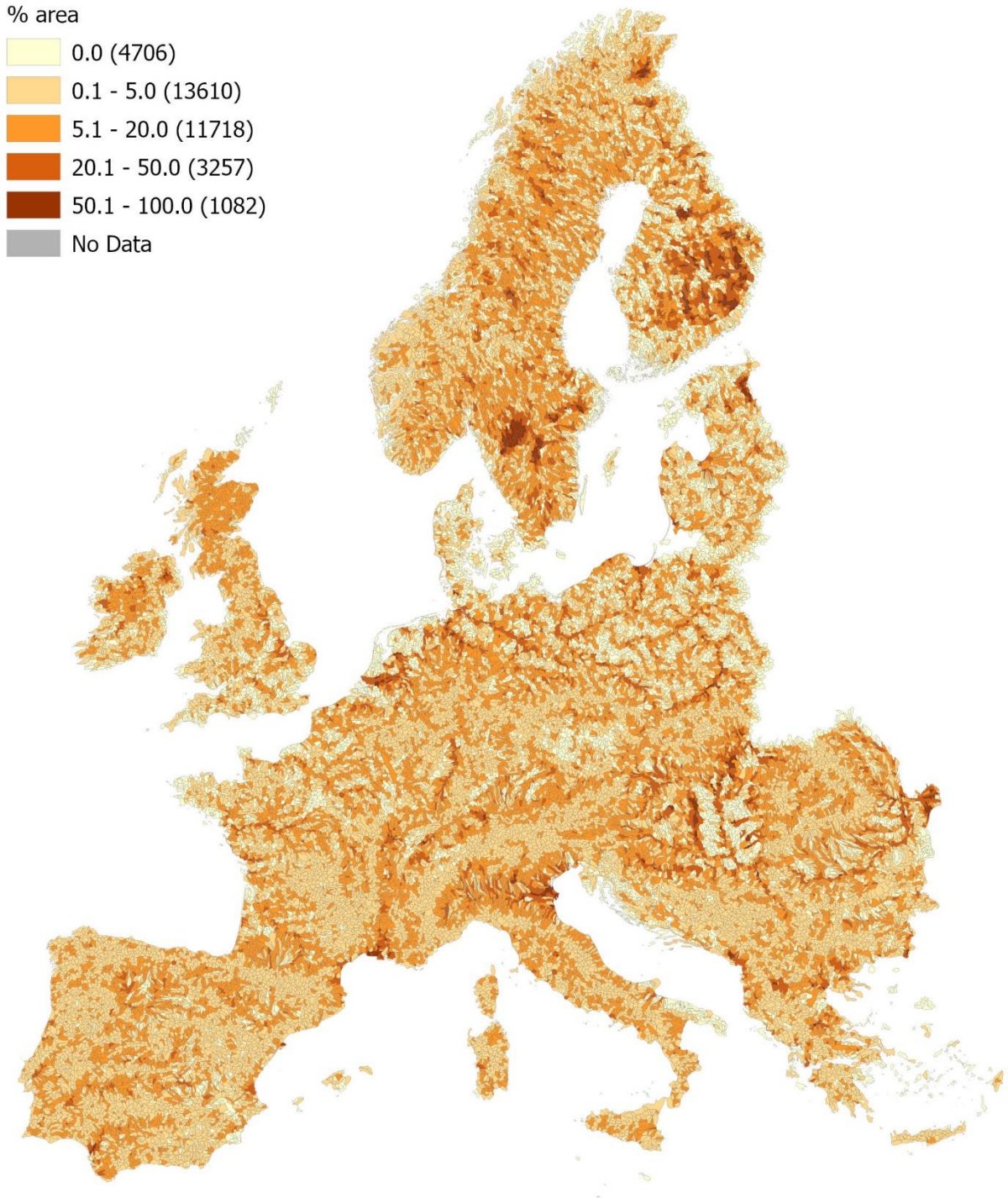
Data Uncertainties

- Source data for this layer has a high spatial resolution with a minimum mapping unit area of 0.5 hectares and a minimum width of 10 meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) results in low data uncertainty for this layer.
- Source data was validated using a qualitative expert assessment approach (see data source for details), contributing to low data uncertainty for this layer.

Data Sources Copernicus - Delineation of Riparian Zones

Temporal coverage 2011-2013 **Spatial resolution** 0.5 ha

Riparian Zones - Potential



Indicator group	**Current State**	**Metric ID** 293	Back to Layer List

Layer name Riparian Zones - Potential

Sub-group Land Use / Cover **Field name** rw_rp_sp

Description

The potential riparian zone is a modelled area with a high probability to host riparian features. The Copernicus delineation of observable riparian zones is based on topography, land cover, flood hazard maps, and the Harmonized World Soil Database. Potential riparian zones are delineated using a stratification approach of hydrological and geomorphological parameters. These parameters are derived from the input datasets and weighted depending on data quality and significance. The output dataset is produced by combining the membership degree of the input parameters to produce a probability of an area being part of a potential riparian zone.

Processing Steps

The riparian zone delineations were downloaded from the data source provided below. The riparian zone data is provided in a series of delivery units that were first merged to create one riparian zone feature class for all of Europe. A union was created between the riparian zone polygons and the HydroBASIN catchment polygons. The percent area of potential riparian features in each HydroBASIN catchment was then calculated.

Data Normalization

Categorical data breaks were determined based on natural breaks with manual modification to create meaningful and easily interpretable class breaks that are consistent across the riparian zone layers.

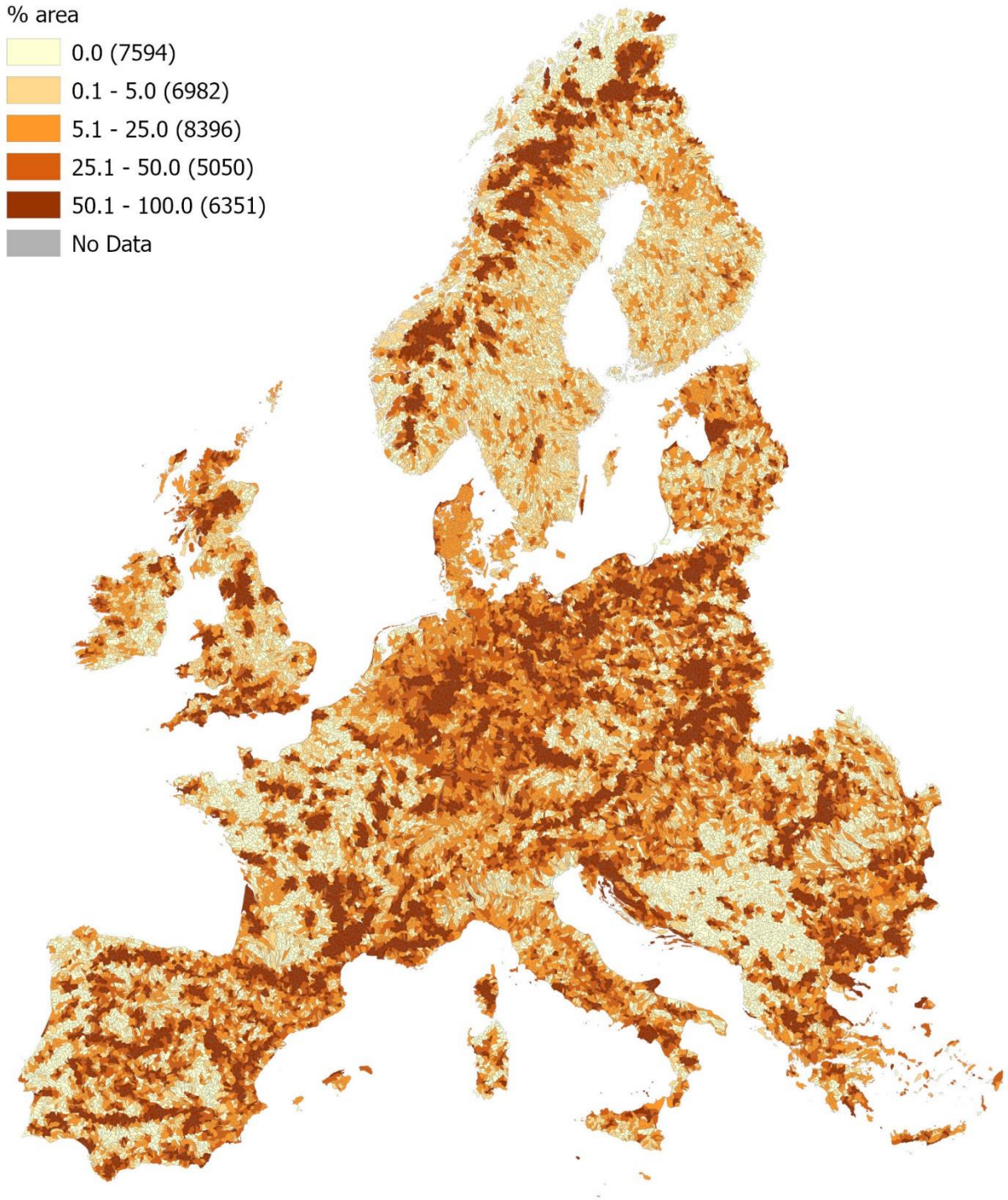
Data Uncertainties

- Source data for this layer has a high spatial resolution with a minimum mapping unit area of 0.5 hectares and a minimum width of 10 meters. The high resolution of the data relative to the average HydroBASIN level 10 catchment area (~150km^2) results in low data uncertainty for this layer.
- Source data was validated using a qualitative expert assessment approach (see data source for details), contributing to low data uncertainty for this layer.

Data Sources Copernicus - Delineation of Riparian Zones

Temporal coverage 2011-2013 **Spatial resolution** 0.5 ha

Protected Areas



Indicator group	**Current State**	**Metric ID** 295	Back to Layer List
Layer name	Protected Areas		
Sub-group	Land Use / Cover	**Field name**	pa_pc_sp

Description

Provides the protected area extent in each level 10 HydroBASIN catchment. Protected area data were sourced from the World Database on Protected Areas (WDPA). This database is a joint effort between IUCN and UNEP to collate protected area information for all countries. All non-marine protected areas with a status designation of 'Adopted', 'Designated', or 'Inscribed' from the 2020 version of the WDPA dataset were included in this data layer.

Processing Steps

Non-marine protected areas with a status designation of 'Adopted', 'Designated', or 'Inscribed' were selected from the 2020 WDPA dataset. A union was created between the protected area polygons and the HydroBASIN catchment polygons. The proportion of protected areas in each HydroBASIN catchment was then calculated.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks. Manual breaks were informed by quantile classification.

Data Uncertainties

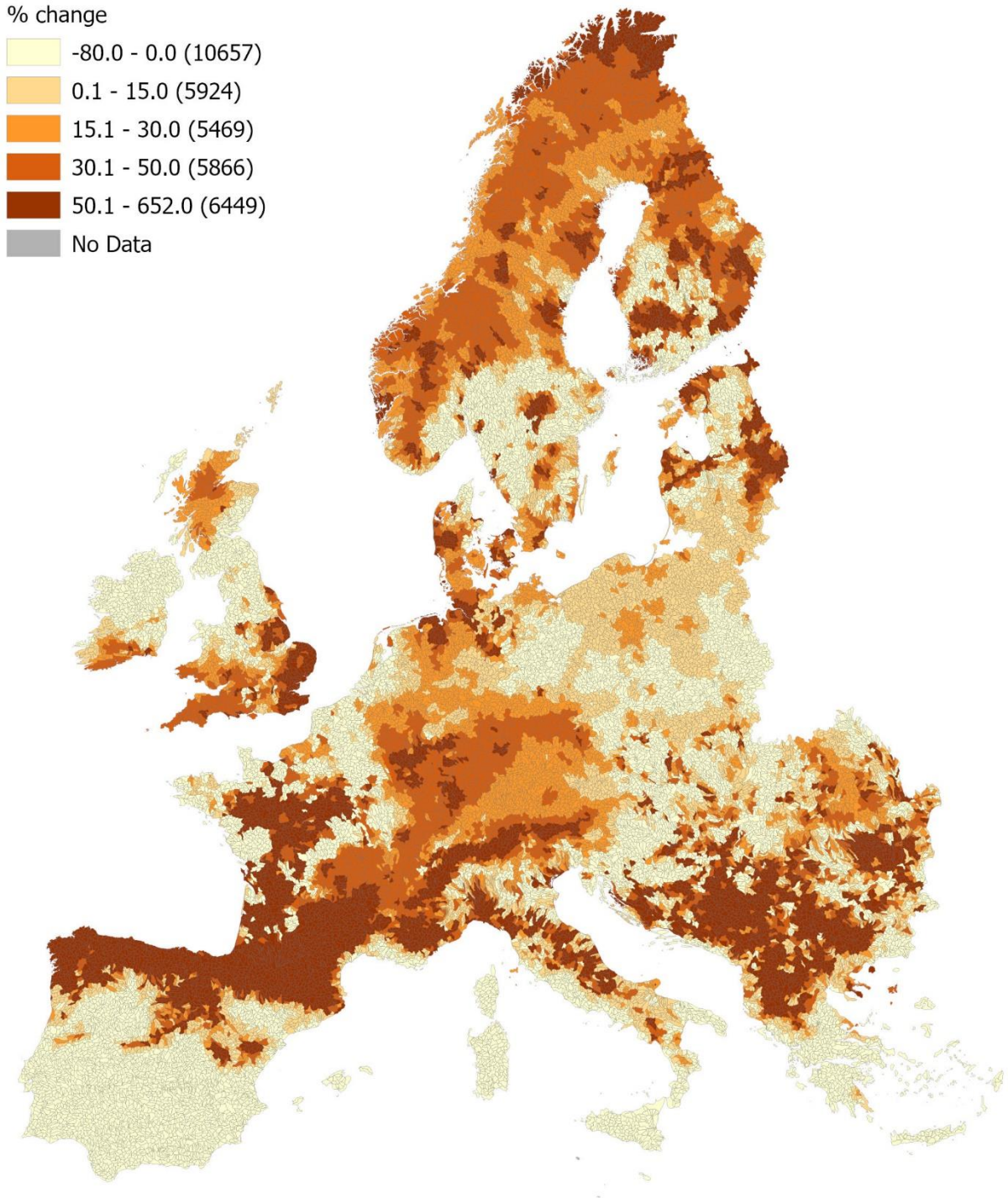
- Source data comes in polygon format delineating protected areas. Data processing involved calculating the percent area of protected areas in each catchment resulting in low data uncertainty for this layer.

Data Sources

World Database on Protected Areas (WDPA)

Temporal coverage	2020	**Spatial resolution**	NA

Aridity Potential (Future Relative Change)



Indicator group	**Future Threats**	**Metric ID** 300	Back to Layer List

Layer name Aridity Potential (Future Relative Change)

Sub-group	Climate Risks	**Field name**	ar_pf_sa

Description

Aridity potential is calculated as the monthly mean values of the ratio between potential evapotranspiration and precipitation. Potential evapotranspiration is the modelled evapotranspiration when there is abundant water. The indicator is calculated as relative change, compared to the reference period (1971 - 2000), averaged over 2041 - 2070 under RCP 8.5 conditions. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The aridity potential index data was downloaded from the data source below. The aridity potential data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the aridity potential values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined based on quantile classification rounded to the nearest fifth.

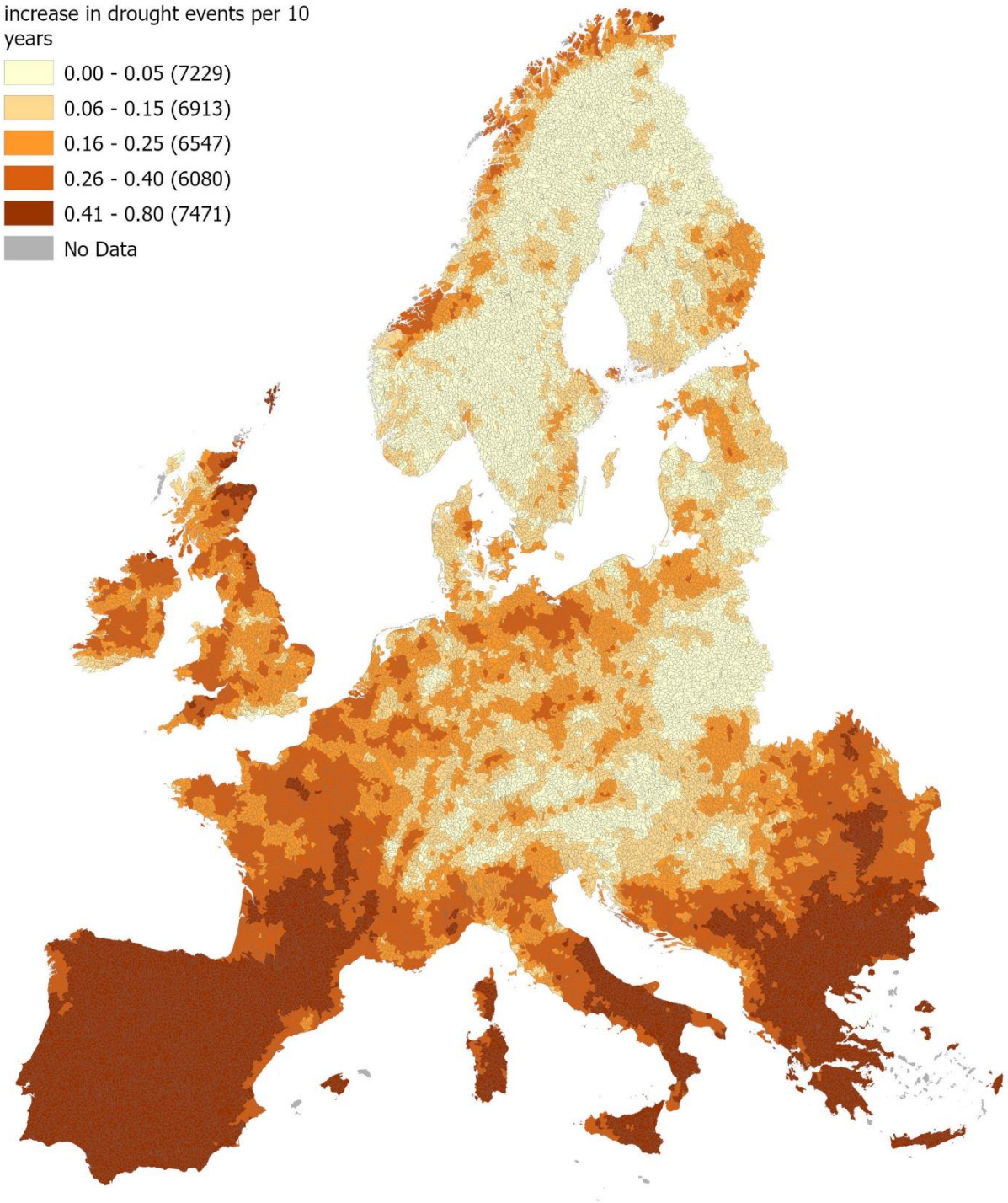
Data Uncertainties

- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources Copernicus - Hydrology-related climate impact indicators

Temporal coverage	2041- 2070 long-term average	**Spatial resolution**	E-HYPE catchments

Projected Increase in Drought Frequency



Indicator group	**Future Threats**	**Metric ID** 305	Back to Layer List

Layer name Projected Change in Drought Frequency

Sub-group	Climate Risks	**Field name**	dr_rs_sa

Description

The projections of increases in drought occurrence come from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). Drought occurrence is determined using the 2.5 percentile pre-industrial soil moisture conditions as a threshold. The number of years in which the soil moisture falls below this threshold for seven consecutive months or longer is used to calculate the probability of a drought event of this magnitude or greater occurring in a given year. The results are expressed as the number of drought events per 10 years.

