

Broadening Our View of Global Biodiversity

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Slide Layout Design

- Unprecedented Loss of Biodiversity
- Scarcity of Reliable Biodiversity Data: Challenges to Conservation

Project Contributions:

1. Mapping occurrence regions for nearly 600,000 species of flora and fauna, including vertebrates and invertebrates, across terrestrial, freshwater, and marine environments.
2. Identification of occurrence regions of "critical" species, such as endemics and with small occurrence ranges, which are under threat due to their limited distribution.
3. Estimation of extinction risks for all species based on local threats and protective measures.
4. Development of geographically specific human coexistence indicators using publicly available data on population density, travel time to cities and ports, water use, commercial fishing activity, and coastal population pressures.

Slide Layout Design (continued)

Project Contributions (continued):

5. Mapping species richness and critical species in geopolitically sensitive areas, including disputed territories, Fragile and Conflict-Affected States, transboundary river basins, and joint marine regimes.
6. Development of a Prototype illustrating the biodiversity profile of a region.
7. Development of a prototype illustrating the biodiversity profile of a country.

Illustration of the Use of the Data:

8. Assessment of the coverage of Protected Areas for preserving endemic species.
9. Estimation of the impacts of sea-level rise on the habitats of critical species in a changing climate.
10. Estimation of the impacts of climate change on food security, nutrition, and health in vulnerable human communities.

Unprecedented Loss of Biodiversity

- Current extinction rates are 1,000 times higher than natural levels.
- Nearly 1 million species are at risk of extinction.

Key drivers:

- Habitat destruction
 - Overexploitation of resources
 - Pollution and illegal wildlife trade
 - Invasive species and climate change
- Urgent action is needed to mitigate these drivers and protect biodiversity.

Scarcity of Reliable Biodiversity Data: Challenges in Conservation

- Limited public data on key ecosystems hampers effective conservation efforts.
- Data gaps are especially pronounced in developing regions, slowing progress.
- Traditional metrics focus narrowly on terrestrial vertebrates, overlooking broader biodiversity.
- Underfunded institutions struggle to update data in the face of emerging threats.
- High-resolution, location-specific data is essential for aligning conservation with development goals.

Project Contribution

Expansion of Species Coverage Beyond Terrestrial Vertebrates:

Mapping Occurrence Regions of 597,532 Species including
Arthropods, Molluscs, Other Animals, Vascular Plants. Fungi and
Other (non-animal and non-plant) Species

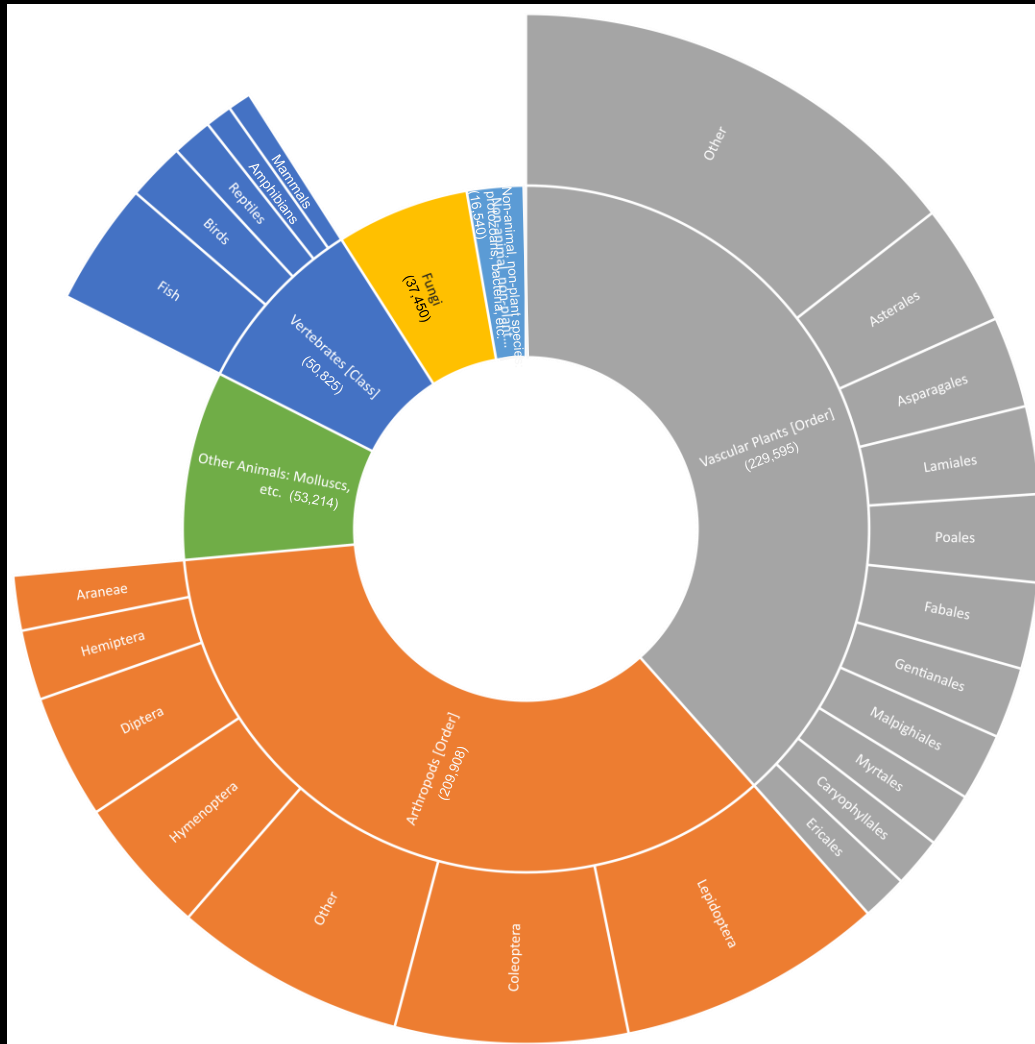
Occurrence Region Maps
for Nearly 600,000 Species Across Terrestrial,
Freshwater, and Marine Environments

Source Data

1. Use of Google's BigQuery for downloading data from GBIF
 - Selecting the geolocated occurrence reports since 1970 for species with at least 5 uniquely defined reporting locations.
 - Downloading a maximum of 20,000 randomly-selected reports per species.
 - Accepting GBIF protocols for occurrence report admissibility.

Count of Species

Source: Global Biodiversity Information Facility (GBIF)



Species Class/ Order	Group	Count
Vertebrates [Class]	Amphibians	5,026
	Birds	10,845
	Mammals	4,377
	Reptiles	7,544
	Fish	23,033
	Subtotal	50,825
Arthropods [Order]	Araneae	10,307
	Coleoptera	43,660
	Diptera	23,321
	Hemiptera	13,123
	Hymenoptera	25,924
	Lepidoptera	50,037
	Other	43,536
	Subtotal	209,908
Vascular Plants [Order]	Asparagales	17091
	Asterales	22841
	Caryophyllales	9321
	Ericales	8545
	Fabales	16194
	Gentianales	13317
	Lamiales	16436
	Malpighiales	12632
	Myrtales	10253
	Poales	16,433
	Other	86,532
	Subtotal	229,595
Fungi		37,450
Non-animal, non-plant species: protozoans, bacteria, etc.		16,540
Other Animals: Molluscs, etc.		53,214
Total		597,532

Methodology for Mapping Species' Occurrence Regions

1. Use of alphahull algorithm for drawing Species Occurrence Region maps following Pateiro-López and Rodríguez-Casal (2010).
2. Removal of Spurious Observations
 - Removal of single bounded areas with less than 3 observations when species have multiple bounded areas.

Lagidium viscacia (Mountain Viscacha)

GBIF occurrences and maps



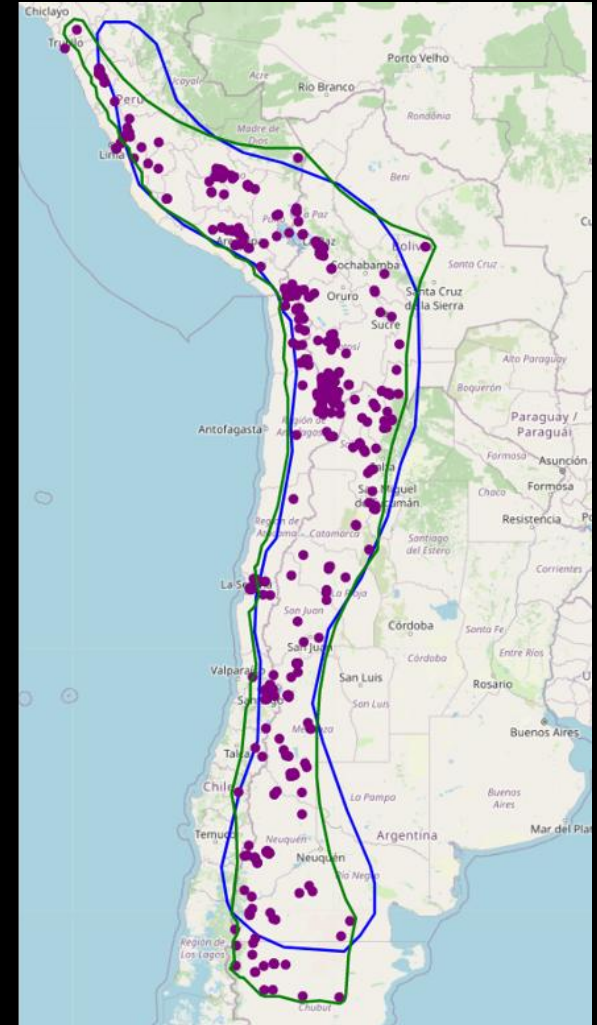
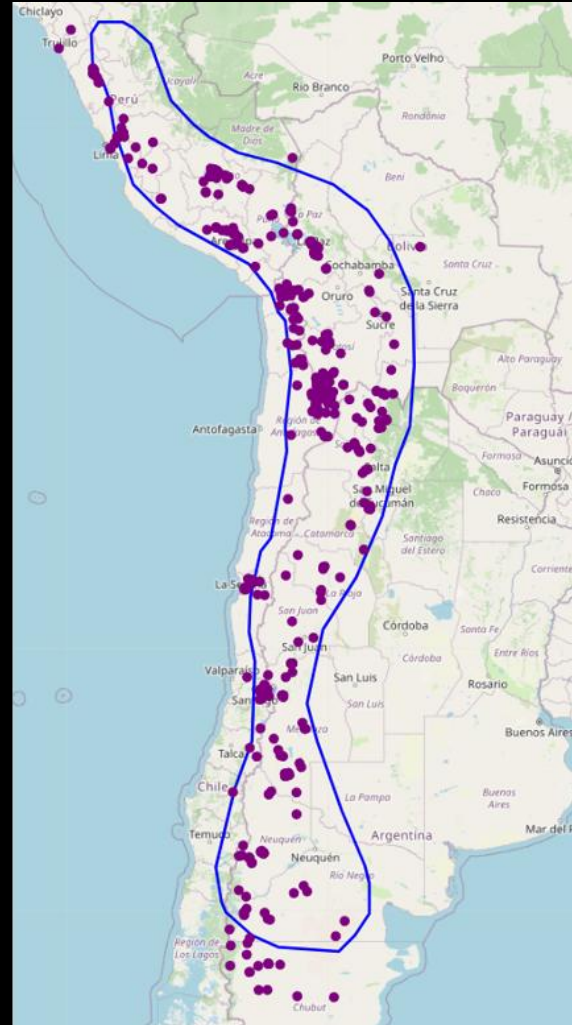
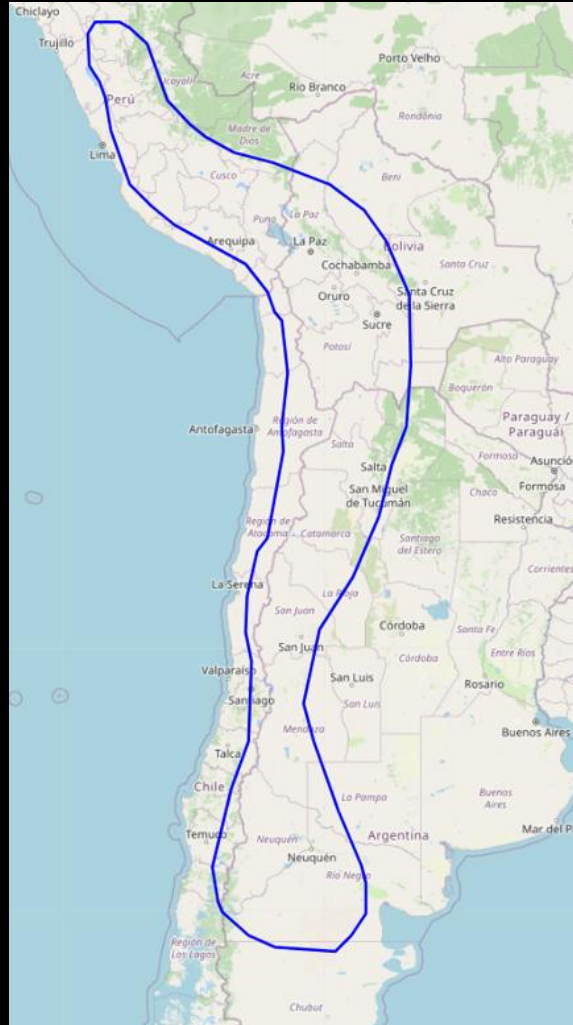
GBIF Occurrence
Reports



Expert Range Map
(Burgin et al. 2020)



GBIF Occurrence
Mapping Algorithm



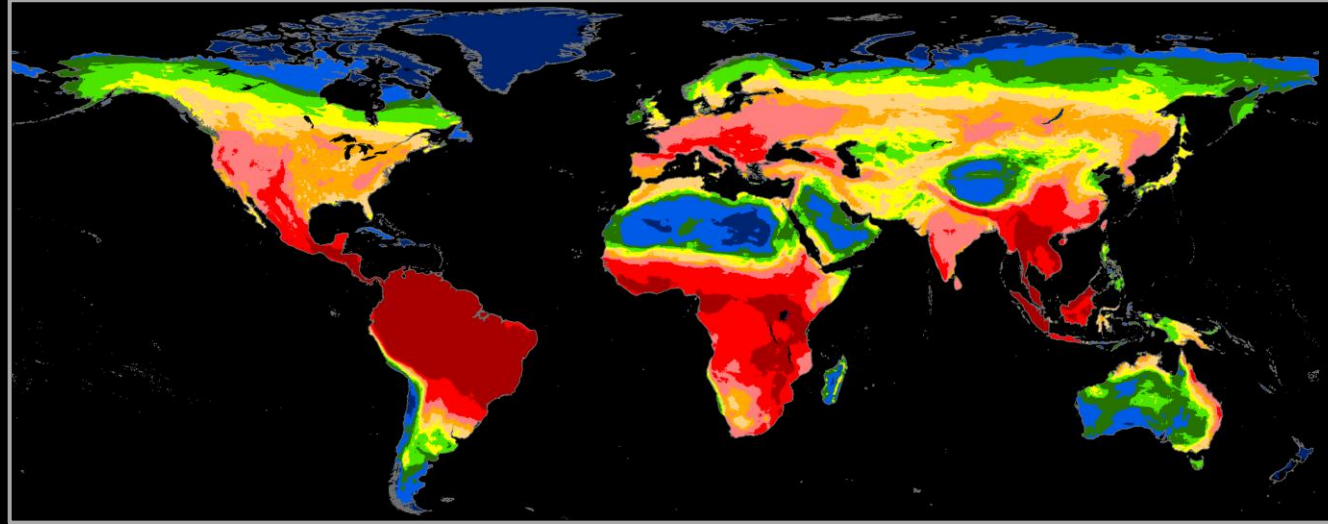
Validation of the Occurrence Maps Constructed with GBIF Data

Comparison of Occurrence Maps constructed from GBIF data with Published Research:

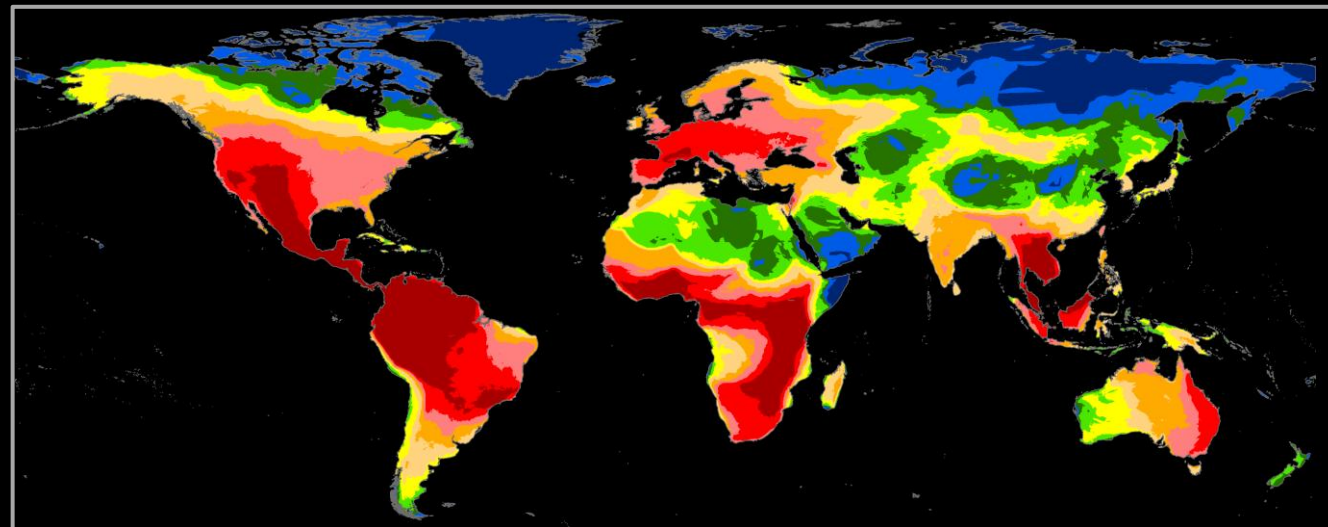
1. Mammal range maps estimated by Marsh et al. (2022)
2. Ant range maps by Kass et al. (2022)
3. Vascular Plant maps estimated by Borgelt et al. (2022)

Matched mammal species densities, Marsh et al. (2022) vs. GBIF occurrence reports

Marsh

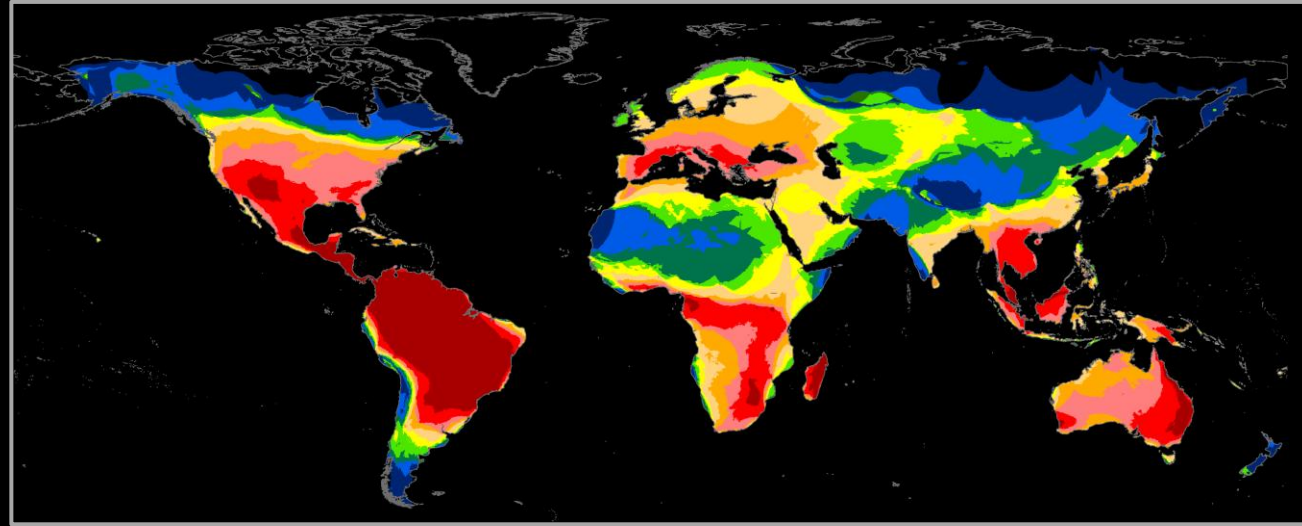


GBIF

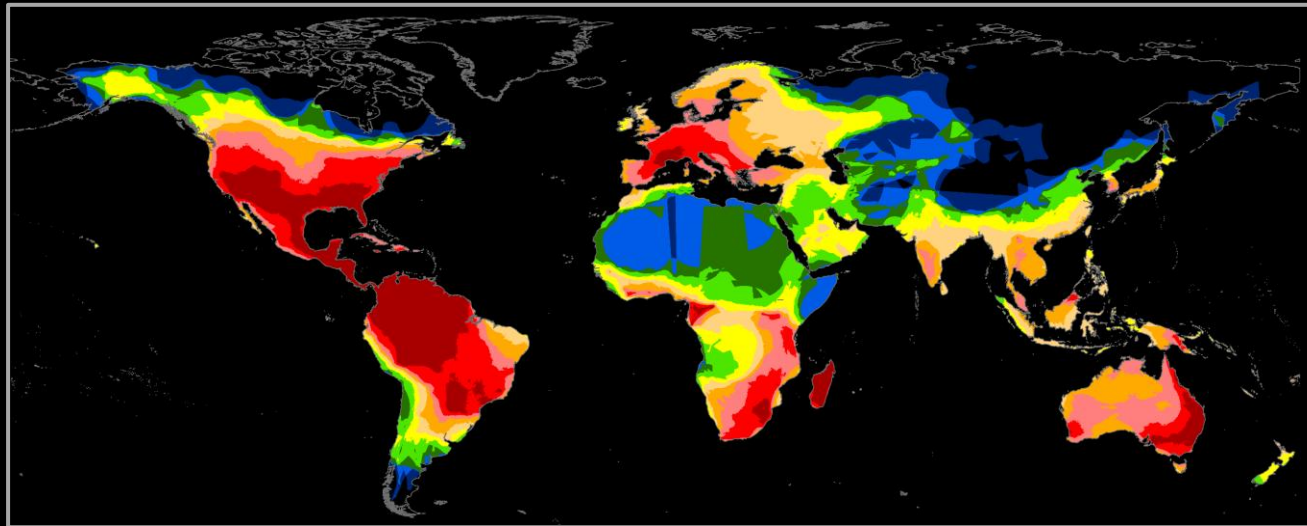


Matched ant species densities, Kass et al. (2022) vs. GBIF occurrence reports

Kass

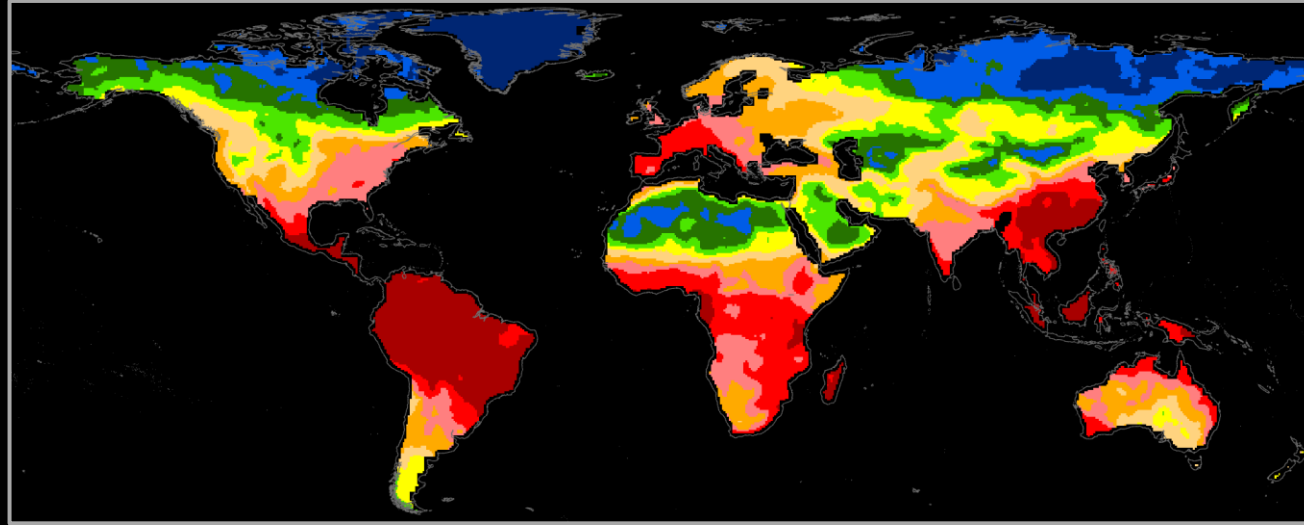


GBIF

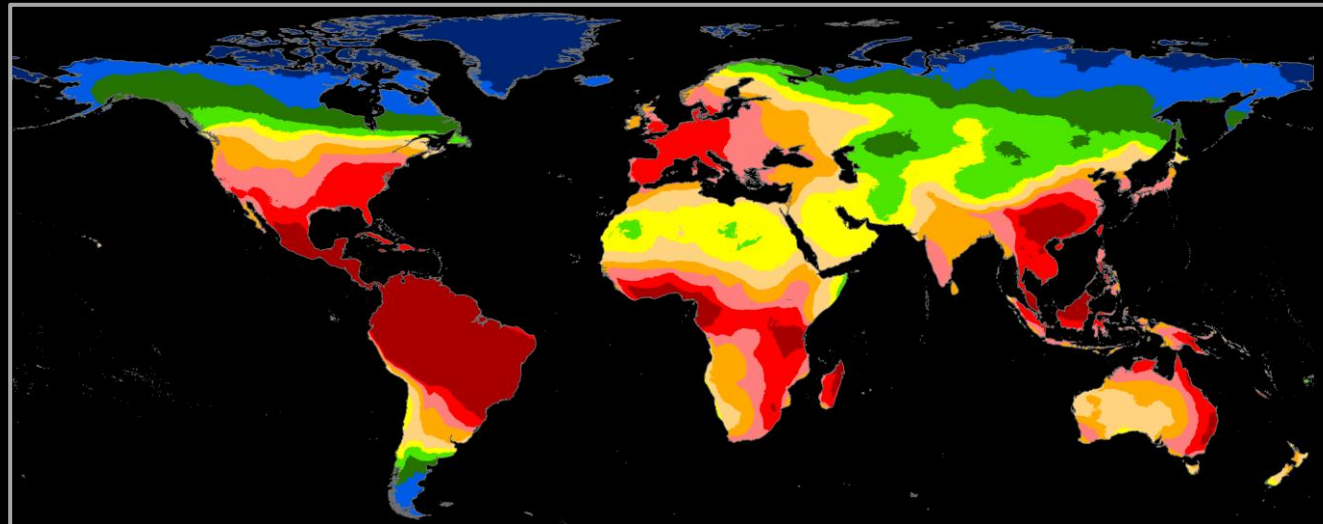


Matched plant species densities, Borgelt et al. (2022) vs. GBIF occurrence reports

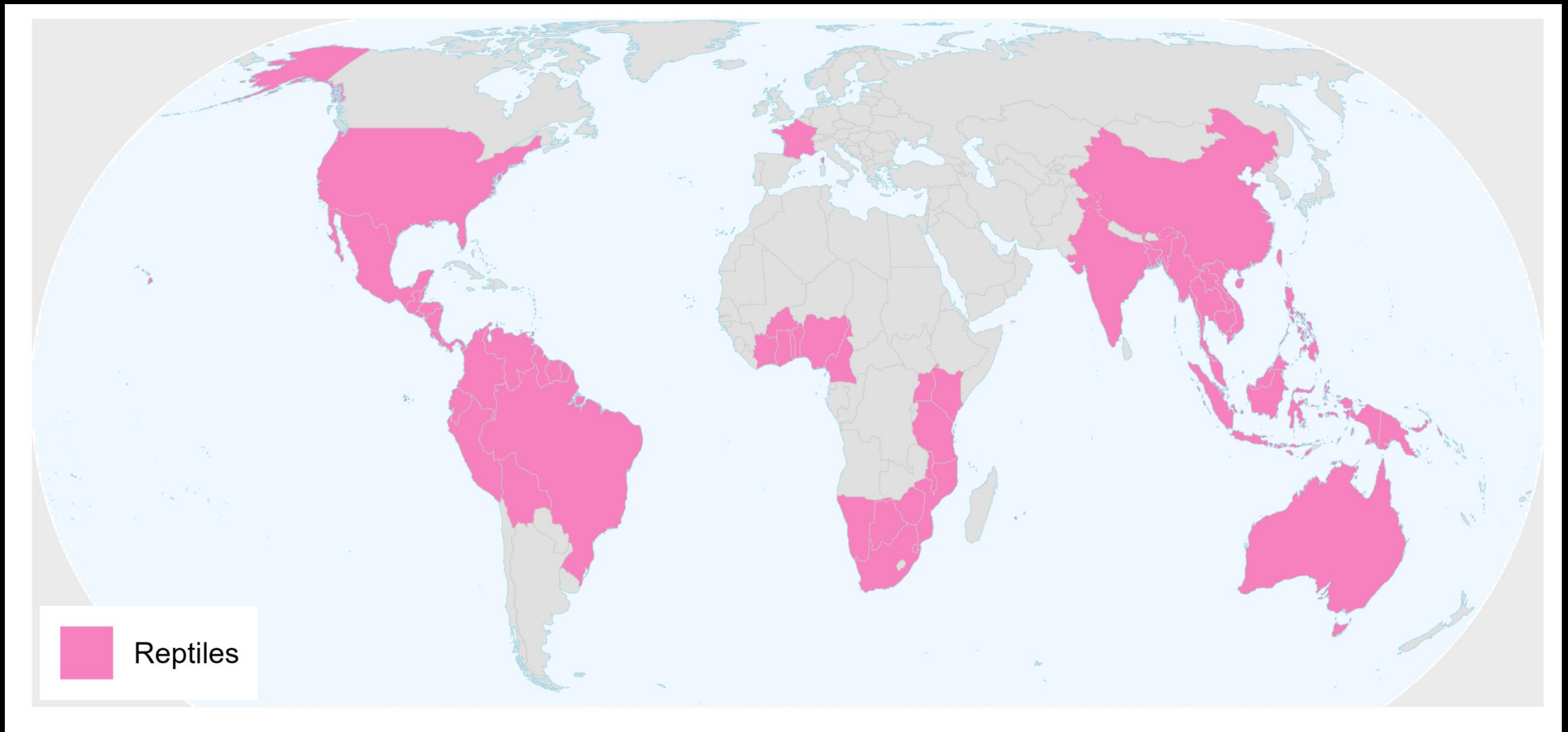
Borgelt



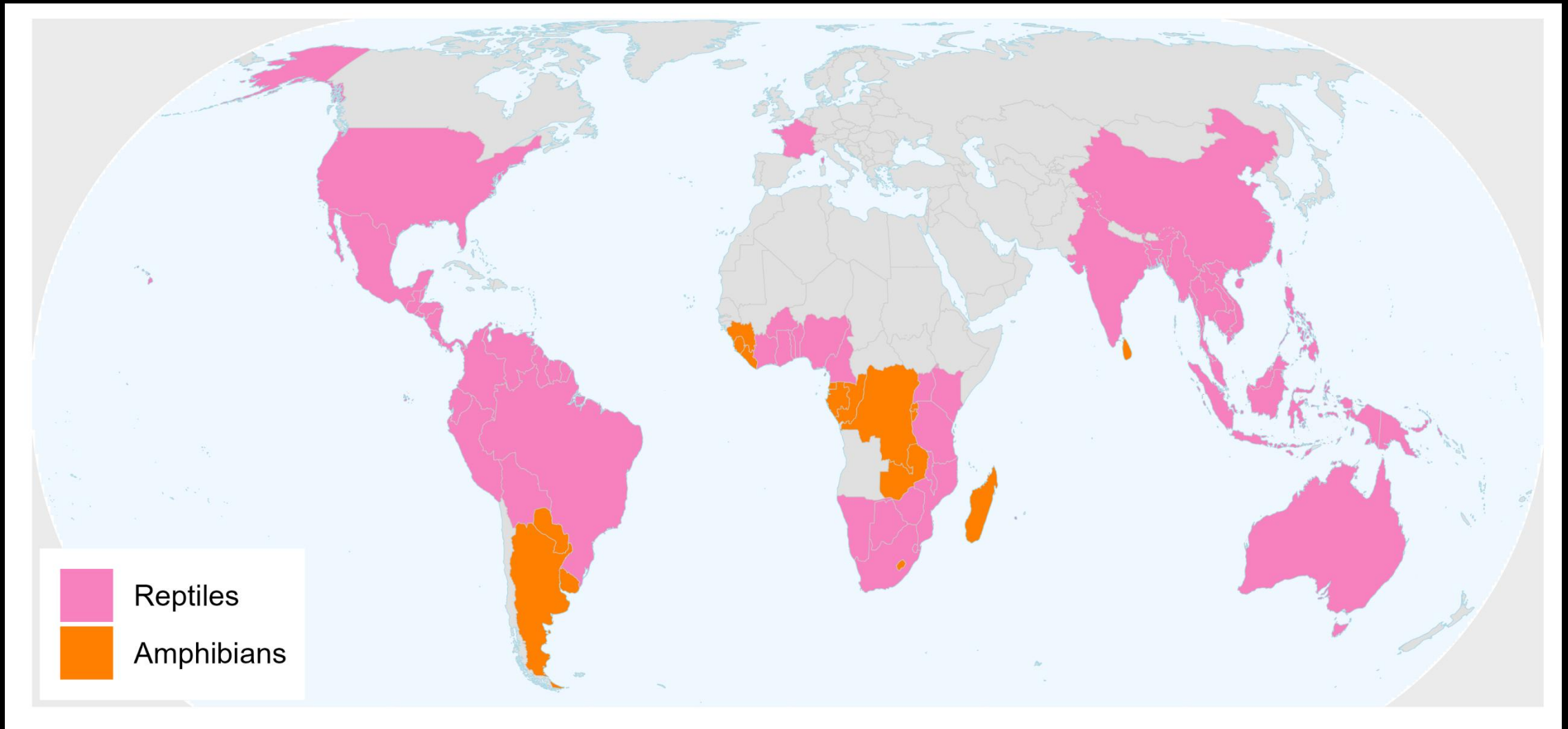
GBIF



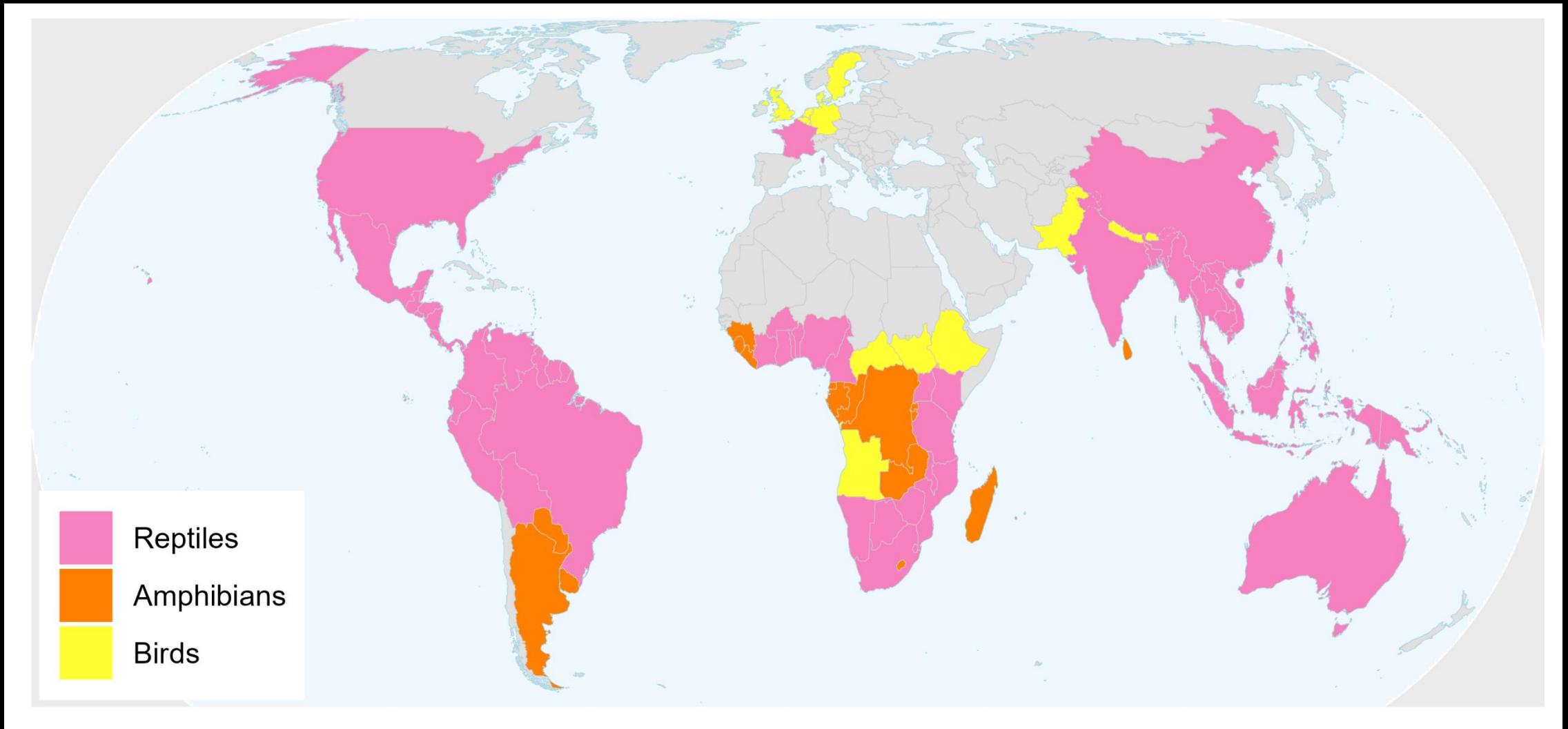
Geographic Distribution of Top 15% Reptiles