Processing Steps

The projected increase in drought frequency data was downloaded from the below data source. The data were provided as grided point features spaced 0.1 degrees apart. The grid of point features was converted to a raster with a spatial resolution of 0.1 degrees. The average of the projected change in drought frequency was then calculated for each HydroBASIN catchment. For catchments with negative values (i.e., the average drought frequency is projected to decrease), the values were converted to zero so that the resulting layer only displays projected increases in drought frequency.

Data Normalization

Categorical data breaks were determined based on quantile classification rounded to the nearest 0.05.

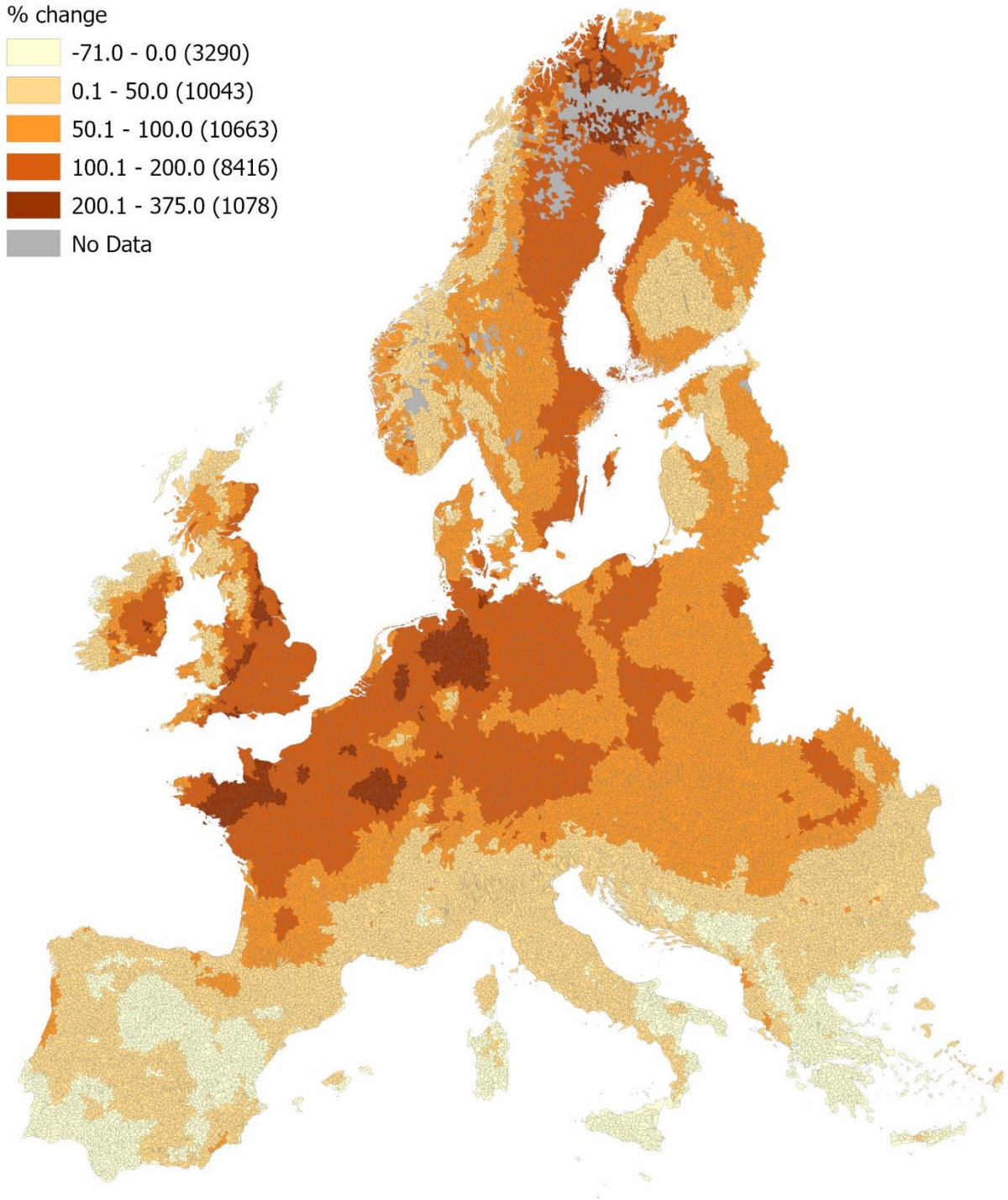
Data Uncertainties

- The coarse resolution of the source data contributes to higher data uncertainty.
- The source data climate projections had good agreement between the suite of GCM and RCM models contributing to lower data uncertainty (Poljanšek et al. 2017).

Data Sources Projected change in meteorological drought frequency

Temporal coverage	2041- 2070 long-term average	**Spatial resolution**	0.1 degrees

Erosion in Cropland (Future Relative Change)



Indicator group	**Future Threats**	**Metric ID** 310	Back to Layer List

Layer name Erosion in Cropland (Future Relative Change)

Sub-group	Threats to Water Quality	**Field name**	cl_fu_rn

Description

The data is sourced from the Revised-Universal-Soil-Loss-Equation-based Global Soil Erosion Modelling (GloSEM) 1.3 dataset, which provides soil erosion caused by water at a high spatial resolution (100m x 100m). GloSEM erosion estimates were produced with a global potential soil erosion model, using a combination of remote sensing, GIS modelling and census data. The model considers land-cover and management, rainfall-runoff erosivity, soil erodibility, terrain slope, and conservation support-practices as environmental factors when calculating soil erosion. The soil erosion estimates by the GLoSEM model show high agreement with European regional soil erosion models providing confidence in the validity of these estimates.

Processing Steps

The cropland erosion values and cropland fraction data were downloaded from the data source provided below. Cropland erosion values were available for 2019 and 2070. The cropland erosion values were corrected by multiplying the erosion values by a true area pixel grid. The true-area corrected cropland erosion values were then multiplied by the cropland fraction raster. The sum of the cropland erosion values in each level 10 HydroBASIN was then calculated and normalized by the level 10 HydroBASIN catchment area. The relative change between the 2019 and 2070 values was calculated for each HydroBASIN.

Data Normalization

Categorical data breaks were determined based on quantile classification rounded to the nearest 50.

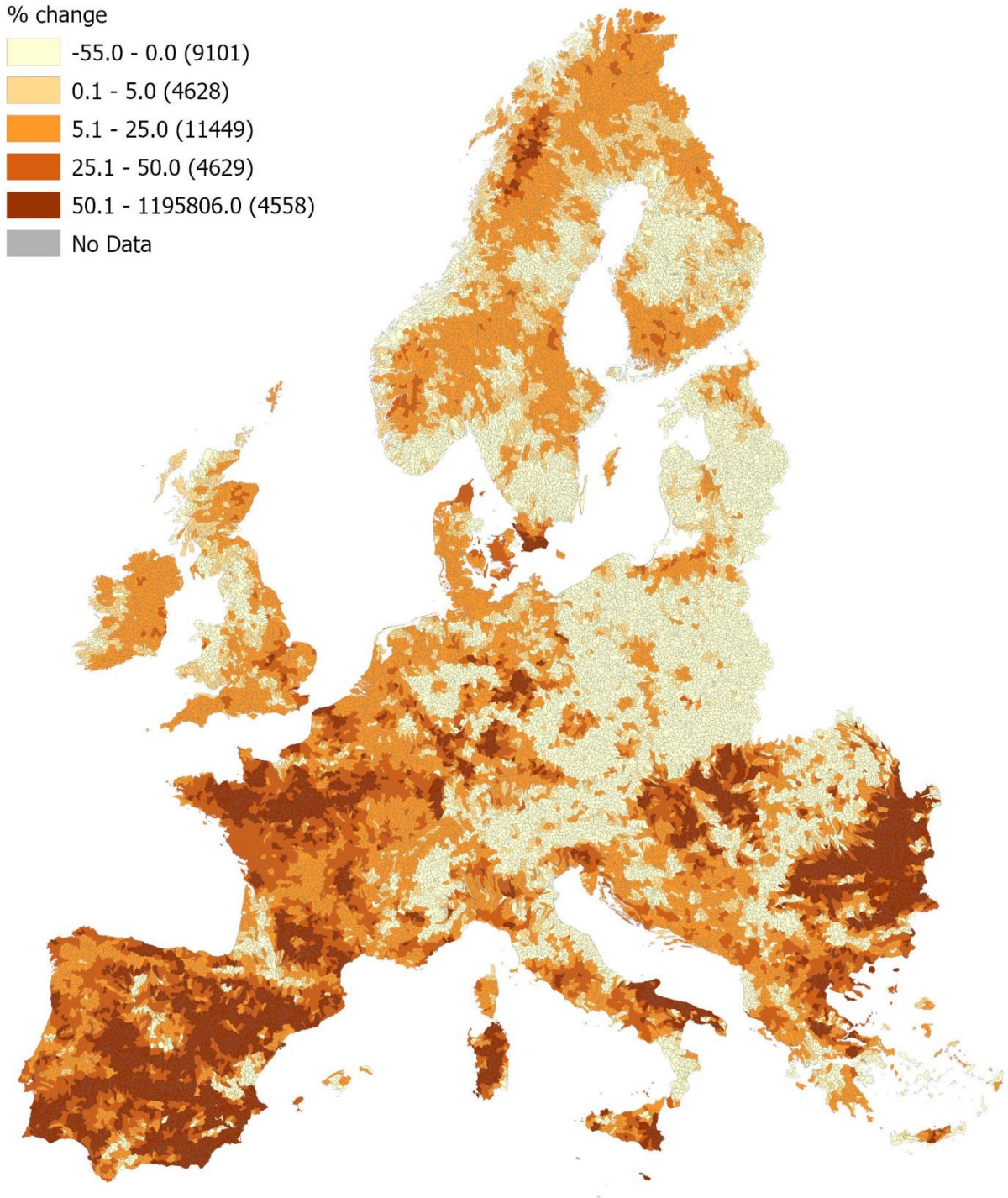
Data Uncertainties

- The modelled source data was assessed to have good prediction capacity (R2 = 0.6) (Borrelli et al., 2022), which contributes to increased data uncertainty.
- The modelled source data is based on coarse resolution WorldClim data, which contributes to increased data uncertainty.

Data Sources Borrelli et al. (2022)

Temporal coverage	2070	**Spatial resolution**	100m grid

Phosphorus Stream Concentration (Future Relative Change)



Indicator group	**Future Threats**	**Metric ID** 315	Back to Layer List

Layer name Phosphorus Stream Concentration (Future Relative Change)

Sub-group	Threats to Water Quality	**Field name**	p_scf_sa

Description

Phosphorus concentration is the mass of phosphorus divided by the volume of water. The indicator is calculated as the relative change, compared to the reference period (1971 - 2000), in the annual mean value of total phosphorus concentration from a local stream averaged over 2041 - 2070 under RCP 8.5 conditions. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The phosphorus concentration data was downloaded from the data source below. The phosphorus concentration data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the phosphorus concentration values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined based on qauntile classification and with manual modification to create meaningful and interpretable class breaks.

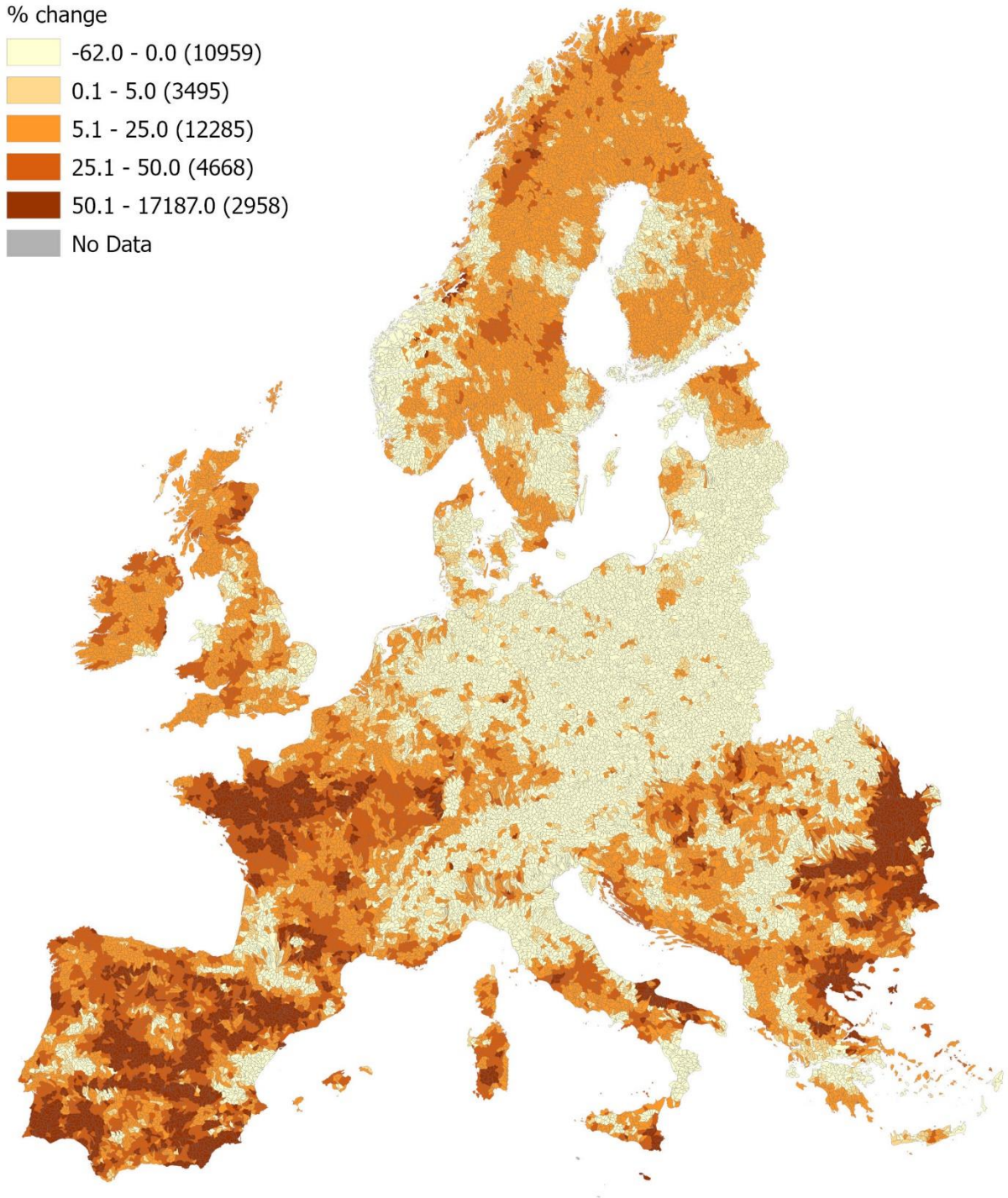
Data Uncertainties

- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources Copernicus - Hydrology-related climate impact indicators

Temporal coverage	2041- 2070 long-term average	**Spatial resolution**	E-HYPE catchments

Nitrogen Stream Concentration (Future Relative Change)



Indicator group	**Future Threats**	**Metric ID** 320	Back to Layer List

Layer name Nitrogen Stream Concentration (Future Relative Change)

Sub-group	Threats to Water Quality	**Field name**	n_scf_sa

Description

Nitrogen concentration is the mass of nitrogen divided by the volume of water. The indicator is calculated as the relative change, compared to the reference period (1971 - 2000), in the annual mean value of total nitrogen concentration from a local stream averaged over 2041 - 2070 under RCP 8.5 conditions. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The nitrogen concentration data was downloaded from the data source below. The nitrogen concentration data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the nitrogen concentration values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined based on qauntile classification with manual classification to create meaningful and interpretable class breaks.

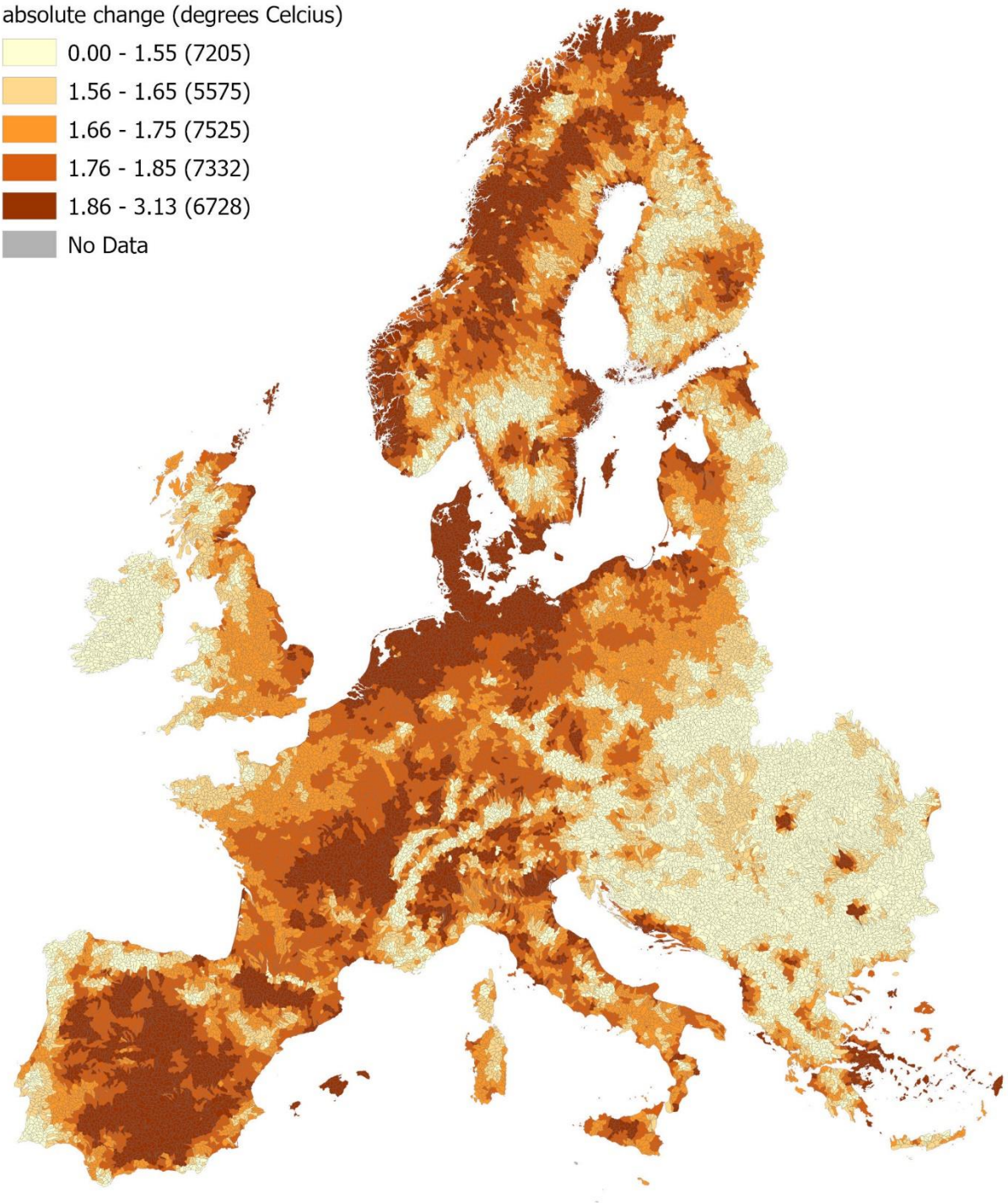
Data Uncertainties

- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources Copernicus - Hydrology-related climate impact indicators

Temporal coverage	2041- 2070 long-term average	**Spatial resolution**	E-HYPE catchments

Local Stream Water Temperature (Future Absolute Change)



Indicator group	**Future Threats**	**Metric ID** 325	Back to Layer List

Layer name Local Stream Water Temperature (Future Absolute Change)

Sub-group	Climate Risks	**Field name**	tm_sf_sa

Description

Water temperature is the simulated water temperature in local streams. The indicator is calculated as absolute change, compared to the reference period (1971 - 2000), in mean annual values of water temperature from a local stream averaged over 2041 - 2070 under RCP 8.5 conditions. The data is created from bias adjusted regional climate simulations from the European Coordinated Regional Climate Downscaling Experiment (EURO-CORDEX), which represents the current state-of-the-art in European regional climate and hydrological modelling as well as indicator production.

Processing Steps

The water temperature data was downloaded from the data source below. The water temperature data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the water temperature values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined using the quantile classification with rounding to the nearest 0.05.

Data Uncertainties

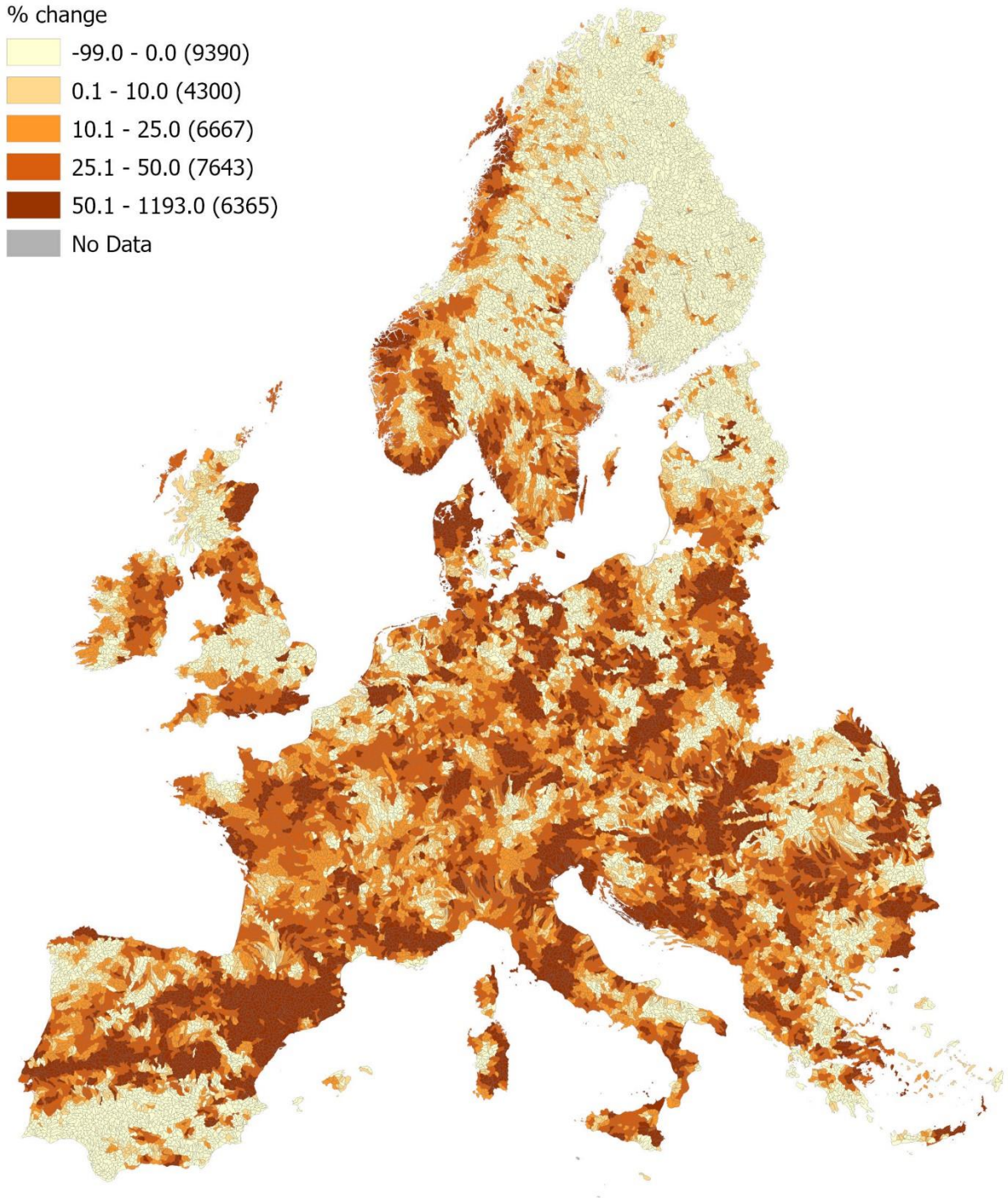
- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources

Copernicus - Hydrology-related climate impact indicators

Temporal coverage	2041- 2070 long-term average	**Spatial resolution**	E-HYPE catchments

Flood Recurrence



Indicator group	**Future Threats**	**Metric ID** 327	Back to Layer List
Layer name	Future Flood Recurrence		
Sub-group	Climate Risks	**Field name**	fl_50_sa

Description

Flood recurrence is the simulated average of annual maximum river discharge for the 50-year flood return period. From the data source, data are provided as the 2-, 5-, 10- and 50-year return period of annual daily maximum river discharge estimated using a Gumbel distribution. The indicator is calculated as relative change, compared to the reference period (1971 - 2000), in mean annual maximum river discharge with a 50-year return period averaged over 2041 - 2070 under RCP 8.5 conditions.

Processing Steps

The flood recurrence data was downloaded from the data source below. The flood recurrence data table was joined to the E-HYPE catchment polygons. The E-HYPE catchment polygons were intersected with the level 10 HydroBASINS polygons. The intersections of the two polygon layers was used to determine the areal proportion of E-Hype catchments within each HydroBASIN. The areal proportion was used as a weight for the flood recurrence values in calculating the spatial weighted average for each HydroBASIN.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest 5.

Data Uncertainties

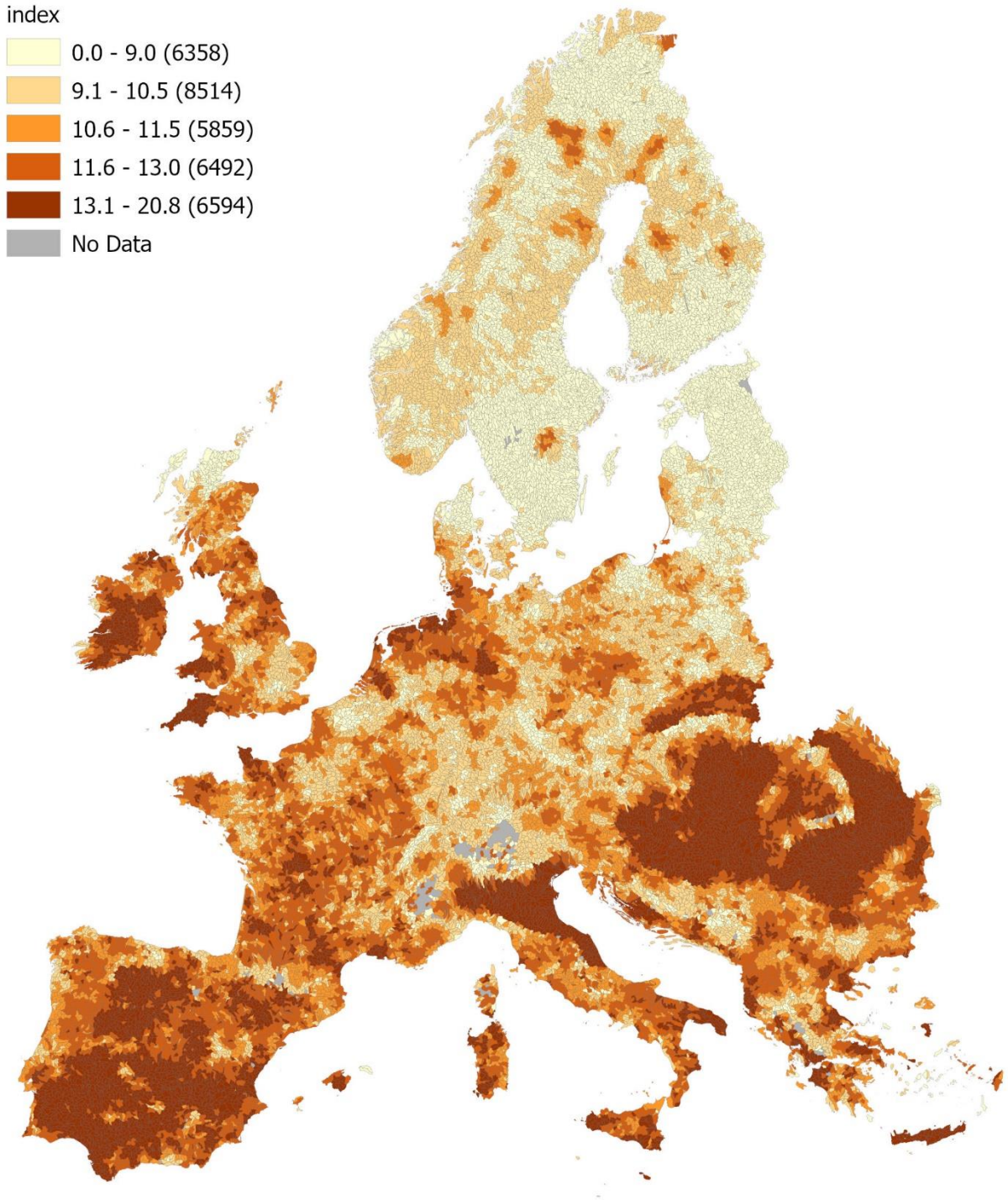
- The coarse resolution of the underlying source data (5 kilometer resolution) contributes to greater data uncertainty for this layer.

Data Sources

Copernicus - Hydrology-related climate impact indicators

Temporal coverage	2041 – 2071 long-term average	**Spatial resolution**	EHYPE catchments

Development Potential Index



Indicator group	**Future Threats**	**Metric ID** 330	Back to Layer List

Layer name Development Potential Index

Sub-group Development Threats **Field name** dp_nh_sa

Description

The dataset for this layer comes from Oakleaf et al. (2019). Oakleaf et al. (2019) created 13 global land suitability maps at a 1 kilometer resolution from public datasets of resource potential and development feasibility. For each index, the value for 1 square kilometer of land presents a relative ranking based on its likelihood to be modified in the future by the indices corresponding sector. The sectors included in this data are concentrated solar power, voltaic solar, wind power, hydropower, coal mining, conventional oil extraction, unconventional oil extraction, conventional gas extraction, unconventional gas extraction, metallic metal mining, non-metallic metal mining, crop development, and biofuel expansion. Suggested uses of this dataset are to identify high-risk areas where future development may impact, biodiversity, climate or environmental assets.

Processing Steps

A regional cumulative development index was created following the recommendations of Oakleaf et al. (2019) by standardizing each DPI layer to an area of interest through converting the continuous DPI values to z-scores and then summing the standardized raster using equal weightings. Due to redundancy between the hydropower development potential index and other layers representing future threats of hydropower development, the hydropower index was removed from the analysis. The remaining indices were development potential for concentrated solar power, photovoltaic solar, wind power, coal mining, conventional oil extraction, unconventional oil extraction, conventional gas extraction, unconventional gas extraction, metallic metal mining, non-metallic metal mining, crop development, and biofuel expansion.

Data Normalization

Categorical data breaks were determined using quantile classification with rounding to the nearest 0.5.

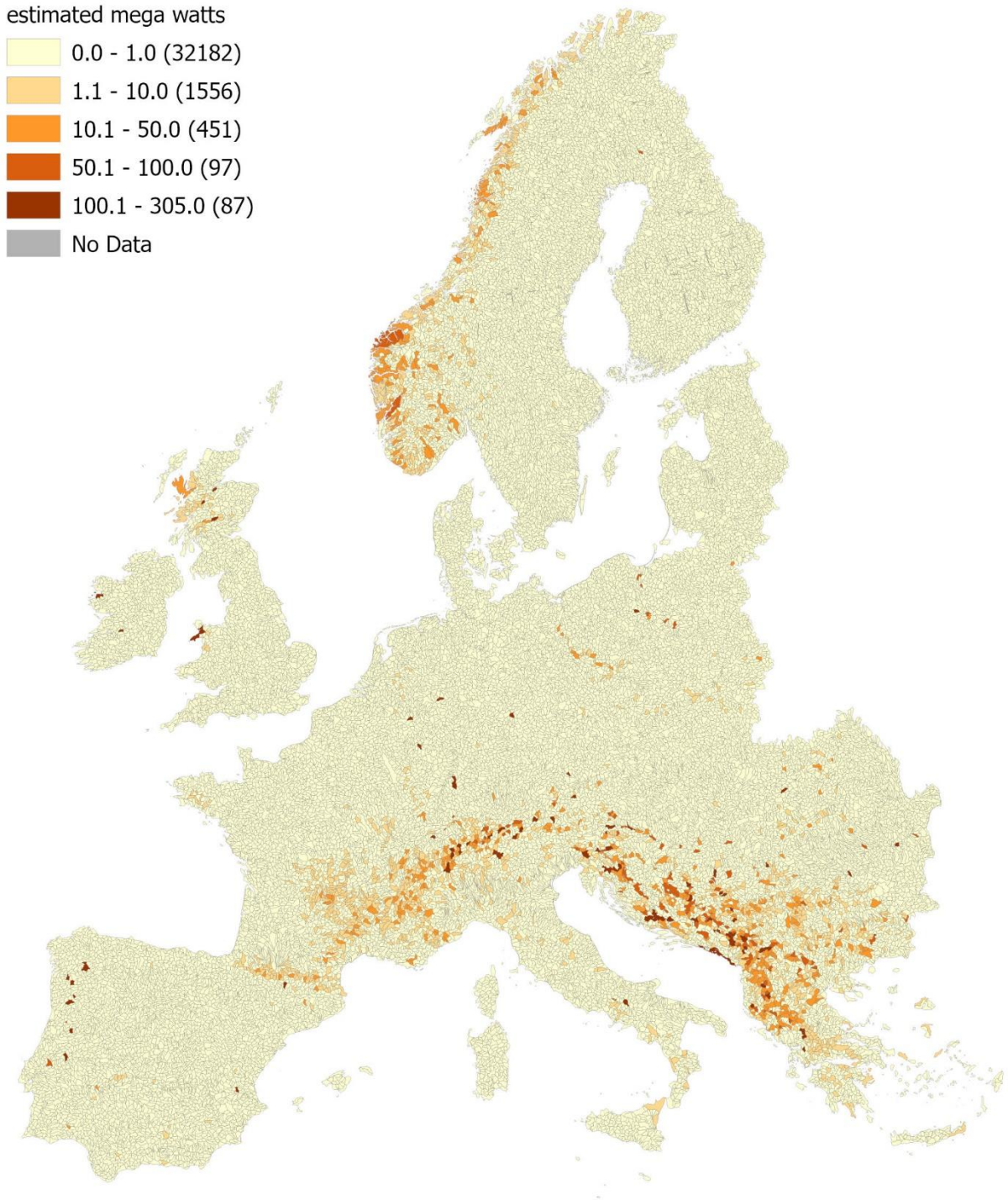
Data Uncertainties

- The source data is provided at a high spatial resolution of 1 kilometer, relative to the average area of HydroBASIN level 10 catchments (~150km^2), contributing to low data uncertainty for this layer.
- High agreement was found between the data source layer and validation datasets, contributing to low data uncertainty for this layer. See Oakleaf et al. (2020) for further details on data source validation.

Data Sources Oakleaf et al. 2019

Temporal coverage NA **Spatial resolution** 1km

Planned Hydropower



Indicator group	**Future Threats**	**Metric ID** 335	Back to Layer List
Layer name	Planned Hydropower		
Sub-group	Development Threats	**Field name**	hp_pl_pc

Description

This data is sourced from the hydropower dam inventory conducted as part of the Hydropower pressure on European rivers: The story in numbers report. The inventory was compiled from global and European dam databases and included all existing, planned, and under construction hydropower dams that generate >1 MW. Small hydropower dams that generate between 0.1 and 1 MW were considered where possible. The inventory distinguished hydropower plants into 5 categories based on installed power (0.1 - 1, 1 - < 10, 10 - < 50, 50 - < 100, > 100). Hydropower dams with less than 10 MW are considered small, between 10 MW and 50 MW are considered medium-sized, and 50 MW or larger are considered large. This data layer considers only the planned hydropower dams from the inventory. Planned dams in the inventory were defined as those officially planned, licensed and potentially designated hydropower plants.

Processing Steps

Planned hydropower dams were selected from the inventory. Each dam was assigned a value at the midpoint of the installed power range indicated for the dam. Dams with an installed capacity greater than 100 MW were assigned 150. A spatial join was then conducted to sum the installed power of the planned dams in each HydroBASIN catchment.

Data Normalization

Categorical data breaks were determined based on the hydropower plant size categories defined by the data source.

Data Uncertainties

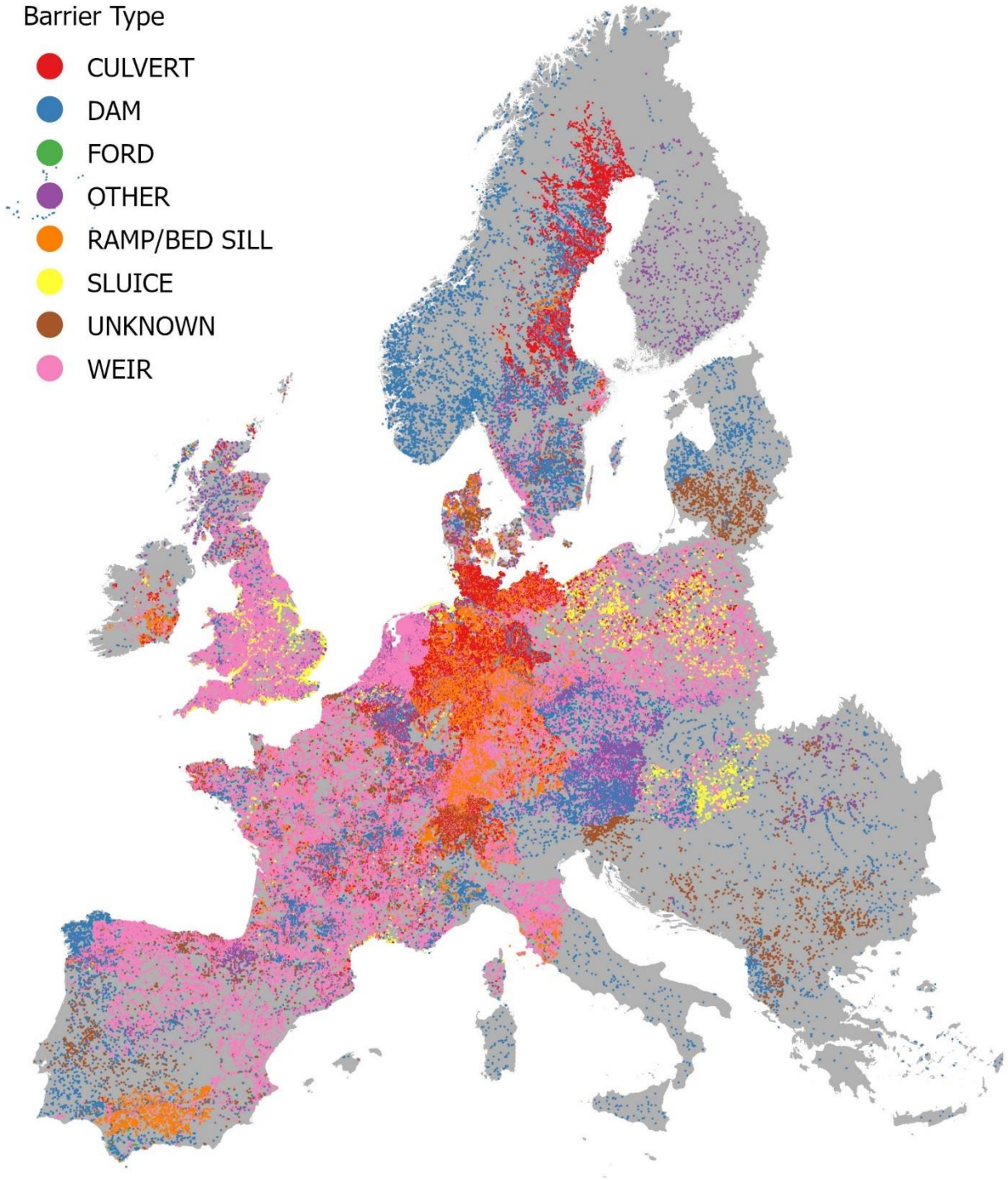
- Layer values are provided as an aggregate sum of the estimated mega watts of hydropower dams in a catchment. Due to the aggregation, a catchment value could be due to a single large dam or many small dams. These scenarios may have distinct ecological implications that can no longer be discerned from the aggregate value, increasing data uncertainty for this layer

Data Sources

Hydropower pressure on European rivers: The story in numbers, 2019 © EuroNatur, Fluvius, GEOTA, RiverWatch, WWF.