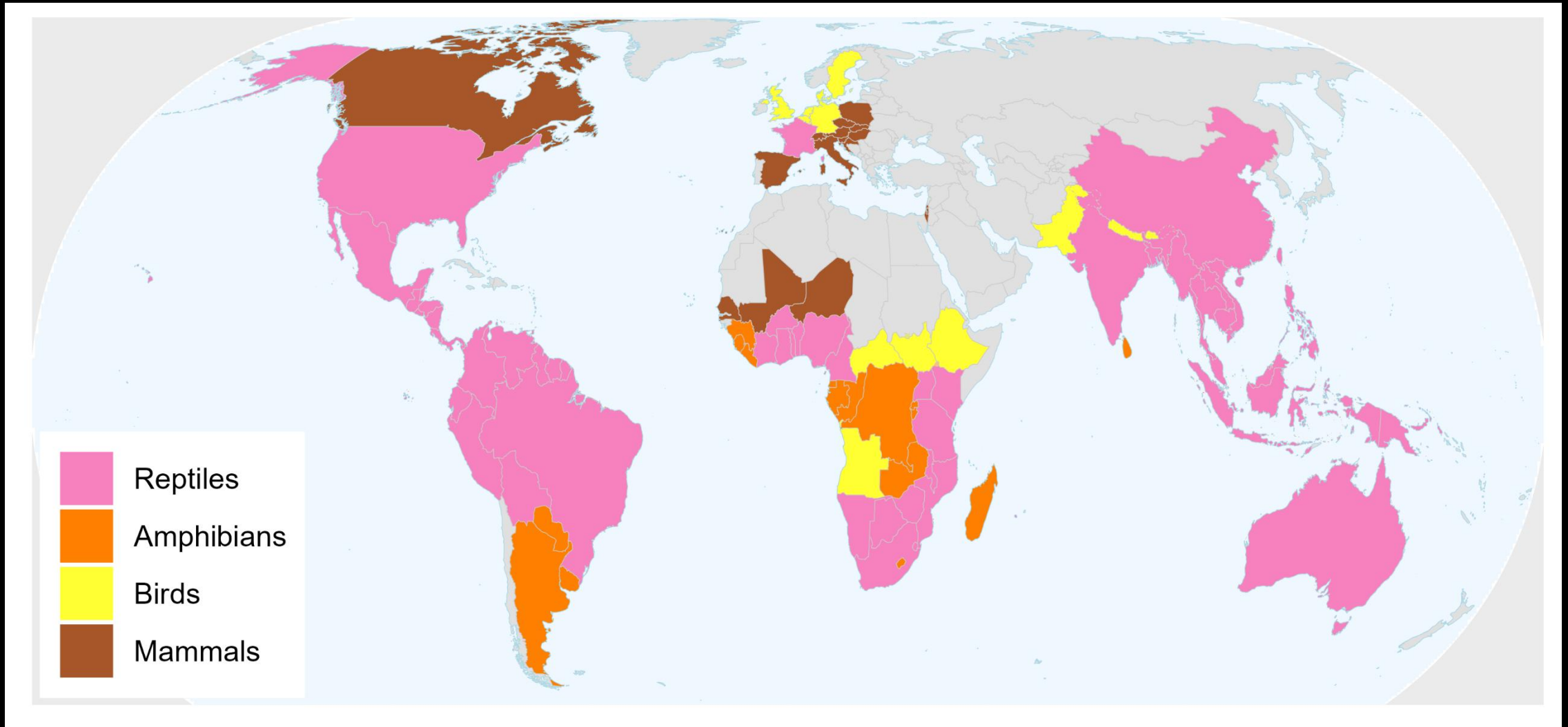
Addition of Countries with Top 15% Amphibians



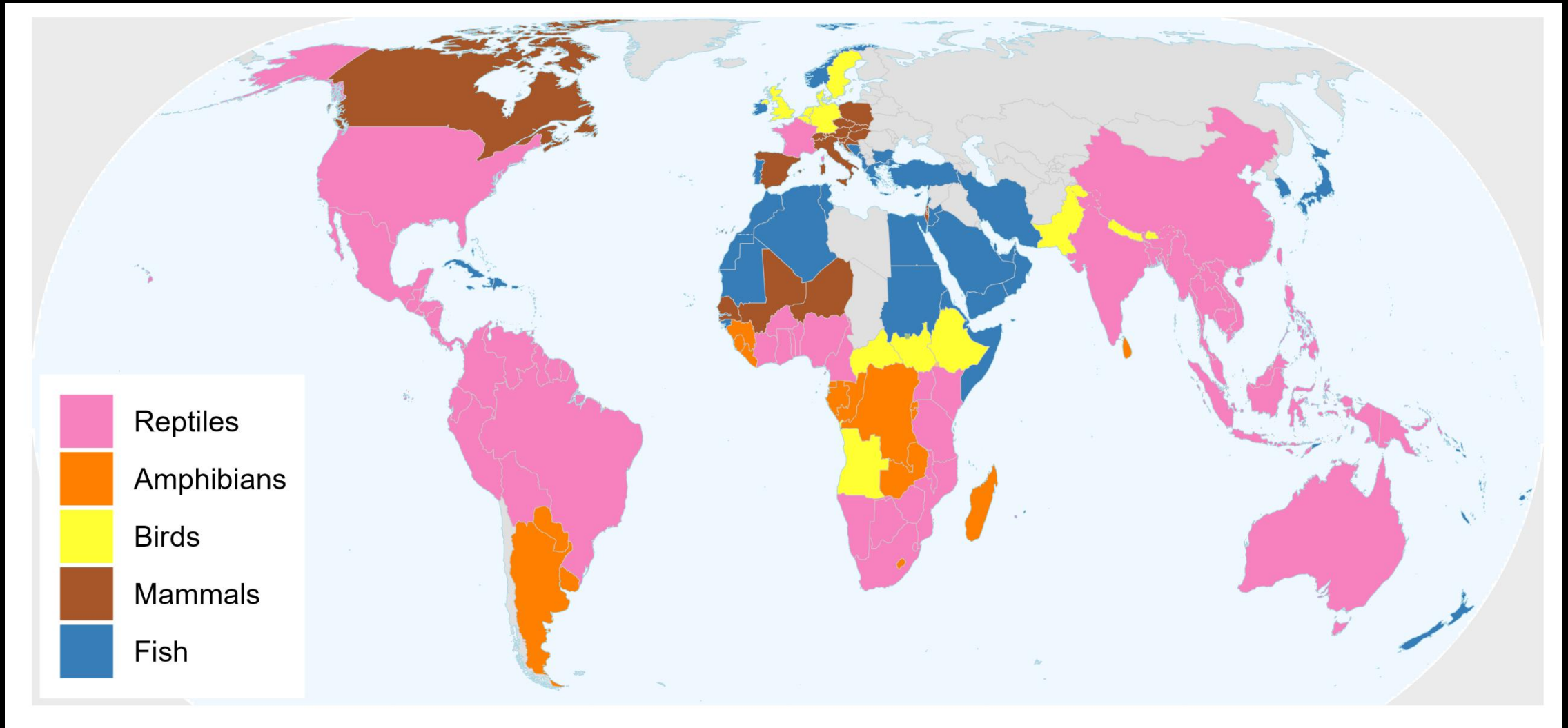
Addition of Countries with Top 15% Birds



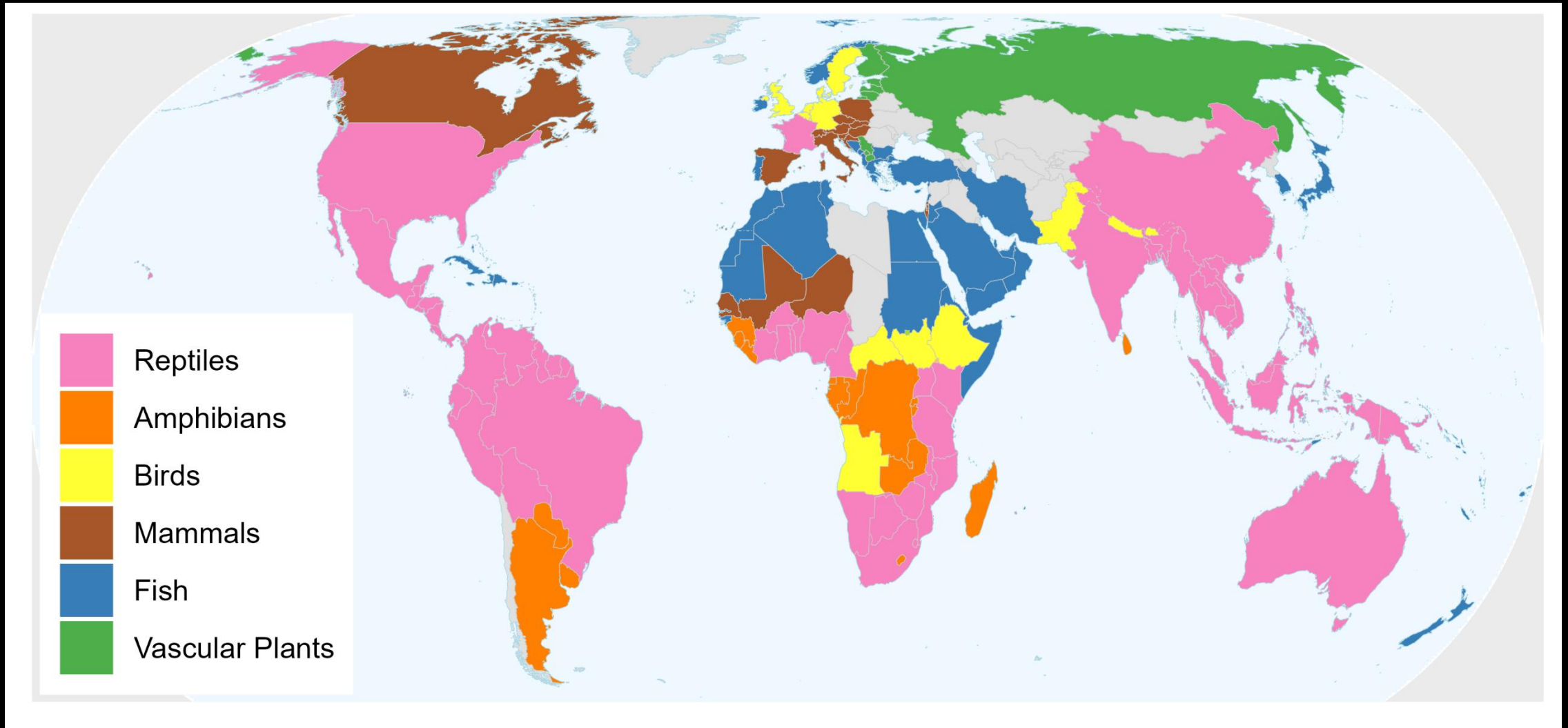
Addition of Countries with Top 15% Mammals



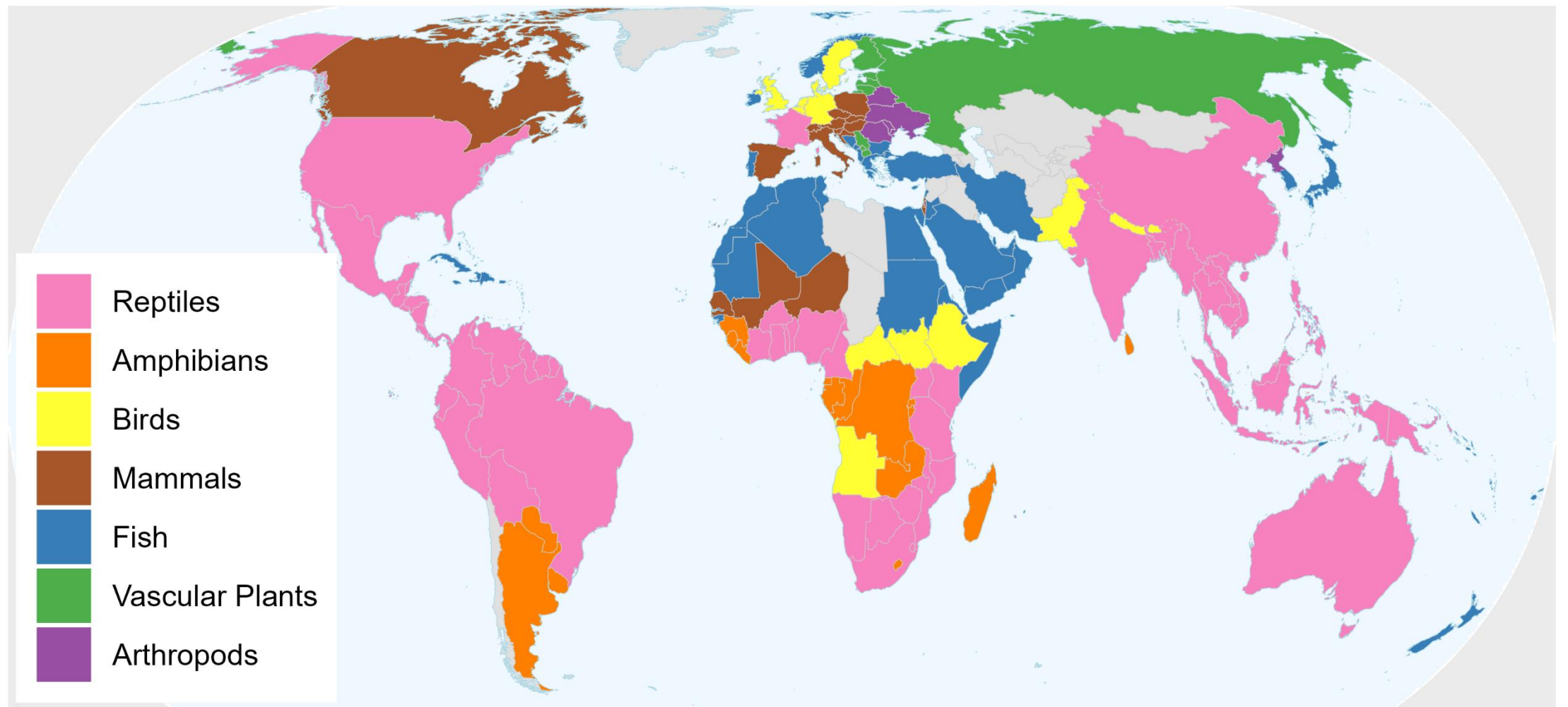
Addition of Countries with Top 15% Fish



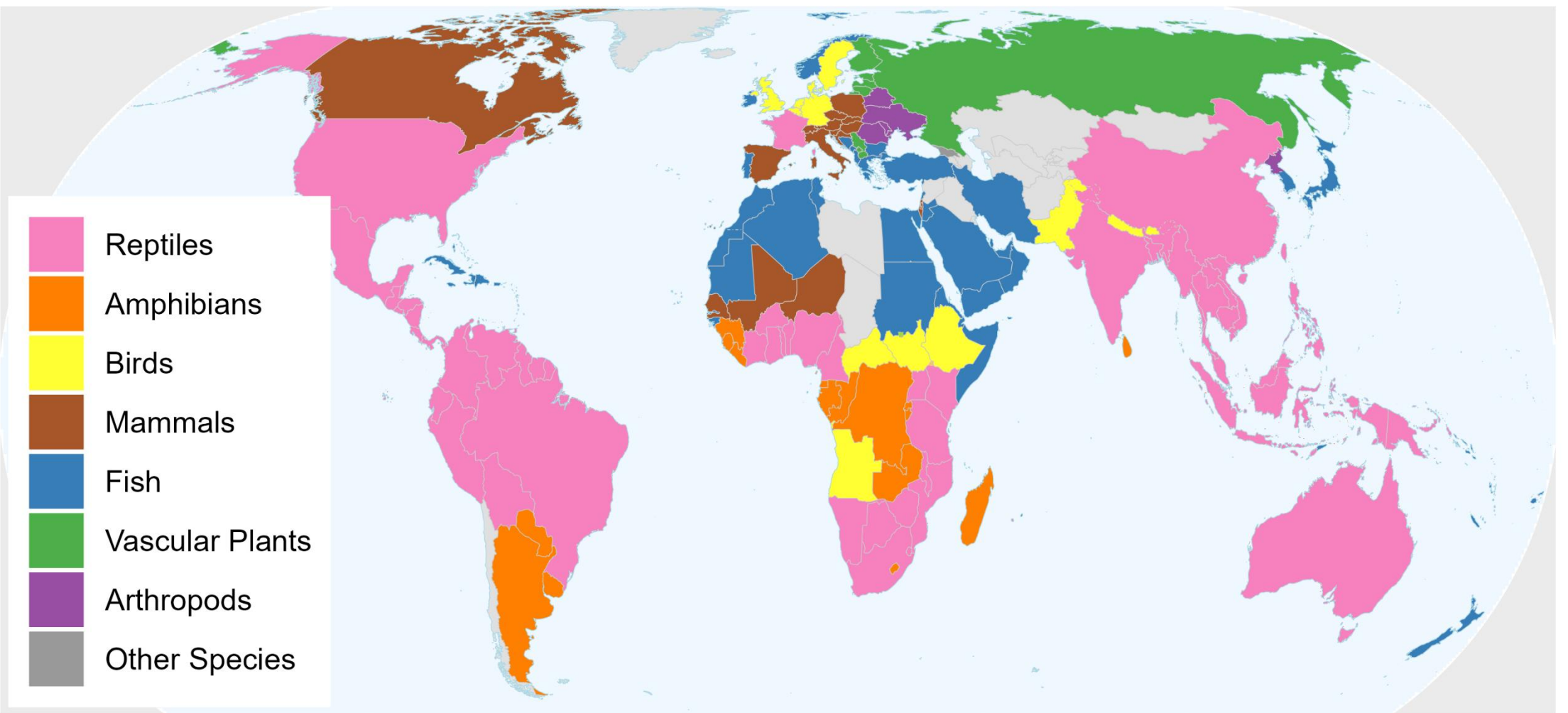
Addition of Countries with Top 15% Vascular Plants



Addition of Countries with Top 15% Arthropods



Addition of Countries with Top 15% Other Species



Identification of species: Endemic Species and Small Occurrence Region Species

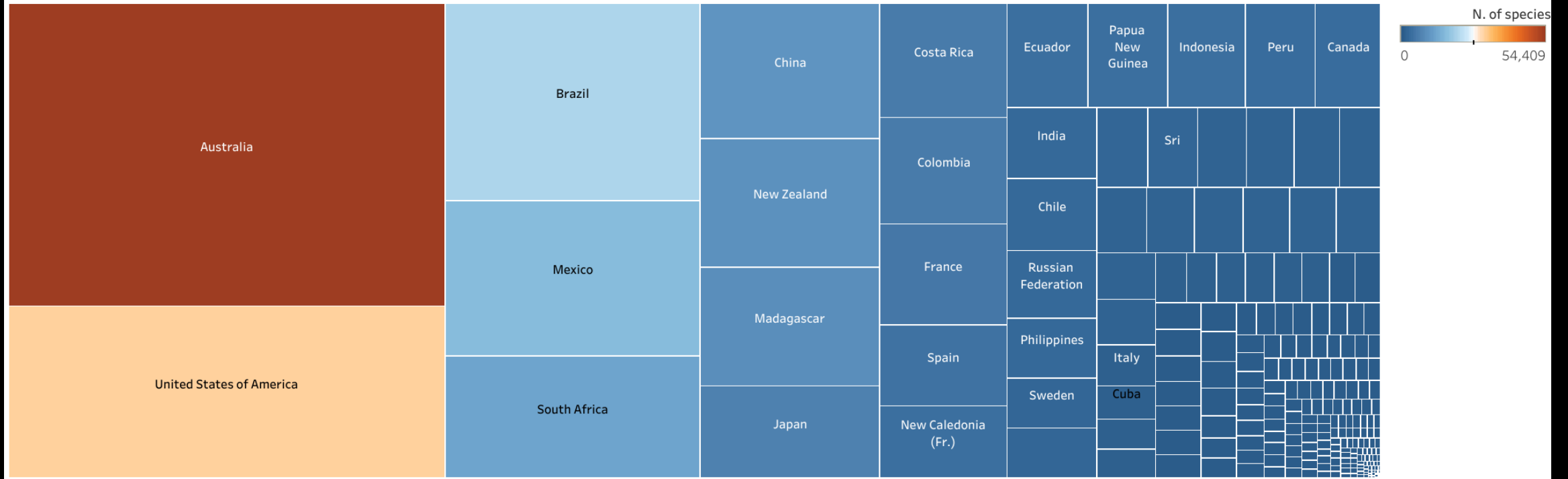
Project Contribution

- **Location mapping of Endemic and small-occurrence region species across diverse taxa:** Arthropods, Molluscs, Other Animals, Vascular Plants, Fungi, and Other (non-animal and non-plant) Species for alternative criteria of endemism and small occurrence region.
- **Regional Distribution of Endemic and small-occurrence region species across diverse taxa:** Arthropods, Molluscs, Other Animals, Vascular Plants, Fungi, and Other (non-animal and non-plant) Species by World Bank Income Group.

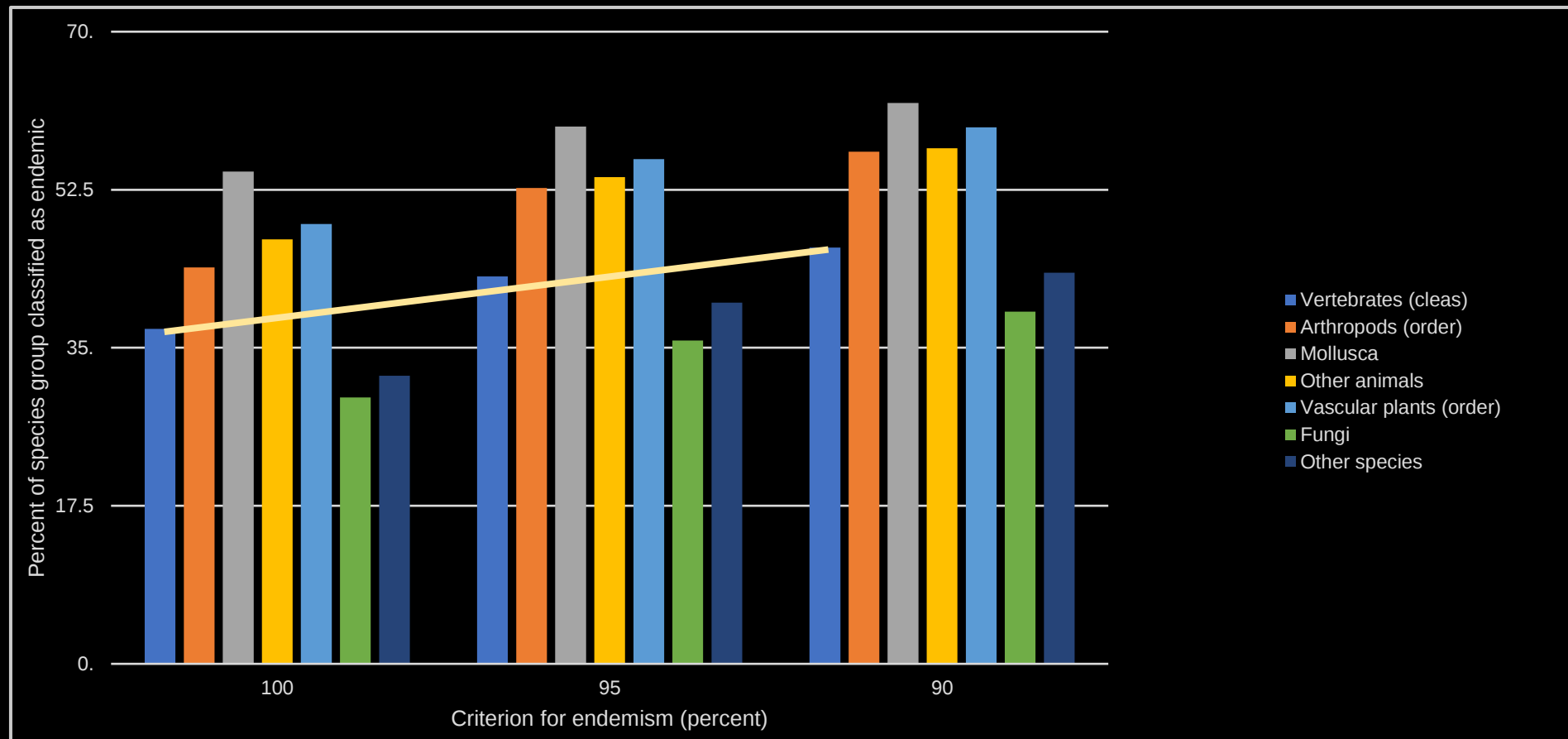
Distribution of Endemic Species

Endemicity Criterion: 100%

Number of Endemic Species by Country (100% endemism - found only in the country)



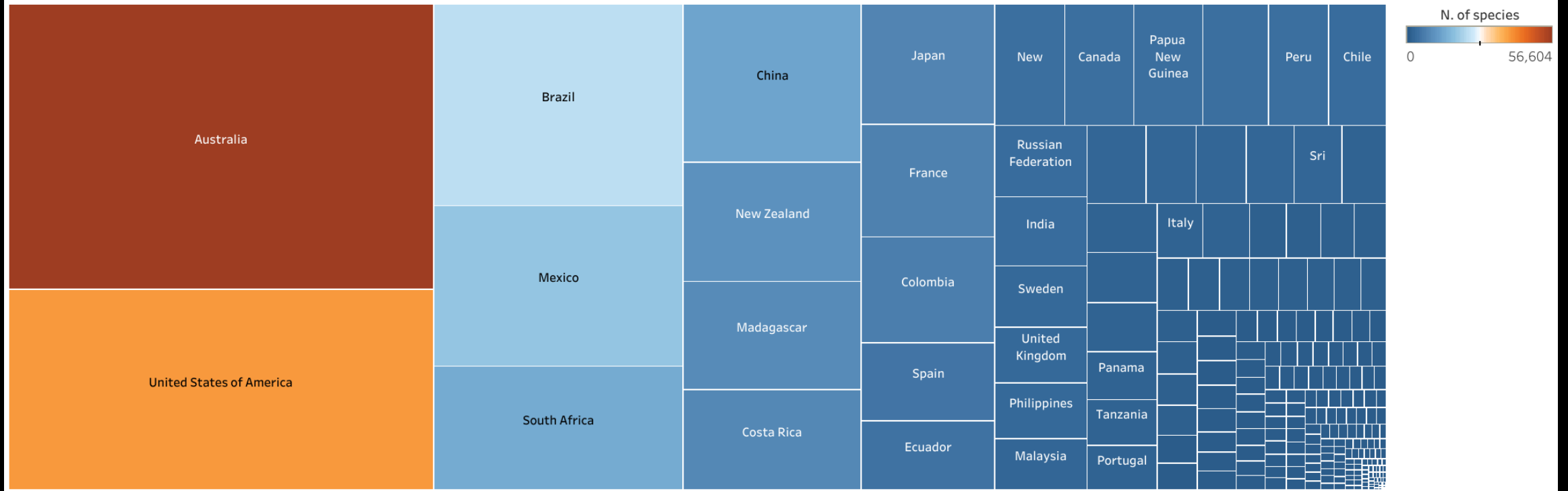
Endemism by Species Group



Distribution of Endemic Species

Endemicity Criterion: 95%

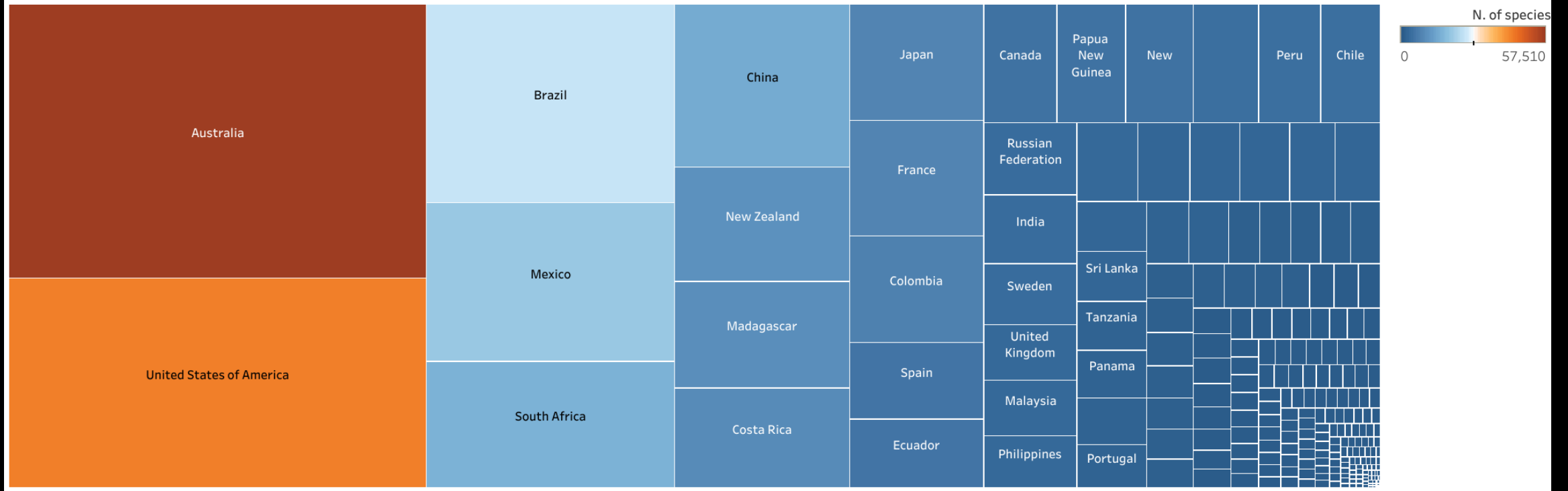
Number of Endemic Species by Country (95% endemicity - found only in the country)



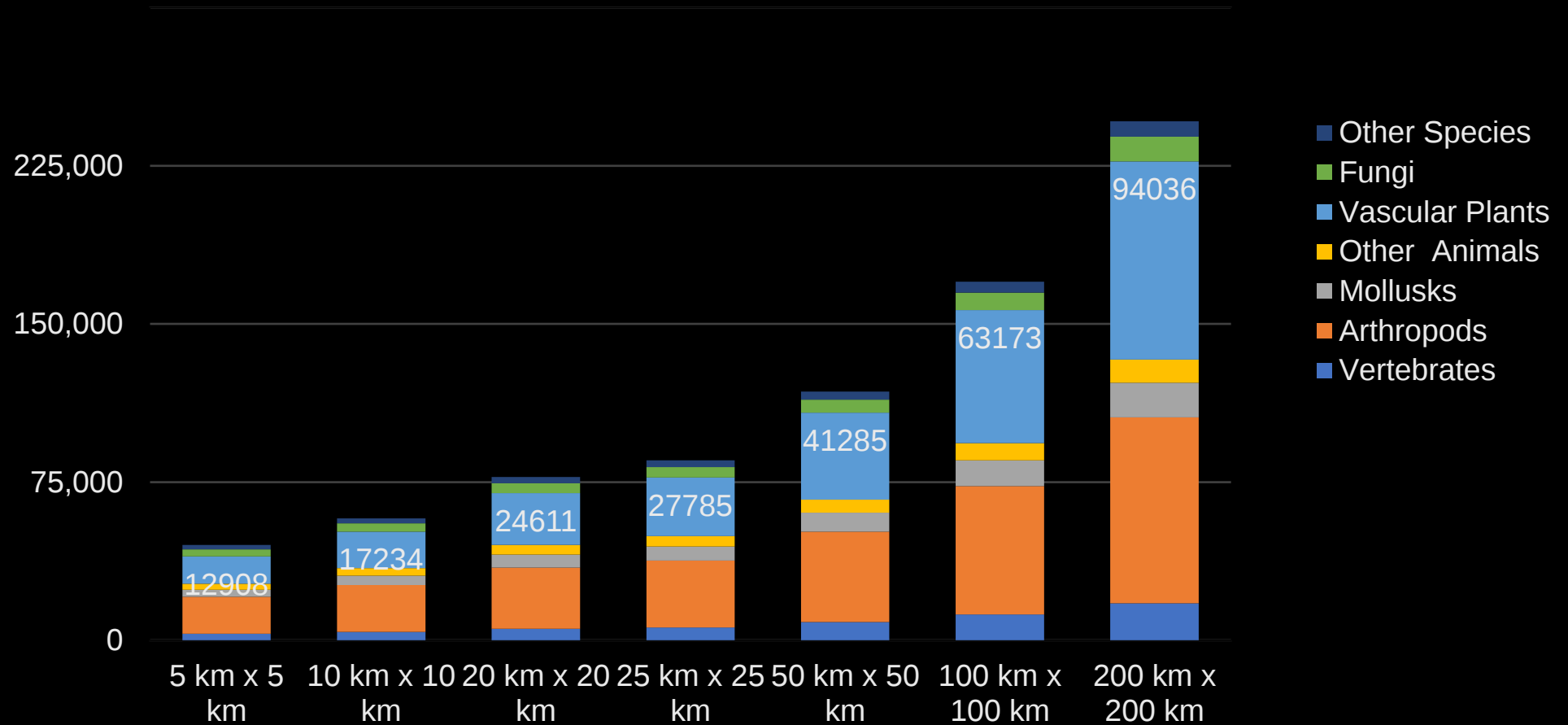
Distribution of Endemic Species

Endemicity Criterion: 90%

Number of Endemic Species by Country (90% endemicity - found only in the country)

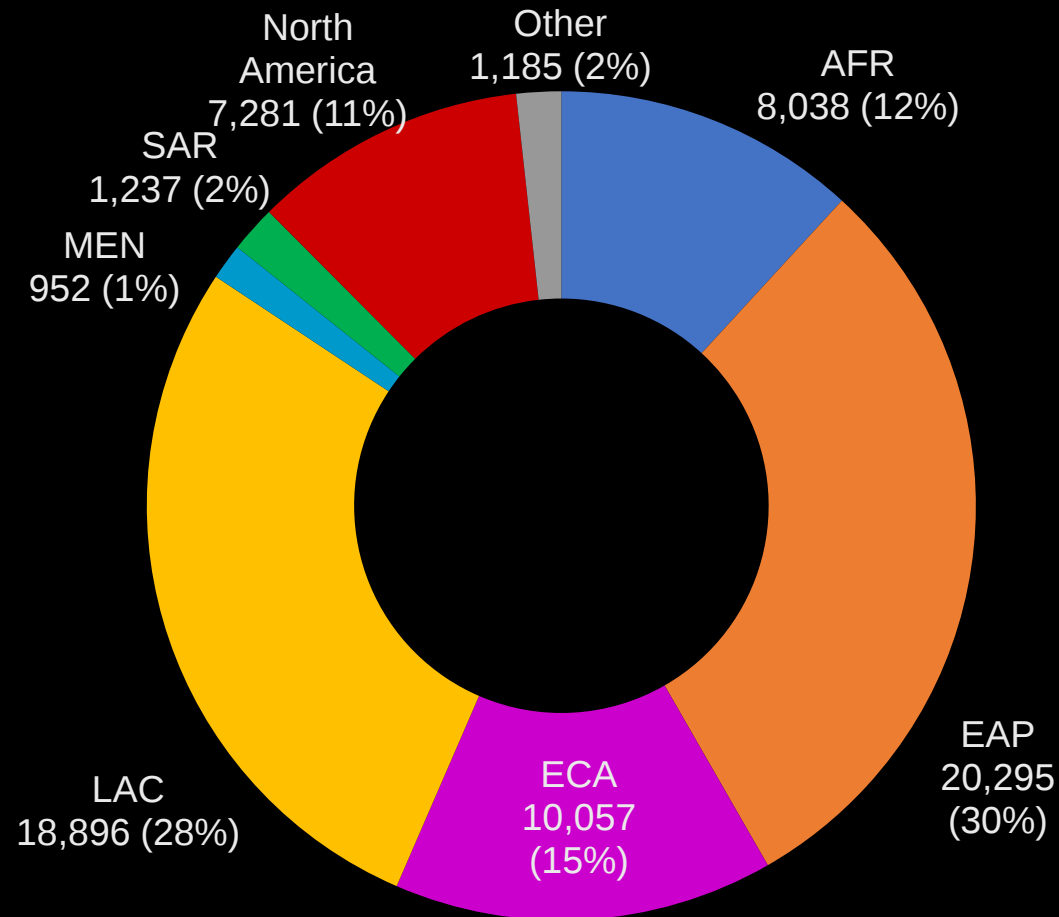


Total Count of Small Occurrence Region Species Based on Presence



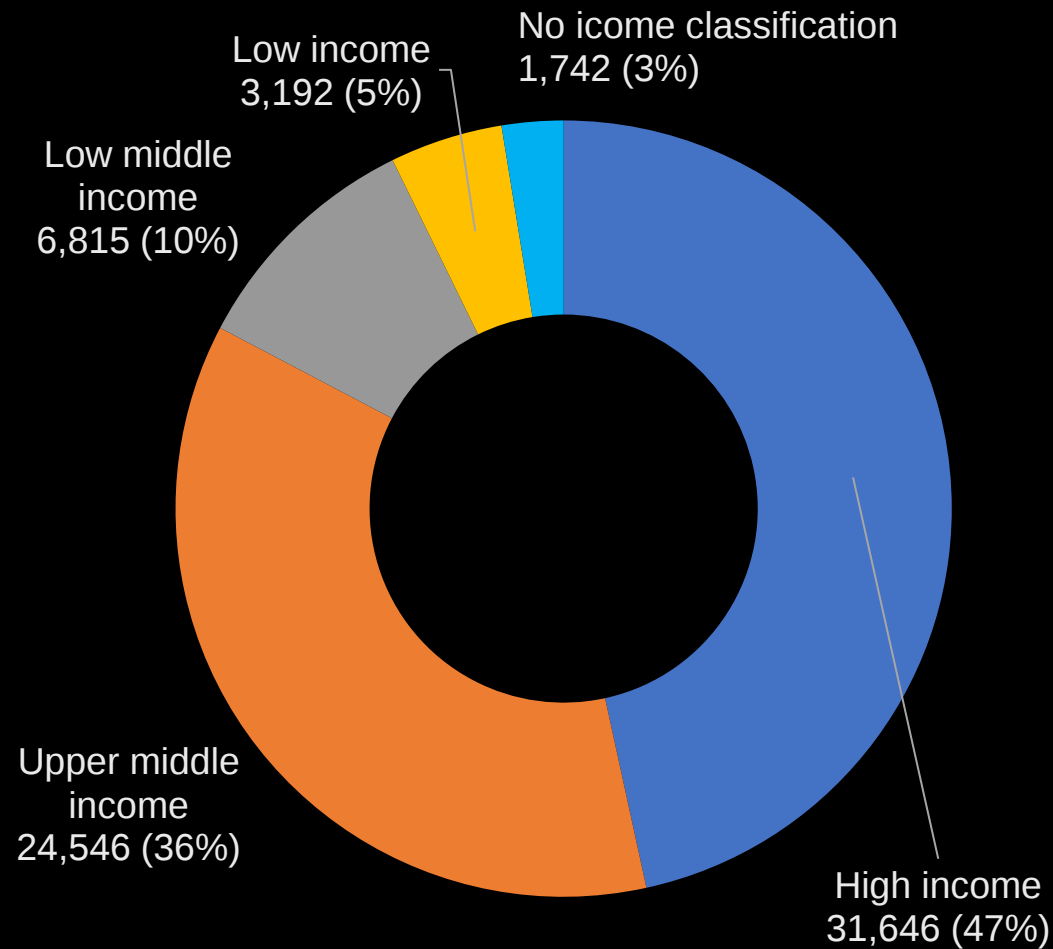
Regional Distribution of Species Found in a Single Country and with Small Occurrence Region