Temporal coverage	2019	**Spatial resolution**	NA

AMBER Barrier Types



Indicator group	**Additional Layers**	**Metric ID** bar	Back to Layer List
Layer name	Amber Barrier Types		
Sub-group	-	**Field name**	aux_amb_bar

Description

Point locations of all the barrier AMBER database, displayed by barrier type.

Dam: A dam is a barrier that blocks or constrains the flow of water and raises the water level, forming a reservoir. Dams come in many shapes and sizes. Dams are often used in the generation of electricity.

Weir: A weir is a barrier aimed at regulating flow conditions and water levels or at intercepting sediment or at reducing the channel slope for stabilizing the channel bed of a river or stream. Water often flows freely over the top of a weir. Weirs come in many shapes and sizes but often have a height of less than 5 meters.

Culvert: A culvert is a structure which allows a stream or river to flow through/under an obstruction. Culverts are often embedded in soil and come in many shapes and sizes, varying from round and elliptical to box-shaped.

Ford: A ford is a structure in a river or stream which creates a shallow place for crossing by vehicle or on foot.

Sluice: A sluice is a movable barrier aimed at controlling water levels and flow rates in rivers and streams. By opening or closing the sluice, water levels and flow rates can be altered. Sluices come in many shapes and sizes. Coastal sluices drain river water into sea during low tides. In addition, sluices are also used in ship locks, to allow ships to navigate past dams or other obstructions.

Ramp: A ramp or a bed sill is a structure aimed at stabilising the channel bed and reducing erosion. These structures come in many forms. Most are underwater structures (i.e. not blocking the flow of water, only acting on river bed and channel slope). They often have a height of less than 1-2 meters.

Processing Steps

Data was downloaded from the Amber data repository, and clipped to the study area extent.

Data Normalization

NA

Data Uncertainties

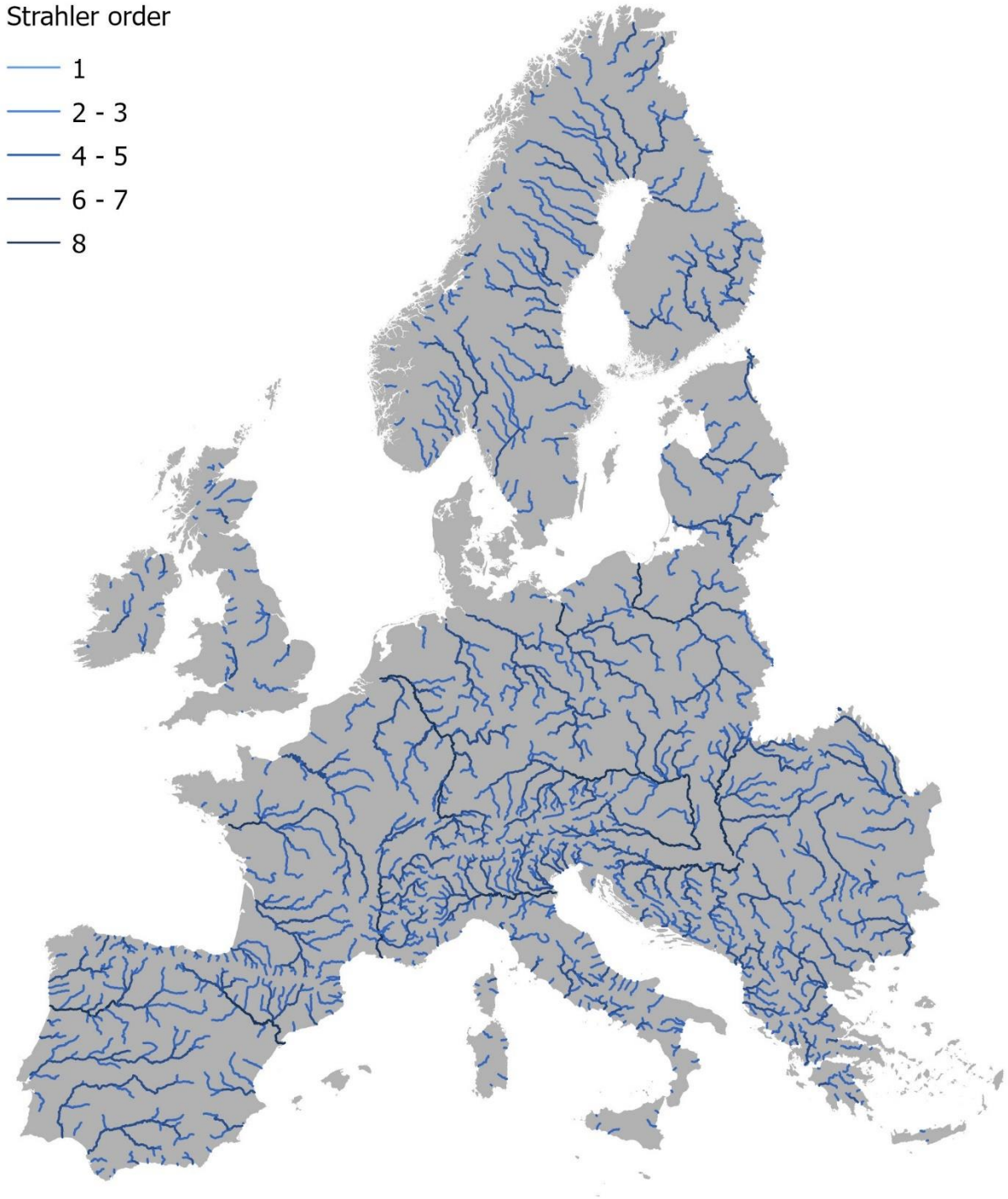
NA

Data Sources

AMBER project website
AMBER barrier atlas
AMBER publication

Temporal coverage	2020	**Spatial resolution**	NA

River Network



Indicator group	**Additional Layers**	**Metric ID** riv	Back to Layer List
Layer name	River Network		
Sub-group	-	**Field name**	aux_riv_net

Description

This data is sourced from the European Catchments and Rivers Network System (ECRINS), a hydrological system with a river network containing 1,348,163 river segments. ECRINS was created from the Catchment Characterisation and Modelling (CCM) developed by the Joint Research Council (JRC), Corine Land Cover, Water Framework Directive reporting units, and other data sources. ECRINS is the hydrological system used by the European Environmental Agency and the Water Information System for Europe (WISE). The river segments mimic natural drainage, while also fulfilling topological constraints.

Processing Steps

The data was downloaded from the ECRINS repository, and clipped to the study area extent.

Data Normalization

NA

Data Uncertainties

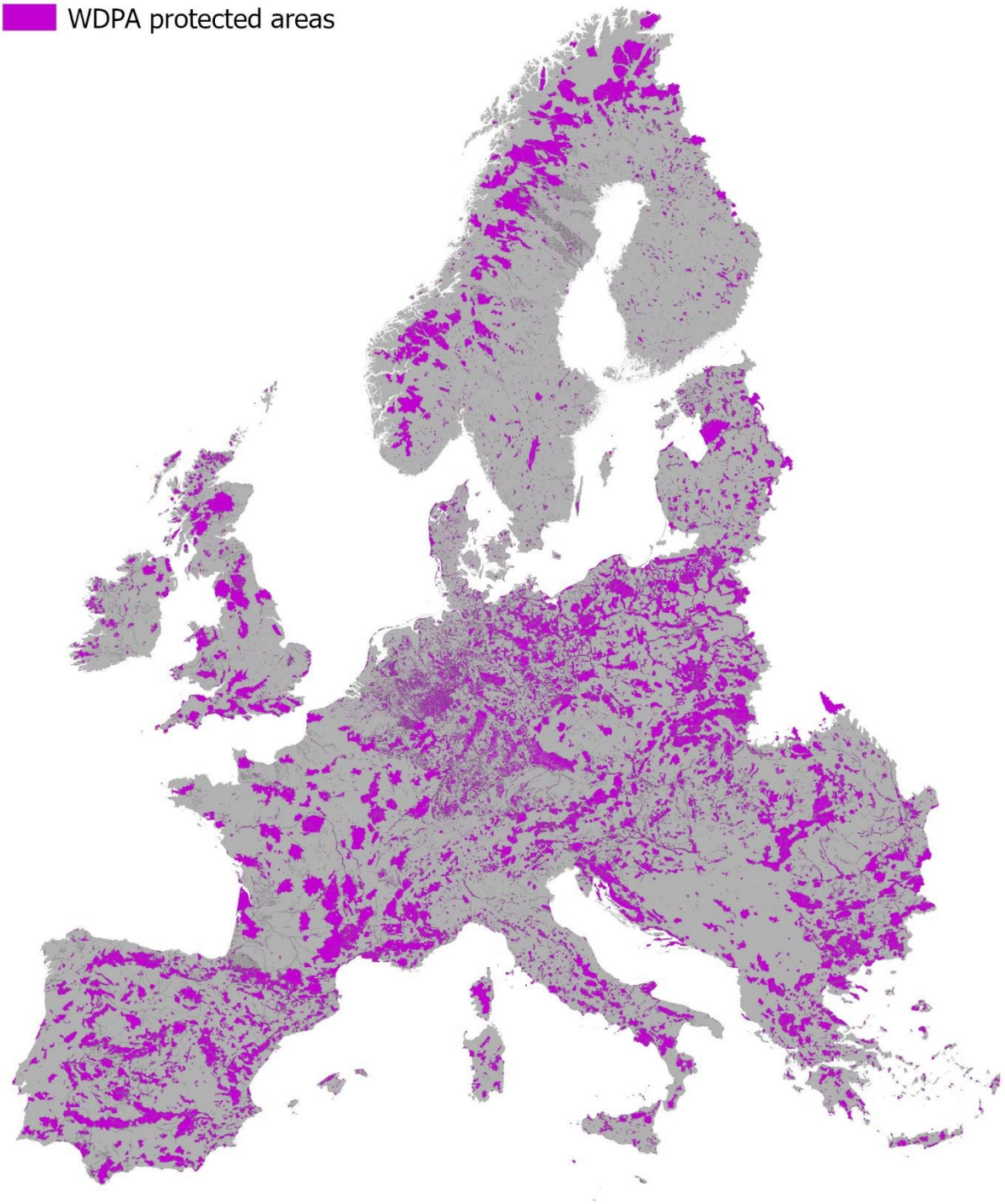
NA

Data Sources

European catchments and Rivers network system (ECRINS)

Temporal coverage	2012	**Spatial resolution**	NA

Protected Areas (WDPA)



Indicator group	**Additional Layers**	**Metric ID** wdpa	Back to Layer List
Layer name	Protected Areas (WDPA)		
Sub-group	-	**Field name**	aux_wdp_dat

Description

The World Database on Protected Areas (WDPA) is the most comprehensive global database of marine and terrestrial protected areas. It is a joint project between UN Environment Programme and the International Union for Conservation of Nature (IUCN), and is managed by UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), in collaboration with governments, non-governmental organisations, academia and industry.

Processing Steps

All non-marine protected areas with a status designation of 'Adopted', 'Designated', or 'Inscribed' from the 2020 version of the WDPA dataset were selected and intersected with the study area extent. The protected area polygons that intersected the study area were added to the tool.

Data Normalization

NA

Data Uncertainties

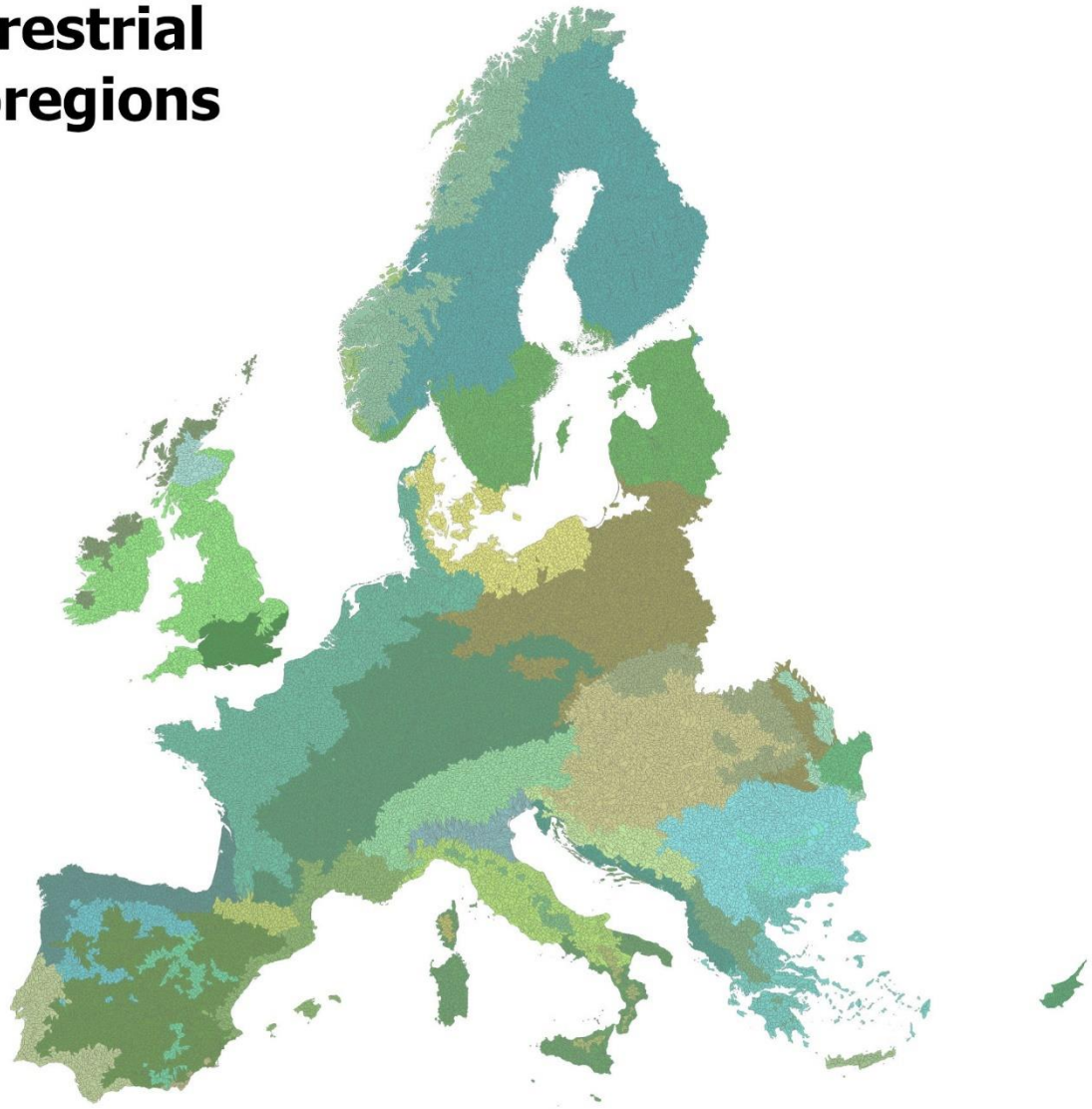
NA

Data Sources

World Database on Protected Areas (WDPA)

Temporal coverage	2020	**Spatial resolution**	NA

Terrestrial Ecoregions



- Appenine deciduous montane forests
- Balkan mixed forests
- Baltic mixed forests
- Cantabrian mixed forests
- Celtic broadleaf forests
- Central European mixed forests
- Dinaric Mountains mixed forests
- East European forest steppe
- English Lowlands beech forests
- European Atlantic mixed forests
- Euxine-Colchic broadleaf forests
- Madeira evergreen forests
- North Atlantic moist mixed forests
- Pannonian mixed forests
- Po Basin mixed forests
- Pyrenees conifer and mixed forests
- Rodope montane mixed forests
- Sarmatic mixed forests
- Western European broadleaf forests
- Alps conifer and mixed forests
- Caledon conifer forests
- Carpathian montane forests
- Scandinavian coastal conifer forests
- Scandinavian and Russian taiga
- Pontic steppe
- Kola Peninsula tundra
- Scandinavian Montane Birch forest and grasslands
- Aegean and Western Turkey sclerophyllous and mixed forests
- Canary Islands dry woodlands and forests
- Corsican montane broadleaf and mixed forests
- Crete Mediterranean forests
- Cyprus Mediterranean forests
- Iberian conifer forests
- Iberian sclerophyllous and semi-deciduous forests
- Illyrian deciduous forests
- Italian sclerophyllous and semi-deciduous forests
- Mediterranean Acacia-Argania dry woodlands and succulent thickets
- Northeastern Spain and Southern France Mediterranean forests
- Northwest Iberian montane forests
- Pindus Mountains mixed forests
- South Apennine mixed montane forests
- Southeastern Iberian shrubs and woodlands
- Southwest Iberian Mediterranean sclerophyllous and mixed forests
- Tyrrhenian-Adriatic sclerophyllous and mixed forests

Indicator group	**Additional Layers**	**Metric ID** teco	Back to Layer List
Layer name	Terrestrial Ecoregion Types		
Sub-group	-	**Field name**	aux_tec_dat

Description

Terrestrial Ecoregions of the World (TEOW) is a biogeographic regionalization that defines ecoregions and biomes as relatively large units of land or water containing a distinct assemblage of natural communities sharing a large majority of species, dynamics, and environmental conditions of the Earth's terrestrial biodiversity. For Europe, the TEOW ecoregions were developed in concert with the Digital map of European ecological regions (DMEER) (Olson et al. 2001). In the study area, there are 44 unique ecoregions.

Processing Steps

The Terrestrial Ecoregions of the World are available at the level 10 HydroBASIN scale as part of HydroATLAS and as such no data processing was required.

Data Normalization

NA

Data Uncertainties

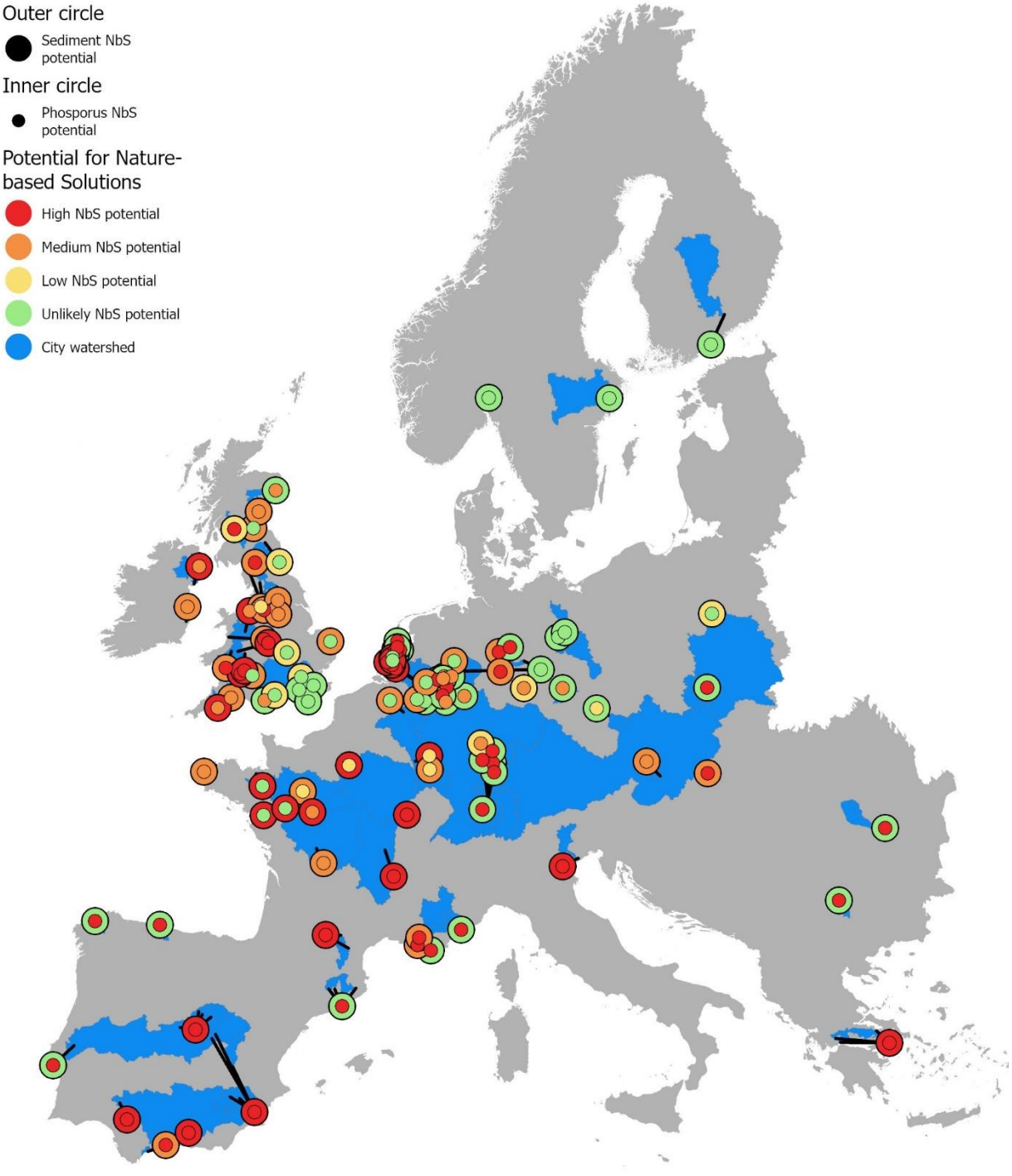
NA

Data Sources

Terrestrial Ecoregions of the World (TEOW)
Digital map of European ecological regions (DMEER)
HydroATLAS
Olson et al. 2001

Temporal coverage	NA	**Spatial resolution**	NA

Potential for Nature-based Solutions



Indicator group	**Additional Layers**	**Metric ID** cities	Back to Layer List

Layer name Potential for Nature-based Solutions

Sub-group - **Field name** aux_cities_dat

Description

The Resilient Cities Report assesses the potential for a range of nature based solutions (NBS) (i.e., cover crops, riparian buffers, forest protection, and reforestation) to mitigate diffuse pollution associated with agricultural soil erosion and nutrient pollution in the source water catchments for 109 European cities significantly dependent on surface water for their water supply. The report identifies where NBS could make a substantial difference to mitigate diffuse pollution in a cost-effective manner and provides an approximation of where efforts to deploy NBS at scale to protect water sources could deliver greatest impact. The data are summarized in two data layers representing the potential for NBS to reduce sediment and phosphorus pollution. See the report for further details.

Processing Steps

The data was provided by the Authors of the Resilient Cities Report. No data processing was required.

Data Normalization

NA

Data Uncertainties

NA

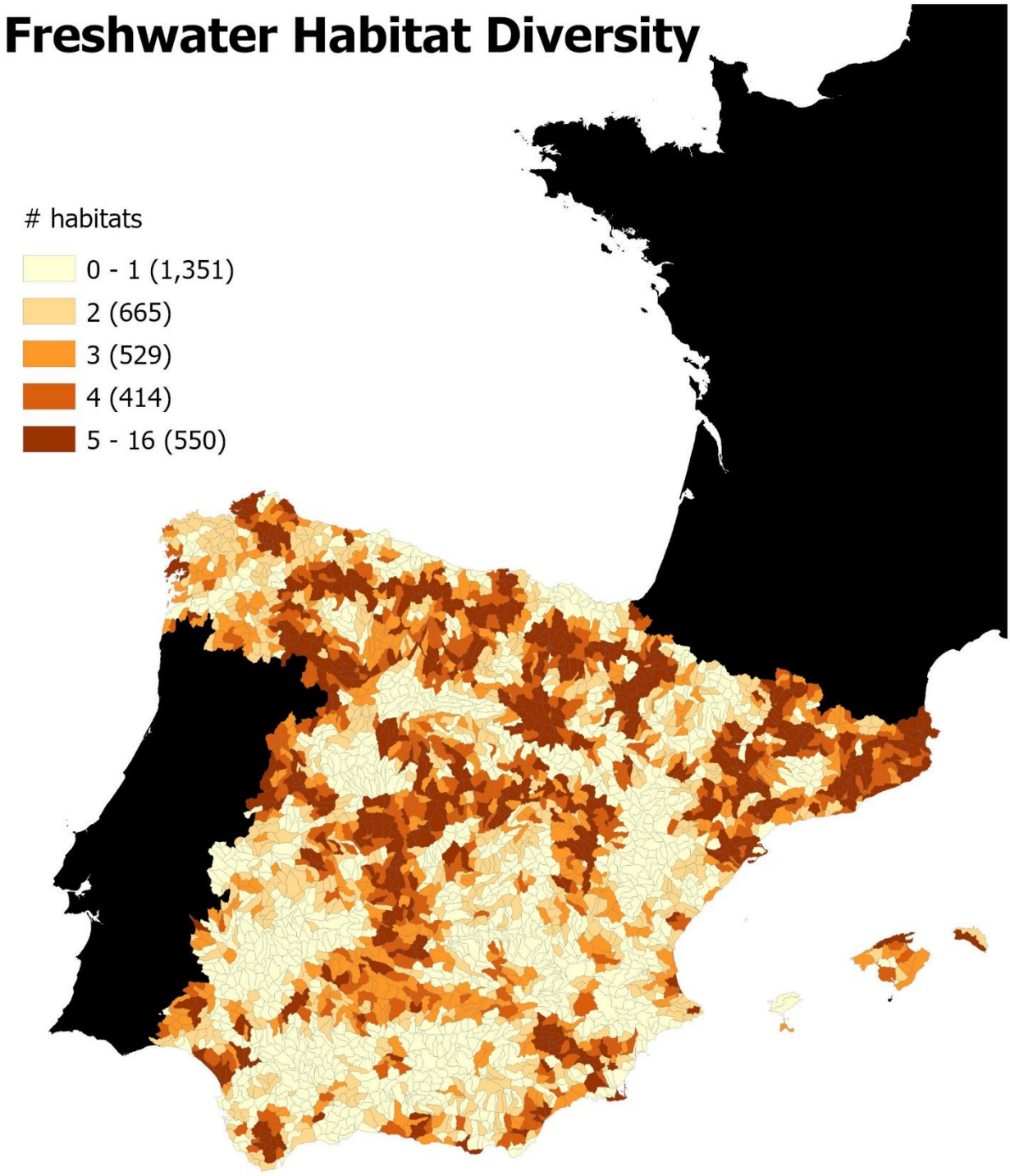
Data Sources

Resilient Cities Report

Temporal coverage NA **Spatial resolution** NA

Spain Case Study Specific Layers

Freshwater Habitat Diversity



Indicator group	**Biodiversity**	**Metric ID** 130	Back to Layer List
Layer name	Freshwater Habitat Diversity		
Sub-group	Habitat	**Field name**	sp_ch_ab

Description

This indicator measures the richness of freshwater-related 'Community Interest' habitats (reported under Article 17 of the Habitats Directive on a grid with a 10 kilometer resolution). These are natural habitat types of community interest whose conservation requires the designation of special areas of conservation. From the full list of Community Interest habitats, those classified under the group 3 of freshwater related habitats were selected.

Processing Steps

This data layer was processed by I-CATALIST. Community Habitats distribution (represented in a 10km*10km grid) was intersected with the HydroBASINS level 10 catchments (HB10). When grids representing the distribution of a particular habitat covered more than a 5% of an HB10 unit, then the freshwater habitats richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

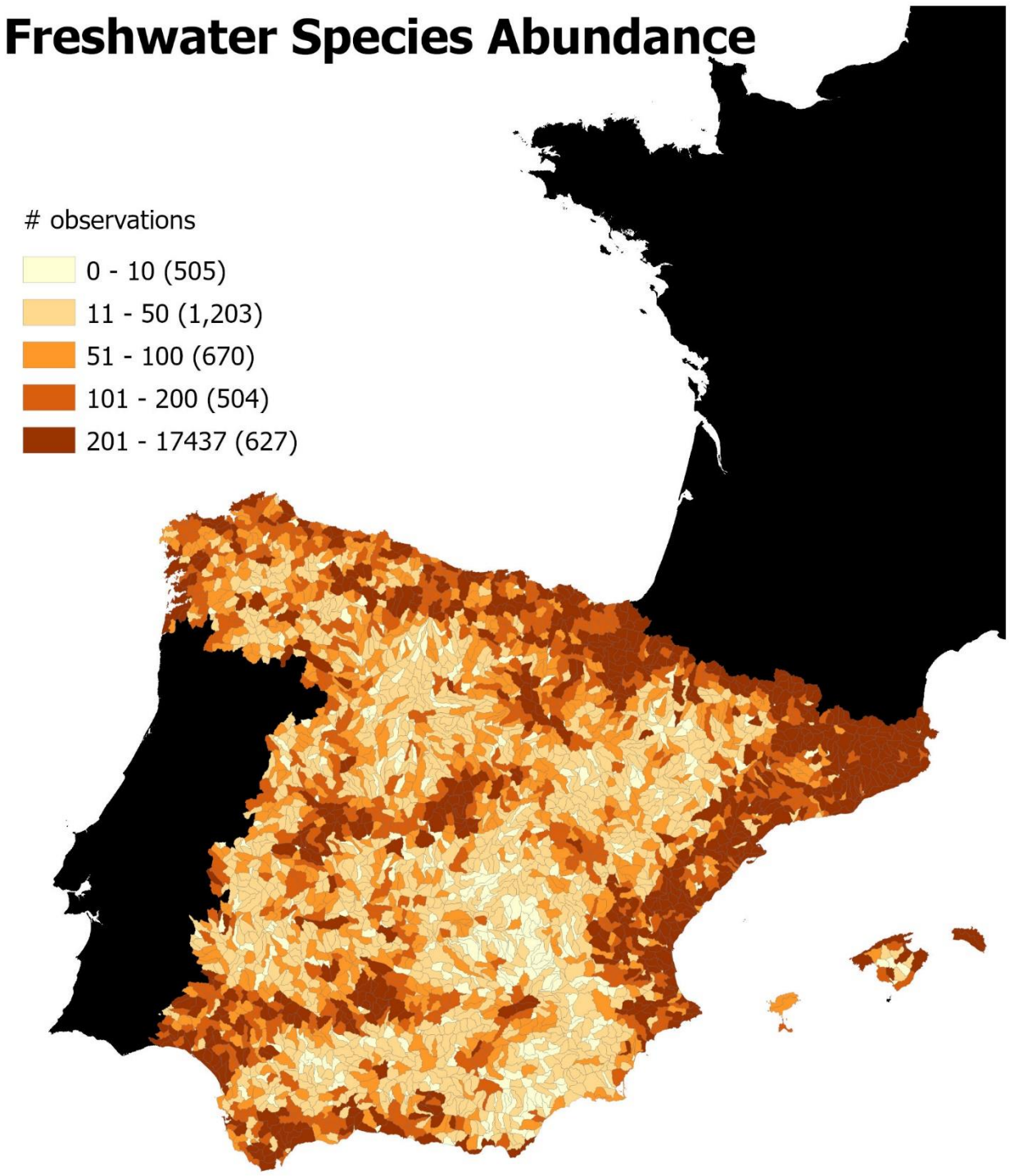
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources

Article 17 – Spain Ministry for ecological transition

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Freshwater Species Abundance



Indicator group **Biodiversity** **Metric ID** 135 Back to Layer List

Layer name Freshwater Species Abundance

Sub-group Freshwater Species **Field name** sp_fw_ab

GBIF—the Global Biodiversity Information Facility—is an international network and data infrastructure funded by the world's governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth. The network draws these diverse data sources together through the use of data standards, including Darwin Core, which forms the basis for the bulk of GBIF.org's index of hundreds of millions of species occurrence records. Publishers provide open access to their datasets using machine-readable Creative Commons license designations.

Description The GBIF occurrence data, number of observations of species, was used for several groups of freshwater taxa, including the taxonomic classes of Actinopterygii (fishes), Amphibia, Bivalvia, Insecta (order Odonata) and Mammalia (Lutra lutra, Galemys pyrenaicus, Neomys anomalus and Neomys fodiens). The two latter were selected for their role as bioindicators of good habitat quality. The same process was carried out for plants where abundance data were collected for the families (Cyperaceae, Juncaceae and Ranunculaceae) and the genera (Schoenoplectus and Typha) as recommended by Cirujano Bracamonte et al., 2014. In both cases GBIF data was filtered by selecting only human observations (not fossil specimens), and from institutions with representation or an equitable level of sampling at the national level to avoid bias. This information provides the abundance of these groups of freshwater species.

Processing Steps This data layer was processed by I-CATALIST. Data were downloaded from GBIF as a csv file (including coordinates for each observation) and curated to sort out some issues (in particular differences in the way the coordinates of some observations have been registered into the database). Number of observations inside the HydroBASINS level 10 catchments (HB10) were aggregated.

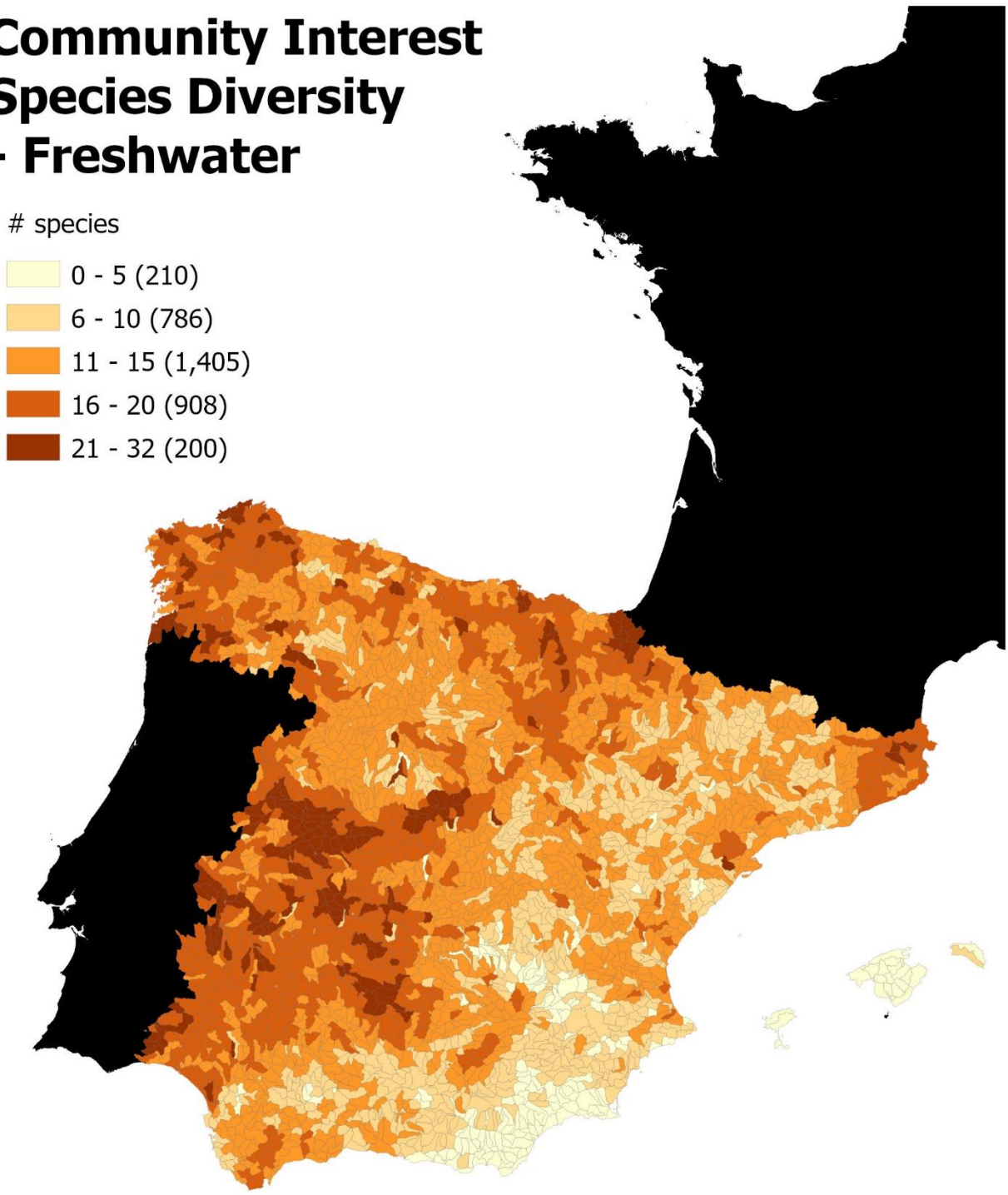
Data Normalization Categorical data breaks were determined using quantile classification with manual modification to create meaningful and easily interpretable class breaks.

Data Uncertainties - The source data consists of presence only species observations, which can be affected by sampling effort. Species may be present in areas not indicated in the source data due to lack of detection. The source data was filtered to consider only data from institutions with an equitable level of sampling at the national level, which contributes to lower data uncertainty for this layer.

Data Sources GBIF biodiversity database

Temporal coverage NA **Spatial resolution** NA

Community Interest Species Diversity - Freshwater



Indicator group	**Biodiversity**	Metric ID 136	Back to Layer List

Layer name Community Interest Species Diversity - Freshwater

Sub-group Freshwater Species **Field name** sp_cf_ab

Description

This indicator measures the richness of freshwater-related 'Community Interest' species (reported under Article 17 of the Habitats Directive). The 'Community Interest' species are species of wild flora or fauna which, in the European territory of the EU Member States are: endangered (with the exception of those species whose natural range extends only marginally into the territory of the EU), or vulnerable, (their transfer to the endangered category is considered likely in the near future), or rare (their populations are small in size and, while not currently endangered or vulnerable), or are endemic (require special attention because of the uniqueness of their habitat or because of possible conservation implications of their exploitation). The presence of habitats and species are reported on grid with a 10 kilometer resolution. This data layer considers species covered under the habitats directive that were determined to be linked to freshwater habitats based on expert opinion.

Processing Steps

This data layer was processed by I-CATALIST. The species distributions in the Article 17 for Spain were downloaded from the second link specified below, although this information is also available in the first link for the whole EU. Freshwater species were determined through expert opinion by I-CATALIST S.L. These individual species distributions (represented in a 10km*10km grid) were intersected with the HydroBASINS level 10 catchments (HB10). When grids representing the distribution of a particular species covered more than a 5% of a HB10 unit, then the freshwater species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification with manual modification to create meaningful and easily interpretable class breaks.