Total count based on Endemicity Criterion 100% and 25km x 25 km occurrence region, by World Bank region



Distribution of Species Found in a Single Country and with Small Occurrence Region by WBG Income Class

Total count based on endemism criterion 100% and 25km x 25 km occurrence region by WBG income classification



Estimation of Extinction Risks of Species with Occurrence Region Maps, Local Threats and Protection

Project Contribution

- **Methodology** for estimating extinction threats from local threats and Protections
- **Estimates** of extinction threats of all 597,532 species

Threat / Protection Indicators Terrestrial Species

Threat Indicators

Size of Species Occurrence Region

Source: Global Biodiversity
and Analytics
Project

Population Density

Source: GPW v4 from
SEDAC/CIESIN

Human Settlement Sensitivity

Source: Global Biodiversity
and Analytics
Project

Protection Indicators

Formal Protection

Source: UNEP – WCMC,
2019

Threat / Protection Indicators Marine Species

Threat Indicators

Size of Species Occurrence Region

Source: Global Biodiversity
and Analytics
Project

Fishing Intensity

Source: a) Satellite Imagery
b) Global Fish Watch: Near real
time recording of fishing effort
by vessels using Global AIS

Coastal Population Influence

Source: GPW v4 from
SEDAC/CIESIN

Protection Indicators

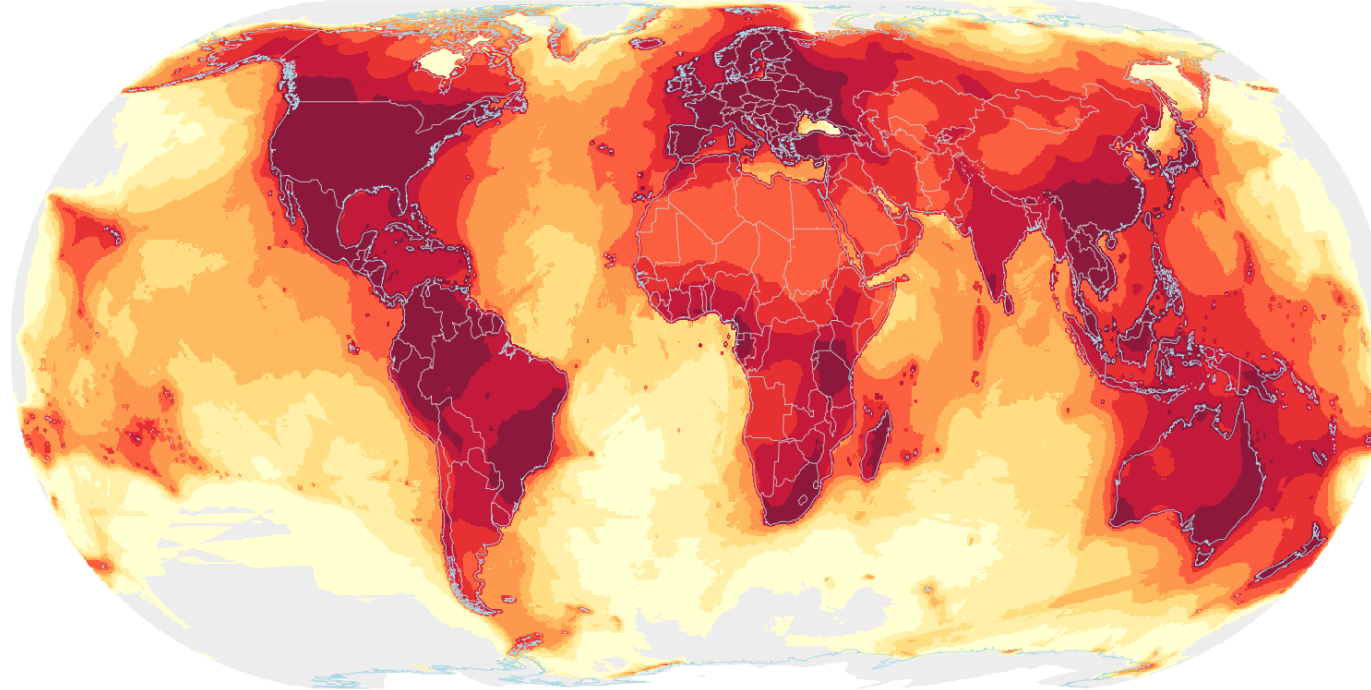
Formal Protection

Source: UNEP – WCMC,
2019

EEZ Coverage

Source: Flanders Marine Institute, 2019

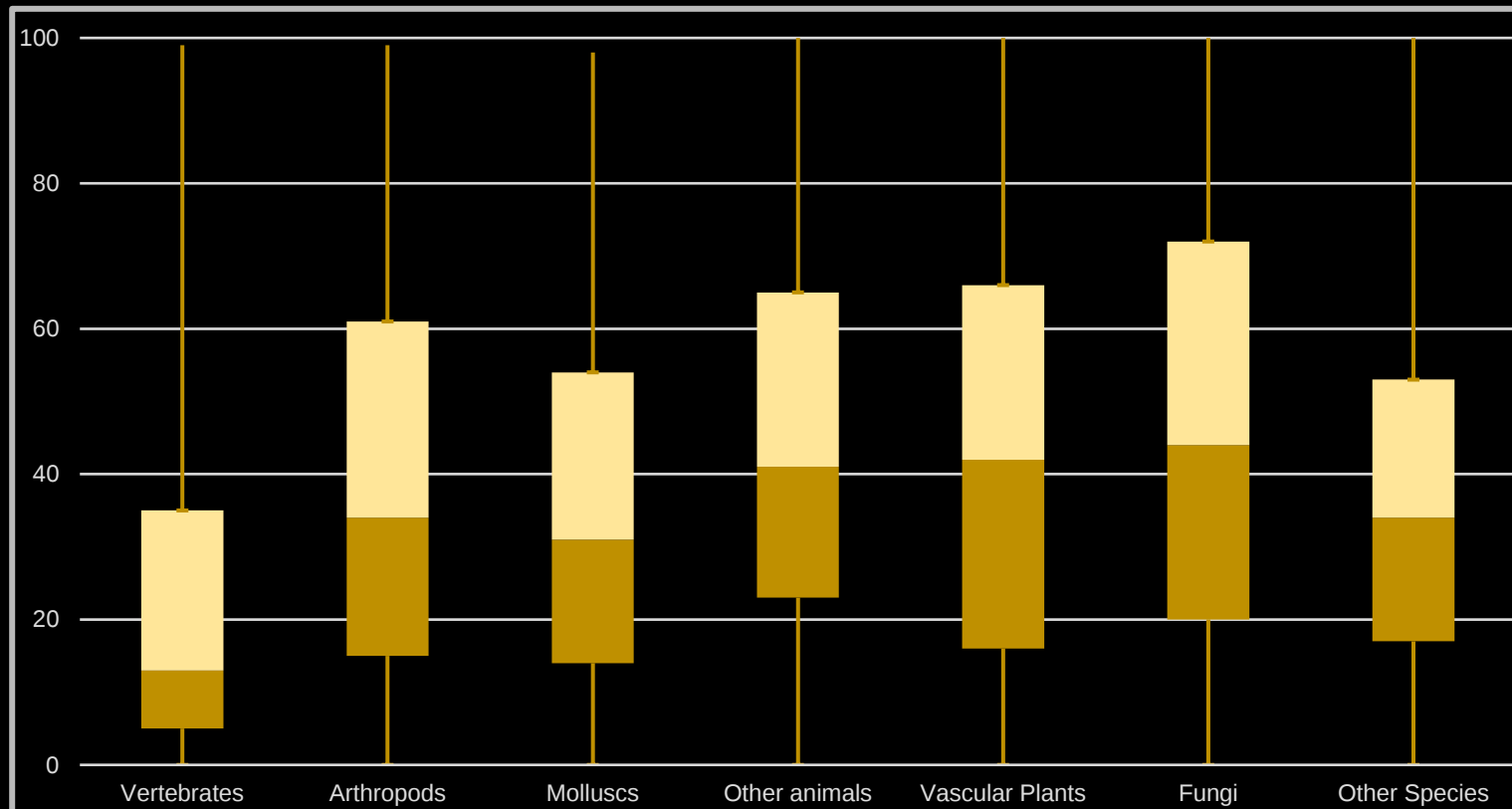
Model Predicted Extinction Threat Indicator: All GBIF Species



Biodiversity Index Value

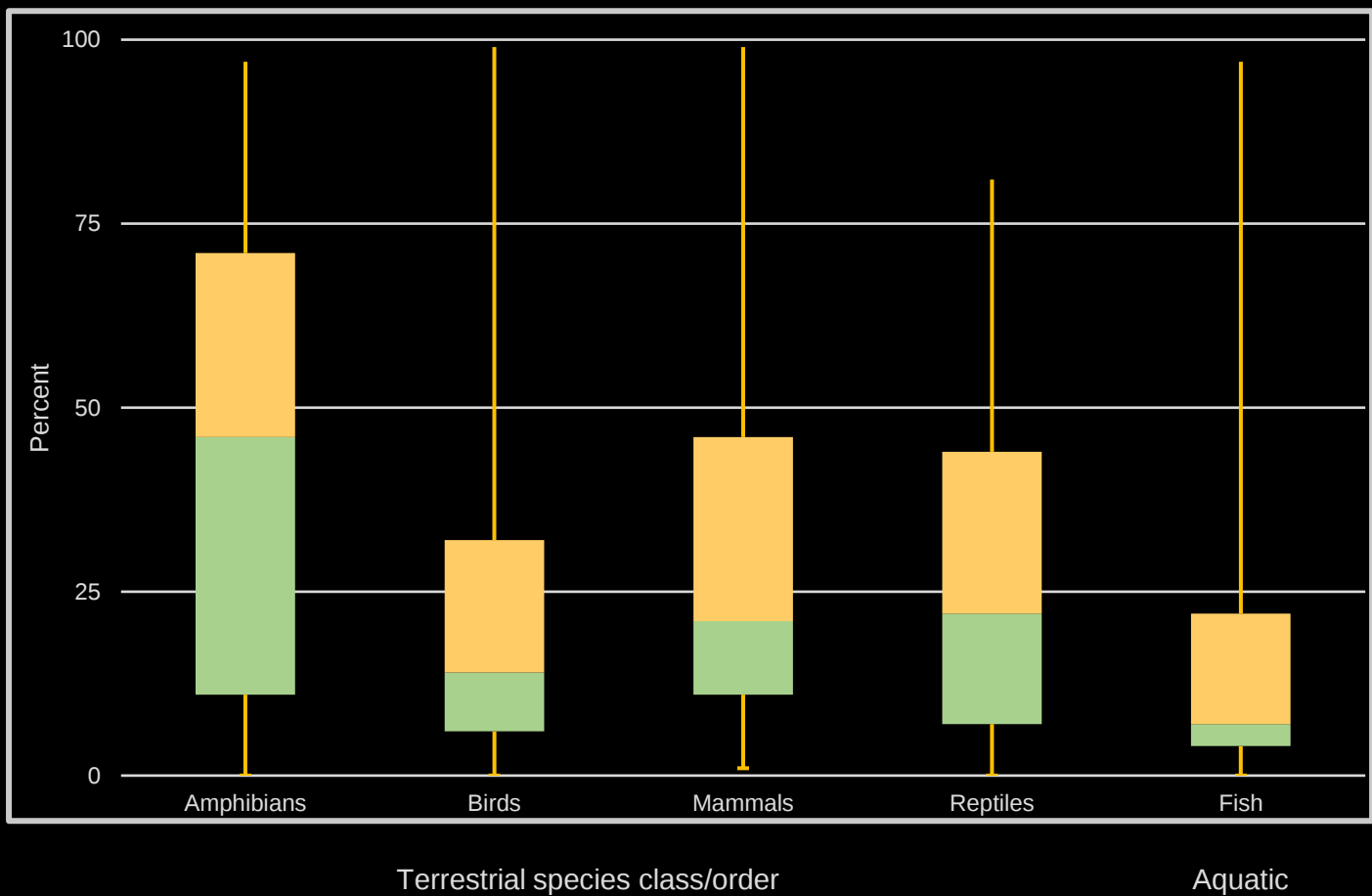


Model Predicted Extinction Threat Indicator All GBIF Species



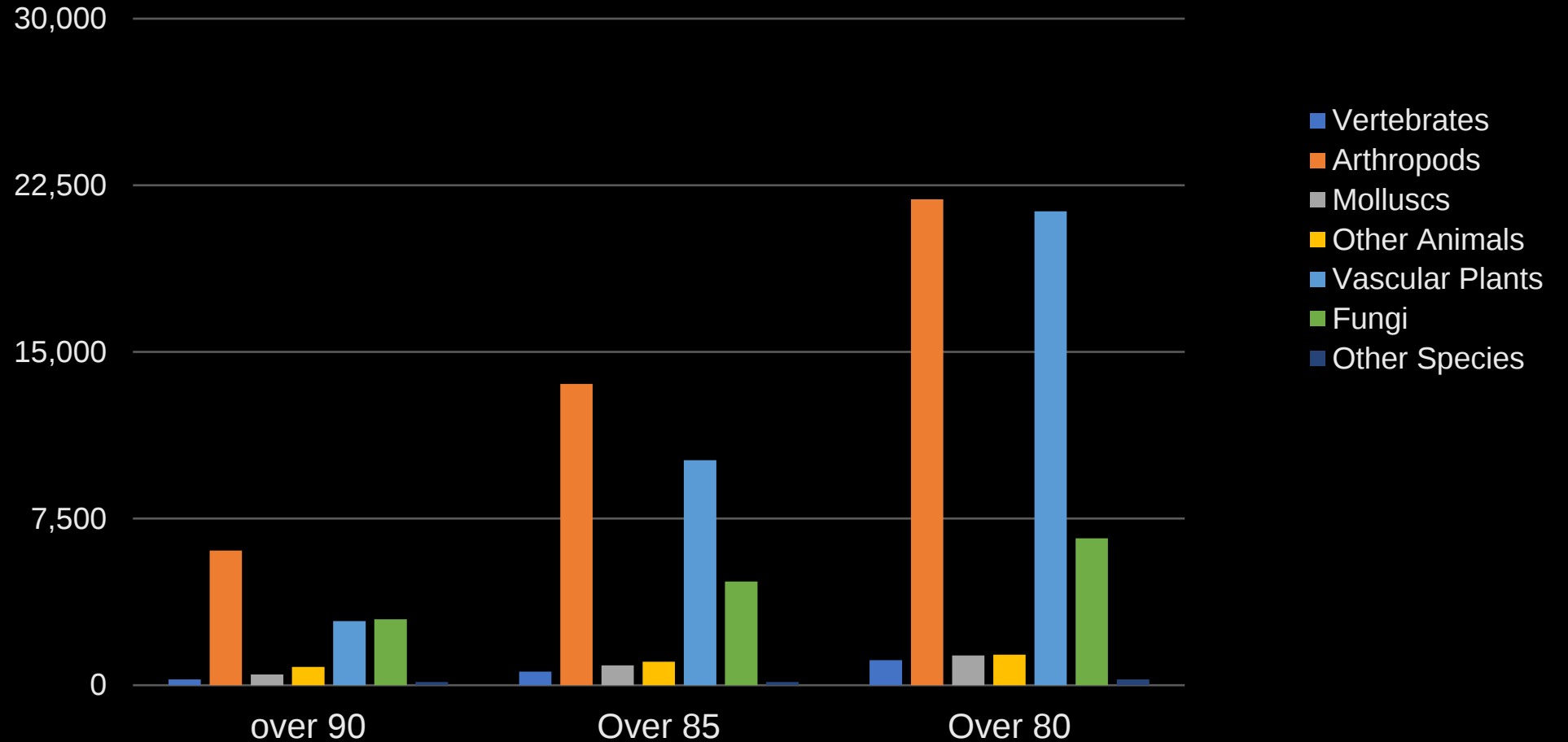
Species Class/ Order	Median Threat Indicator
Vertebrates	13
Arthropods	34
Molluscs	31
Other animals	41
Vascular Plants	42
Fungi	44
Other Species	34

Model Predicted Extinction Threat Indicator Vertebrates

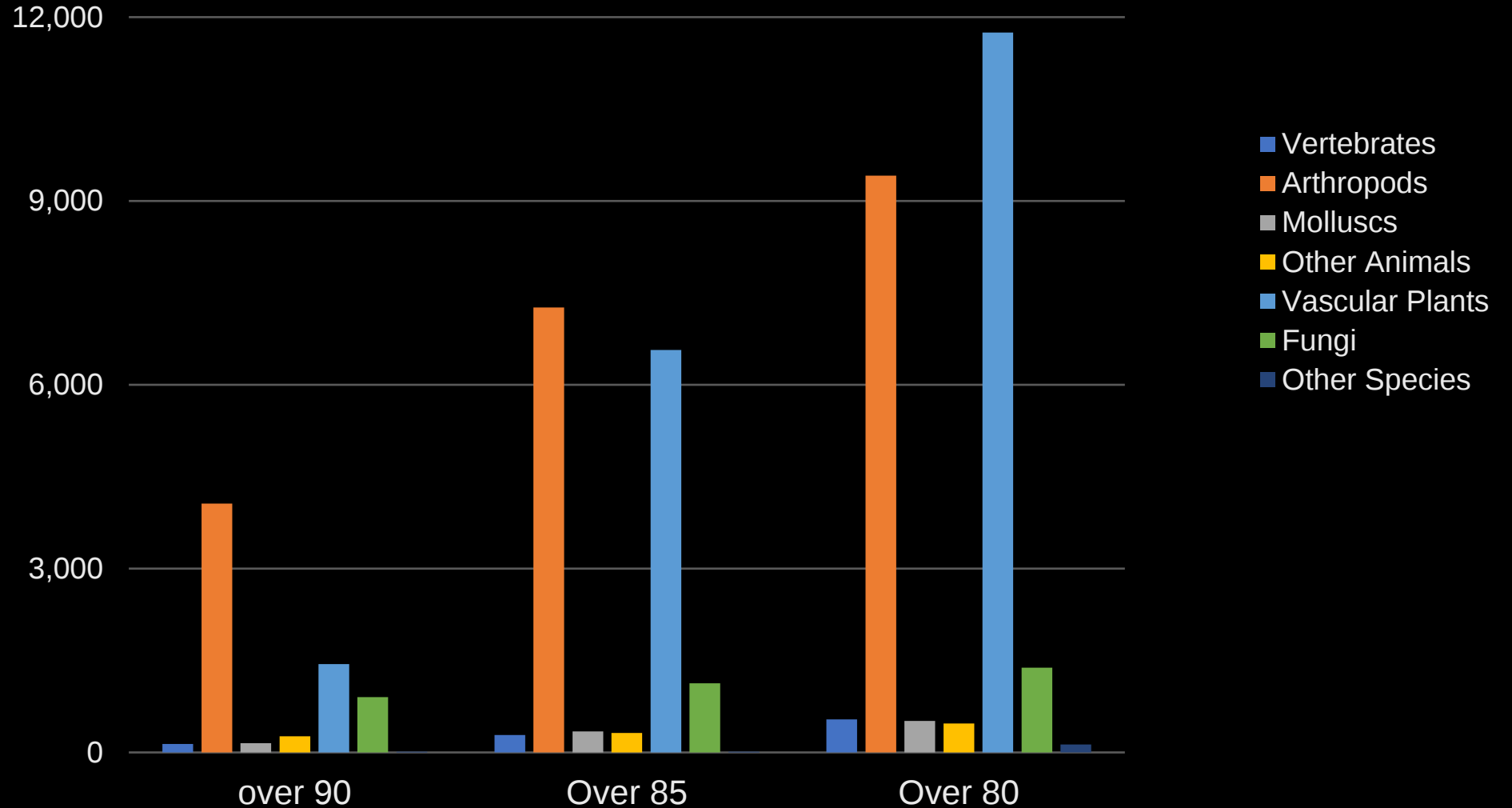


	Species Class/Order	Median Threat Indicator
Terrestrial	Amphibians	46
	Birds	14
	Mammals	21
	Reptiles	22
Aquatic	Fish	7

Count of Species with High Extinction Threat Indicators



Count of Endemic and Small Occurrence Region Species with High Extinction Threat Indicators



Human Coexistence Indicators

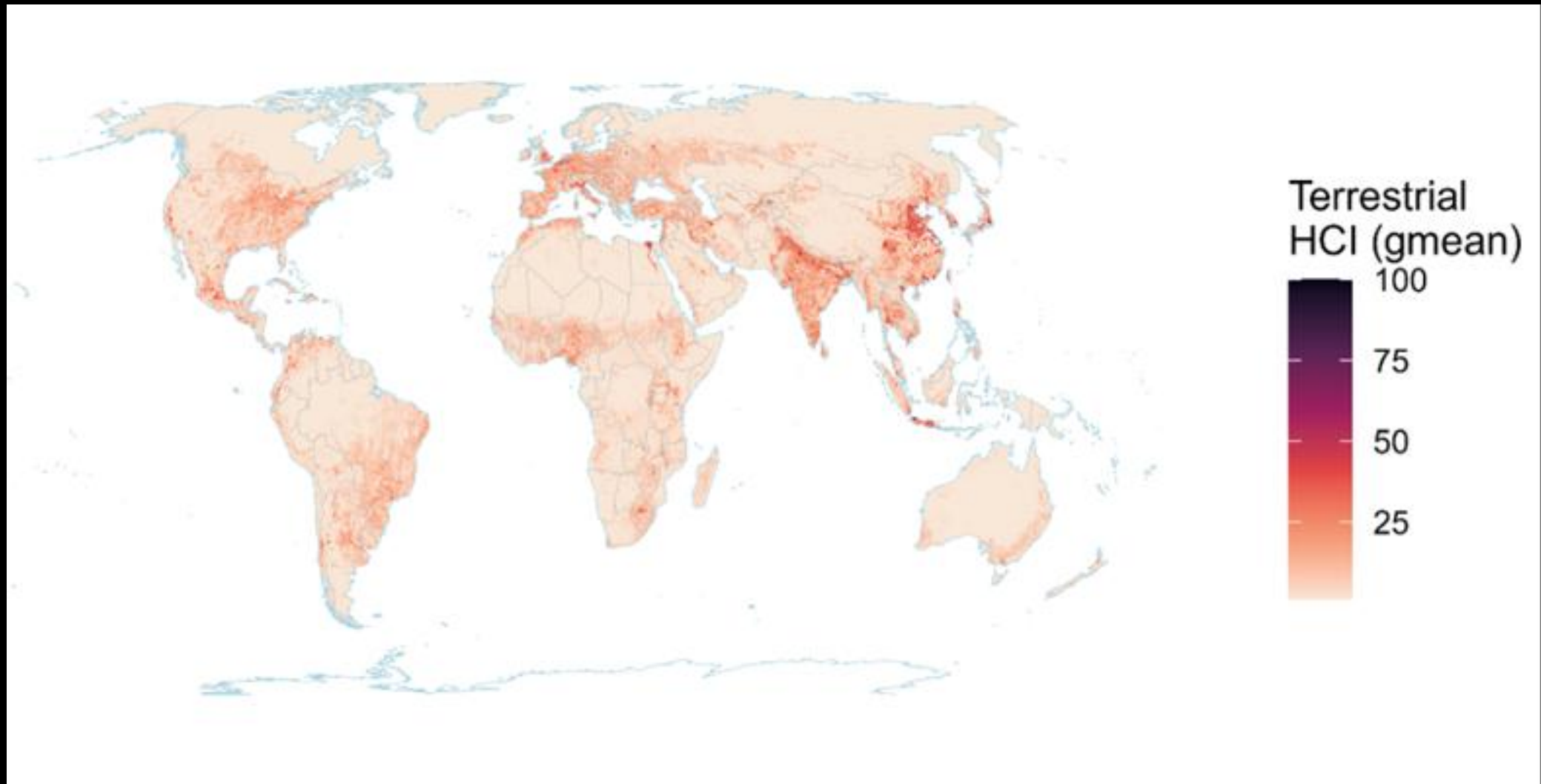
Understanding Peaceful Human Coexistence in High-Biodiversity Habitats

- **Human Expansion:** Leads to habitat loss and fragmentation; agriculture, infrastructure, and urbanization disrupt ecosystems and endanger species.
- **Resource Exploitation:** Deforestation, mining, and overfishing deplete critical resources; pollution from industry and agriculture impacts soil, water, and air.
- **Human-Wildlife Conflict:** Expanding settlements cause conflicts, threatening crops, livestock, and human safety; requires coexistence solutions.
- **Conservation Approaches:** Protected areas, wildlife corridors, and community-driven efforts promote coexistence and biodiversity protection.
- **Prioritization of High-Biodiversity Areas:** Focused interventions help mitigate conflicts, support sustainable practices, and conserve species.

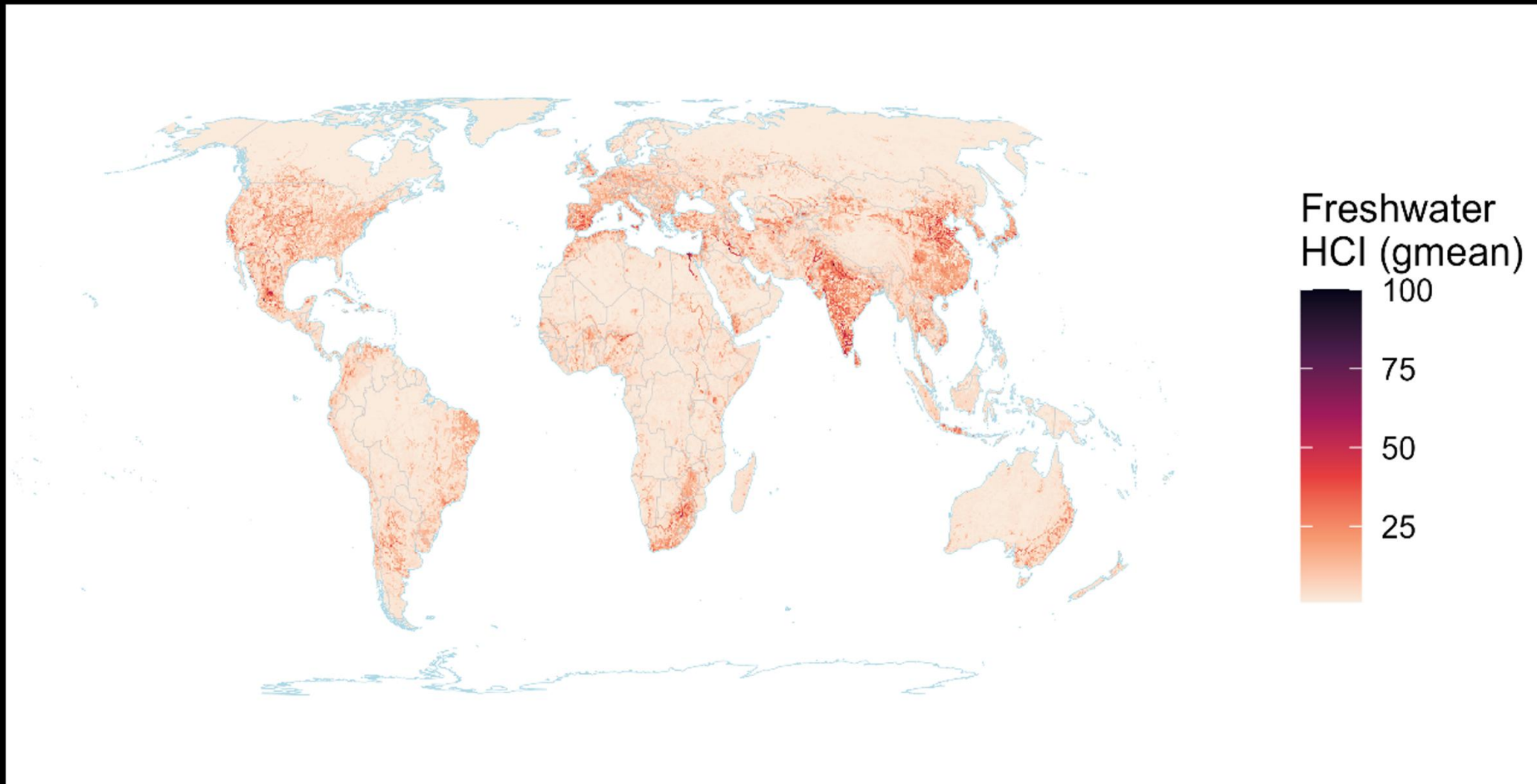
Project Contribution

- Construction of location-specific composite human coexistence indicators based on publicly available secondary data
- Identification of "hotspots"—areas rich in biodiversity where human presence is dense to support global biodiversity conservation
- A flexible scalable framework which is adaptable to various geographic boundaries, such as subnational areas, watersheds, or specific ecoregions, provided fit-for-purpose data is available

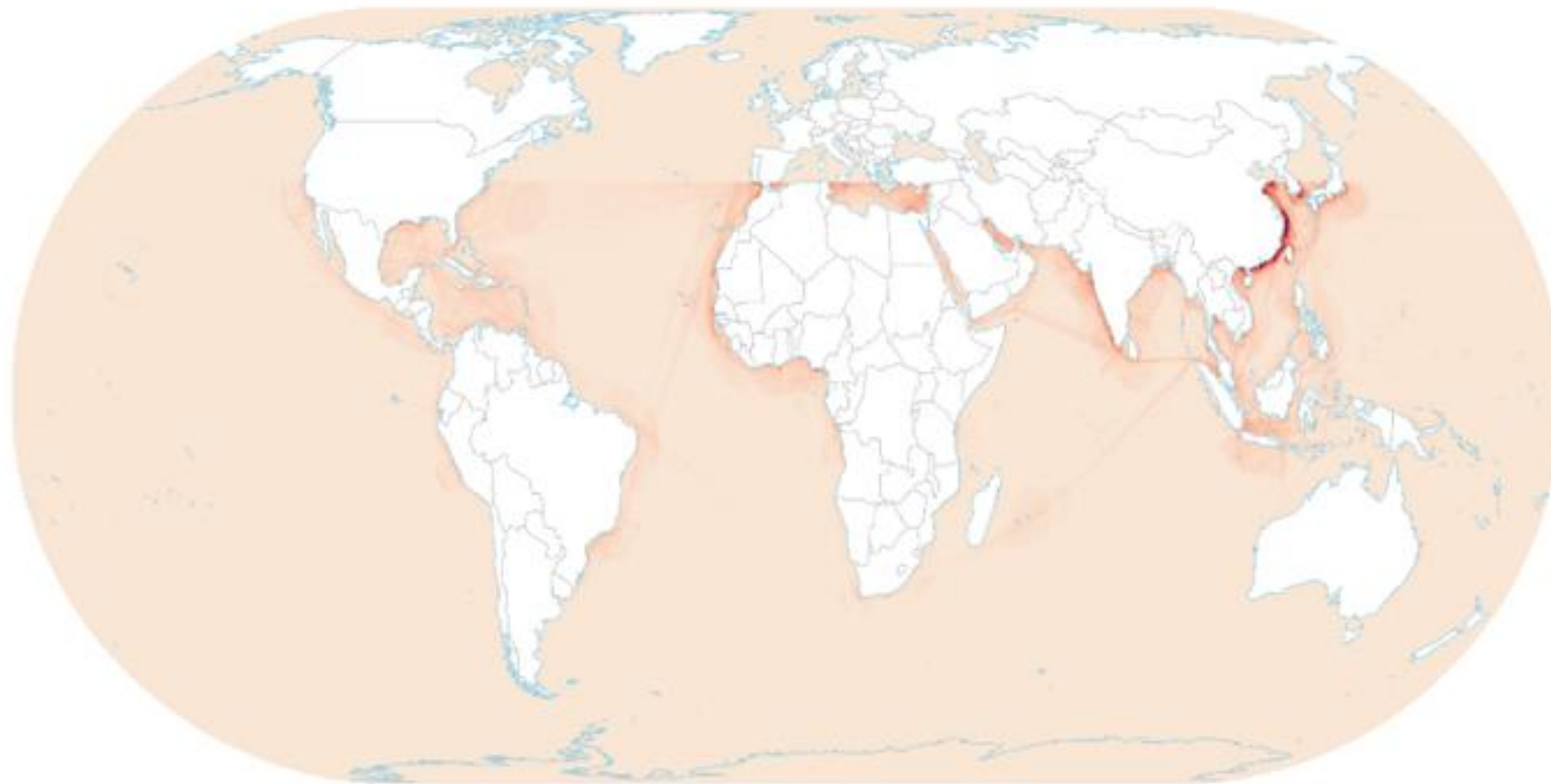
Composite Terrestrial Human Coexistence Indicator



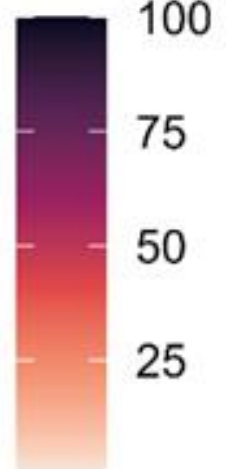
Composite Freshwater Human Coexistence Indicator



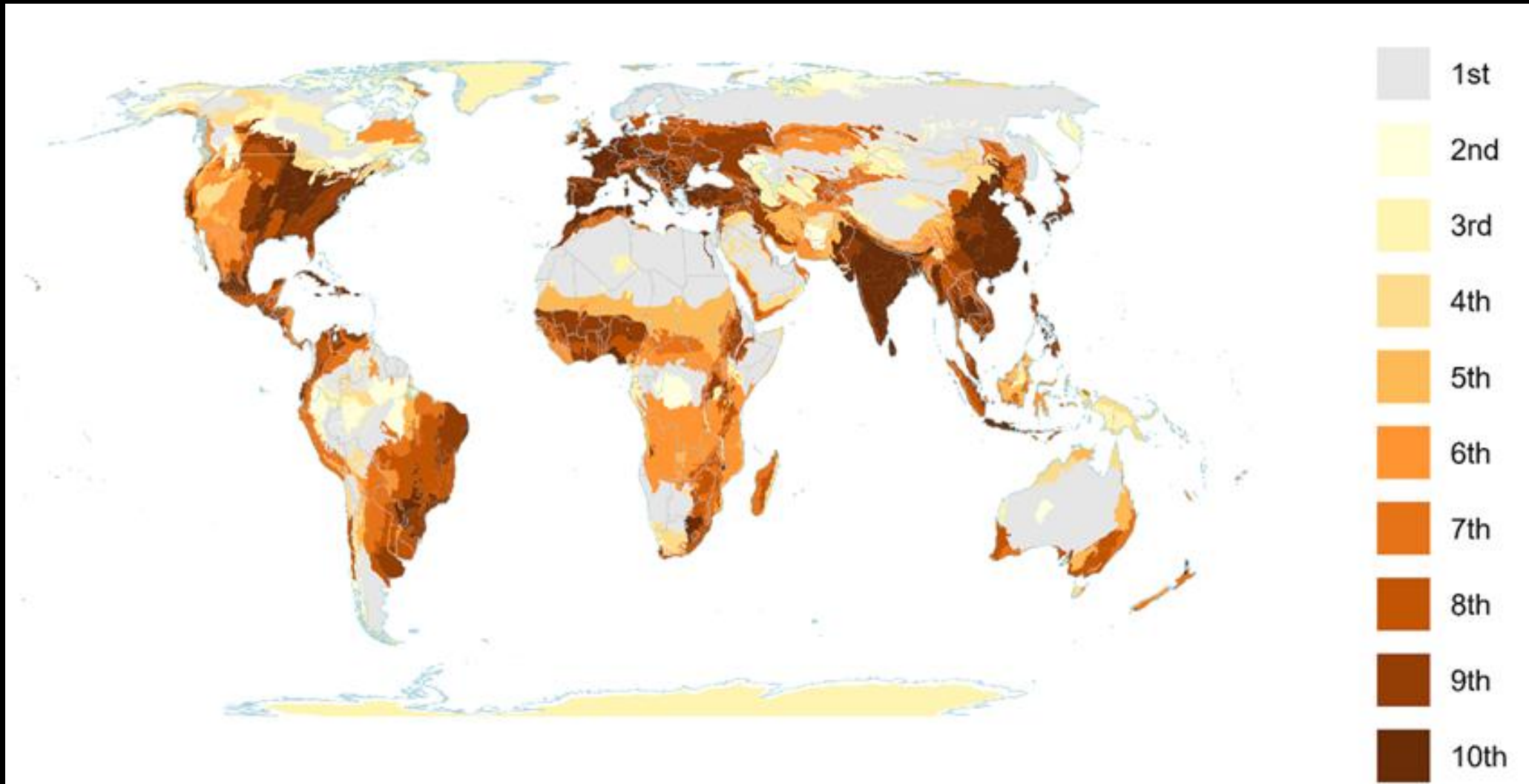
Composite Marine Human Coexistence Indicator



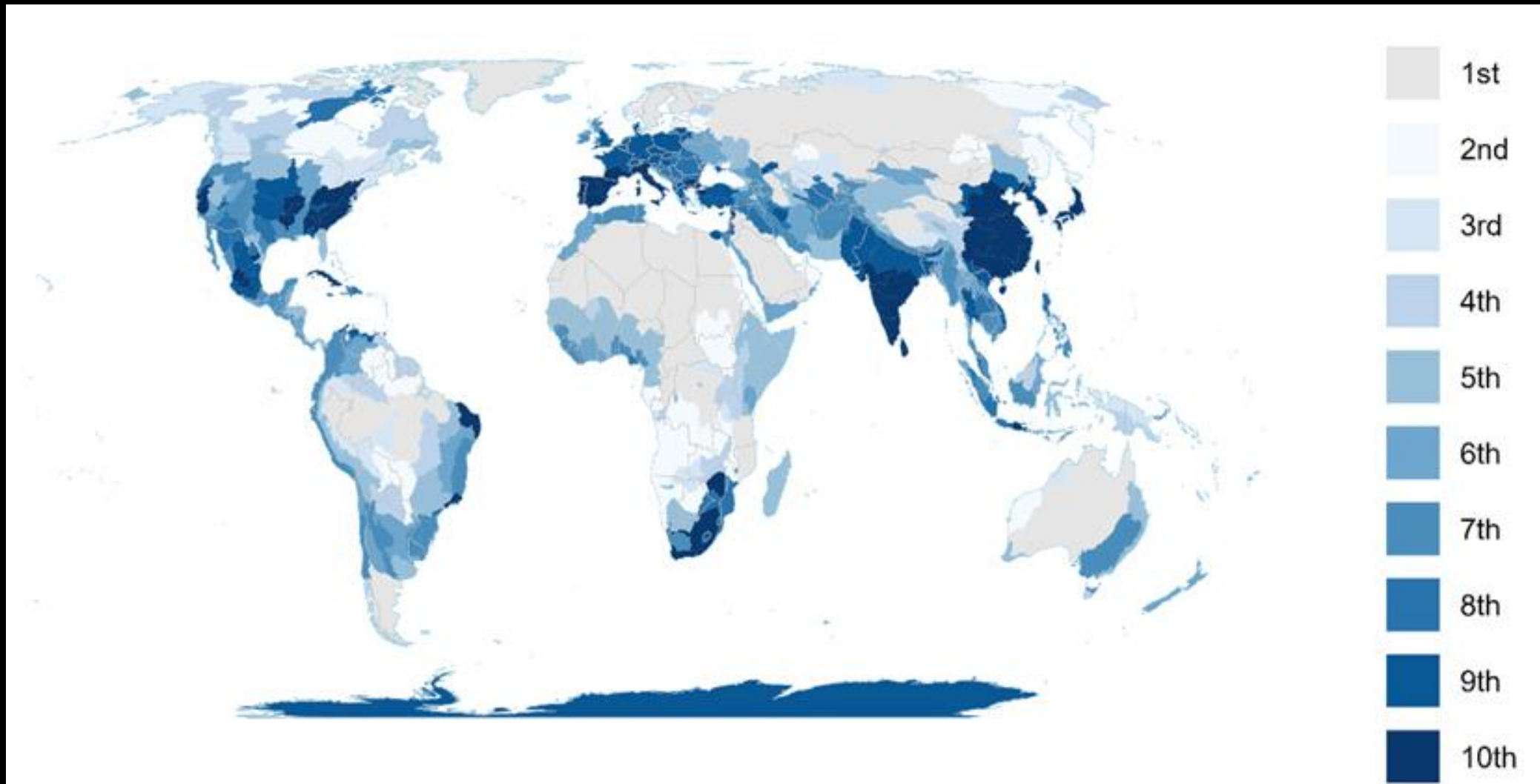
Marine
HCI (gmean)



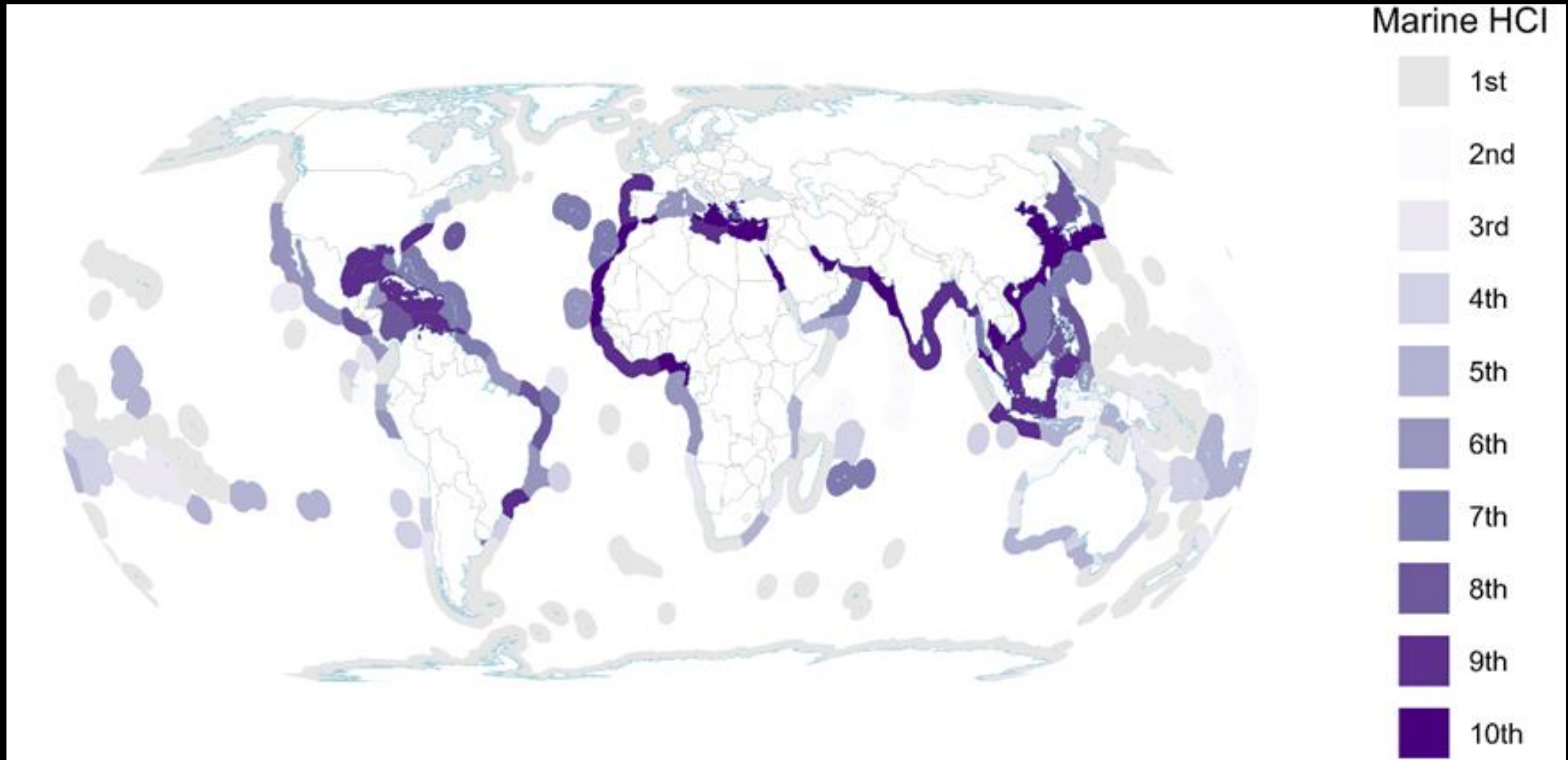
Composite Terrestrial Human Coexistence Indicator in Terrestrial Ecoregions of the World



Composite Freshwater Human Coexistence Indicator in Freshwater Ecoregions of the World



Composite Marine Human Coexistence Indicator in Marine Ecoregions of the World



Prototype Biodiversity Profile of a Region: South America

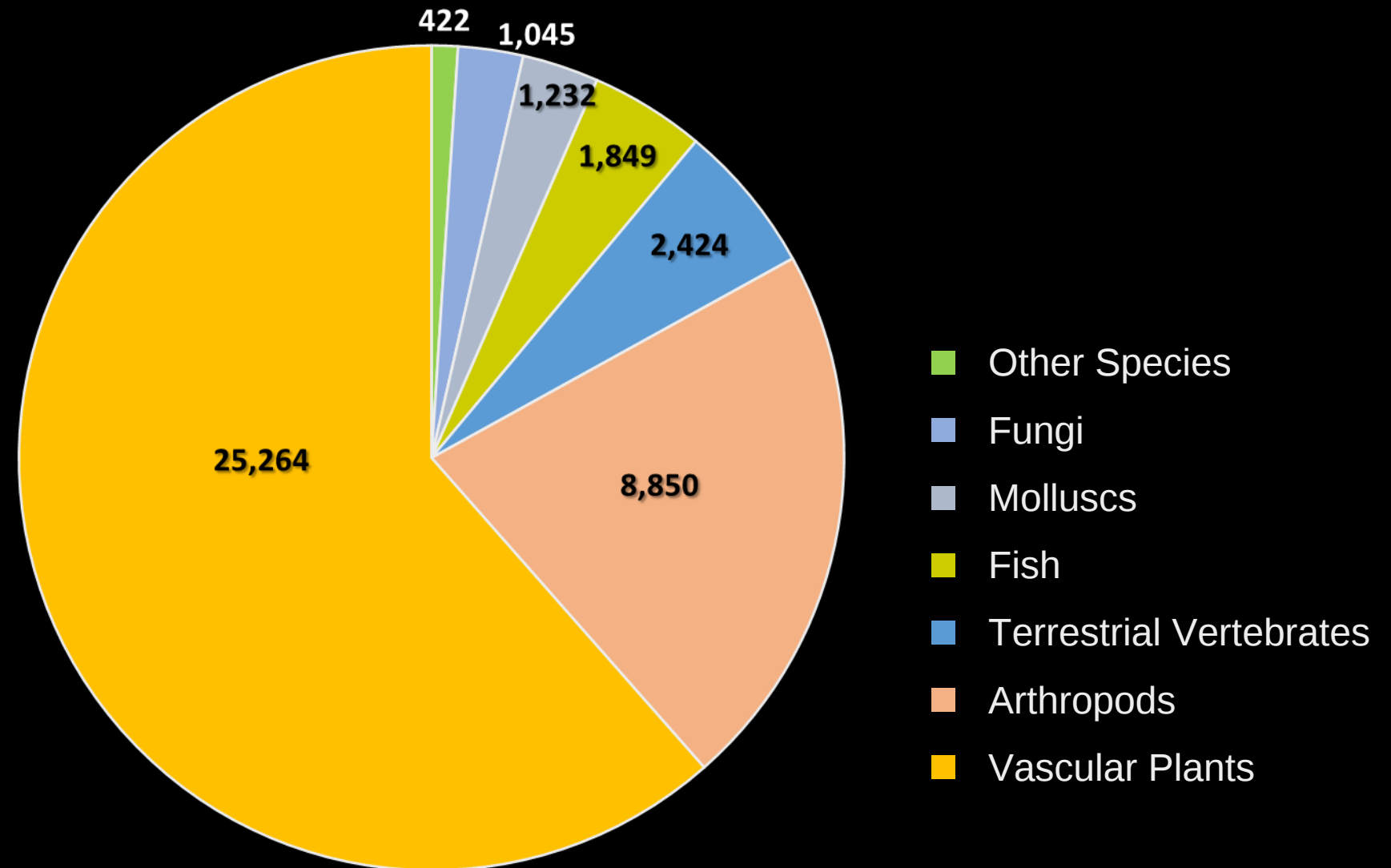
South America: Total Count of Species based on Presence



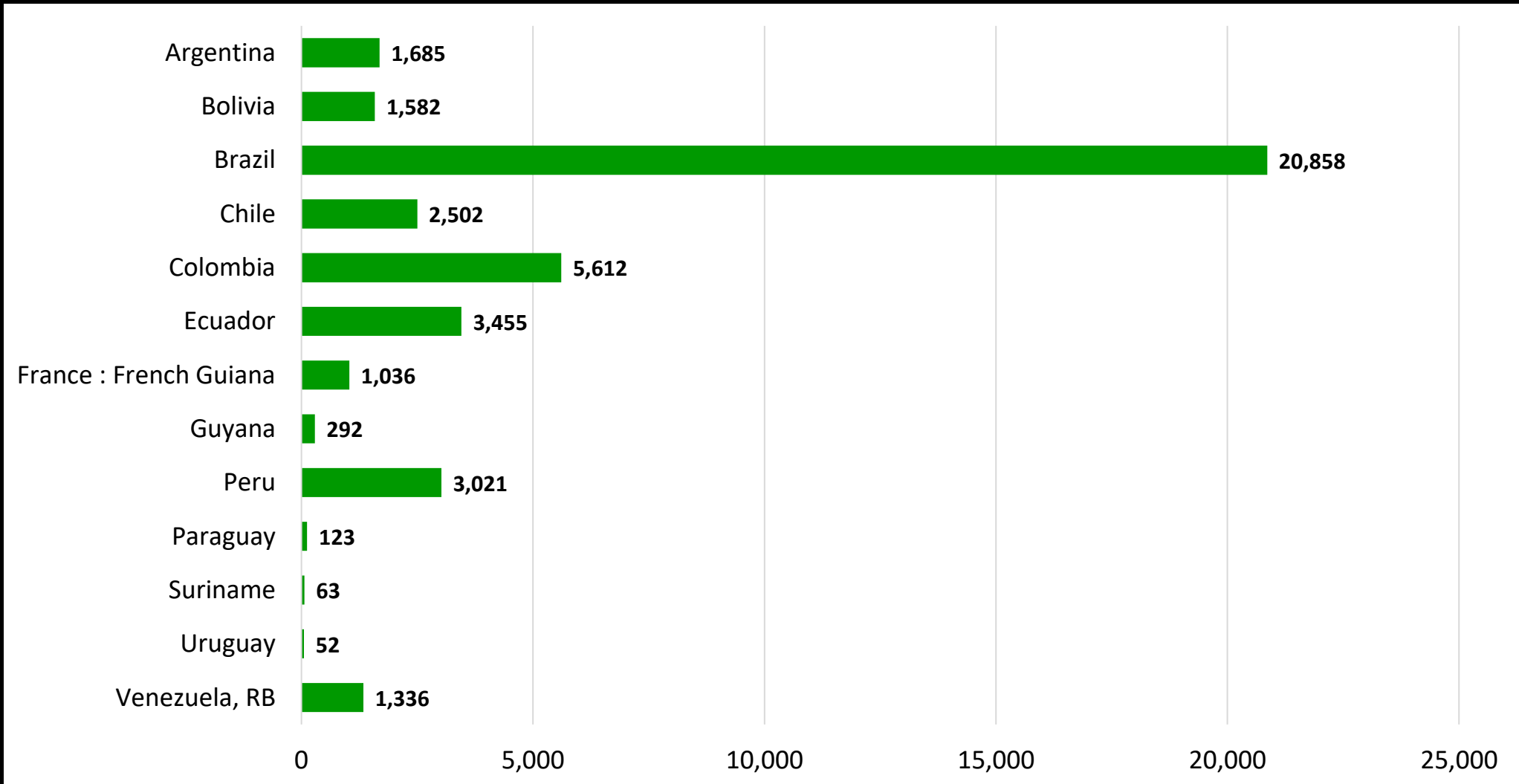
South America: Count of Species Occurrence Region across Countries



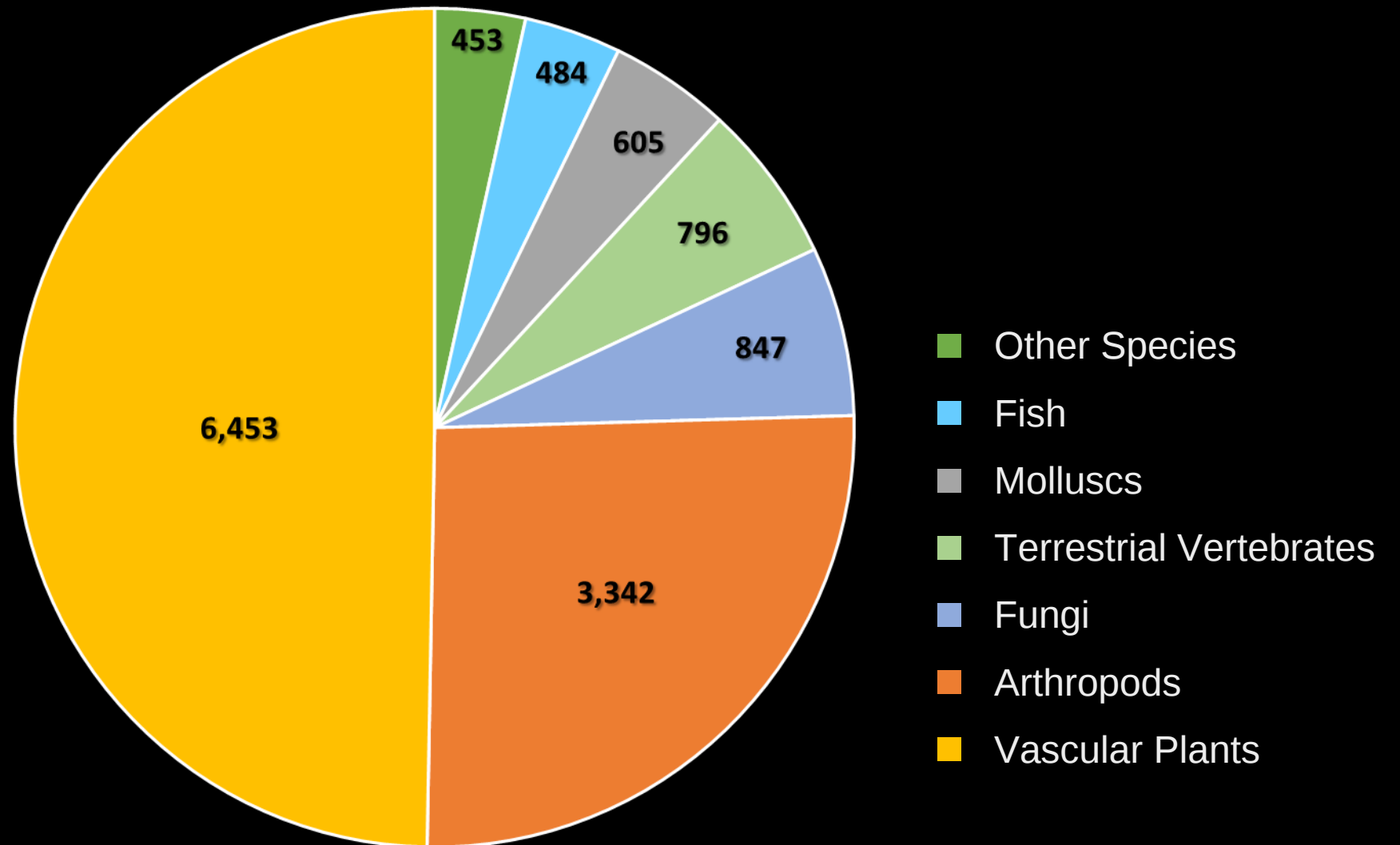
South America: Count of Endemic Species based on Presence Endemicity Criterion 100%



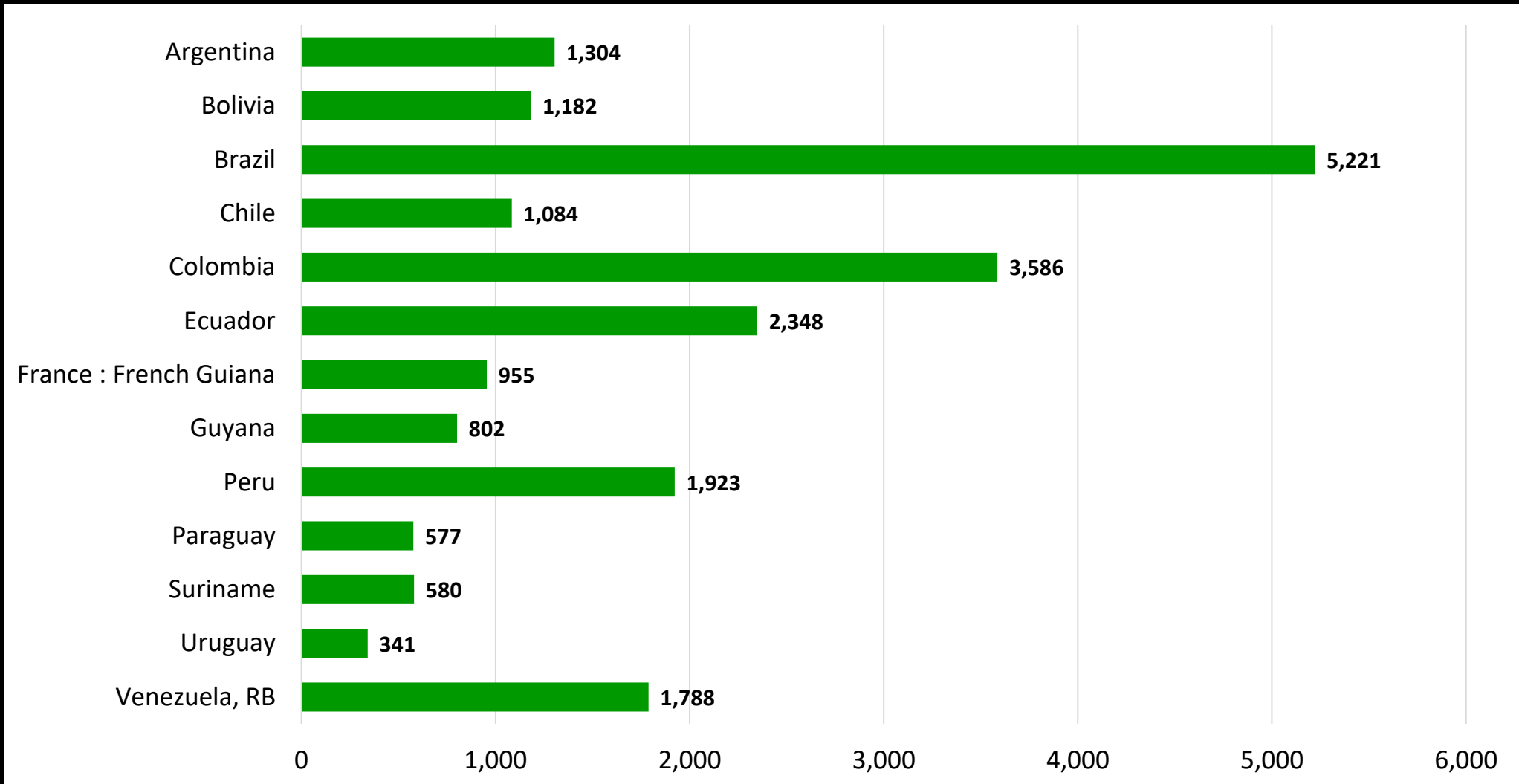
South America: Count of Endemic Species across Countries based on Presence (Endemicity Criterion 100%)



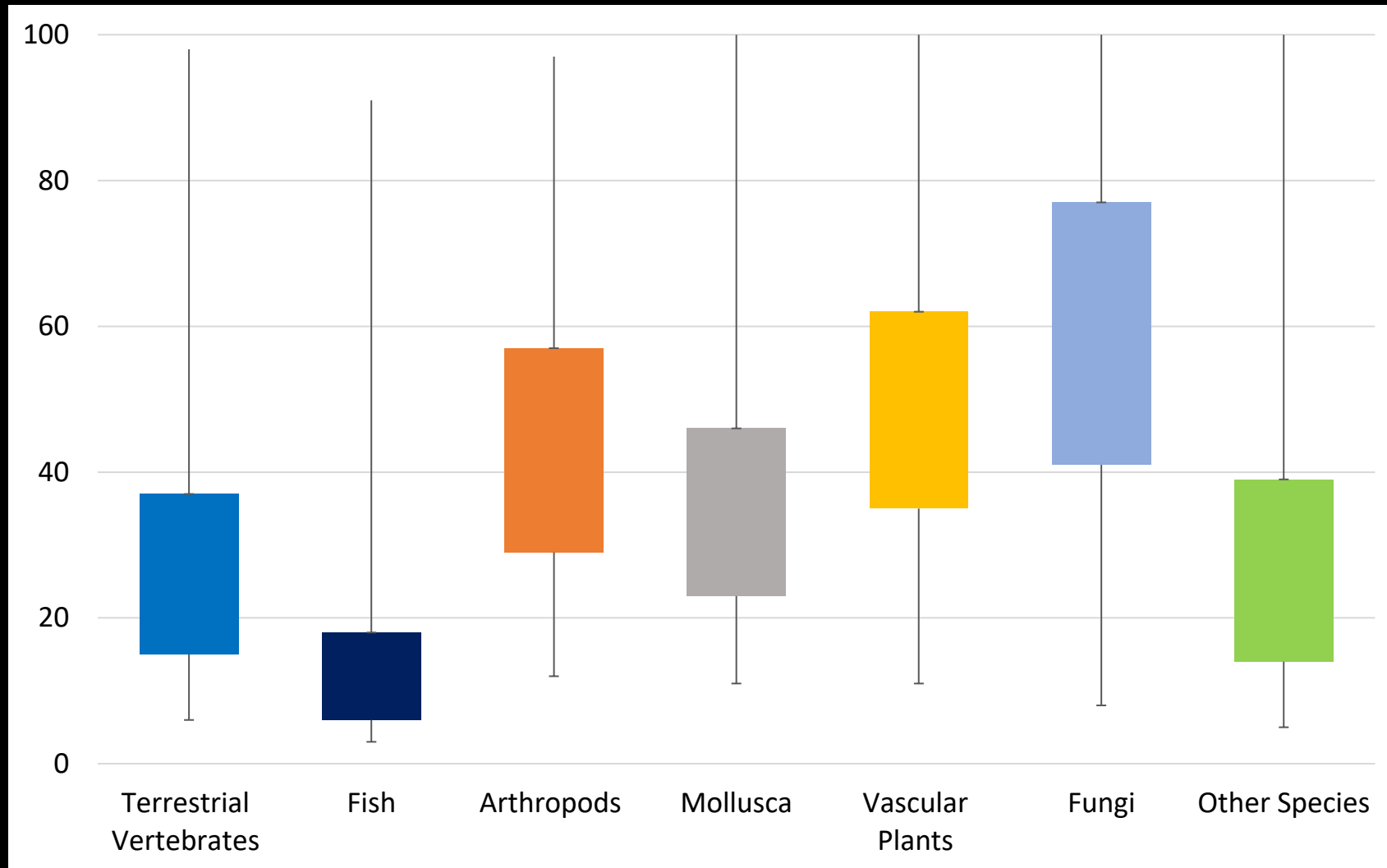
South America: Count of Small (25 km x 25 km) Occurrence Region Species based on Presence



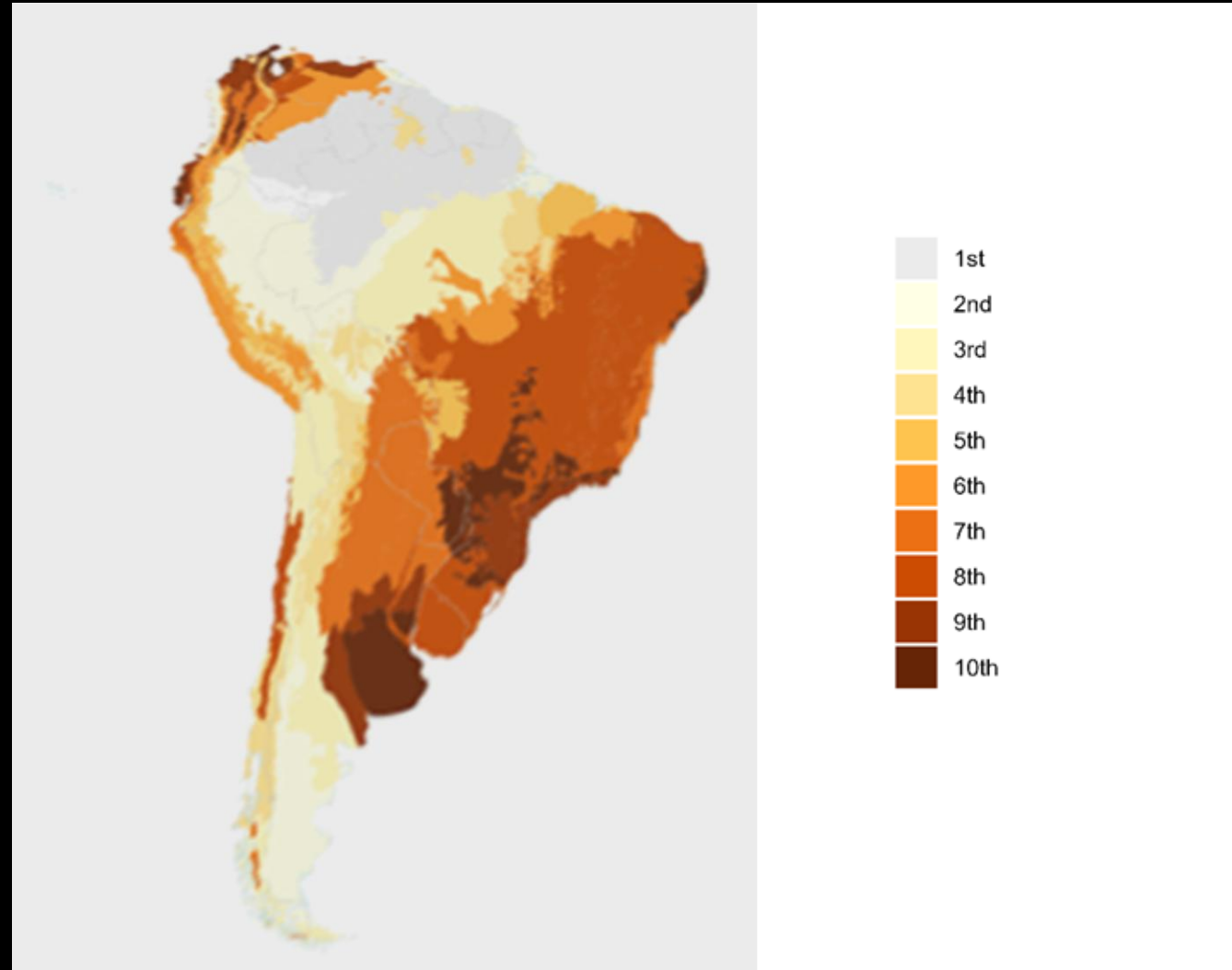
South America: Count of Small (25 km x 25 km) Occurrence Region Species across Countries based on Presence



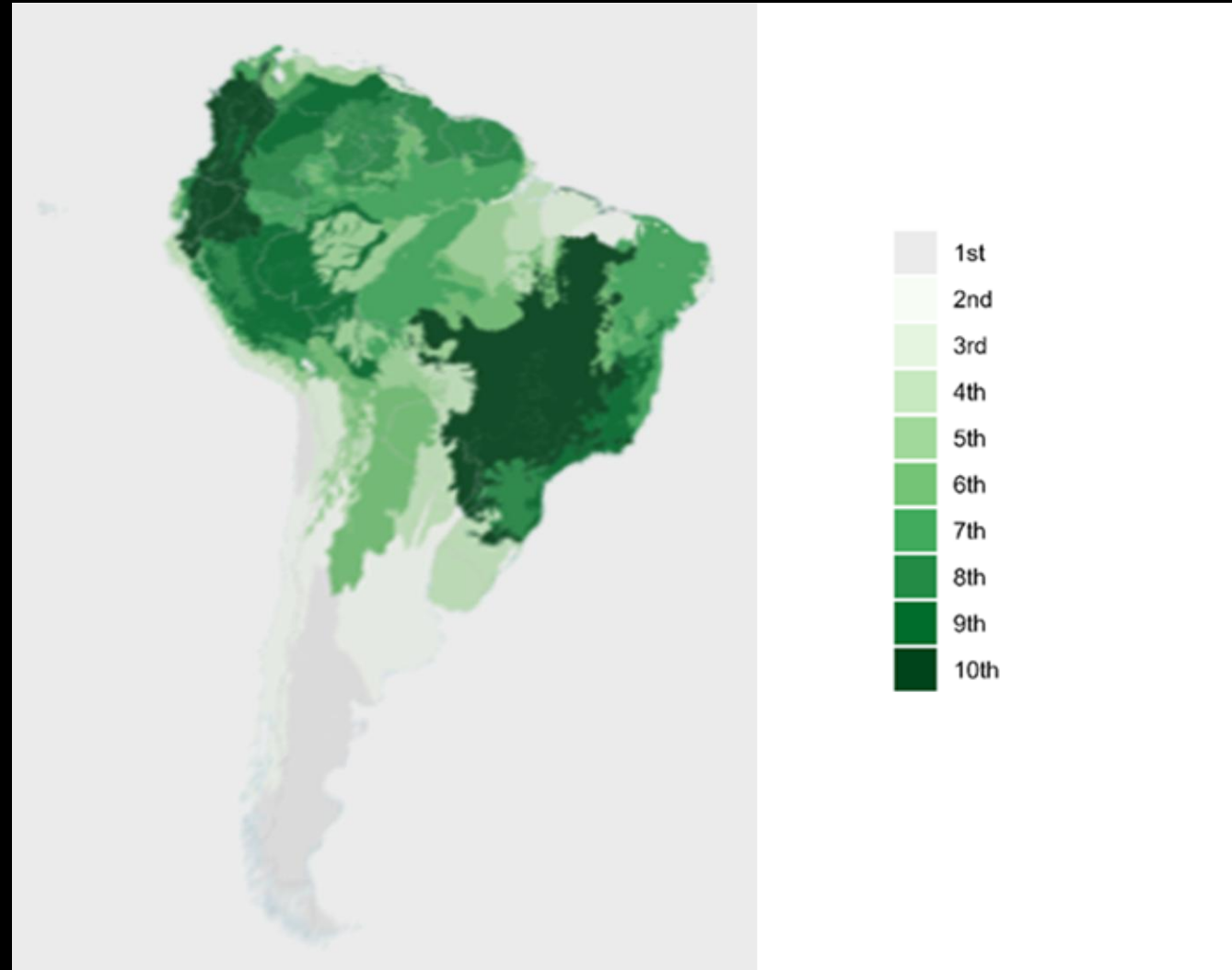
South America: Estimated Extinction Risks by Species



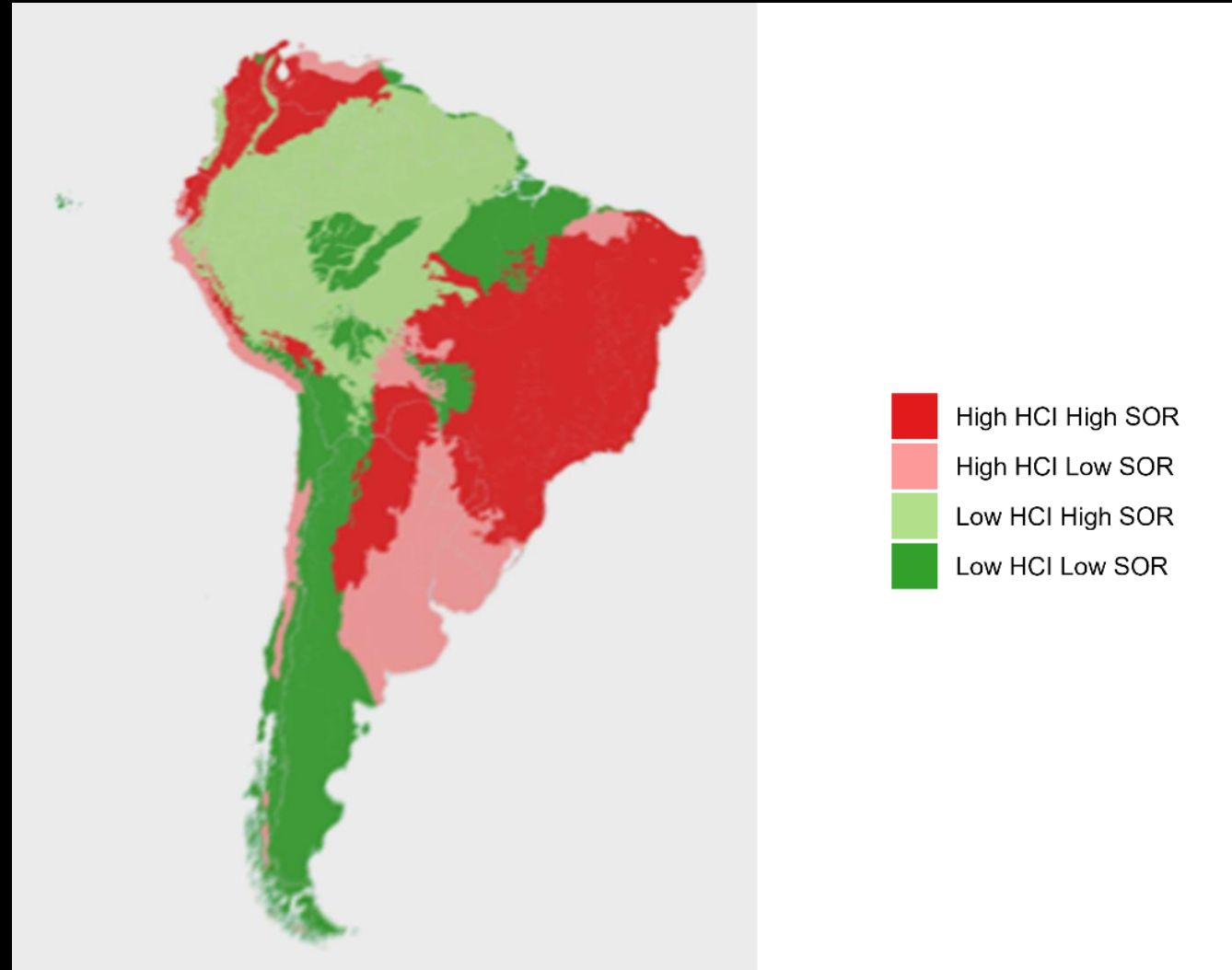
South America: Composite HCI in Terrestrial Ecoregions