Data Uncertainties

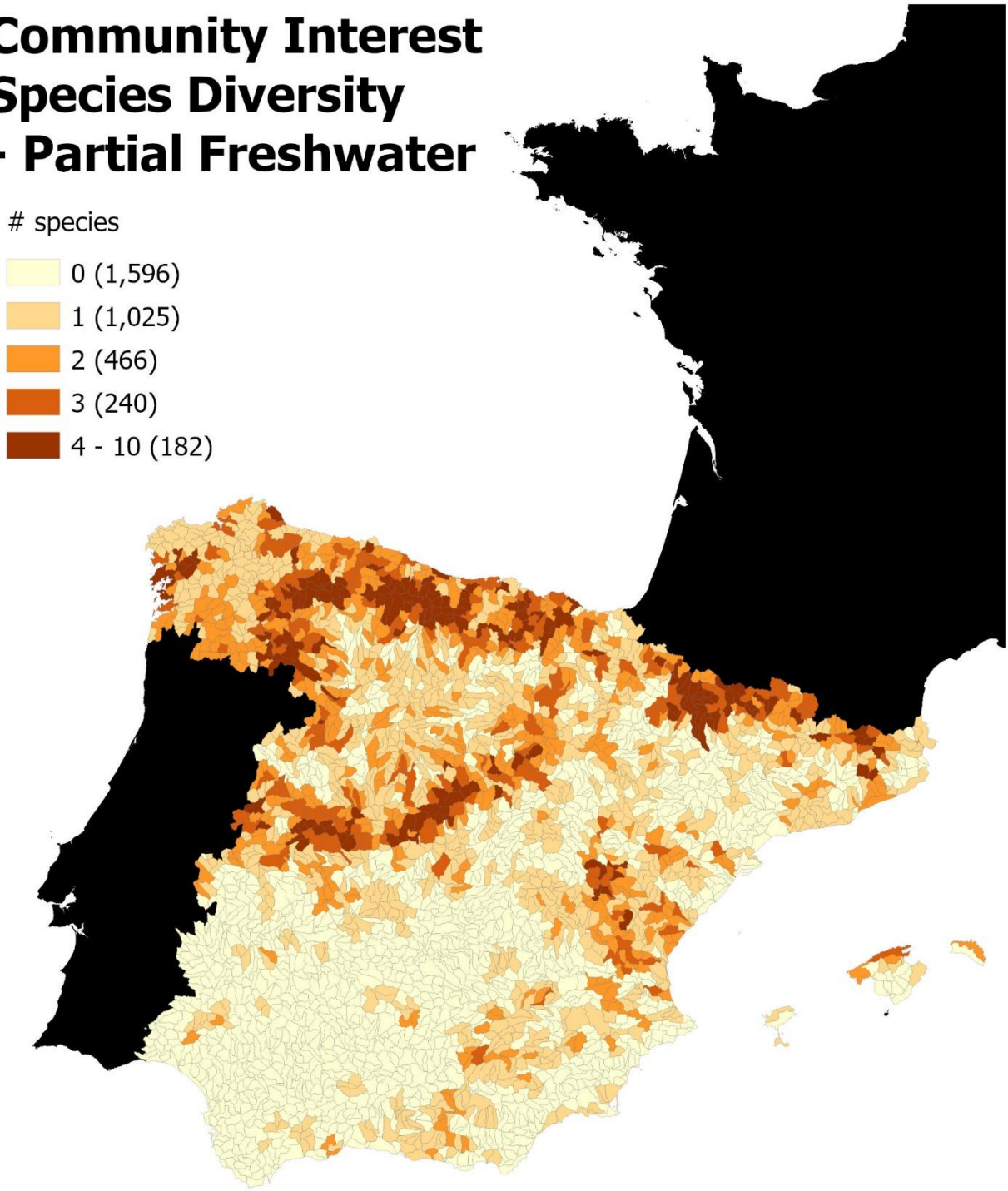
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources

Article 17 - Habitats Directive Database
Article 17 – Spain Ministry for ecological transition

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Community Interest Species Diversity - Partial Freshwater



Indicator group	**Biodiversity**	**Metric ID** 137	Back to Layer List

Layer name Community Interest Species Diversity - Partial Freshwater

Sub-group	Terrestrial Species	**Field name**	sp_cp_ab

Description

This indicator measures the richness of 'Community Interest' species partially linked to freshwater habitats (reported under Article 17 of the Habitats Directive). The 'Community Interest' species are species of wild flora or fauna which, in the European territory of the EU Member States are: endangered (with the exception of those species whose natural range extends only marginally into the territory of the EU), or vulnerable, (their transfer to the endangered category is considered likely in the near future), or rare (their populations are small in size and, while not currently endangered or vulnerable), or are endemic (require special attention because of the uniqueness of their habitat or because of possible conservation implications of their exploitation). The presence of habitats and species are reported on grid with a 10 kilometer resolution. This data layer considers species covered under the habitats directive that were determined to be partially linked to freshwater habitats based on expert opinion. These species do not include those already included within the indicator of freshwater related species. The species partially linked to freshwater habitats have a broader distribution in terms of habitats but can also often be found near or in freshwater habitats (although not exclusively), or in the case of animals they may spend large periods in freshwater habitats although they are not as dependent on them as the freshwater species.

Processing Steps

This data layer was processed by I-CATALIST. The species distributions in the Article 17 for Spain were downloaded from the second link specified below, although this information is also available in the first link for the whole EU. Freshwater species were determined through expert opinion by I-CATALIST S.L. These individual species distributions (represented in a 10km*10km grid) were intersected with the HydroBASINS level 10 catchments (HB10). When grids representing the distribution of a particular species covered more than a 5% of a HB10 unit, then the freshwater species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

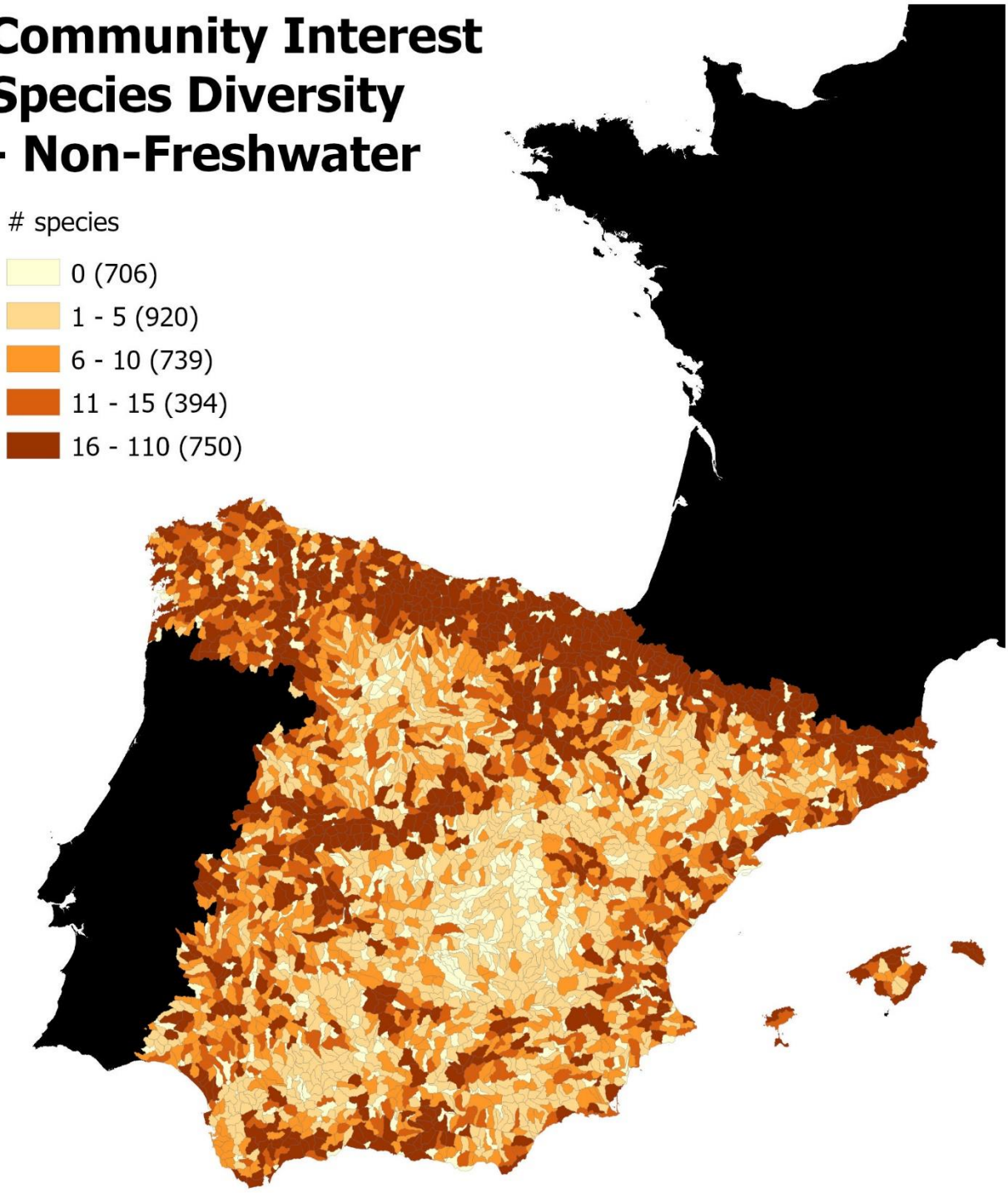
- Source data is reported on a 10km X 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources

Article 17 - Habitats Directive Database
Article 17 – Spain Ministry for ecological transition

Temporal coverage	2013 - 2018 reporting period	**Spatial resolution**	10km x 10km grid

Community Interest Species Diversity - Non-Freshwater



Indicator group	**Biodiversity**	**Metric ID** 138	Back to Layer List

Layer name Community Interest Species Diversity - Non-Freshwater

Sub-group Terrestrial Species **Field name** sp_cn_ab

Description

This indicator measures the richness of 'Community Interest' species partially linked to freshwater habitats (reported under Article 17 of the Habitats Directive). The 'Community Interest' species are species of wild flora or fauna which, in the European territory of the EU Member States are: endangered (with the exception of those species whose natural range extends only marginally into the territory of the EU), or vulnerable, (their transfer to the endangered category is considered likely in the near future), or rare (their populations are small in size and, while not currently endangered or vulnerable), or are endemic (require special attention because of the uniqueness of their habitat or because of possible conservation implications of their exploitation). The presence of habitats and species are reported on grid with a 10 kilometer resolution. This data layer considers species covered under the habitats directive that are not related to freshwater habitats. It includes all the Community Interest species not classified as 'freshwater-related' or 'freshwater partially related species'.

Processing Steps

This data layer was processed by I-CATALIST. The species distributions in the Article 17 for Spain were downloaded from the second link specified below, although this information is also available in the first link for the whole EU. Freshwater species were determined through expert opinion by I-CATALIST S.L. These individual species distributions (represented in a 10km x 10km grid) were intersected with the HydroBASINS level 10 catchments (HB10). When grids representing the distribution of a particular species covered more than a 5% of a HB10 unit, then the freshwater species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification with manual modification to create meaningful and easily interpretable class breaks.

Data Uncertainties

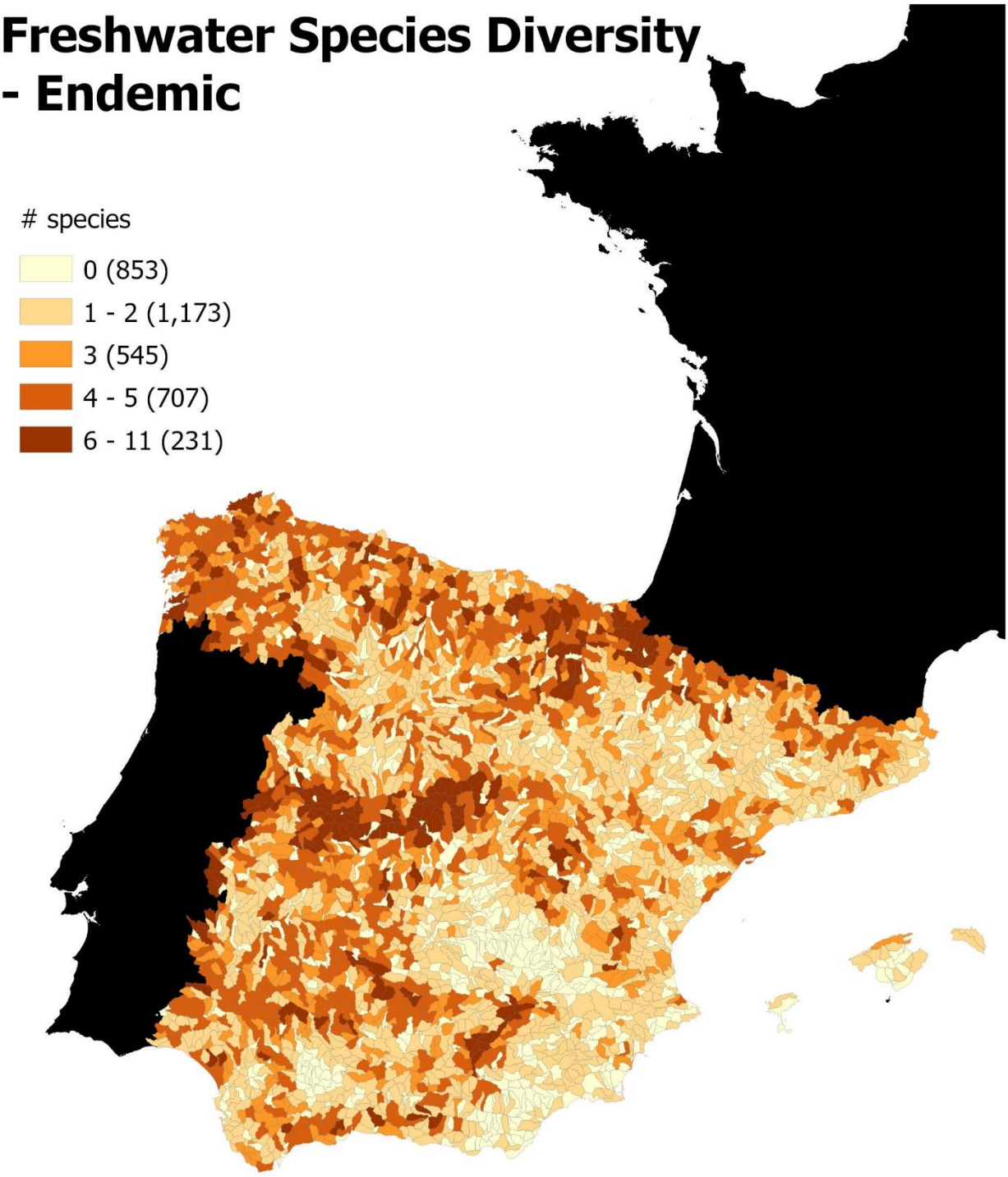
- Source data is reported on a 10km x 10km grid. The resolution of this data is similar to the average area of HydroBASIN level 10 catchments (~150km^2). The coarser resolution of this data increases the data uncertainty for these values.

Data Sources

Article 17 - Habitats Directive Database
Article 17 – Spain Ministry for ecological transition

Temporal coverage 2013 - 2018 reporting period **Spatial resolution** 10km x 10km grid

Freshwater Species Diversity - Endemic



Indicator group **Biodiversity** **Metric ID** 140 Back to Layer List

Layer name Species Diversity - Endemic

Sub-group Freshwater Species **Field name** sp_ed_ab

Description

This indicator represents the richness of endemic freshwater fauna and flora species in Spain. For fauna species, the list of endemisms was extracted from the Red Books for Spain for vertebrate and invertebrate species. The identification of freshwater-related species was made based on expert knowledge and specific queries. This final list is composed by 26 fishes species, 11 amphibia, 1 reptile, 5 mammals, 16 arthropods, 14 mollusks, and 37 flora species.

Processing Steps

This data layer was processed by I-CATALIST. For each species, the distribution was mapped according to the following priority:
- When available, we used the cartography of Community Interest species (Article 17 of Habitats Directive).
- If the identified species is not listed as a Community Interest, we used the GBIF tool to gather distribution data.
- If data about the distribution of the critically endangered species could not be achieved from the two previous data sources, then we used the cartography provided by the IUCN (since this is generated at a larger scale and is less detailed).

The individual species distributions were intersected with the HydroBASINS level 10 catchments (HB10) and when the distribution of a particular species was identified inside an HB10 unit, then the freshwater endemic species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

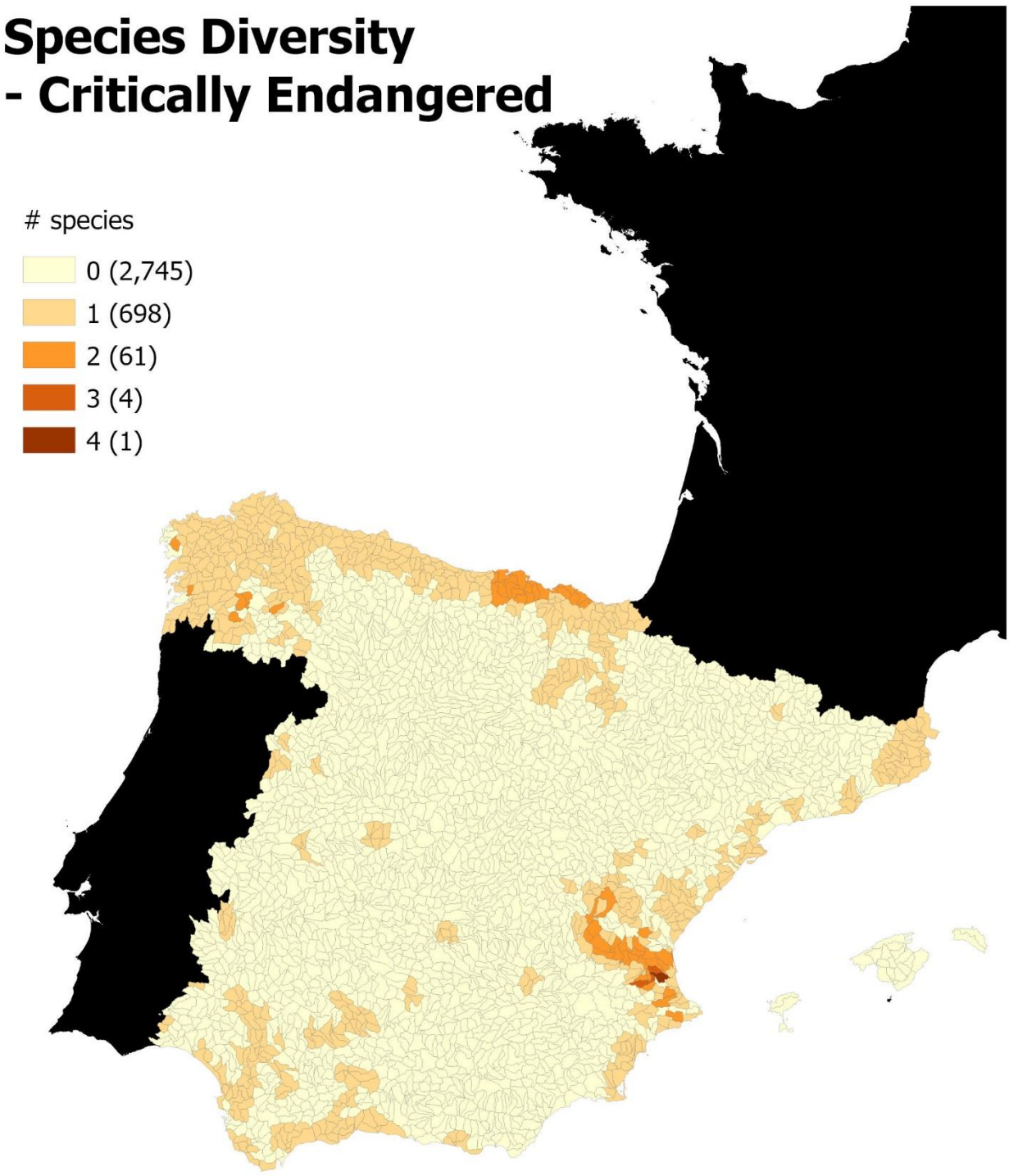
- The coarse resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2, increases the data uncertainty for this layer.