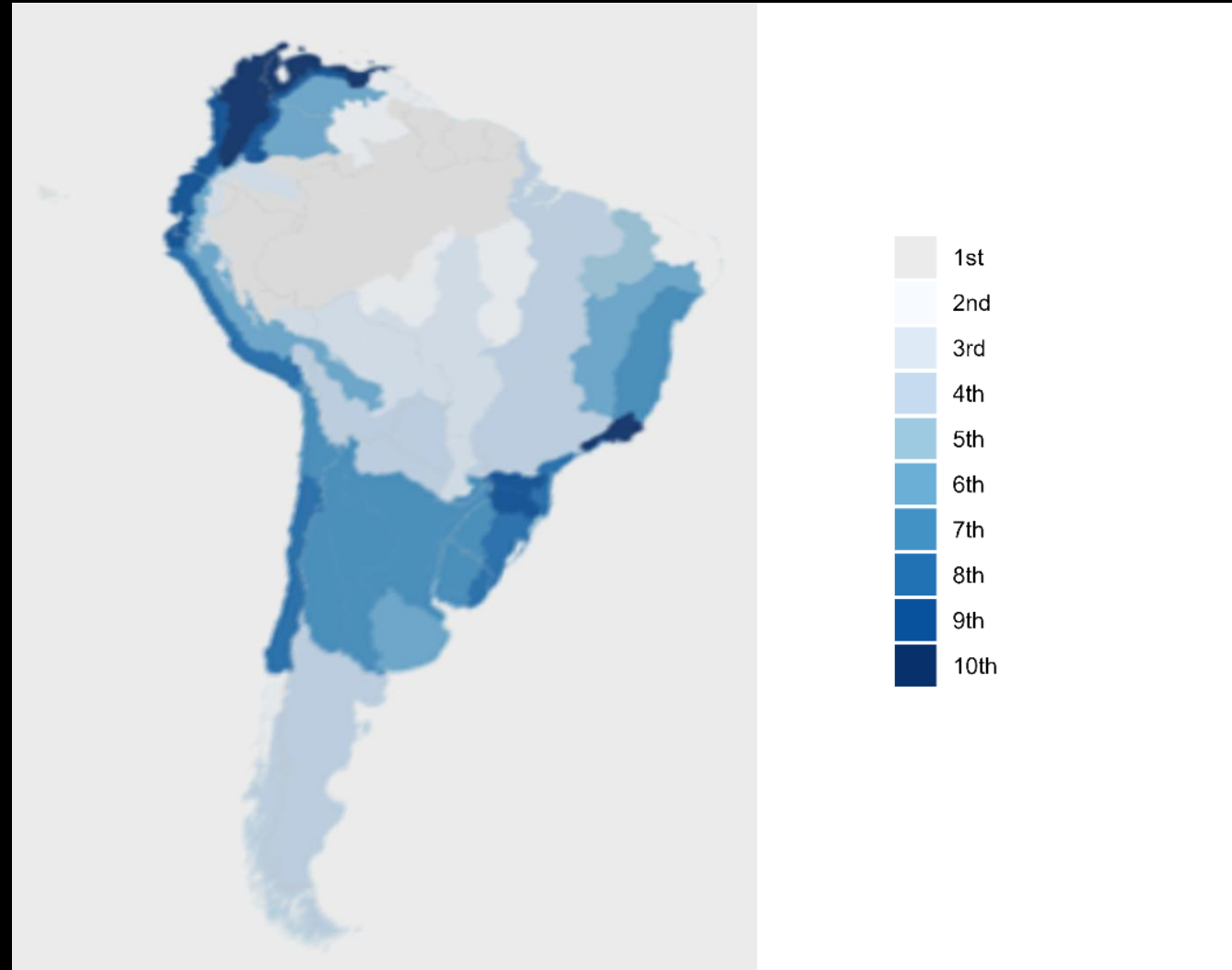
South America: Count of Species Occurrence Regions in Terrestrial Ecoregions



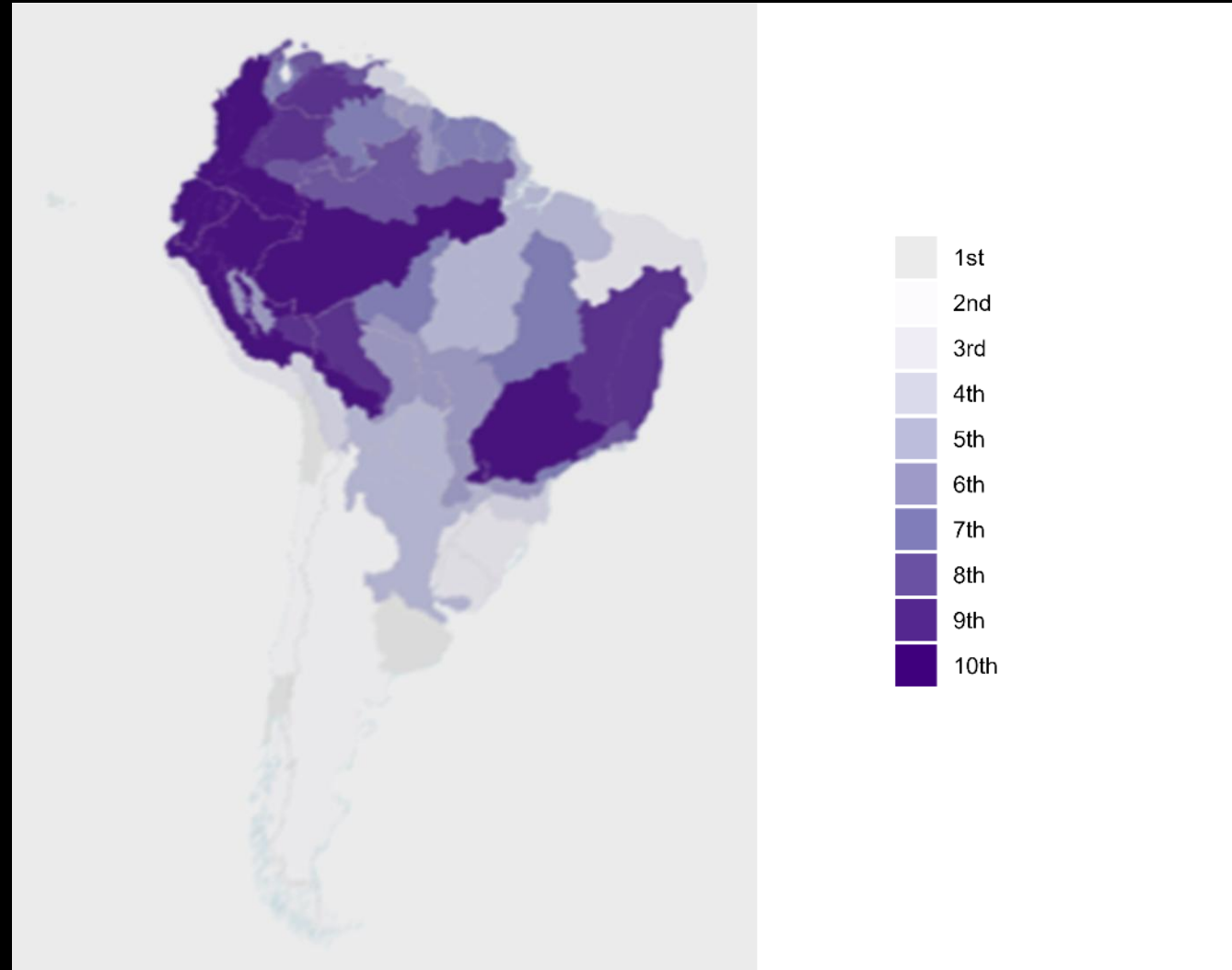
South America: Species Occurrence Regions and Composite HCI in Terrestrial Ecoregions



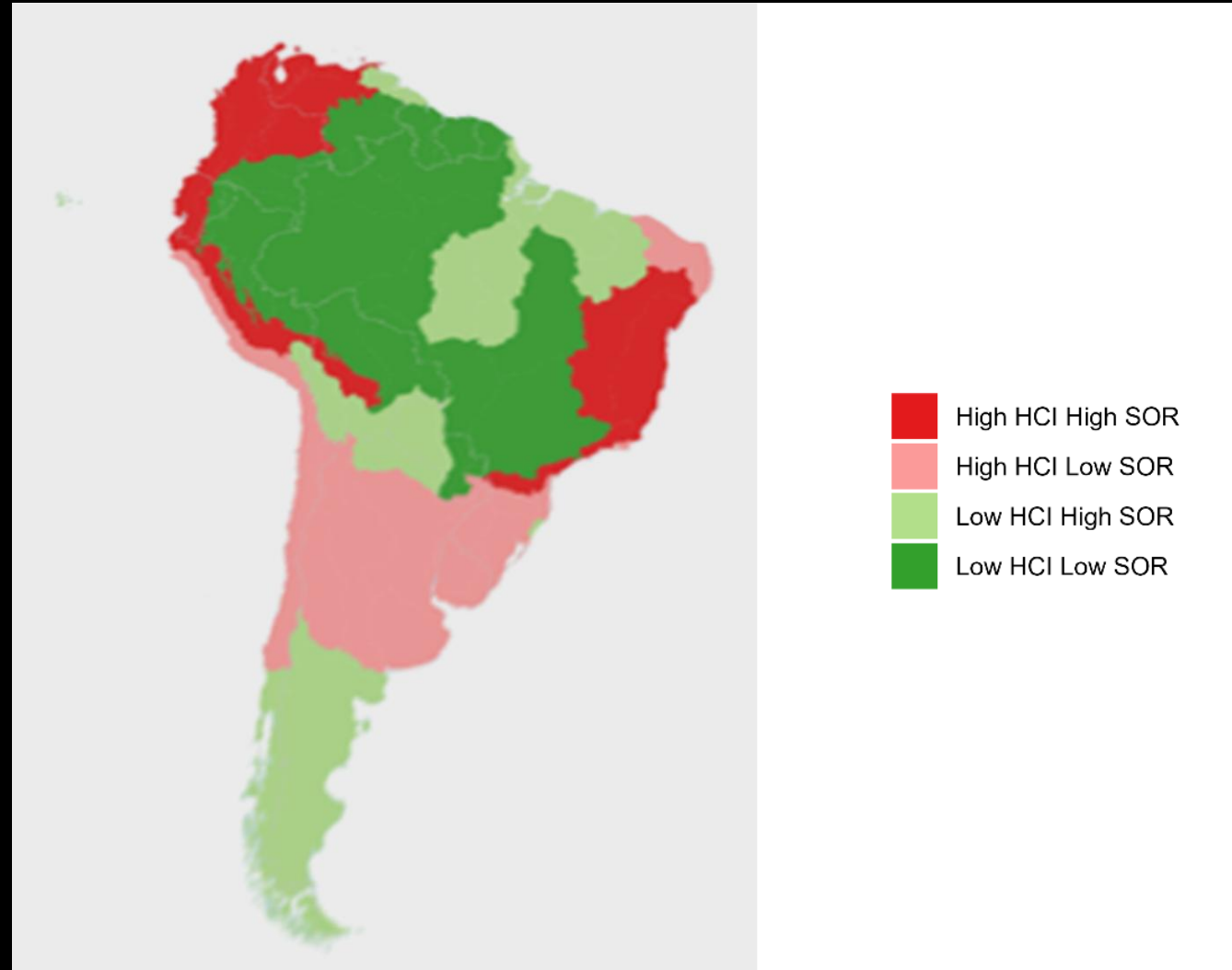
South America: Composite HCI in Freshwater Ecoregions



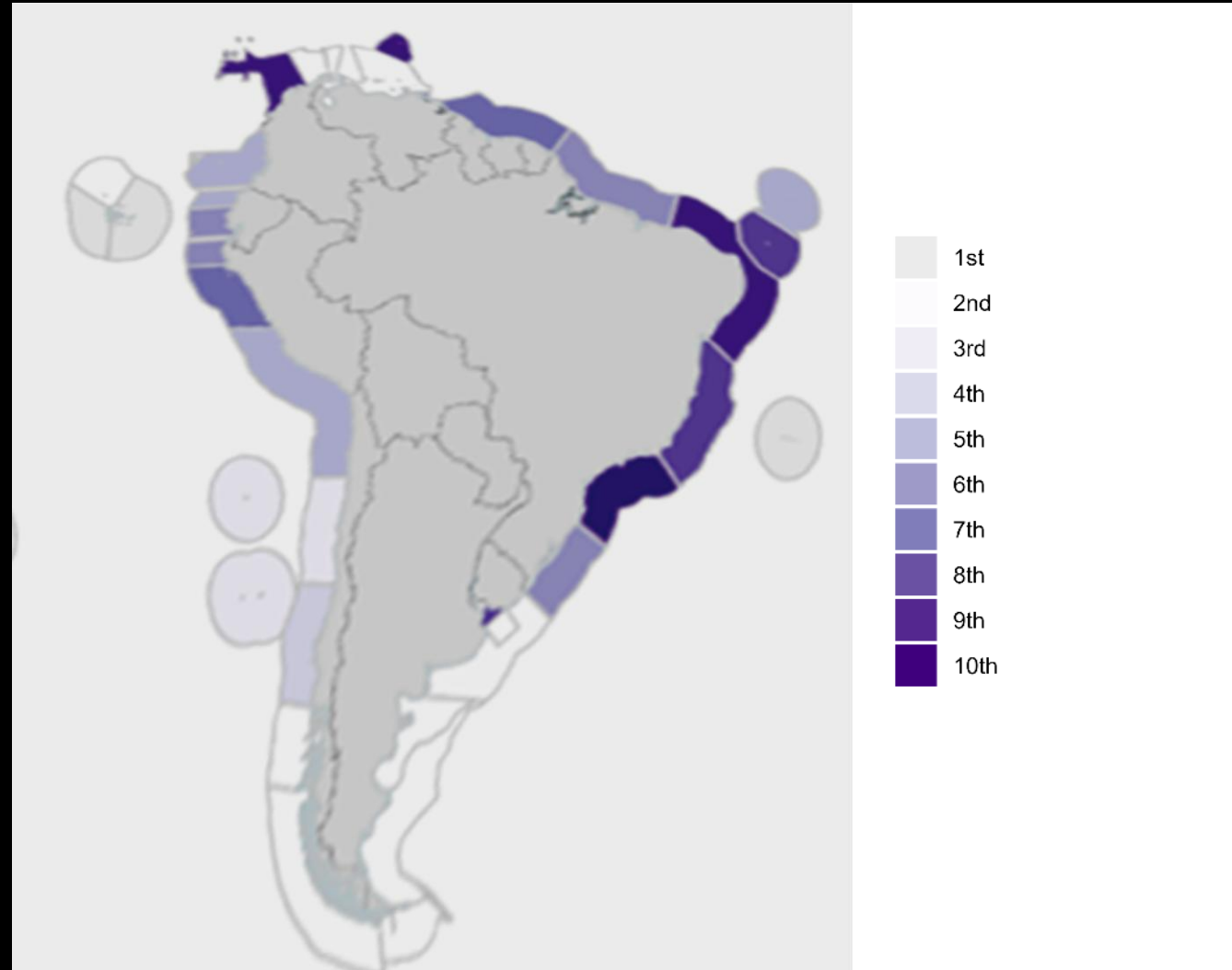
South America: Count of Species Occurrence Regions in Freshwater Ecoregions



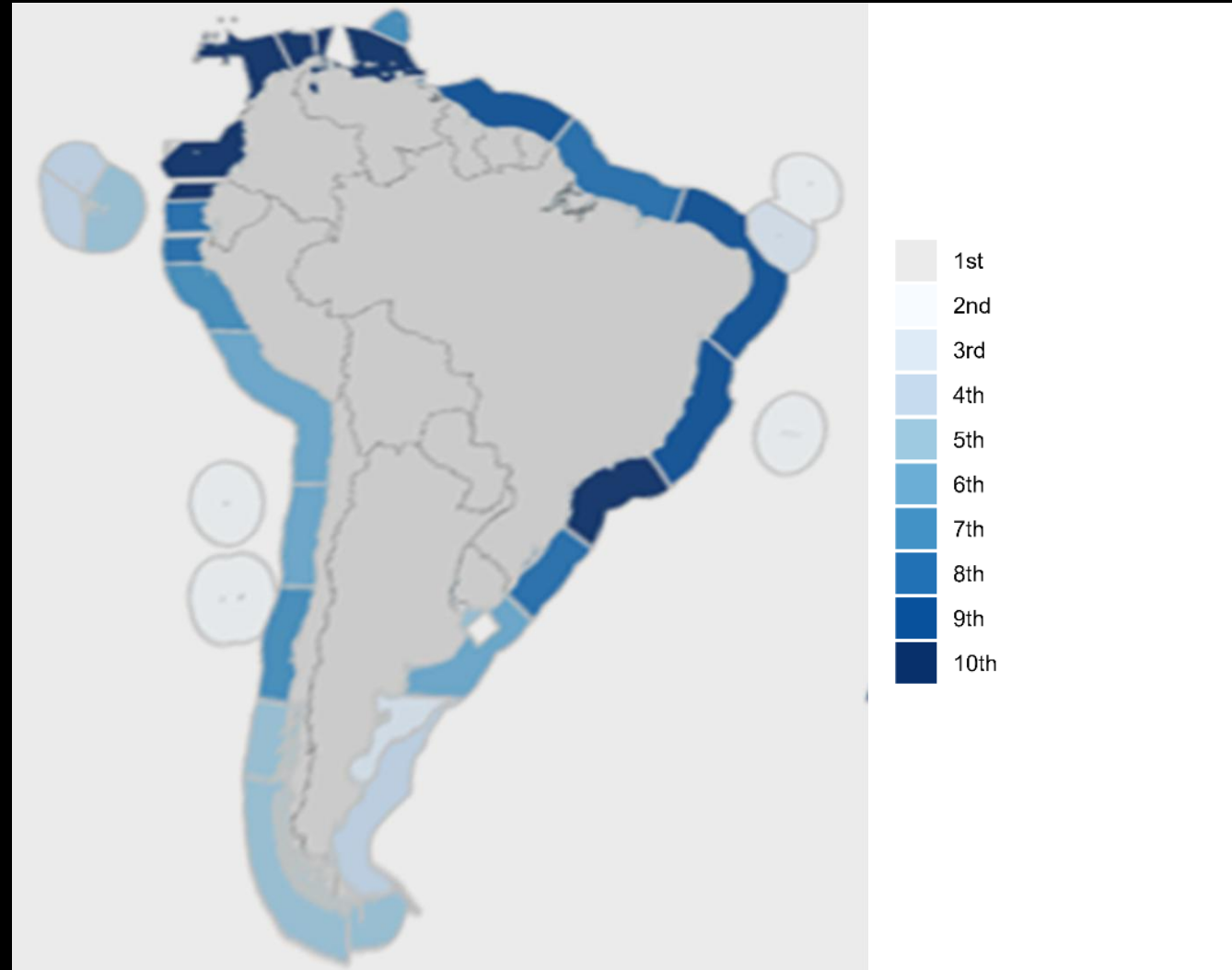
South America: Species Occurrence Regions and Composite HCI in Freshwater Ecoregions



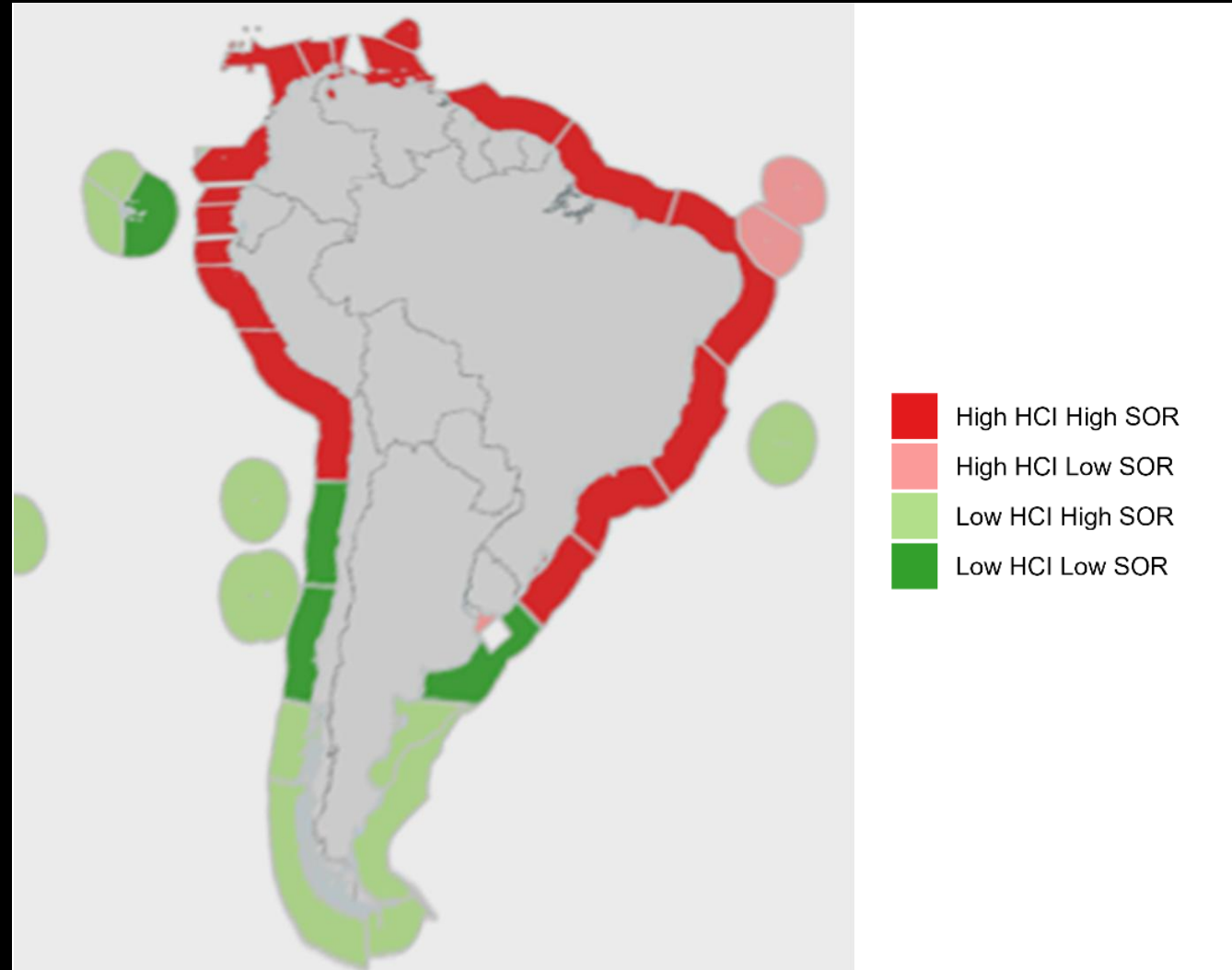
South America: Composite HCI in Marine Ecoregions



South America: Count of Species Occurrence Regions in Marine Ecoregions



South America: Species Occurrence Regions and Composite HCI in Marine Ecoregions

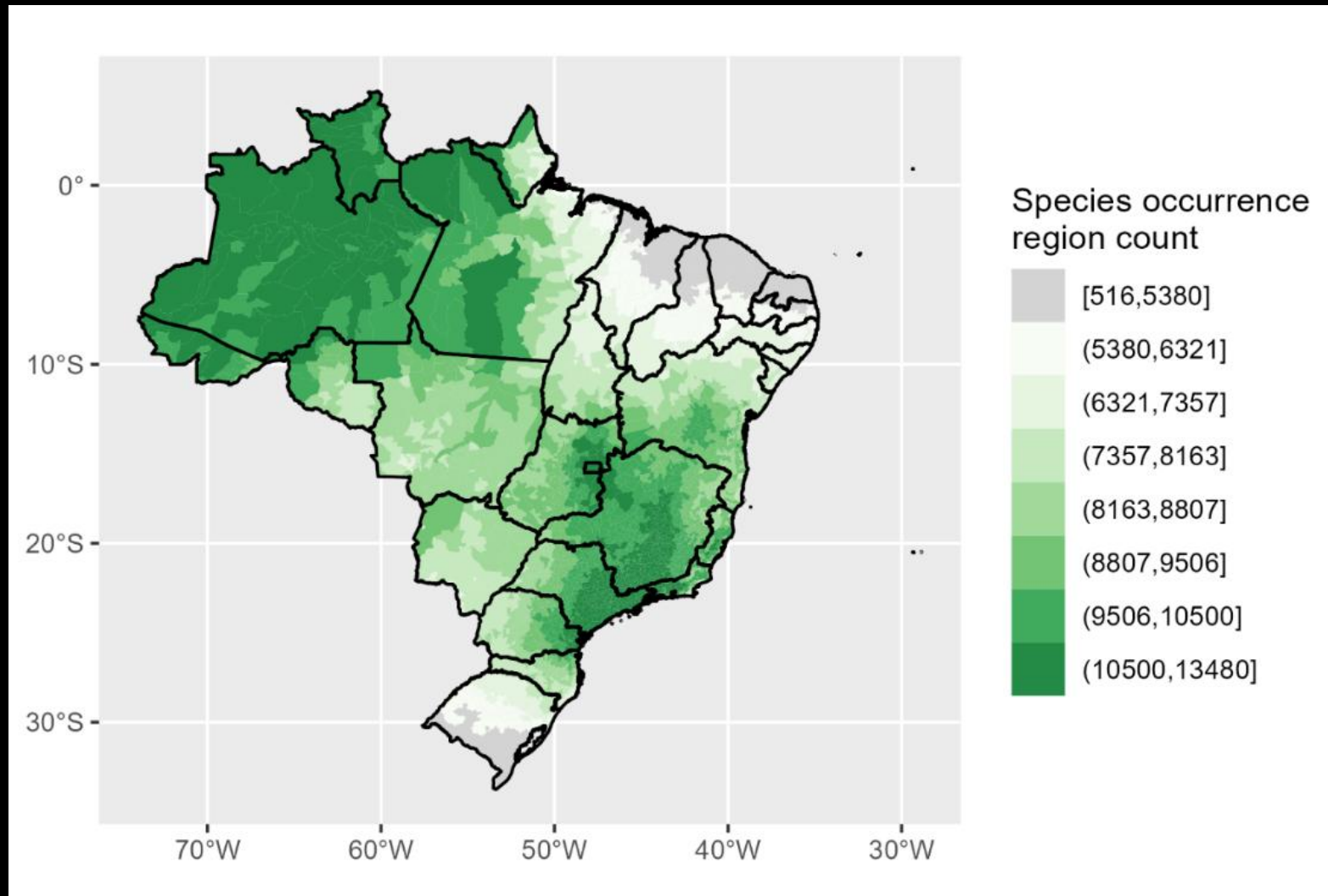


Prototype Biodiversity Profile of a Country: Brazil

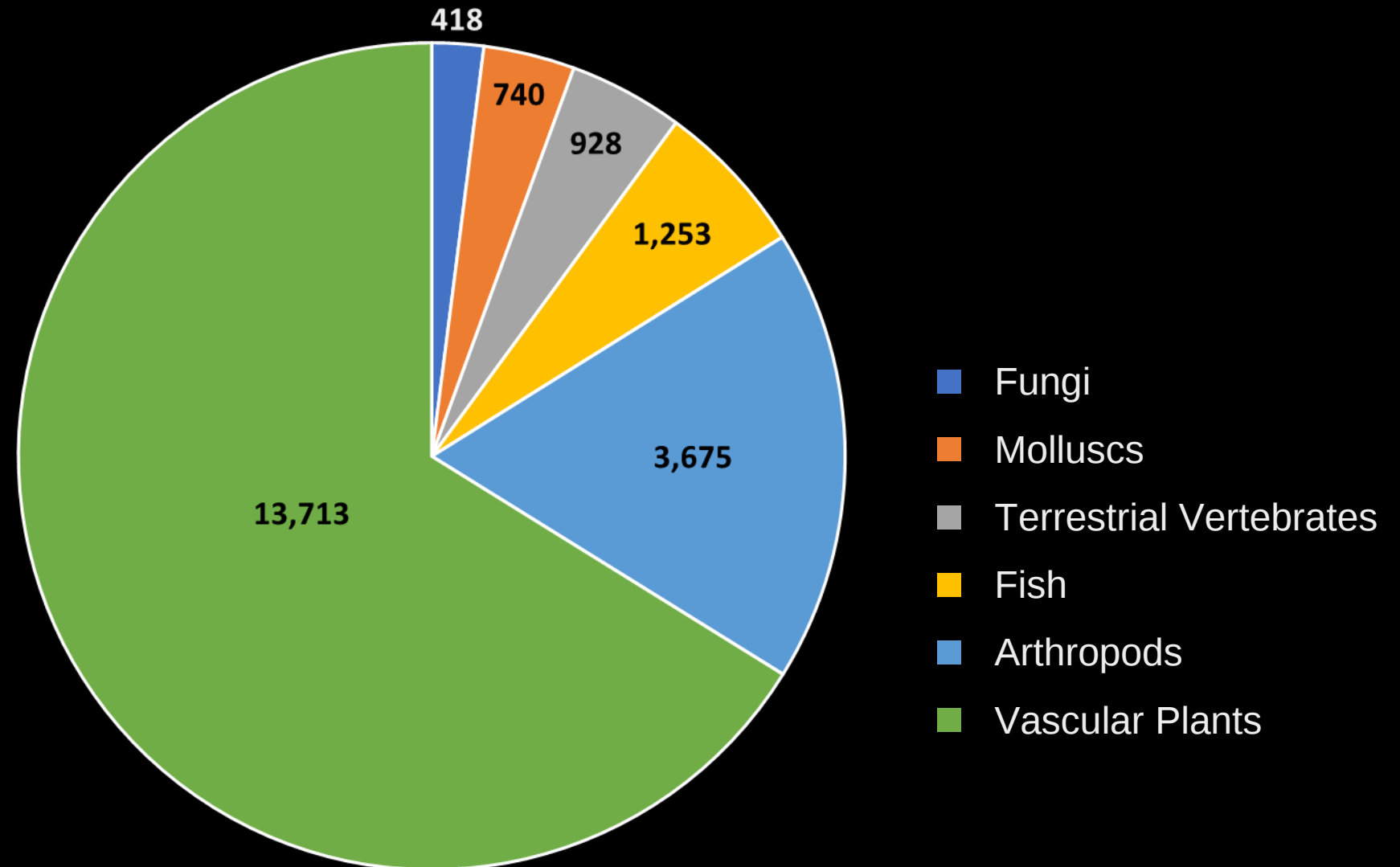
Brazil: Total Count of Species based on Presence



Brazil: Count of Species Occurrence Region across Municipalities

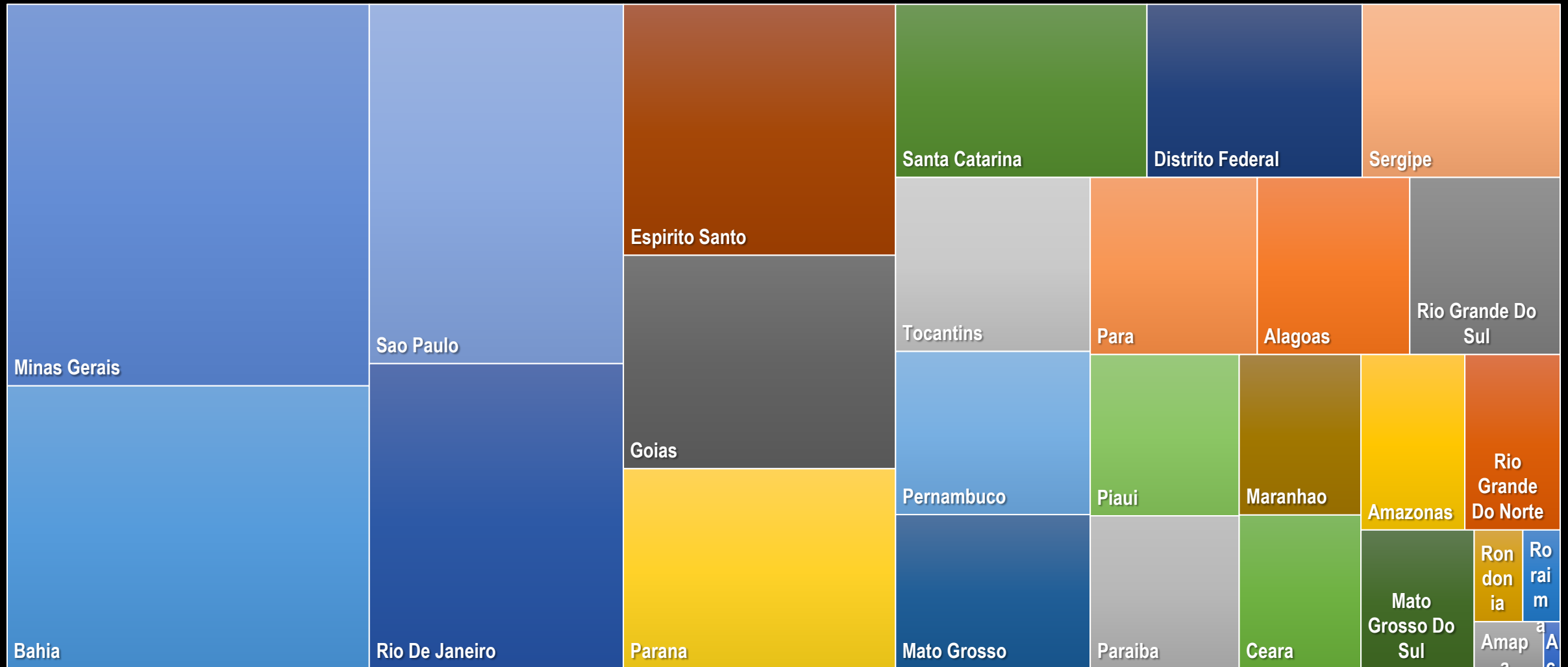


Brazil: Count of Endemic Species based on Presence Endemicity Criterion 100%

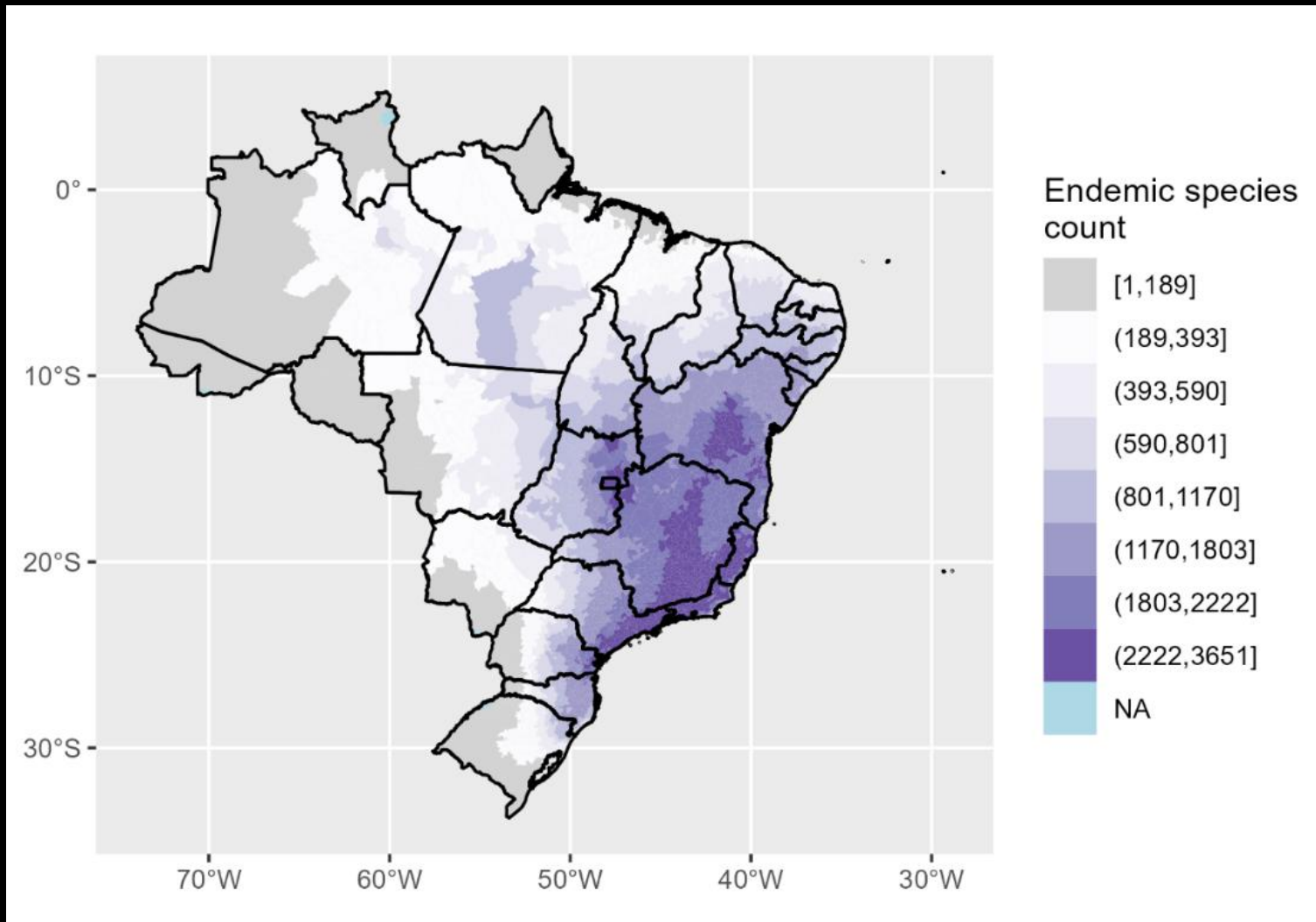


Brazil: Distribution of Endemic Species across States

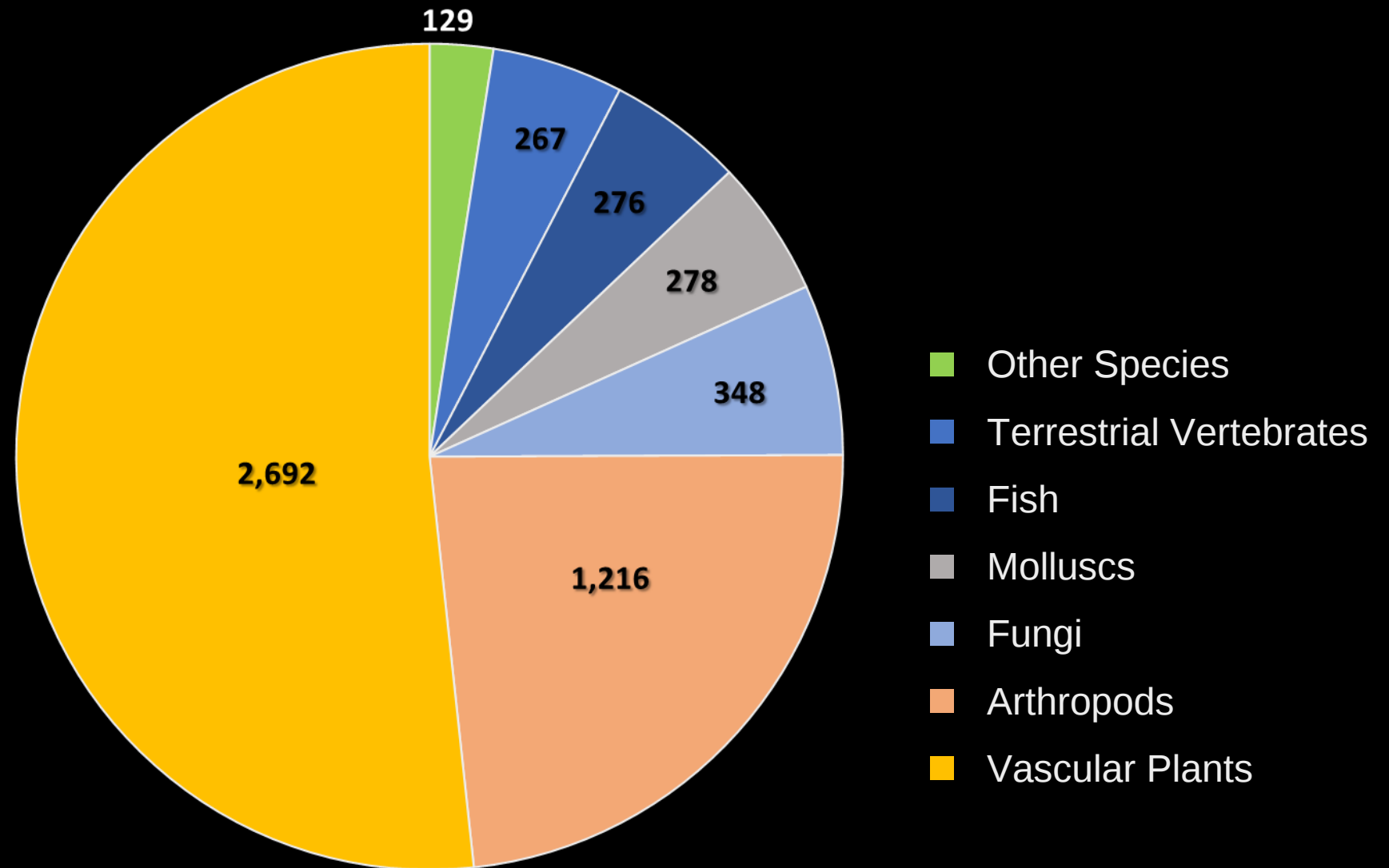
Endemicity Criterion 100%



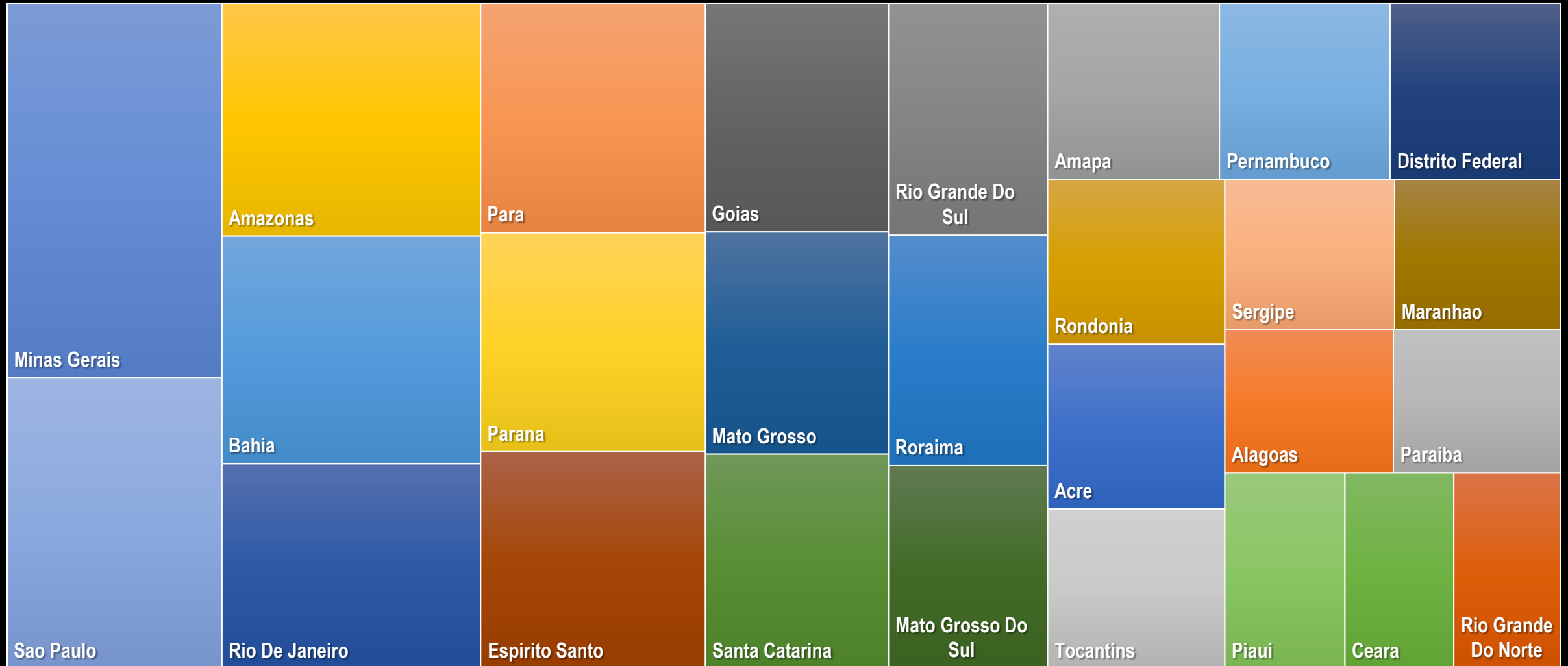
Brazil: Count of Endemic Species Occurrence Regions across Municipalities



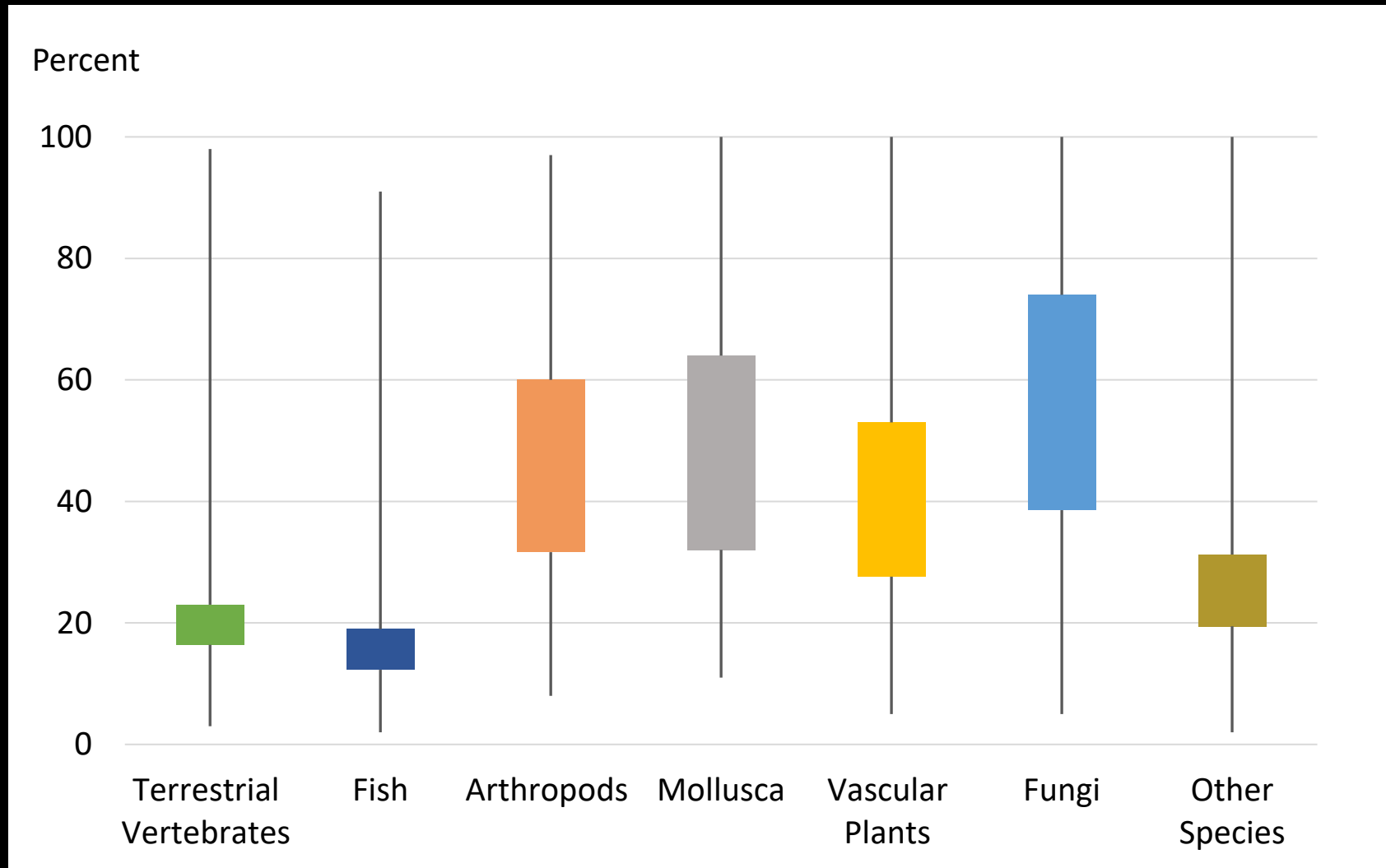
Brazil: Count of Small (25 km x 25 km) Occurrence Region Species based on Presence



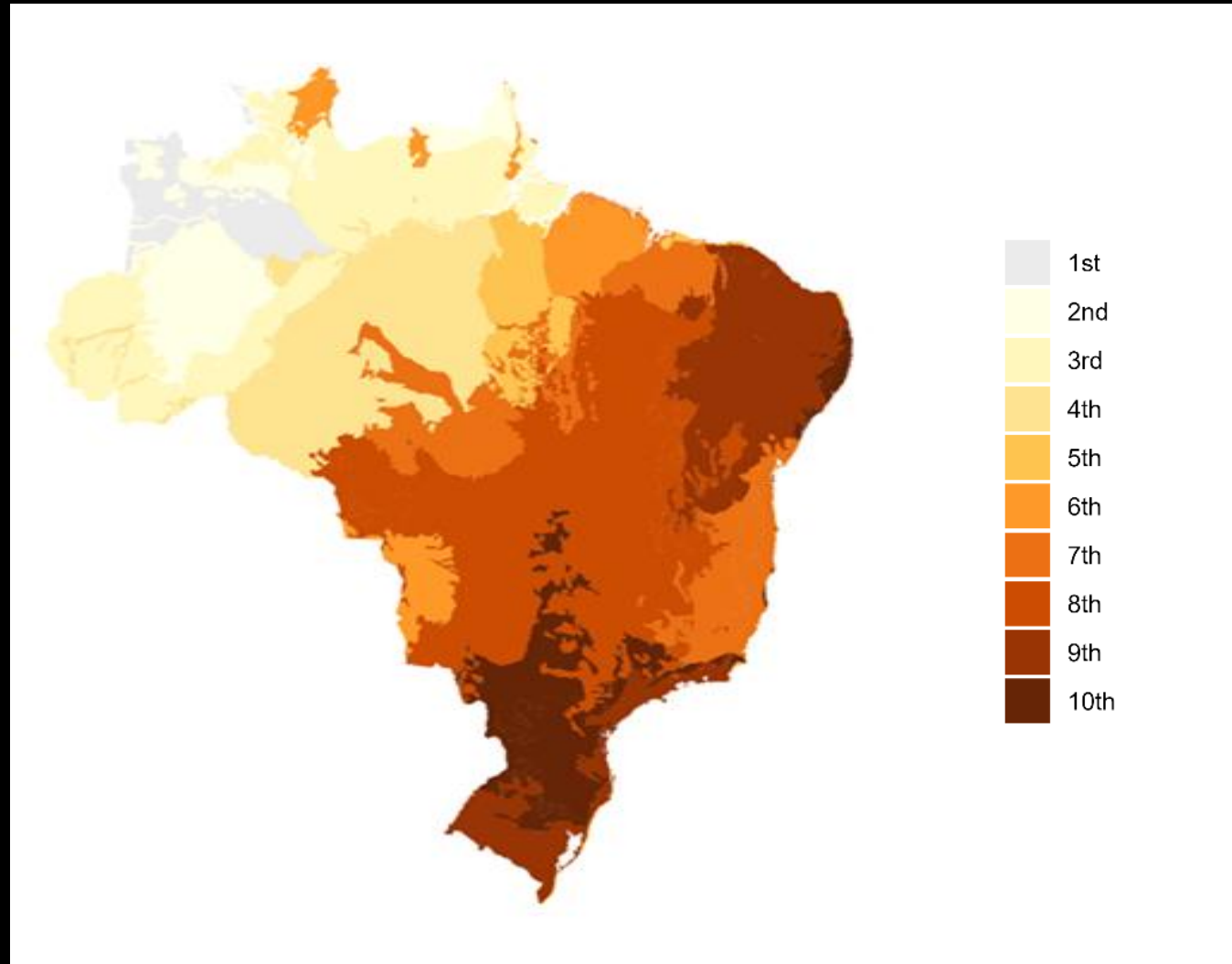
Brazil: Distribution of Small (25 km x 25 km) Occurrence Region Species across States



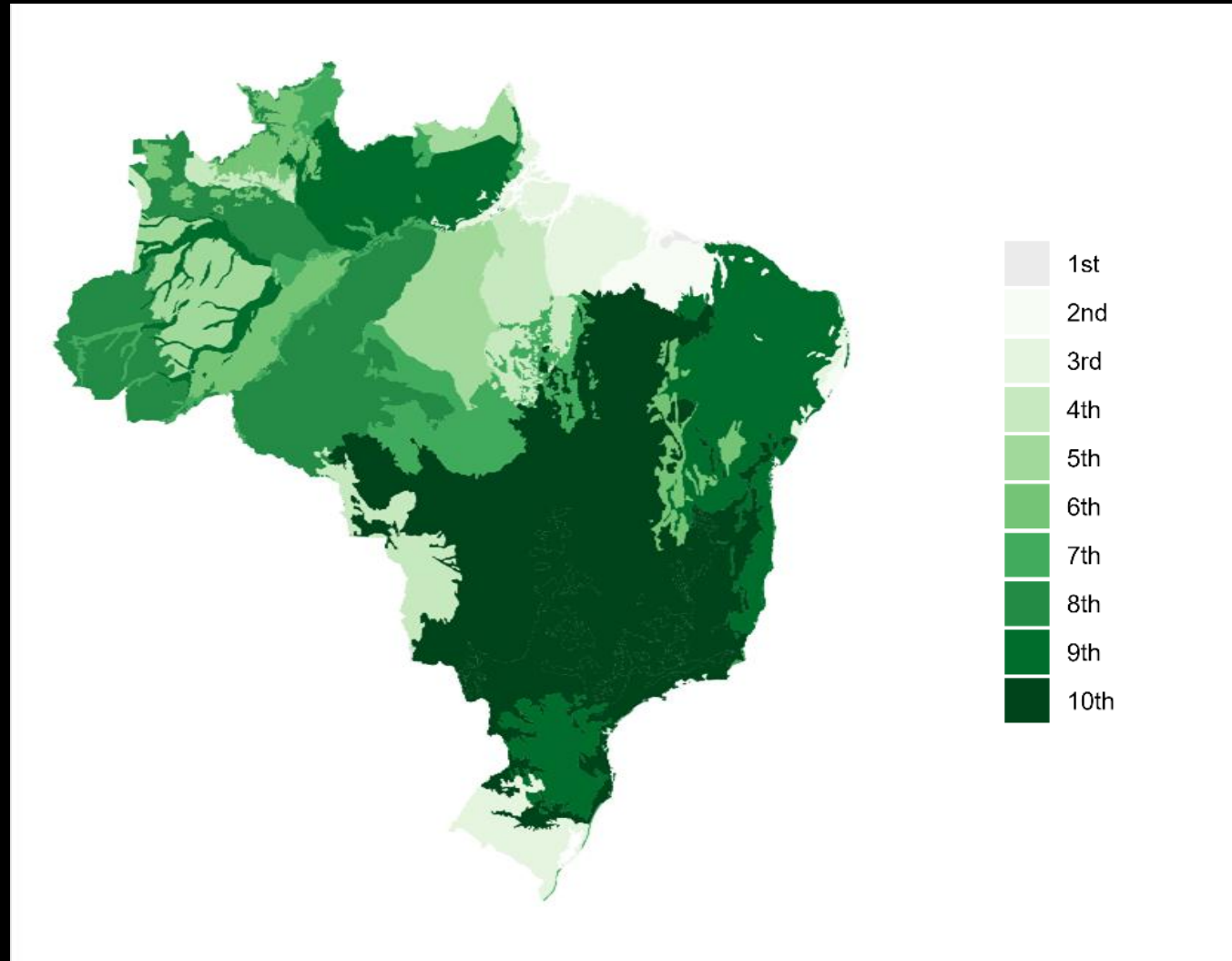
Brazil: Estimated Extinction Risks by Species



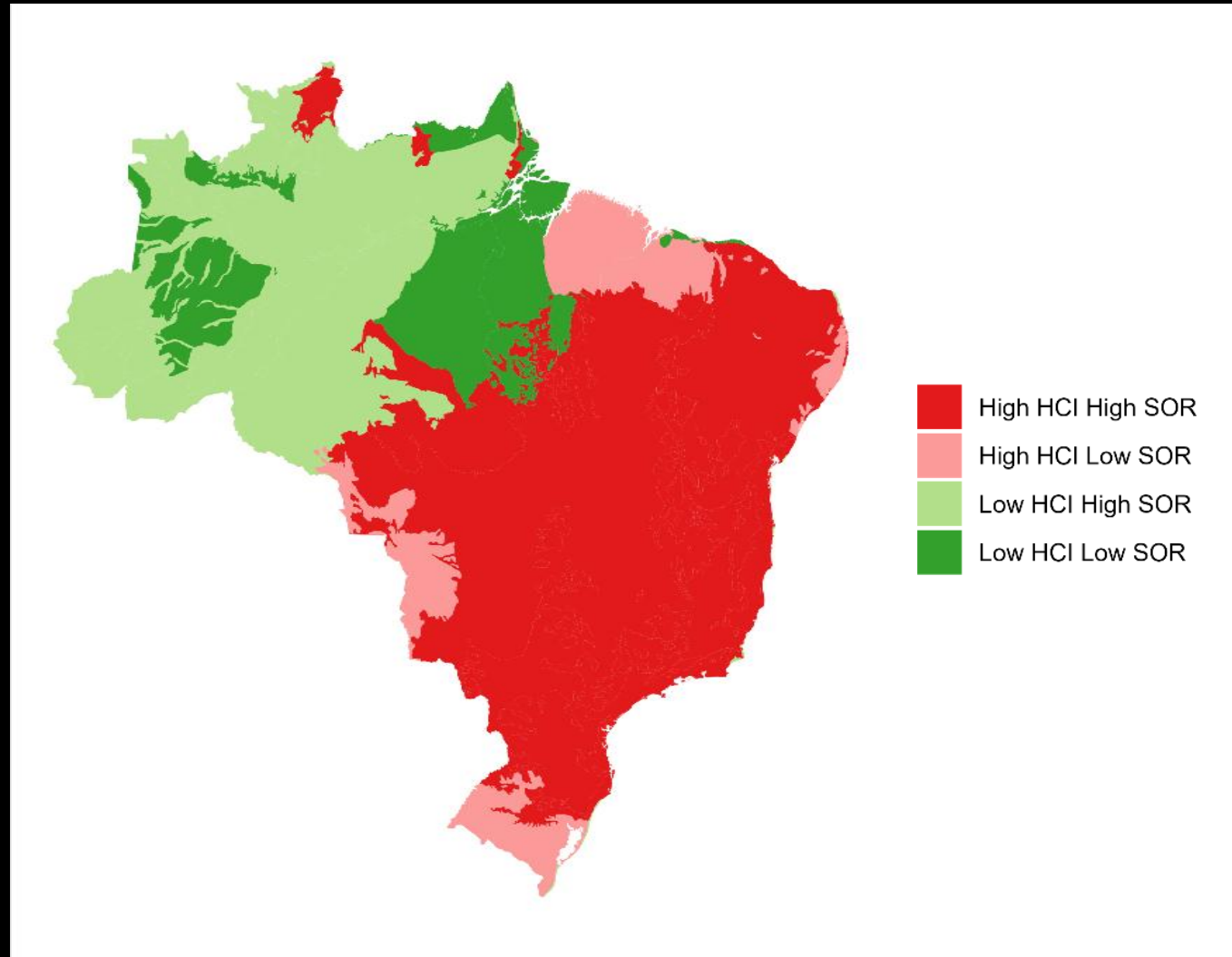
Brazil: Composite HCI in Terrestrial Ecoregions of Brazil



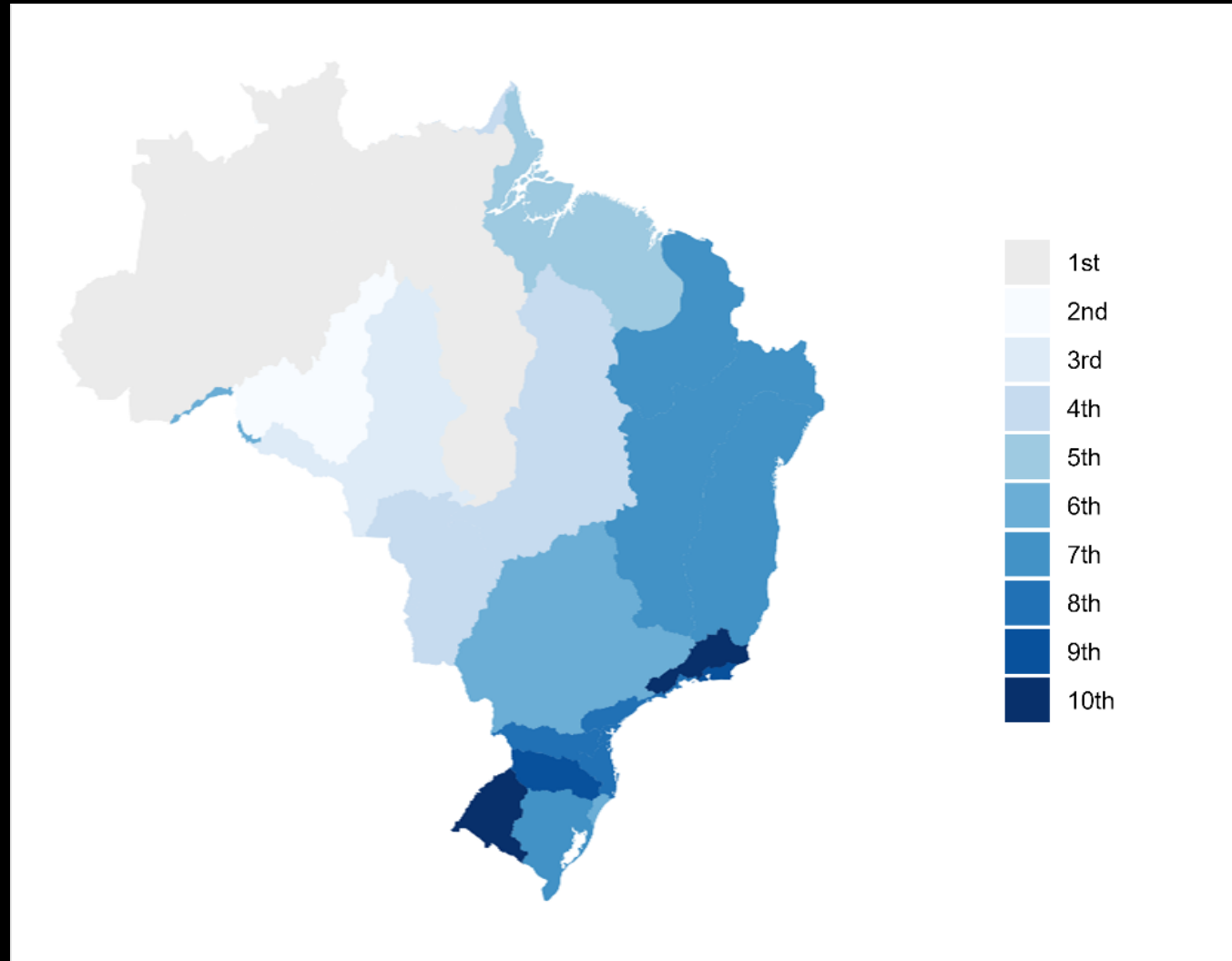
Brazil: Count of Species Occurrence Regions in Terrestrial Ecoregions



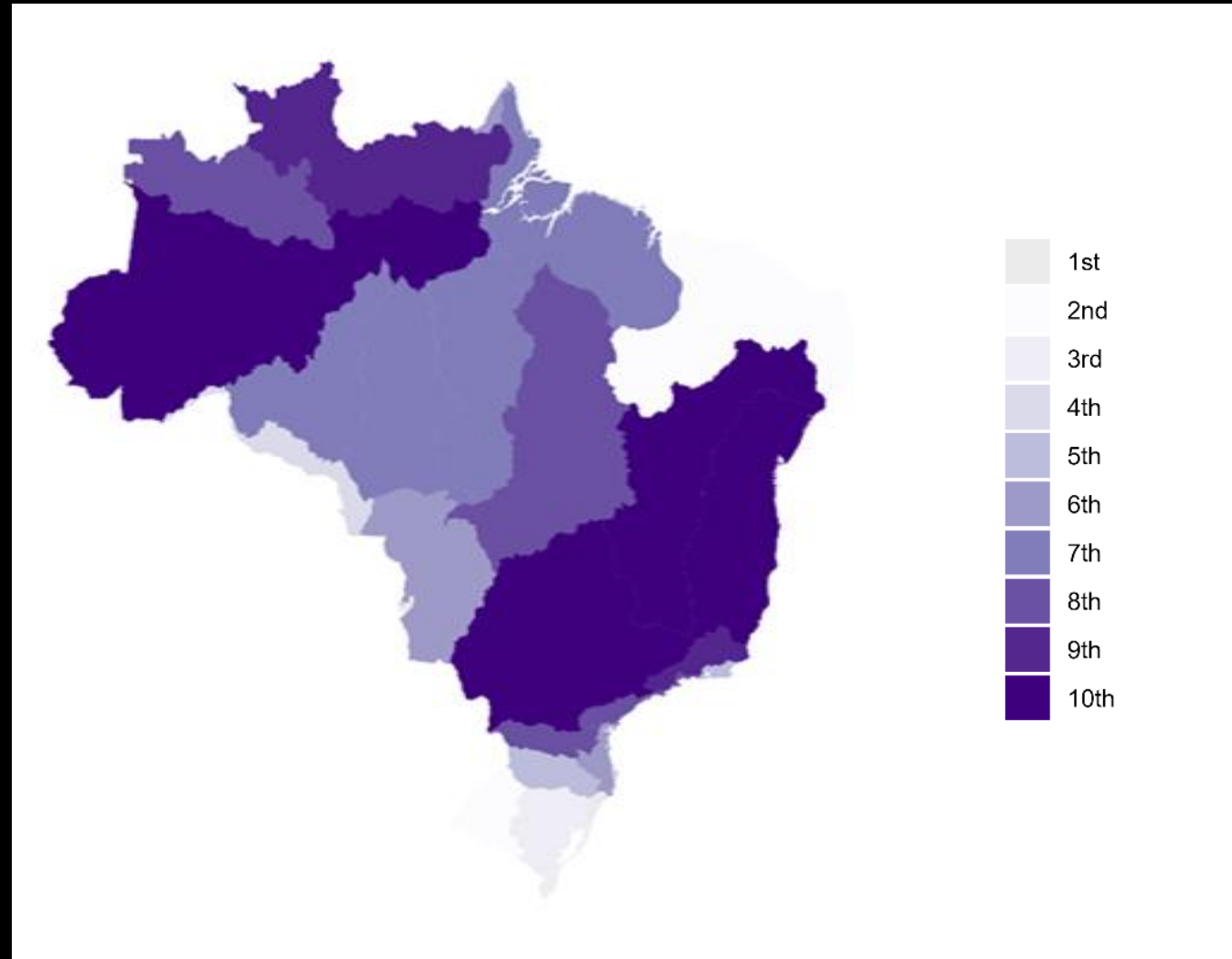
Brazil: Species Occurrence Regions and Composite HCI in Terrestrial Ecoregions



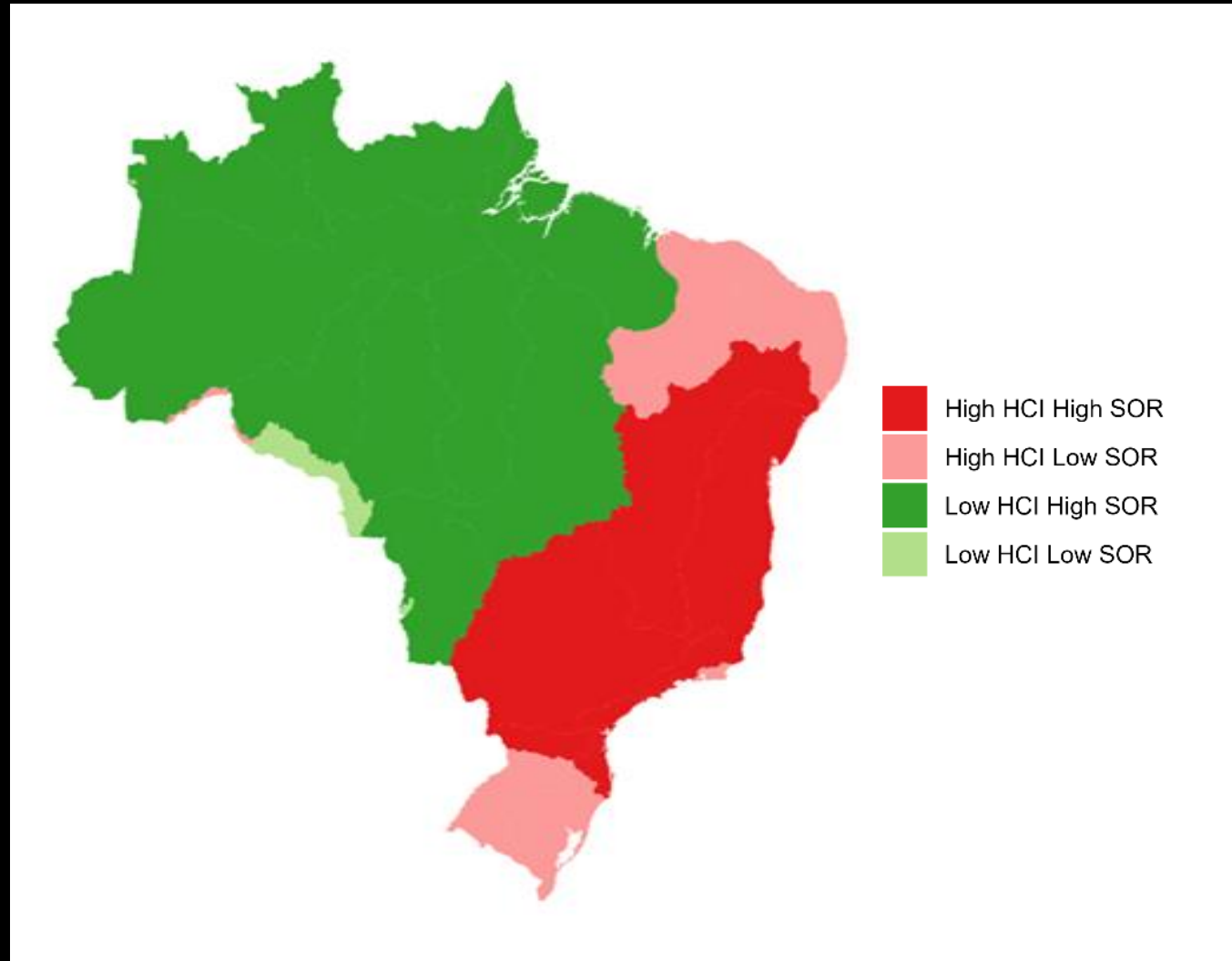
Brazil: Composite HCI in Freshwater Ecoregions



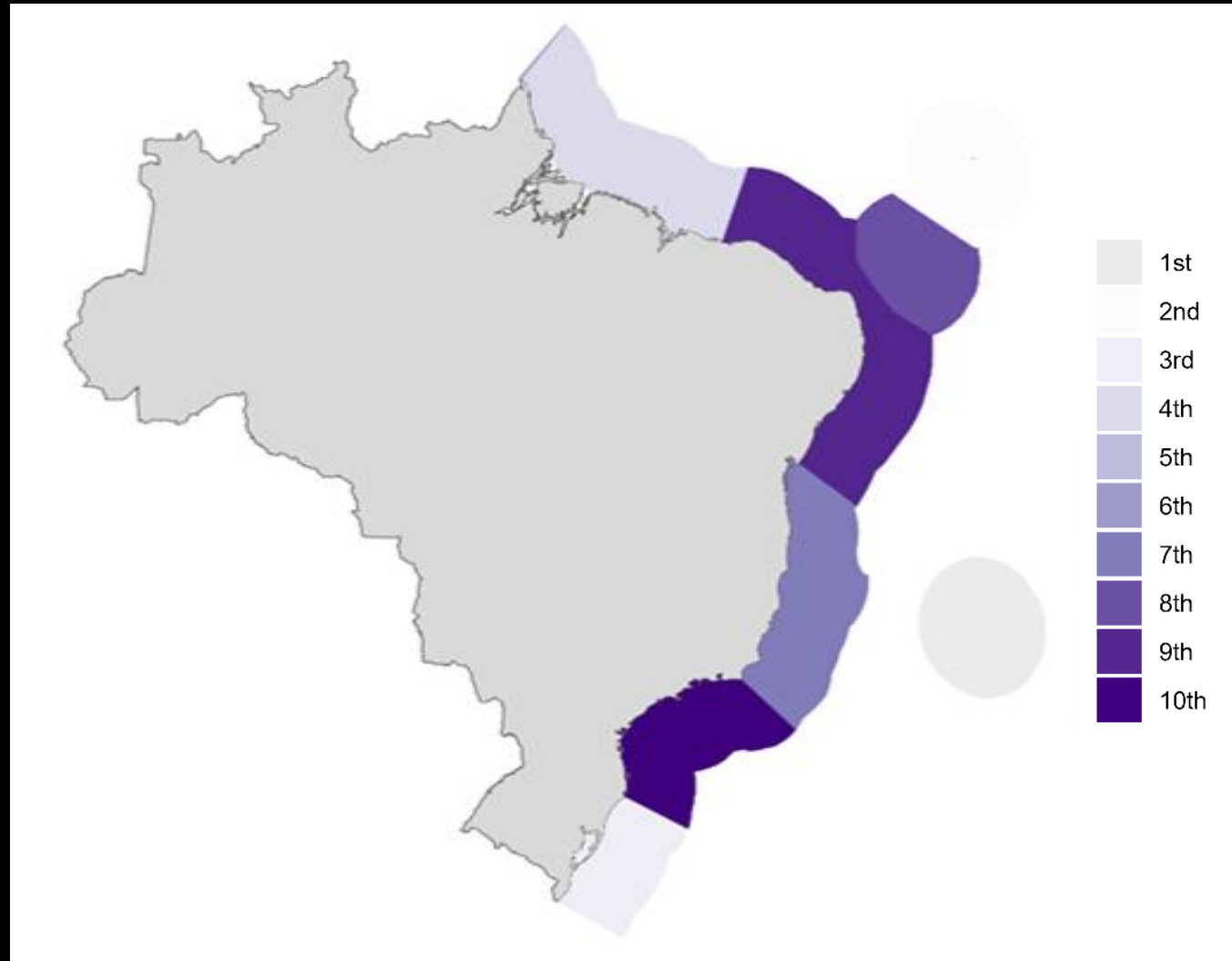
Brazil: Count of Species Occurrence Regions in Freshwater Ecoregions