Data Sources

Red Book vertebrate species Spain
Red Book invertebrates Spain
IUCN Redlist

Temporal coverage NA **Spatial resolution** NA

Species Diversity
- Critically Endangered



Indicator group	**Biodiversity**	**Metric ID** 145	Back to Layer List

Layer name Species Diversity - Critically Endangered

Sub-group IUCN Red List Species **Field name** sp_cr_ab

Description

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species provides a comprehensive data source on the global extinction risk of flora and fauna. Species contained with in the IUCN Red List are classified into 9 categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient and Not Evaluated. Vulnerable, Endangered and Critically Endangered species are considered to be threatened with extinction.

Processing Steps

This data layer was processed by I-CATALIST. The information of Red Listed species were downloaded from the IUCN web page with spatial distribution over Spain. For each of the species classified as 'critically endangered', we collected a cartography of its distribution according to the following priority:
- When available, we used the cartography of Community Interest species (Article 17 of Habitats Directive).
- If the identified species is not listed as a Community Interest, we used the GBIF tool to gather distribution data.
- If data about the distribution of the critically endangered species could not be achieved from the two previous data sources, then we used the cartography provided by the IUCN (since this is generated at a larger scale and is less detailed).

The individual species distributions were intersected with the HydroBASINS level 10 catchments (HB10) and when the distribution of a particular species was identified inside a HB10 unit, then the freshwater species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

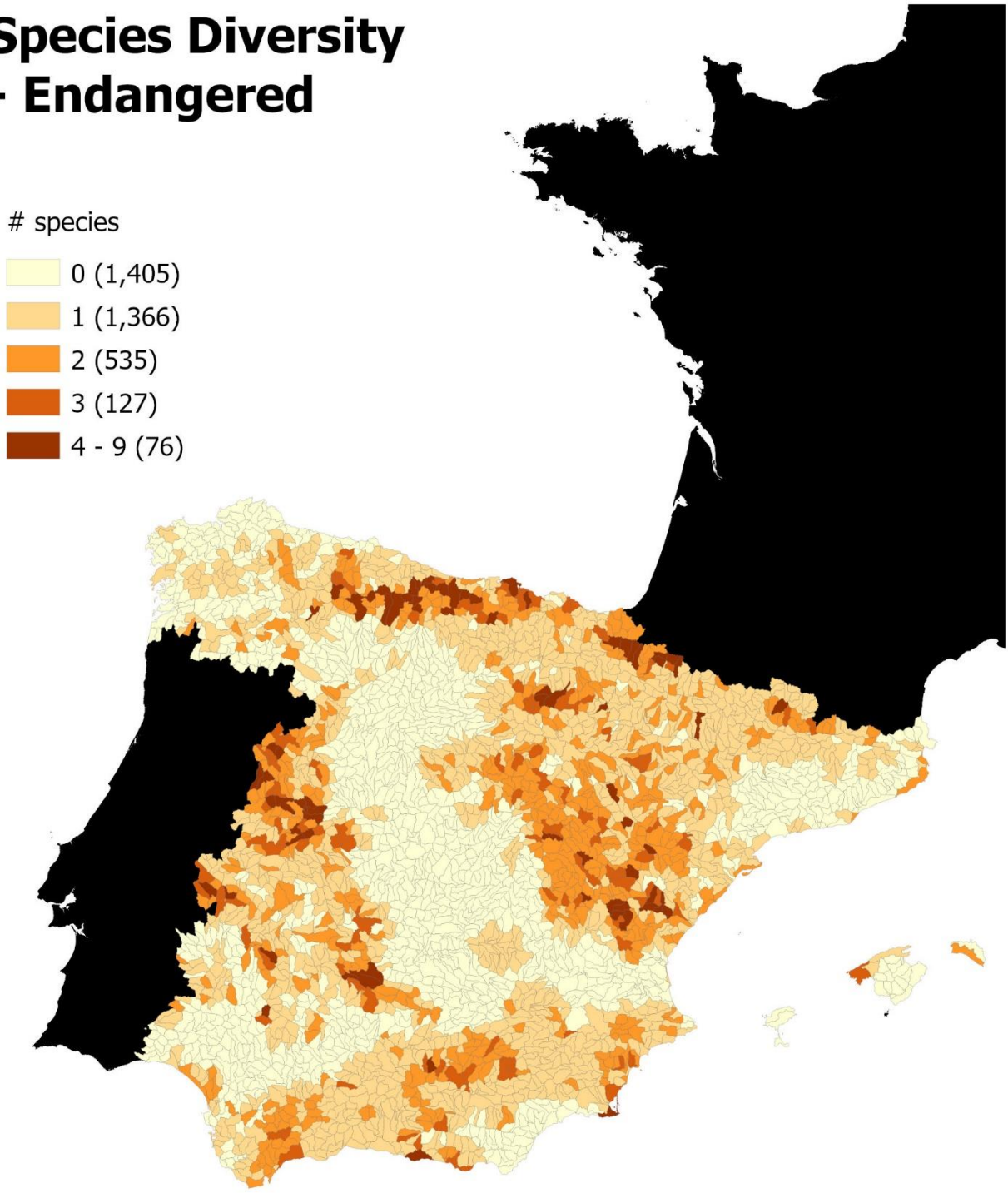
- The coarse resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2), increases the data uncertainty for this layer.

Data Sources

IUCN Red List
Article 17 Community Interest species – Spain Ministry for ecological transition

Temporal coverage NA **Spatial resolution** NA

Species Diversity - Endangered



Indicator group	**Biodiversity**	**Metric ID** 146	Back to Layer List

Layer name Species Diversity - Endangered

Sub-group	IUCN Red List Species	**Field name**	sp_en_ab

Description

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species provides a comprehensive data source on the global extinction risk of flora and fauna. Species contained with in the IUCN Red List are classified into 9 categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient and Not Evaluated. Vulnerable, Endangered and Critically Endangered species are considered to be threatened with extinction.

Processing Steps

This data layer was processed by I-CATALIST. The information of Red Listed species were downloaded from the IUCN web page with spatial distribution over Spain. For each of the species classified as 'endangered', we collected a cartography of its distribution according to the following priority:
- When available, we used the cartography of Community Interest species (Article 17 of Habitats Directive).
- If the identified species is not listed as a Community Interest, we used the GBIF tool to gather distribution data.
- If data about the distribution of the critically endangered species could not be achieved from the two previous data sources, then we used the cartography provided by the IUCN (since this is generated at a larger scale and is less detailed).

The individual species distributions were intersected with the HydroBASINS level 10 catchments (HB10) and when the distribution of a particular species was identified inside a HB10 unit, then the freshwater species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

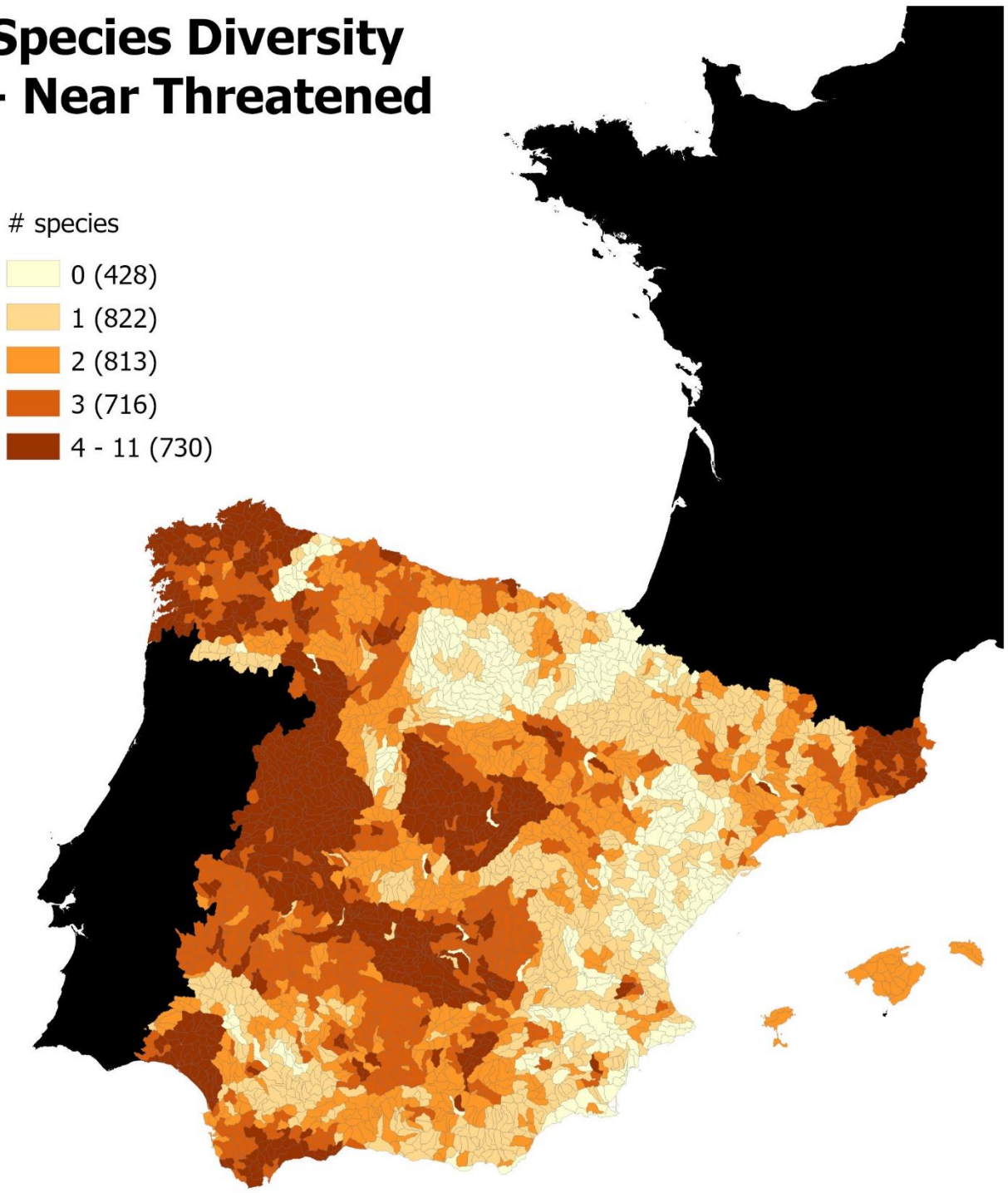
- The coarse resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2), increases the data uncertainty for this layer.

Data Sources

IUCN Red List
Article 17 Community Interest species – Spain Ministry for ecological transition

Temporal coverage	NA	**Spatial resolution**	NA

Species Diversity - Near Threatened



Indicator group	**Biodiversity**	**Metric ID** 147	Back to Layer List

Layer name Species Diversity - Near Threatened

Sub-group IUCN Red List Species **Field name** sp_nt_ab

Description

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species provides a comprehensive data source on the global extinction risk of flora and fauna. Species contained with in the IUCN Red List are classified into 9 categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient and Not Evaluated. Vulnerable, Endangered and Critically Endangered species are considered to be threatened with extinction.

Processing Steps

This data layer was processed by I-CATALIST. The information of Red Listed species were downloaded from the IUCN web page with spatial distribution over Spain. For each of the species classified as 'near threatened', we collected a cartography of its distribution according to the following priority:
- When available, we used the cartography of Community Interest species (Article 17 of Habitats Directive).
- If the identified species is not listed as a Community Interest, we used the GBIF tool to gather distribution data.
- If data about the distribution of the critically endangered species could not be achieved from the two previous data sources, then we used the cartography provided by the IUCN (since this is generated at a larger scale and is less detailed).

The individual species distributions were intersected with the HydroBASINS level 10 catchments (HB10) and when the distribution of a particular species was identified inside a HB10 unit, then the freshwater species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

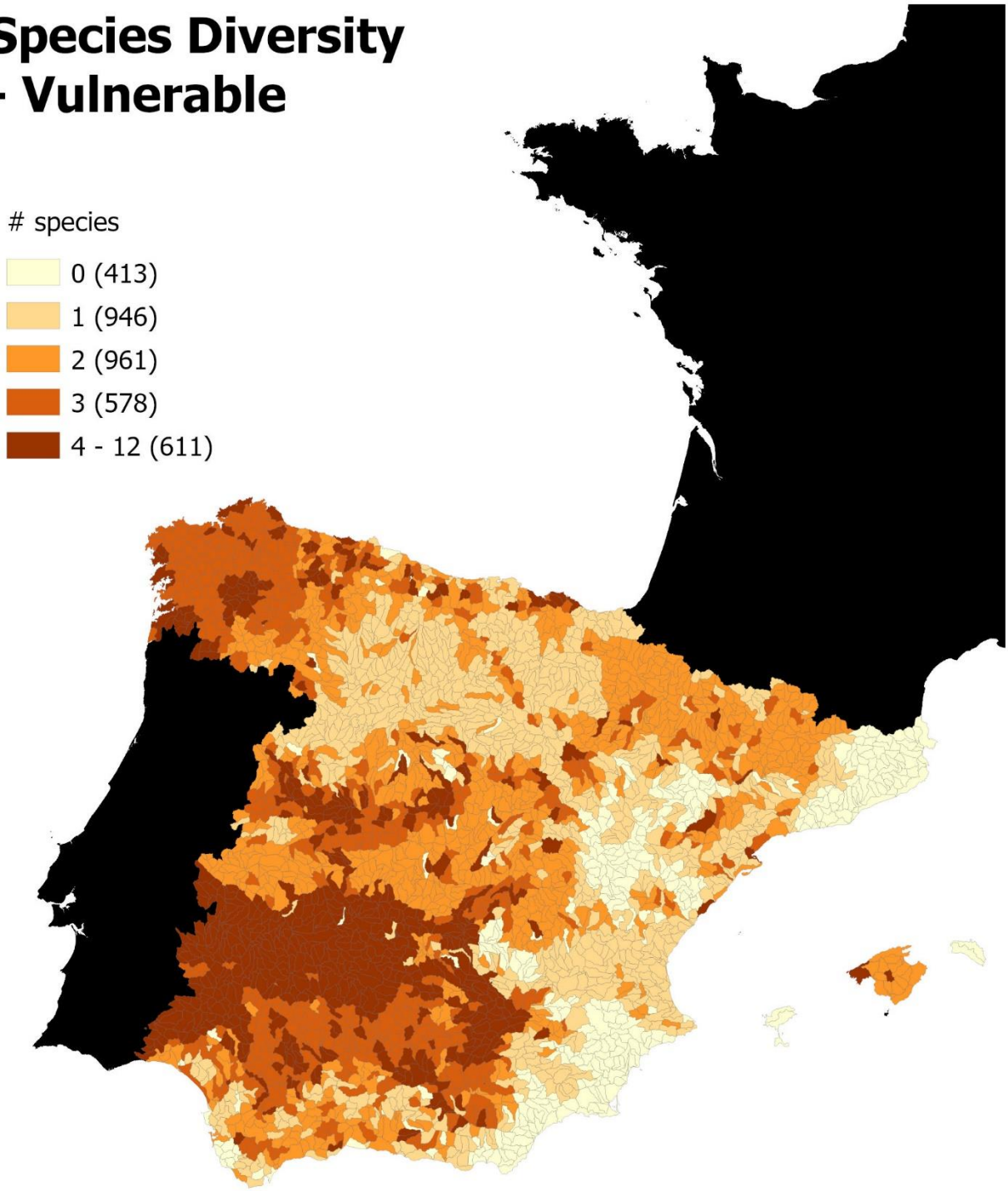
- The coarse resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2), increases the data uncertainty for this layer.

Data Sources

IUCN Red List
Article 17 Community Interest species – Spain Ministry for ecological transition

Temporal coverage NA **Spatial resolution** NA

Species Diversity - Vulnerable



Indicator group	**Biodiversity**	**Metric ID** 148	Back to Layer List

Layer name Species Diversity - Vulnerable

Sub-group	IUCN Red List Species	**Field name**	sp_vu_ab

Description

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species provides a comprehensive data source on the global extinction risk of flora and fauna. Species contained with in the IUCN Red List are classified into 9 categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient and Not Evaluated. Vulnerable, Endangered and Critically Endangered species are considered to be threatened with extinction.

Processing Steps

This data layer was processed by I-CATALIST. The information of Red Listed species were downloaded from the IUCN web page with spatial distribution over Spain. For each of the species classified as 'vulnerable', we collected a cartography of its distribution according to the following priority:
- When available, we used the cartography of Community Interest species (Article 17 of Habitats Directive).
- If the identified species is not listed as a Community Interest, we used the GBIF tool to gather distribution data.
- If data about the distribution of the critically endangered species could not be achieved from the two previous data sources, then we used the cartography provided by the IUCN (since this is generated at a larger scale and is less detailed).

The individual species distributions were intersected with the HydroBASINS level 10 catchments (HB10) and when the distribution of a particular species was identified inside an HB10 unit, then the freshwater species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

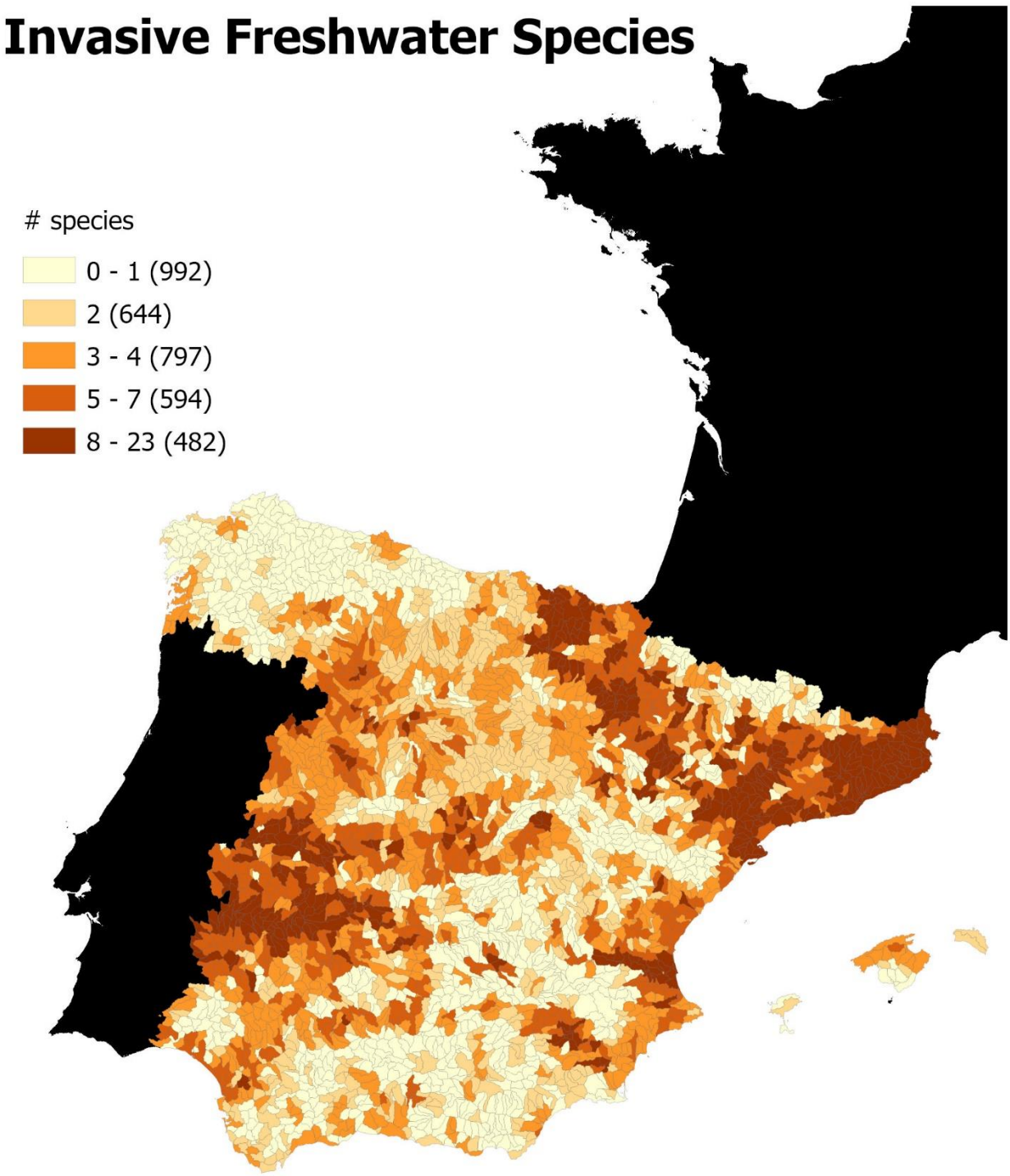
- The coarse resolution of the source data, relative to the average area of the HydroBASIN level 10 catchments (~150km^2), increases the data uncertainty for this layer.