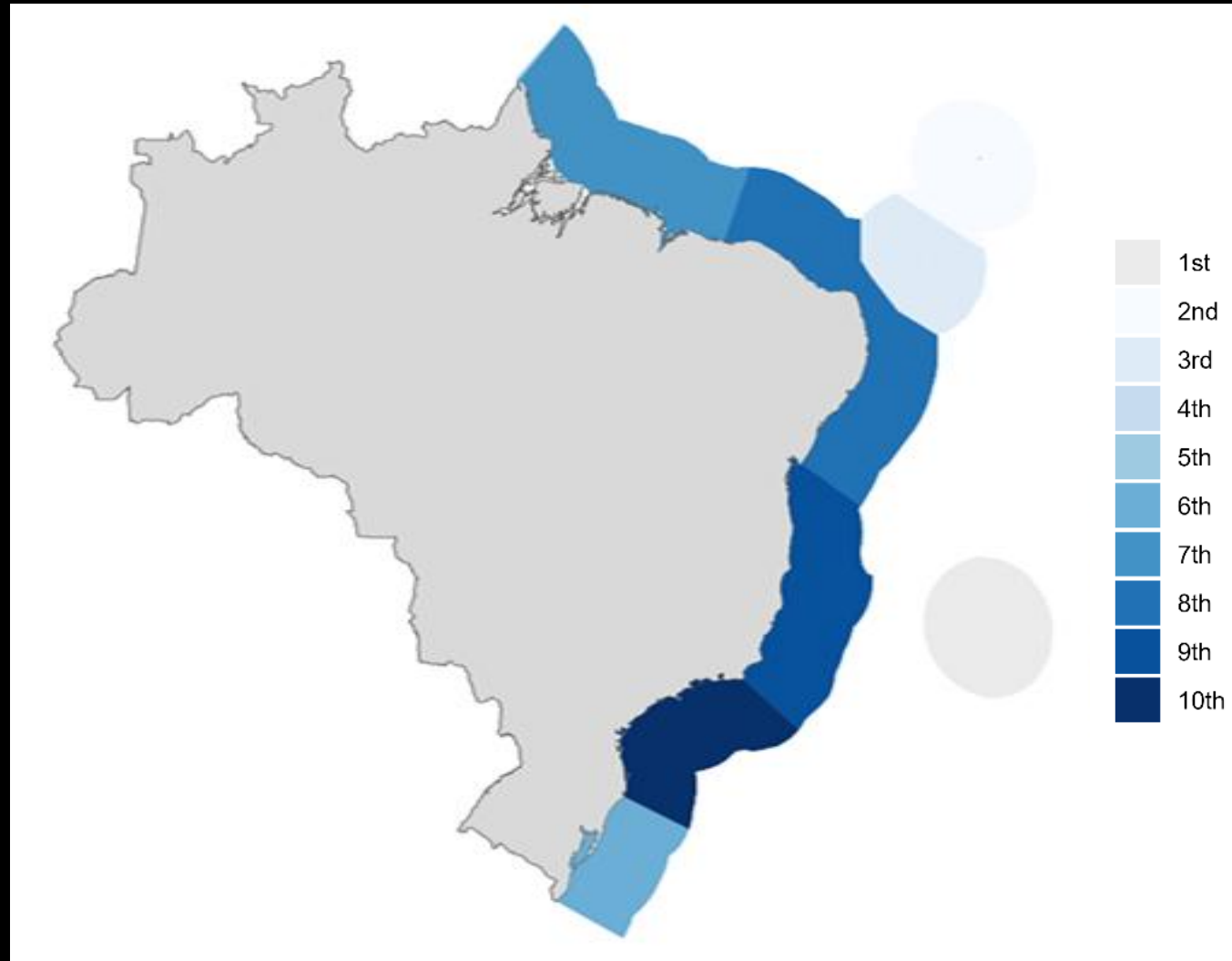
Brazil: Species Occurrence Regions and Composite HCI in Freshwater Ecoregions



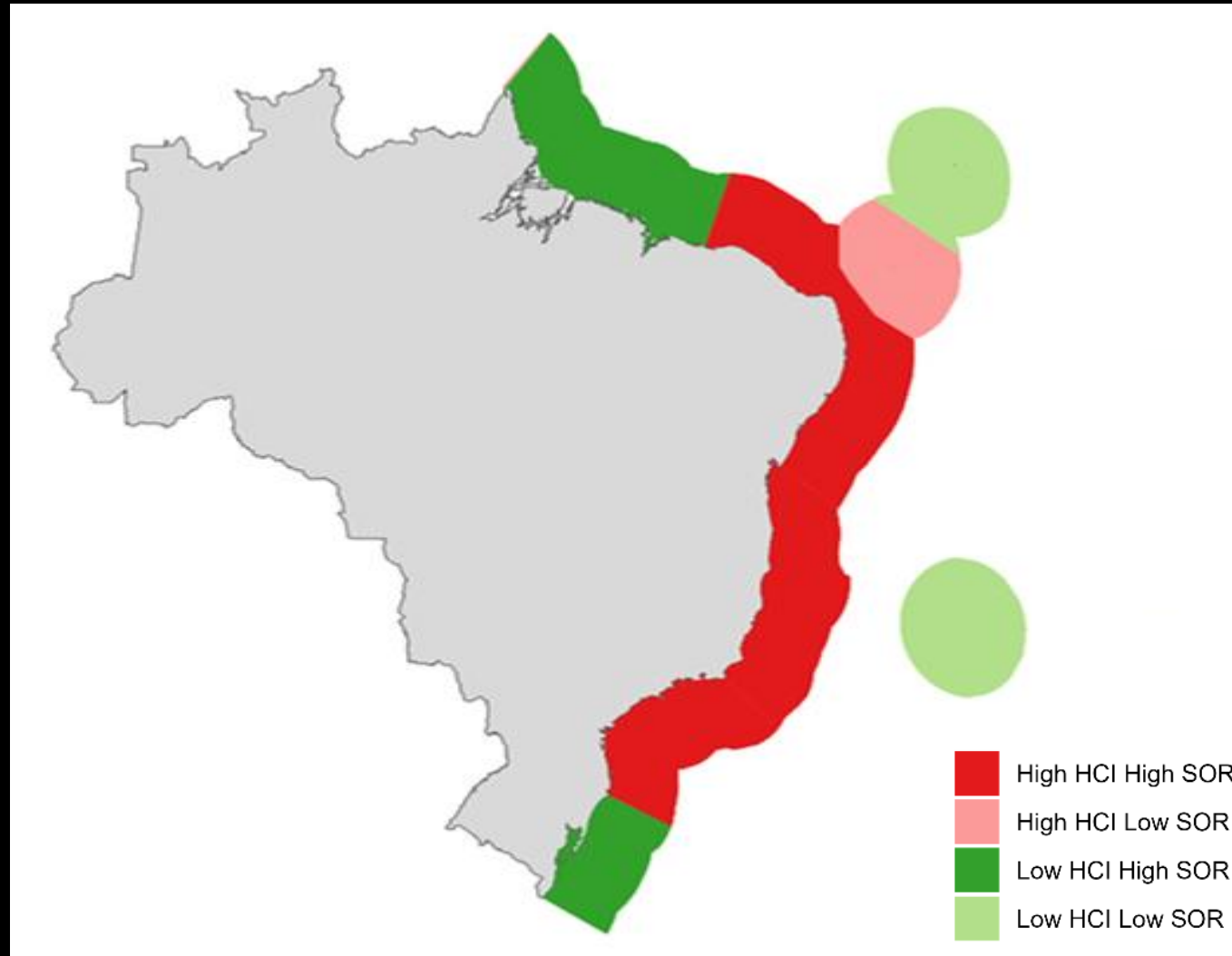
Brazil: Composite HCI in Marine Ecoregions



Brazil: Co-Count of Species Occurrence Regions in Marine Ecoregions



Brazil: Species Occurrence Regions and Composite HCI in Marine Ecoregions



Geographic Distribution of Biodiversity Species in Geopolitically Sensitive Areas

Project Contribution

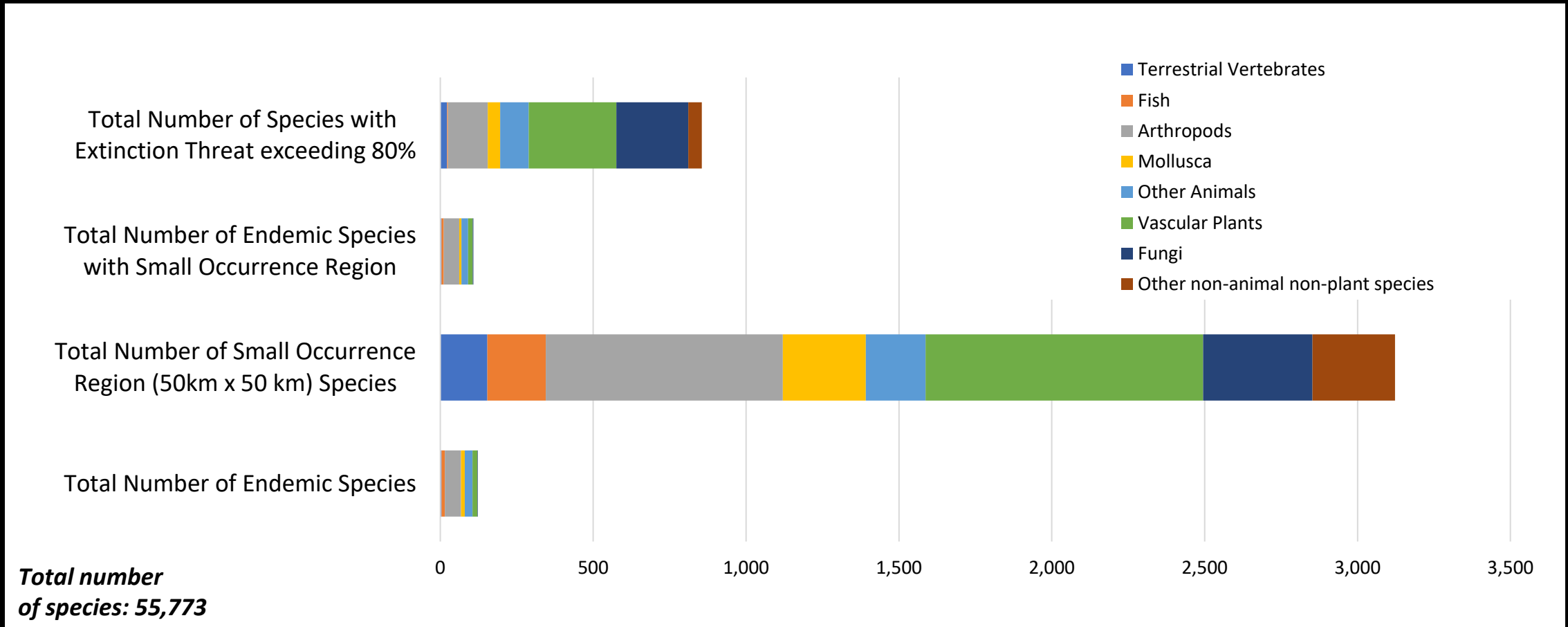
- Reliable and comparable data for 35 disputed territories, 19 conflict-affected countries, and 20 countries experiencing institutional and social fragility, 18 marine joint regimes and 311 international river basins

Geopolitically Sensitive Areas

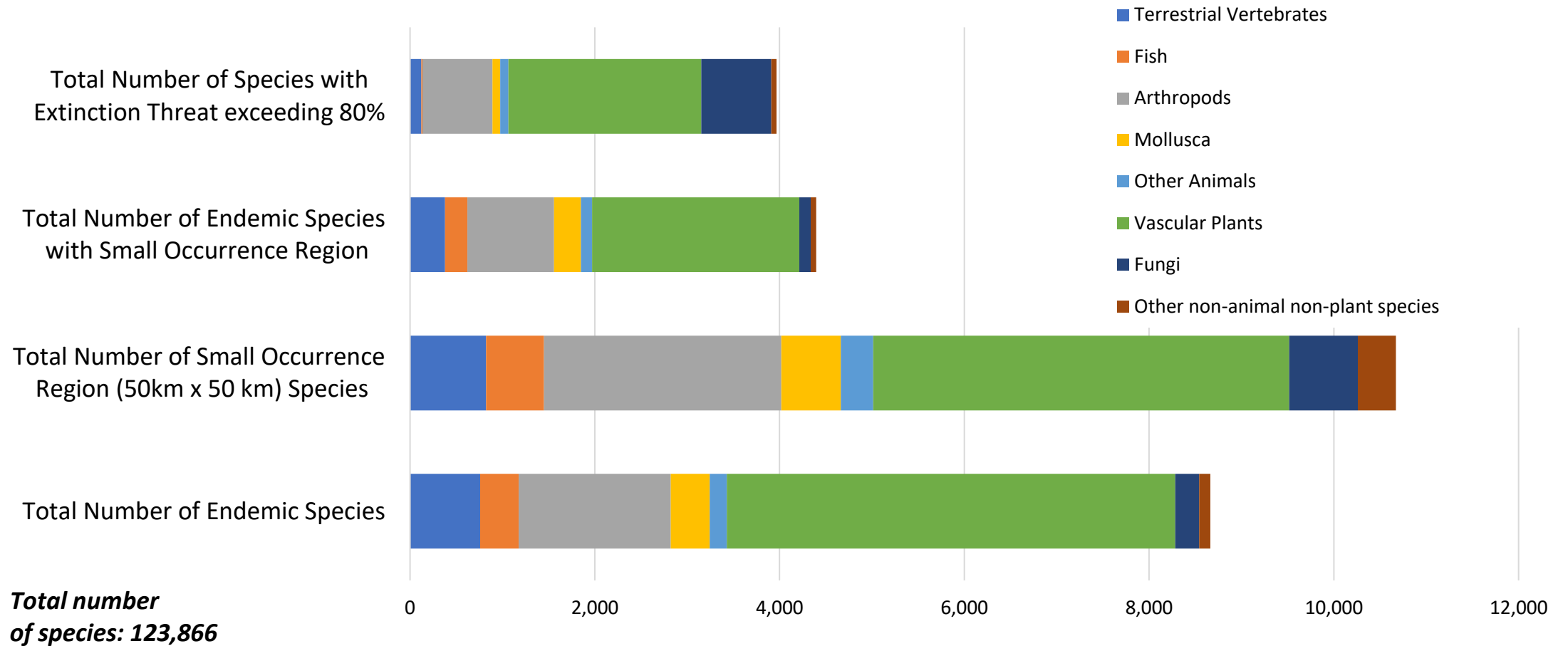
Species Richness and Count of Critical Species

	Count of Total Species (Presence)	Count of Endemic Species	Count of Species with Small Occurrence Region	Count of Species with Threats of Extinction more than 80%
Disputed Territories	55,773	123	3,123	855
Fragile and Conflict State	123,866	8,663	10,672	3,967
Marine Joint Regimes	61,815	0	2,564	734
Transboundary River Basins	369,604	78,883	40,951	21,383

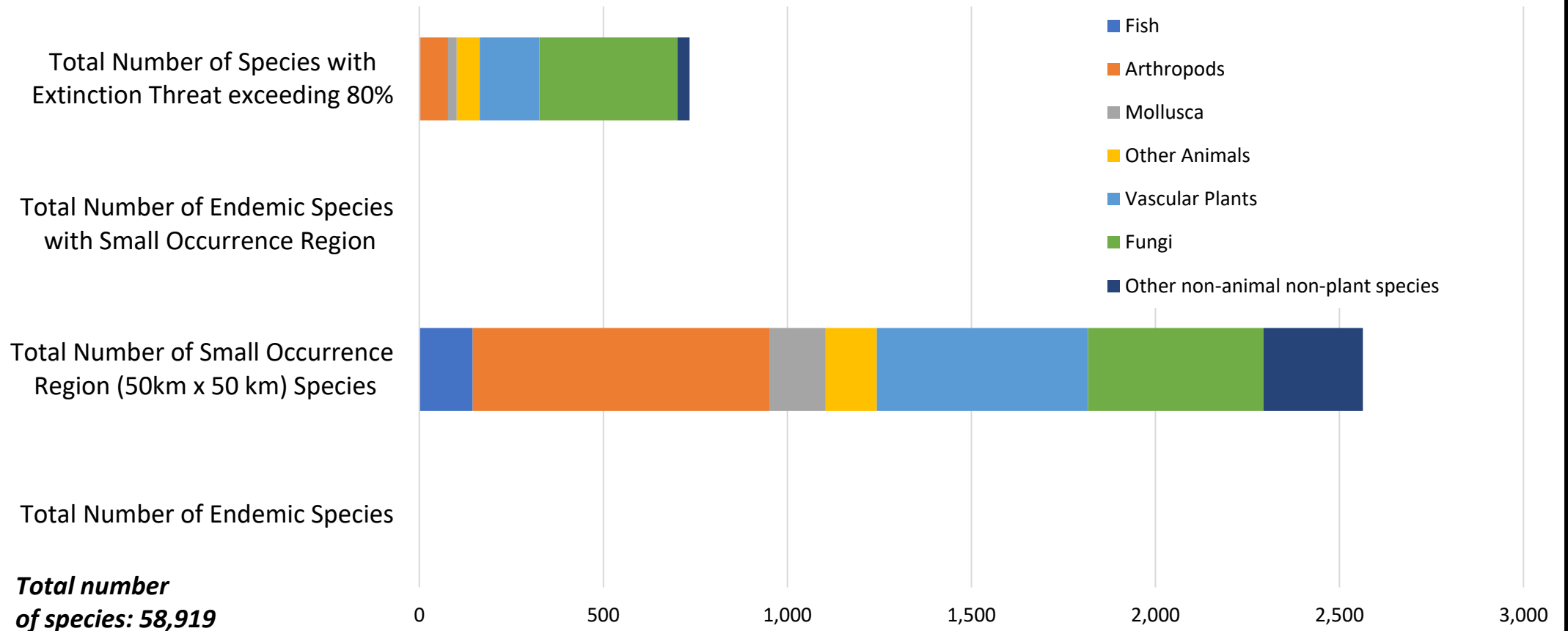
Biodiversity Overview by Species Class/Order in Disputed Territories



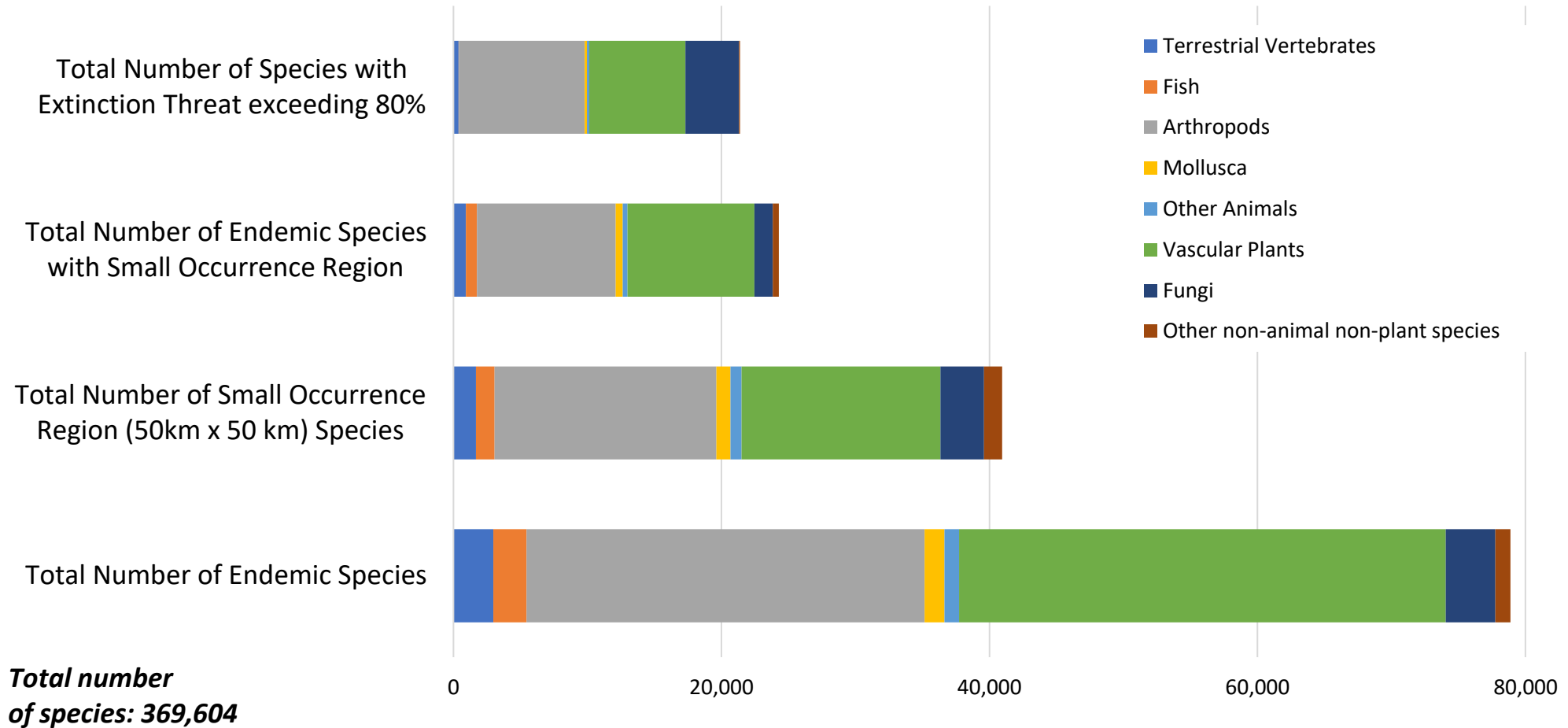
Biodiversity Overview by Species Class/Order in Fragile and Conflict- Affected Countries



Biodiversity Overview by Species Class/Order in Marine Joint Regimes

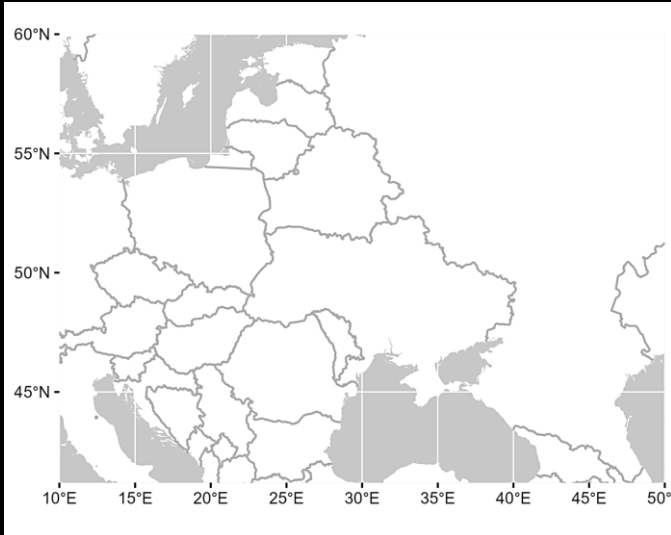


Biodiversity Overview by Species Class/Order in Transboundary River Basins



Fragile and Conflict-affected situations (FCS)

Ukraine

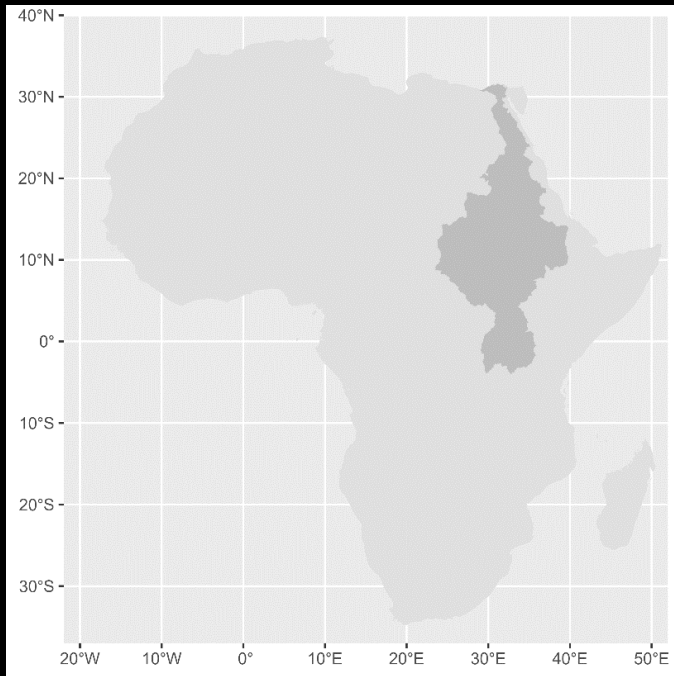


Species conservation status

Species groups	Species count	Small Occurrence Region (25km x 25km)	Country only	Extinction Threat Indicator ≥ 80
Terrestrial Vertebrates	5,309	14	1	45
Fish	5,123	34	1	2
Arthropods	47,528	573	103	1,613
Molluscs	7,155	172	3	182
Other Animals	7,099	165	19	226
Vascular Plants	35,181	278	67	1,085
Fungi	16,513	124	13	1,506
Other species	6,709	41	8	77

Transboundary

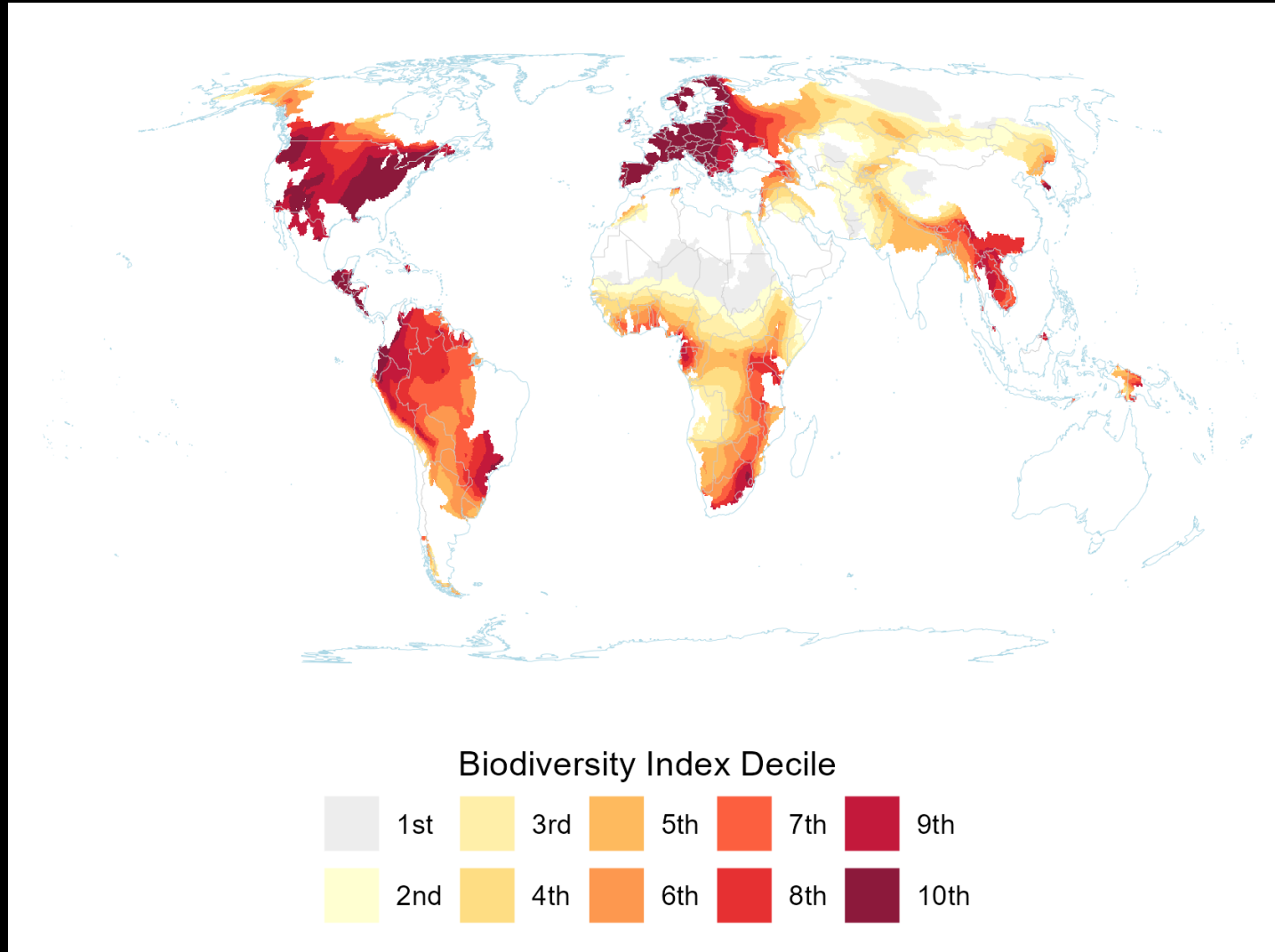
Nile



Species conservation status

Species groups	Species count	Small Occurrence Region (25km x 25km)	Country only	Extinction Threat Indicator ≥ 80
Terrestrial Vertebrates	2,467	94	76	18
Fish	707	68	93	0
Arthropods	2,805	264	283	118
Molluscs	337	11	5	6
Other Animals	366	42	15	2
Vascular Plants	6,547	348	278	104
Fungi	1,046	116	13	106
Other species	566	63	6	2

Transboundary River Basins

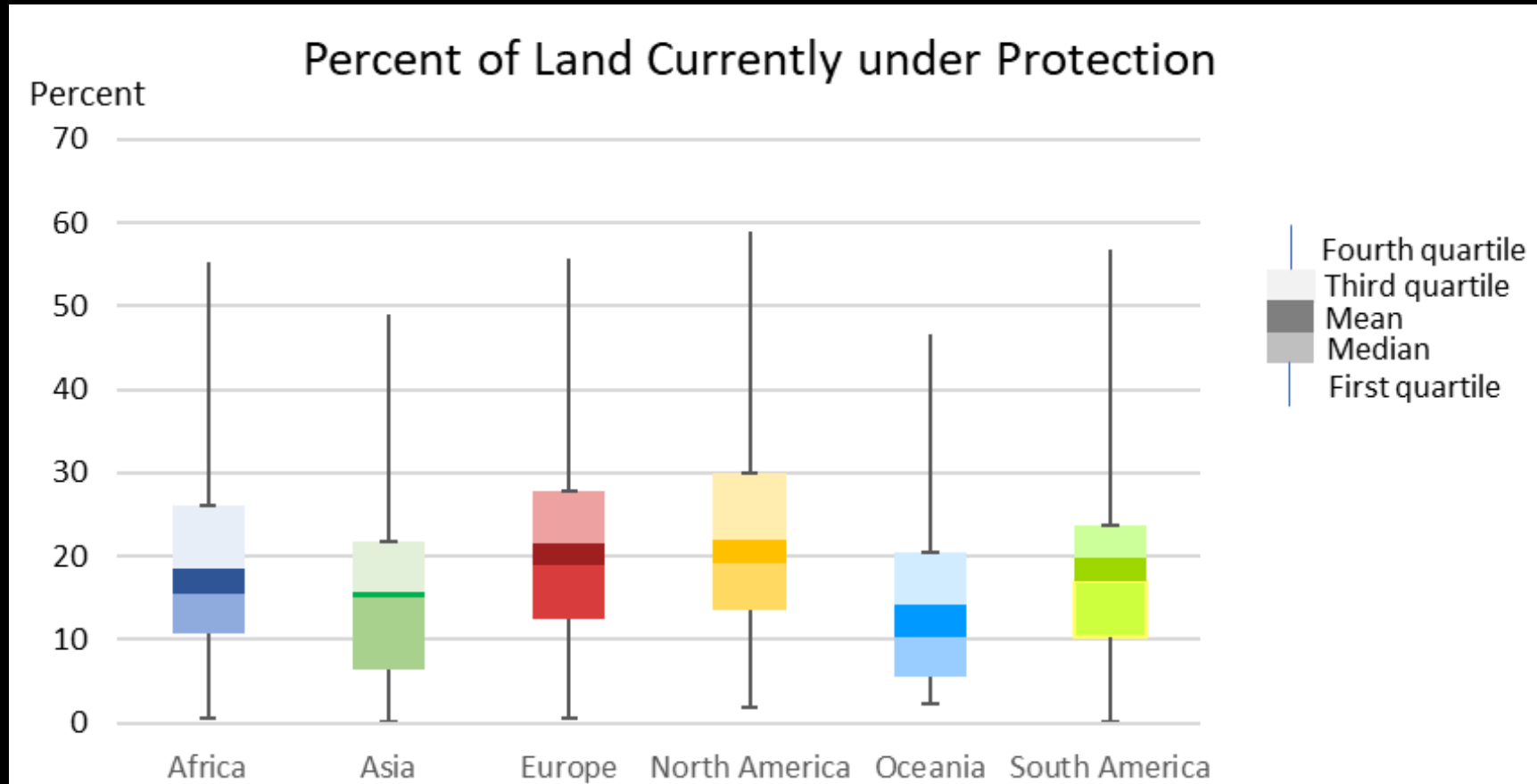


Illustrative uses of Data 1 of 3



- Assessing coverage of PAs for conservation of endemic Species considering species across diverse taxa, Arthropods, Molluscs, Other Animals, Vascular Plants, Fungi, and Other (non-animal and non-plant) Species
- Implications for countries striving to meet their international 30x30 commitments

Global Conservation Efforts: Uneven Progress



Protected Area Coverage of Endemic Species

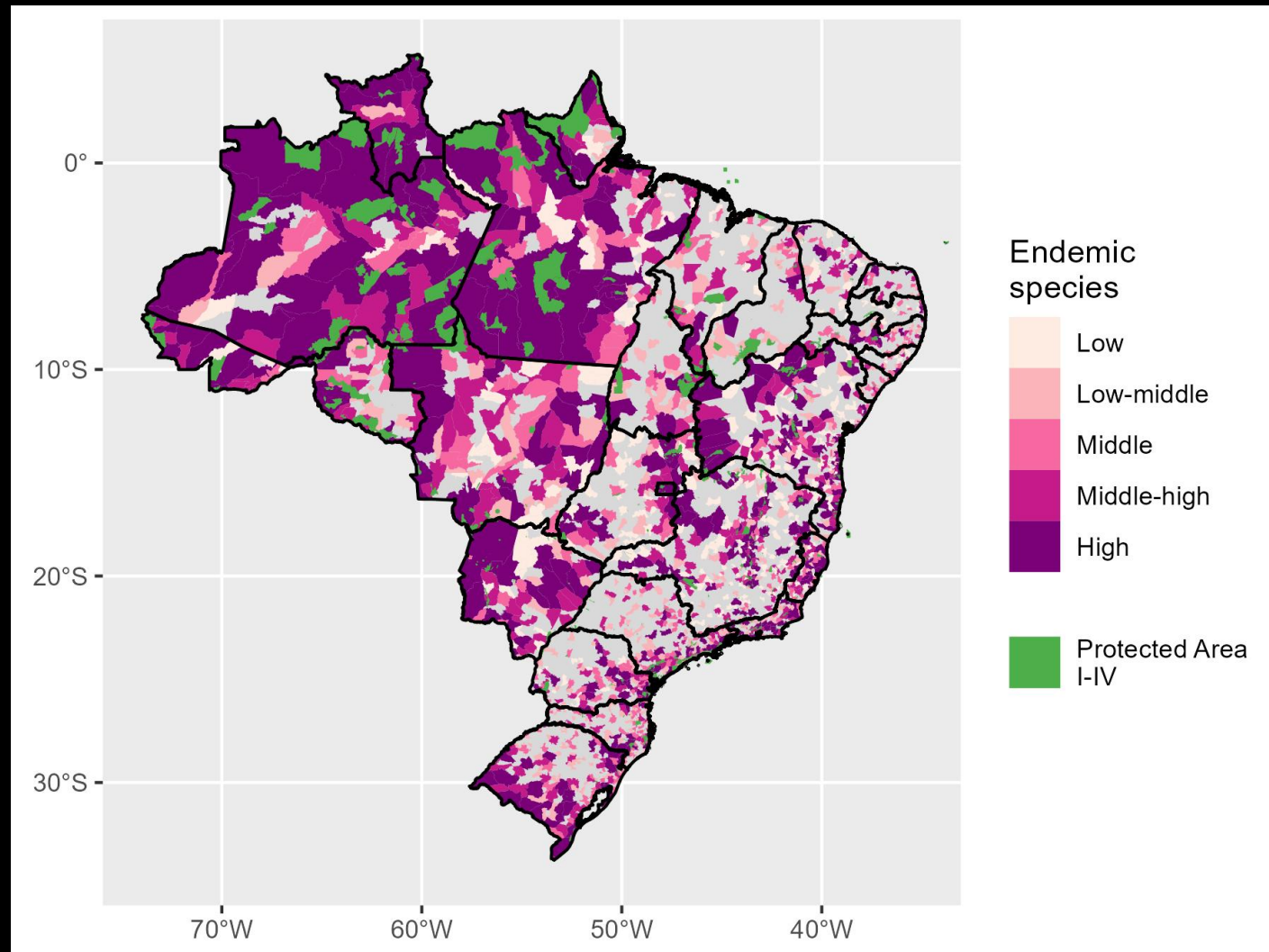
Critical Gap:

1. Focus on Vertebrates
2. Other species are underrepresented
3. Diversity of unprotected species varies significantly between countries.