Data Sources

IUCN Red List
Article 17 Community Interest species – Spain Ministry for ecological transition

Temporal coverage	NA	**Spatial resolution**	NA

Invasive Freshwater Species



Indicator group	**Biodiversity**	**Metric ID** 176	Back to Layer List

Layer name Invasive Freshwater Species

Sub-group Freshwater Species **Field name** sp_iv_ab

Description

A list of Invasive species on the Iberian Peninsula was generated using the EEI-SIBIC database, compiled by the LIFE INVASAQUA project. This project seeks to reduce the introduction and spread of invasive alien species (IAS) in the Iberian Peninsula by increasing public and stakeholder awareness through information, communication and training campaigns, and developing key tools to improve an early warning and rapid response (EWRR) framework for new IAS in freshwater and estuarine habitats. From this catalogue, only those species included in the Spanish catalogue of invasive species were selected.

Processing Steps

This data layer was processed by I-CATALIST. The cartography of Inventory of Exotic Invasive species from the Spain Ministry of Ecological Transition was used to map the distribution of these species. When this was not available, because of the recent inclusion of the species in the EEI-SIBIC database, we used the cartography of the EEI-SIBIC database. The individual species distributions were intersected with the HydroBASINS level 10 catchments (HB10) and when the distribution of a particular species was identified inside a HB10 unit, then the freshwater invasive species richness count within the HB10 unit was increased by one.

Data Normalization

Categorical data breaks were determined using quantile classification.

Data Uncertainties

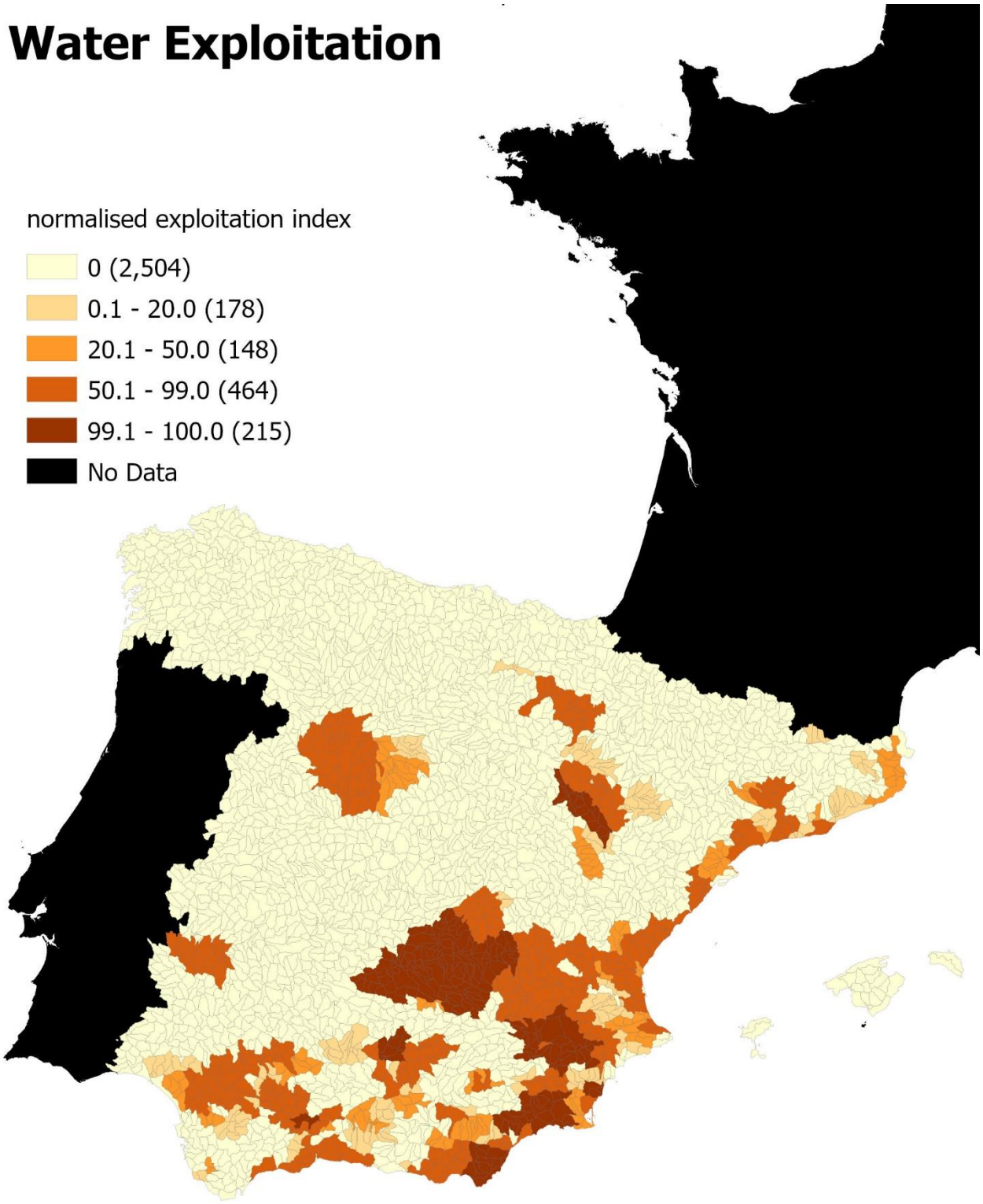
- The small scale (i.e., coarse resolution) of the source data increases data uncertainty for this layer.

Data Sources

EEI-SIBIC
Inventory of invasive species by the Spain Ministry of ecological transition

Temporal coverage 2018 **Spatial resolution** 1:50,000

Water Exploitation



Indicator group	**Current State**	**Metric ID** 221	Back to Layer List
Layer name	Water Exploitation		
Sub-group	Development Pressure	**Field name**	sp_ex_mx

Description

This indicator measures the ratio between groundwater abstractions and available annual groundwater resources for consumptive uses. The latter figure considers the natural yearly water balance (i.e., water balance with no abstractions) and discounts the water resources that are needed to maintain the main freshwater ecosystems dependent on groundwater. These data have been taken from the new River Basin Management Plans for the 2022-2027 period. We consulted each one of the plans across Spain and manually collected the data, since these are still not integrated in GIS format.

Processing Steps

This data layer was processed by I-CATALIST. Alphanumeric data for the groundwater exploitation index were linked to the cartography of the groundwater bodies in Spain. Then, this layer was intersected with the HydroBASINS level 10 catchments (HB10). When several groundwater bodies intersected a HB10 unit, a weighted average was calculated. For the normalization of the data, the following criteria were applied:

- Exploitation index < 0.6 (no big pressure), value =0.
- Exploitation index between 0.6 and 0.8 (pressure), values linearly normalized between 0 and 20
- Exploitation index between 0.8 and 1 (officially overexploited but still not depleting the aquifer), values linearly normalized between 20 and 50
- Exploitation index between 1 and 2 (very high pressure), values linearly normalized between 50 and 100
- Exploitation index > 2, value = 100

Data Normalization

Categorical data breaks were determined based on the values provided for normalization described in the processing steps.

Data Uncertainties

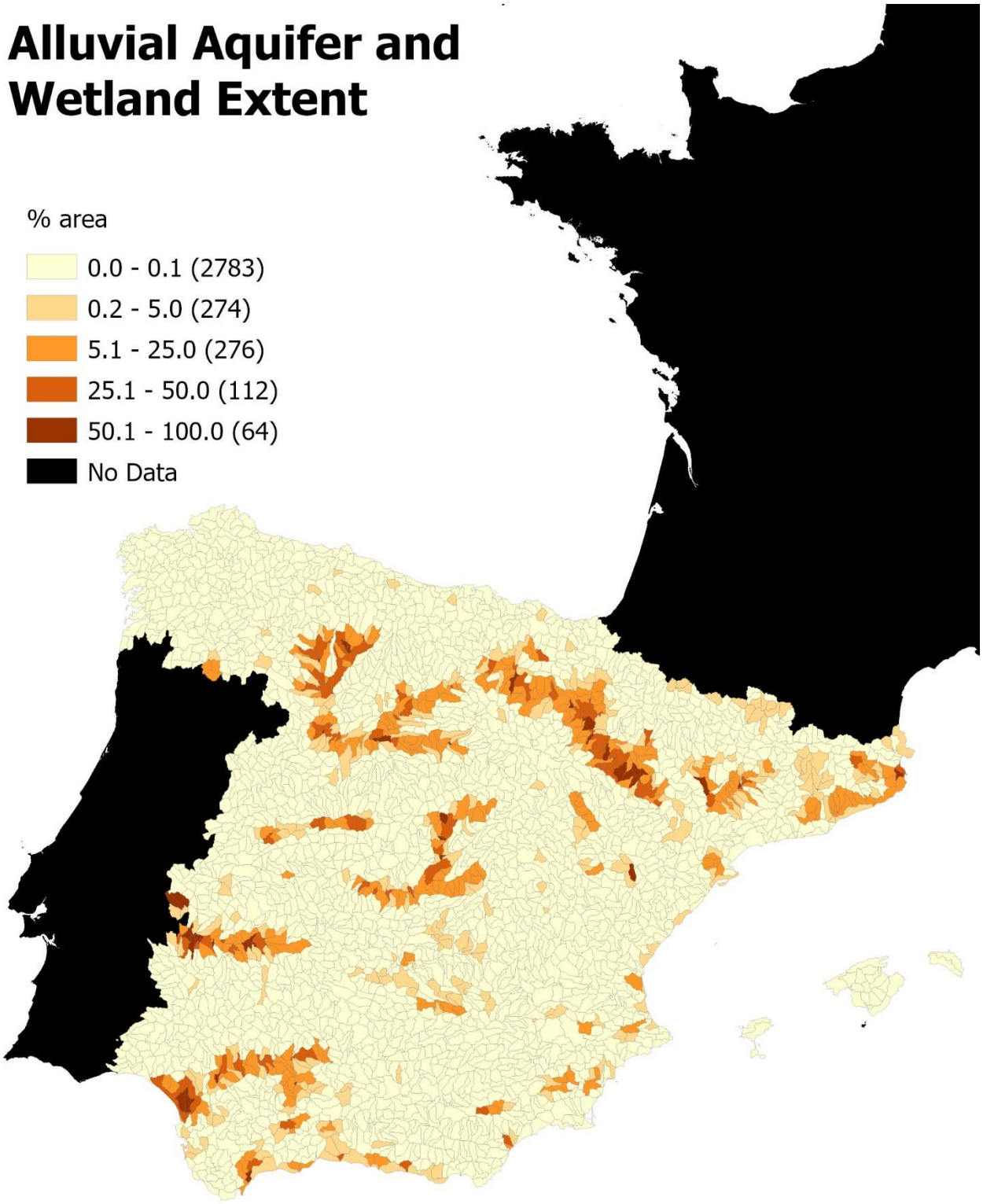
- The source data comes from the Water Framework Directive (WFD), which combines data from multiple sources for 180 river basins across Europe. Differences in the collection and preparation of the individual data sources create a source of uncertainty for this layer. However, the WFD provides reporting guidelines to participating countries to reduce disparities between data sources.

Data Sources

Groundwater bodies in Spain
River Basin Management Plans in Spain 2022-2027 cycle

Temporal coverage	2022 – 2027 reporting period	**Spatial resolution**	NA

Alluvial Aquifer and Wetland Extent



Indicator group	**Current State**	**Metric ID** 226	Back to Layer List

Layer name Alluvial Aquifer and Wetland Extent

Sub-group	Land Use / Cover	**Field name**	sp_aw_sp

Description

This is a proxy indicator related to the presence of groundwater dependent ecosystems where the implementation of Nature-based solution can have a positive impact on water security and biodiversity conservation. It was considered that the extent of alluvial aquifers and wetlands are two strong indicators for the potential presence of groundwater dependent ecosystems.

Processing Steps

This data layer was processed by I-CATALIST. The layer was created from the combination of two data sources: a map of alluvial aquifers created from the official layer of groundwater bodies in Spain (this was based on expert interpretation (name and shape) and knowledge) and a map of wetlands that was created from the official layer of surface water bodies in Spain by removing lineal water bodies and water reservoirs. The extent of wetlands and alluvial aquifers per HydroBASINS level 10 catchments (HB10) were calculated, summed, and converted to percent of HydroBASIN area.

Data Normalization

Categorical data breaks were determined manually to create meaningful and easily interpretable class breaks.

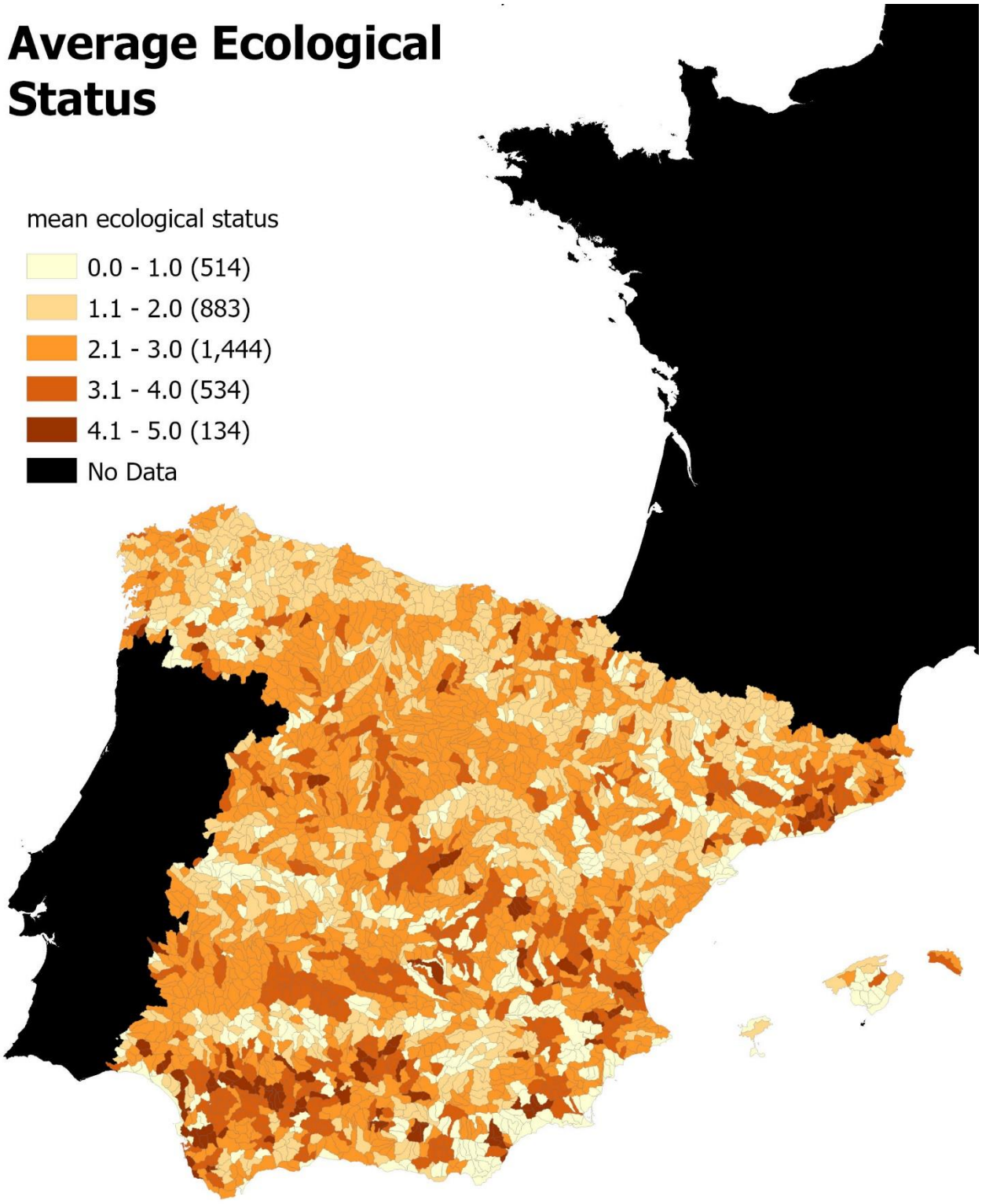
Data Uncertainties

- The small scale (i.e., coarse resolution) of the source data increases data uncertainty for this layer.

Data Sources Surface and Groundwater bodies in Spain

Temporal coverage	2015 – 2021 reporting period	**Spatial resolution**	1:25,000

Average Ecological Status



Indicator group	**Current State**	**Metric ID** 227	Back to Layer List
Layer name	Average Ecological Status		
Sub-group	Water Quality	**Field name**	sp_ec_av

Description

The Water Framework Directive aims to achieve good status for all rivers, lakes and transitional and coastal waters in the EU. As explained by the European Environmental Agency, according to countries' second river basin management plans, good ecological status had been achieved for around 40% of surface waters (rivers, lakes and transitional and coastal waters) by 2015. However, these plans show only limited improvement in ecological status since the first plans were published in 2009, with ecological status remaining similar for most water bodies. Ecological status is defined as an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters. For ecological status a distinction is made between very good, good, moderate, poor, or very poor status.

Processing Steps

This data layer was processed by I-CATALIST. The categories of ecological status were assigned numeric values, ranging from 1 for very good status to 5 for very poor status. Then, the maps of water bodies (lineal and polygonal elements) were intersected with the HydroBASINS level 10 catchments (HB10). Separate weighted averages were calculated for the linear (i.e., rivers and streams) and polygonal (i.e., wetlands, lakes and reservoirs) water bodies, which were later aggregated for each HB10 unit. In those few cases with no values, an average of the surrounding HB10 values was calculated.

Data Normalization

Categorical data breaks were determined using the range of values for the risk indicator score.

Data Uncertainties

- The data are expressed as an average ecological status within each hydroBASIN. Individual waterbodies within the HydroBASIN may differ from the catchment average.

Data Sources

Ecological status – data provided by the Spain Ministry of ecological transition

Temporal coverage	2015 -2021 reporting period	**Spatial resolution**	NA