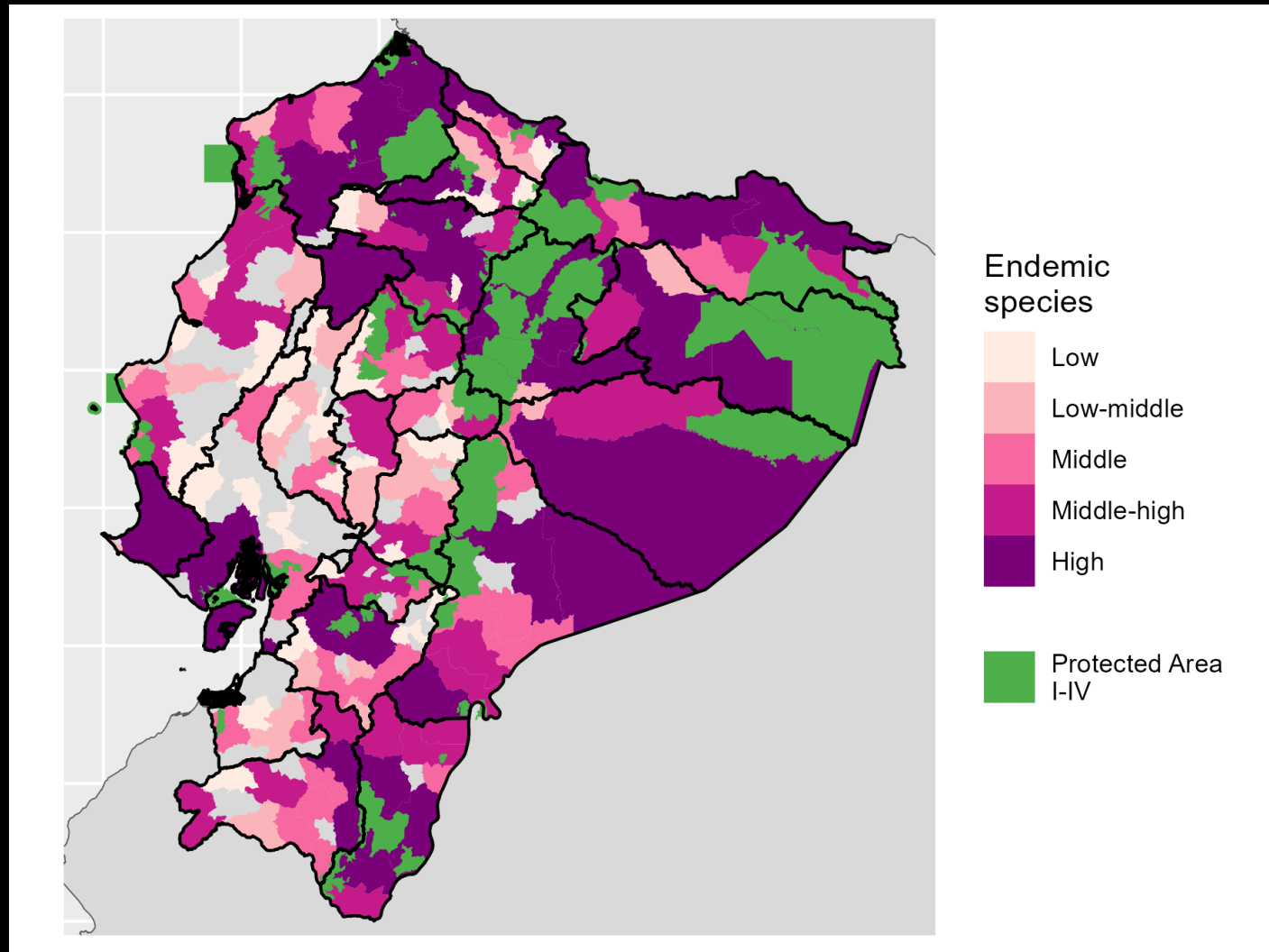
Project Contribution

- Examples of Countries needing to exceed the 30% territorial protection standard

Brazil: Protected Areas and Clusters of Endemic Species



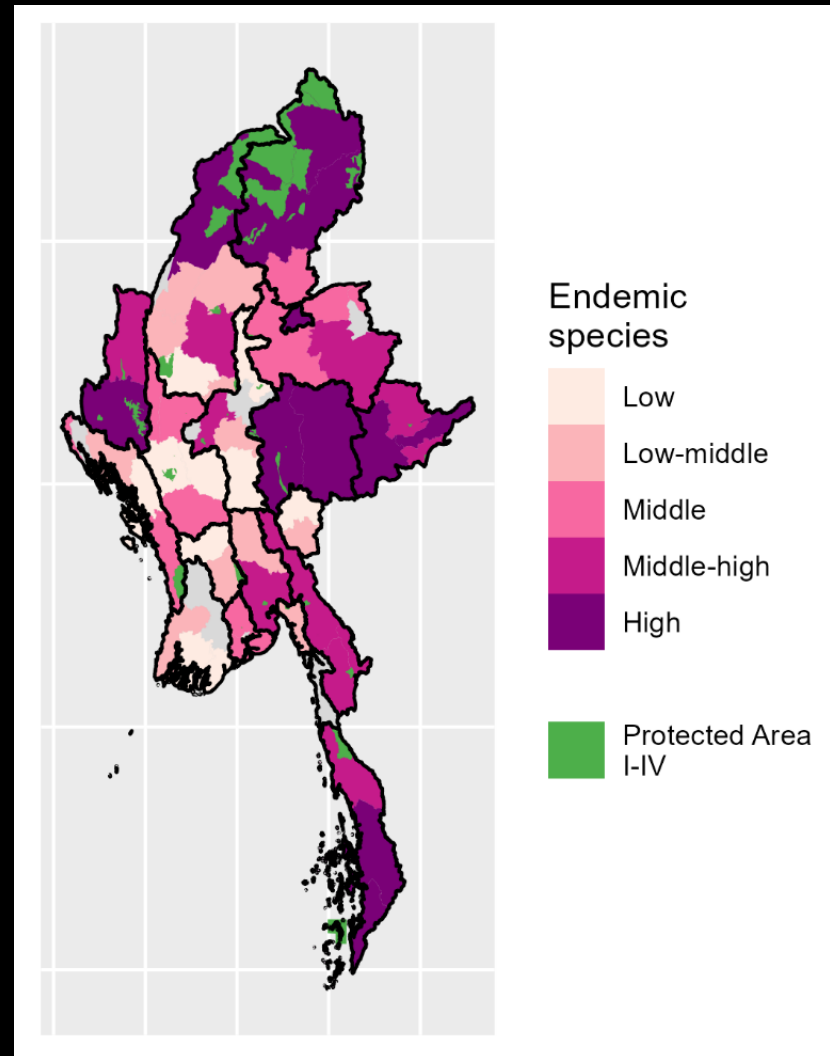
Ecuador: Protected Areas and Clusters of Endemic Species



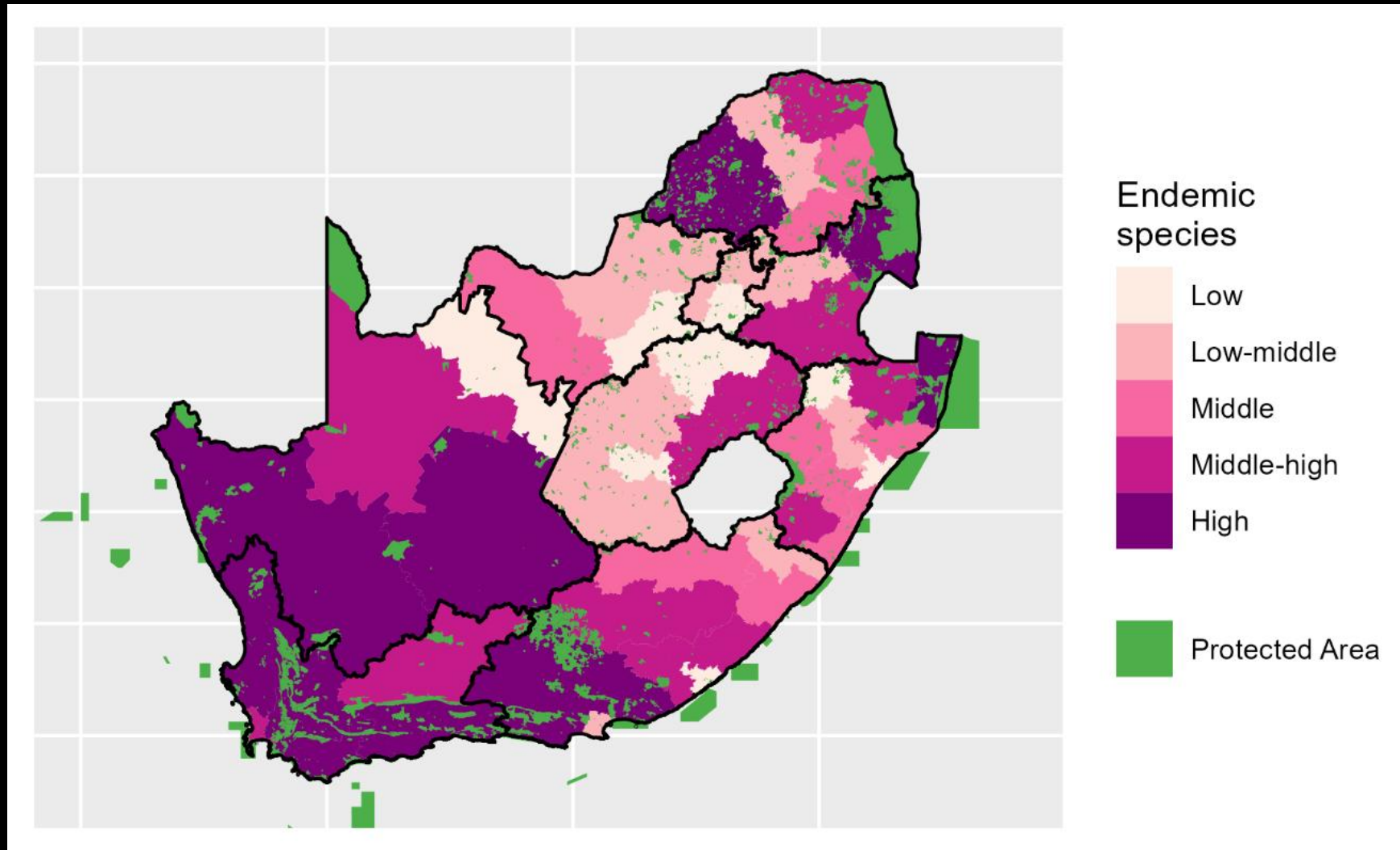
Project Contribution

- Examples of Countries likely to protect new endemic species under 30% territorial standard

Myanmar: Protected Areas and Clusters of Endemic Species



South Africa: Protected Areas and Clusters of Endemic Species



Need for Tailored Conservation Strategies

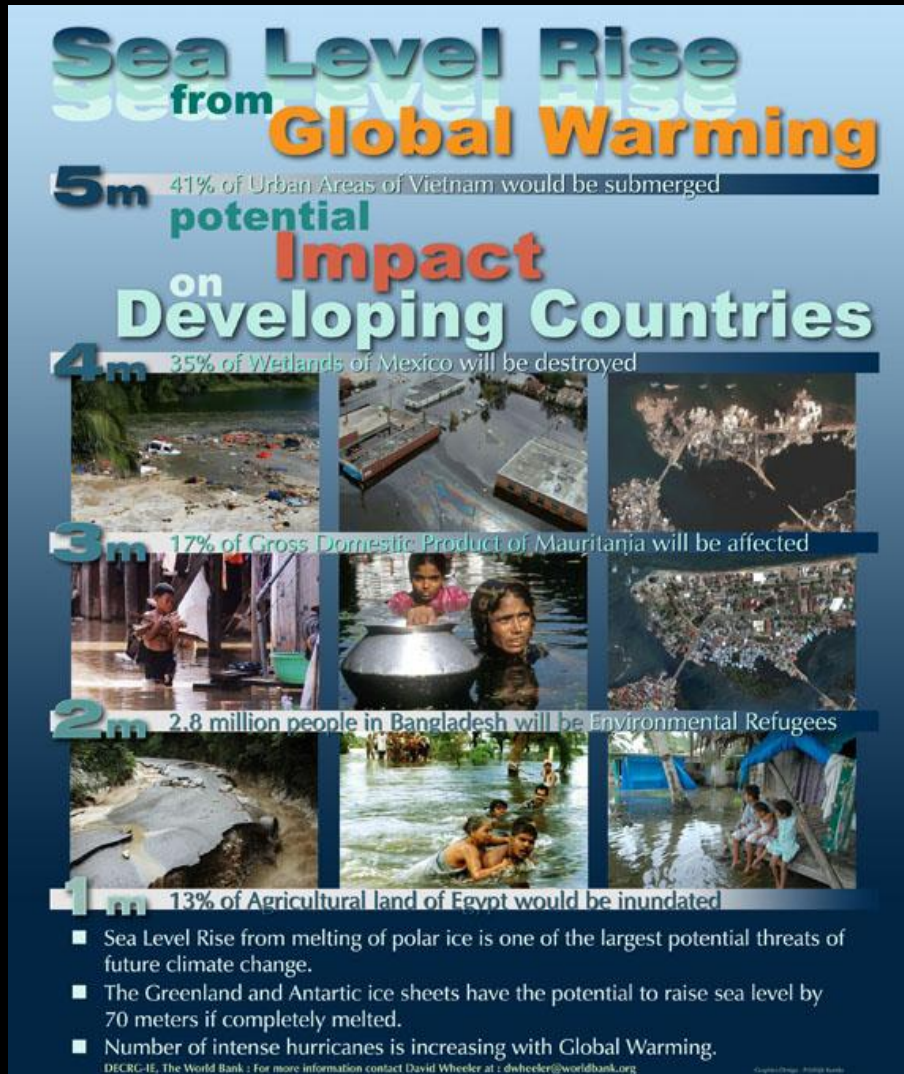
Difference in Geographic Distribution of Species:

1. Concentration of endemic species in specific countries.
2. Endemic species are widely dispersed in other countries.

Implications:

- Countries need to assess their unique ecological contexts and adopt flexible, strategic planning to preserve biodiversity and achieve their 30x30 goals.

Illustrative Uses of Data 2 of 3



- Biodiversity at Risk from Sea-level Rise in a Changing Climate

Project Contribution

- Identifying habitats of endemic species at risk from sea-level rise with climate change
- Identifying Ramsar sites at risk from sea-level rise with climate change

Endemic Species Counts in Coastal Zones at Risk from Sea-Level Rise

Case Study Countries in East Asia & Pacific Region

Coastal Zone	Philippines	Thailand	Vietnam
Elevation: 1m or less	1,682	210	70
Elevation: 2-3m	1,657	204	69
Elevation: 4-5m	1,654	199	76
1km buffer zone ≤ 5m elevation	1,714	234	81
2-3km buffer zone ≤ 5m elevation	1,608	186	71
4-5km buffer zone ≤ 5m elevation	1,467	175	65

Endemic Species Counts in Coastal Zones at Risk from Sea-Level Rise

Case Study Countries in Middle East & North Africa Region

Coastal Zone	Egypt	Tunisia
Elevation: 1m or less	35	63
Elevation: 2-3m	35	62
Elevation: 4-5m	34	62
1km buffer zone ≤ 5m elevation	35	63
2-3km buffer zone ≤ 5m elevation	25	39
4-5km buffer zone ≤ 5m elevation	19	38

Endemic Species Counts in Coastal Zones at Risk from Sea-Level Rise

Case Study Countries in Latin America & Caribbean Region

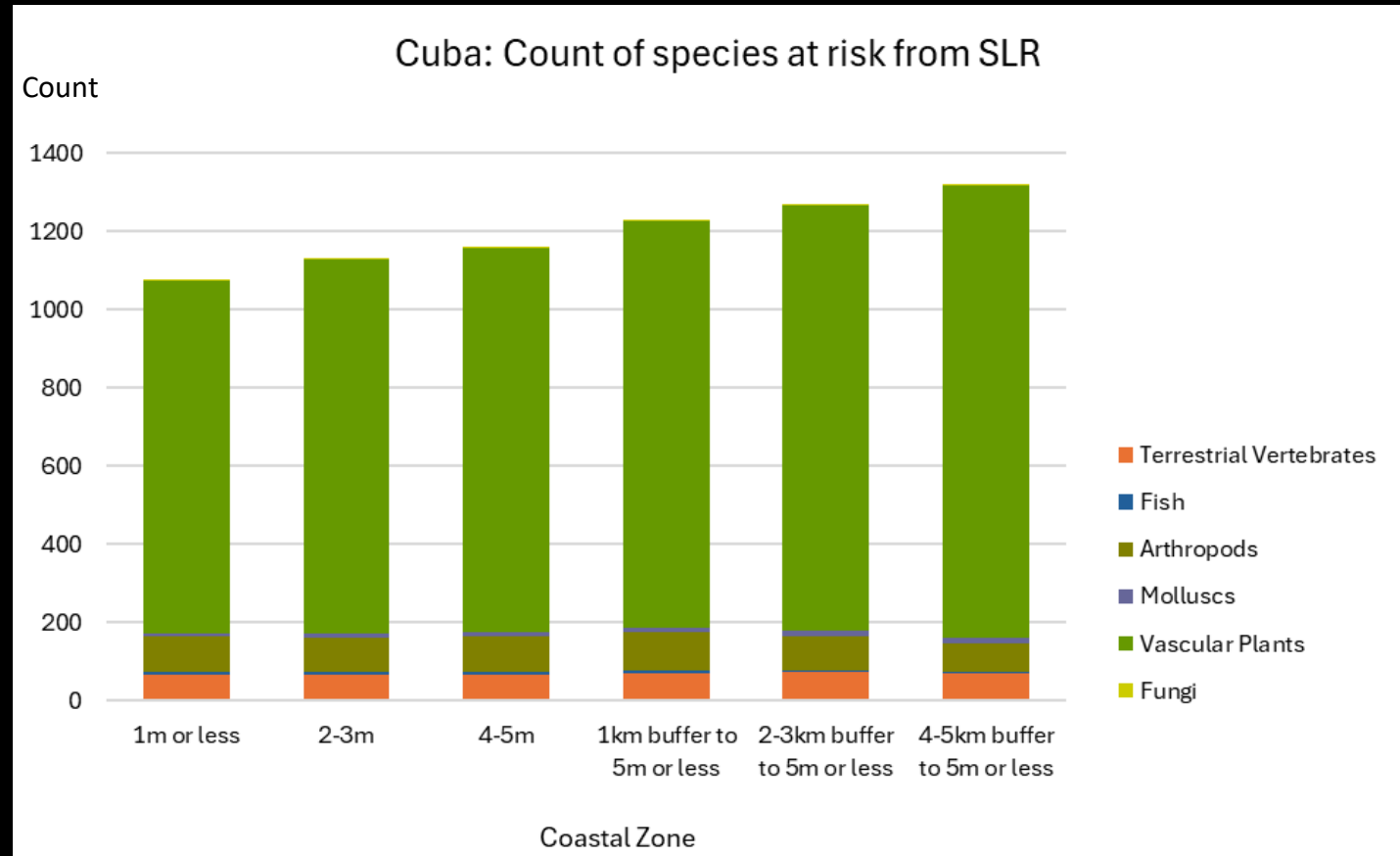
Coastal Zone	Belize	Cuba
Elevation: 1m or less	53	1,074
Elevation: 2-3m	47	1,131
Elevation: 4-5m	28	1,159
1km buffer zone ≤ 5m elevation	23	1,228
2-3km buffer zone ≤ 5m elevation	9	1,268
4-5km buffer zone ≤ 5m elevation	9	1,1319

Endemic Species Counts in Coastal Zones at Risk from Sea-Level Rise

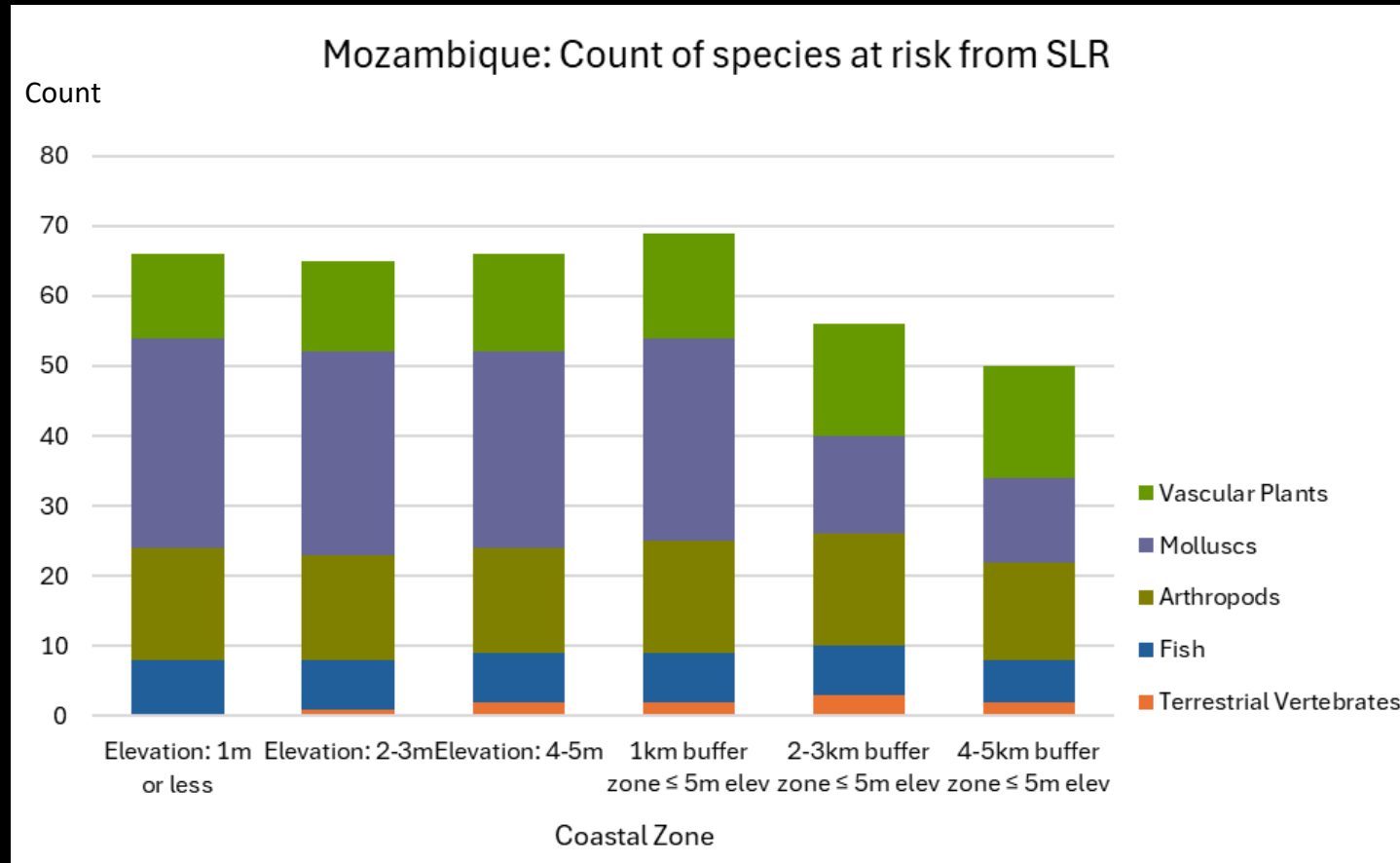
Case Study Countries in Sub Saharan Africa Region

Coastal Zone	Mozambique	South Africa
Elevation: 1m or less	66	3,367
Elevation: 2-3m	65	3,381
Elevation: 4-5m	66	3,422
1km buffer zone ≤ 5m elevation	69	3,581
2-3km buffer zone ≤ 5m elevation	56	3,552
4-5km buffer zone ≤ 5m elevation	50	3,449

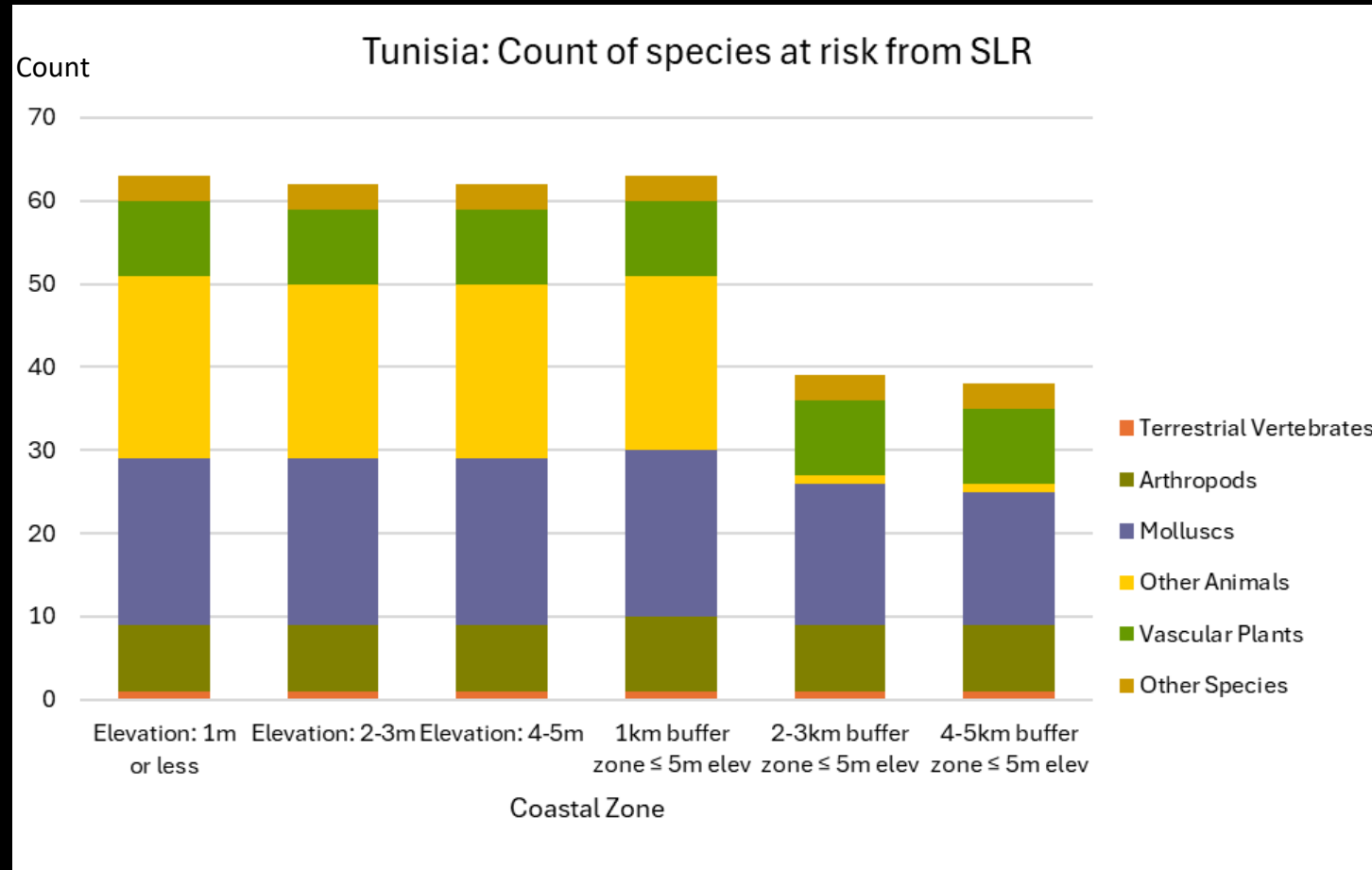
Endemic Species by Group in Coastal Zones at Risk from Sea-Level Rise



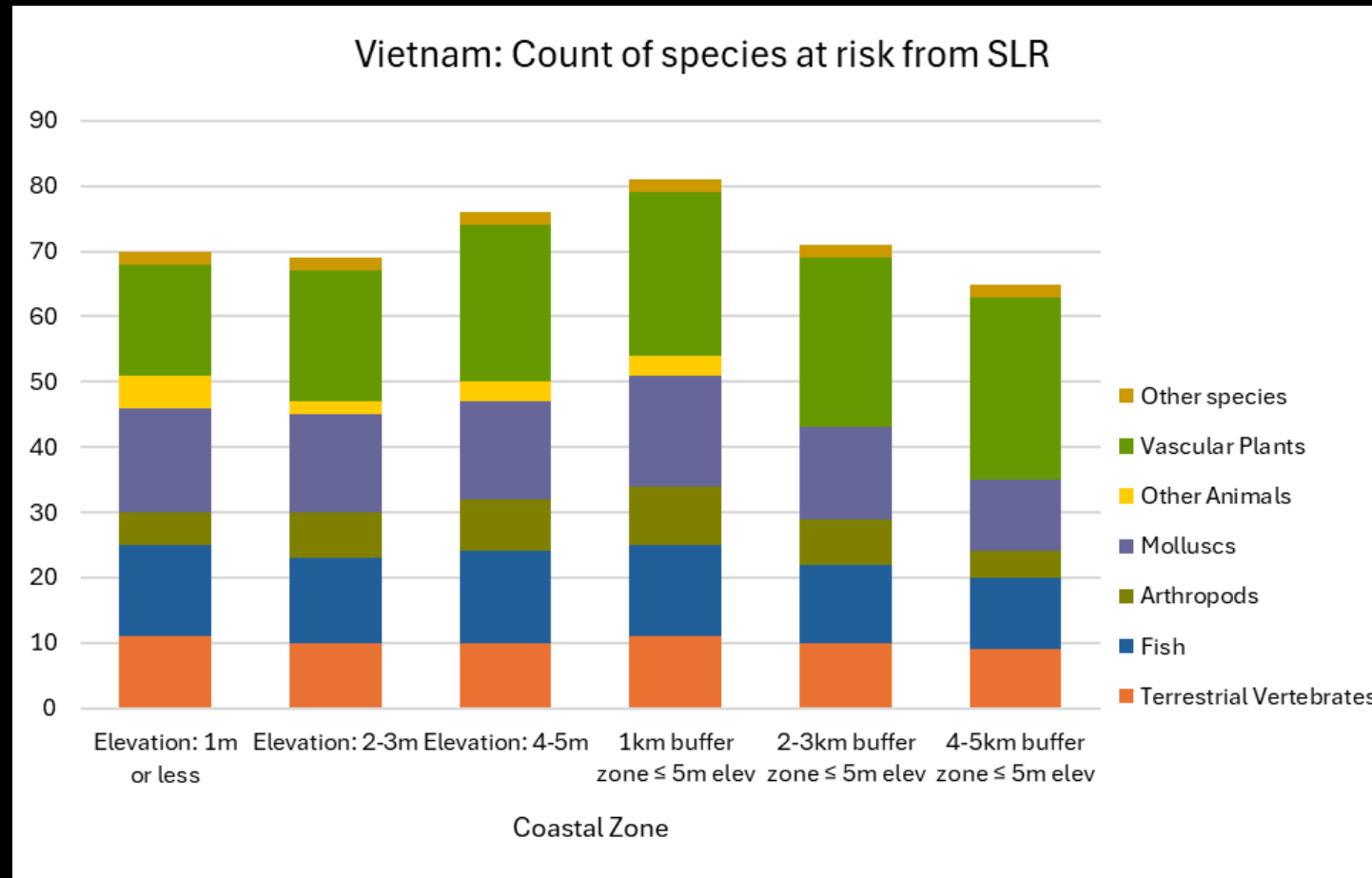
Endemic Species by Group in Coastal Zones at Risk from Sea-Level Rise



Endemic Species by Group in Coastal Zones at Risk from Sea-Level Rise

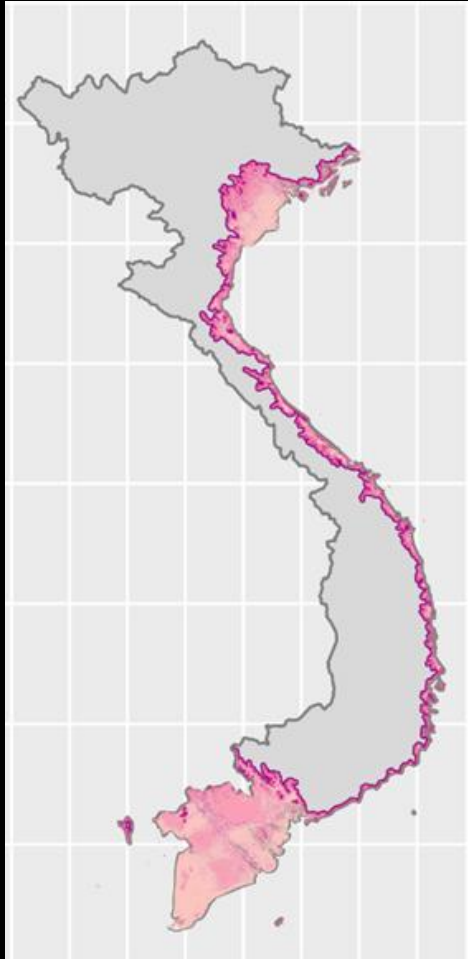


Endemic Species by Group in Coastal Zones at Risk from Sea-Level Rise

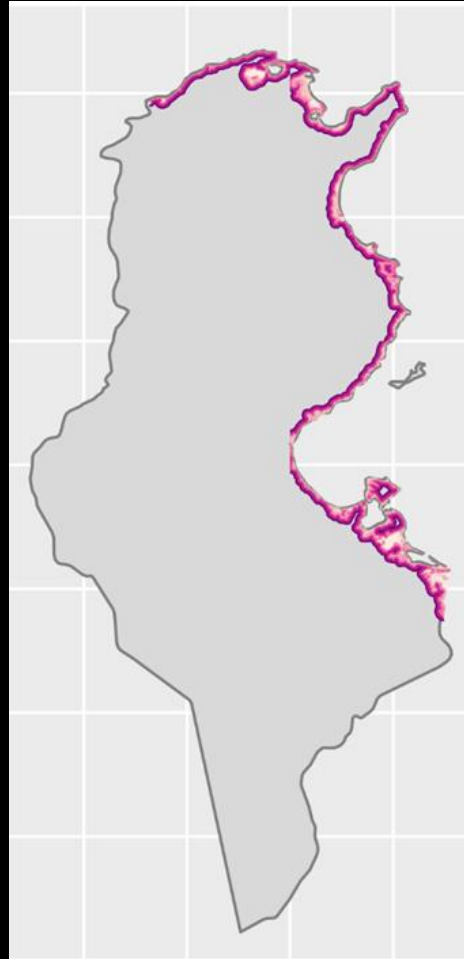


Coastal Zones at Risk from Sea-Level Rise

Vietnam



Tunisia



Mozambique

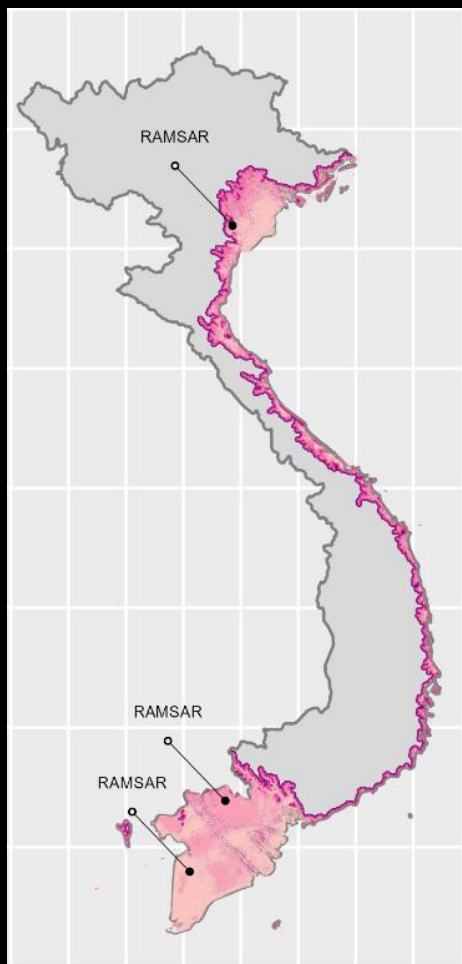


Coastal zones

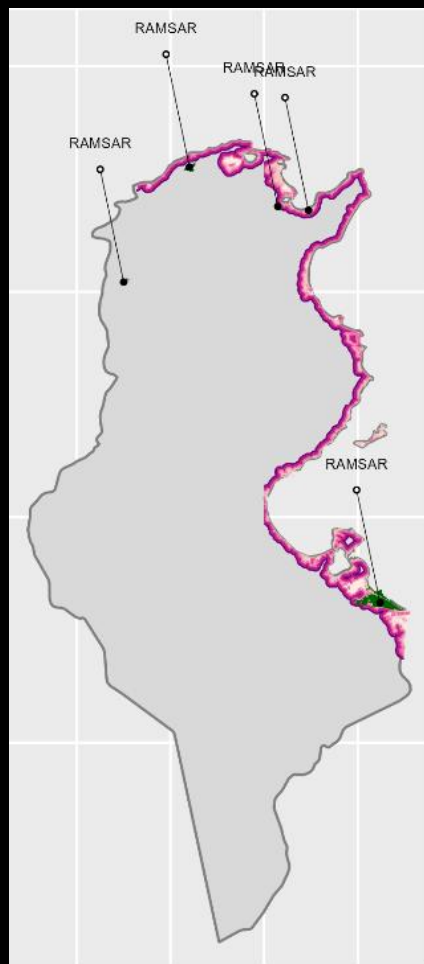
- 1m or less
- 2-3m
- 4-5m
- 1km buffer to 5m or less
- 2-3km buffer to 5m or less
- 4-5km buffer to 5m or less

Ramsar Sites at Risk from Sea-Level Rise

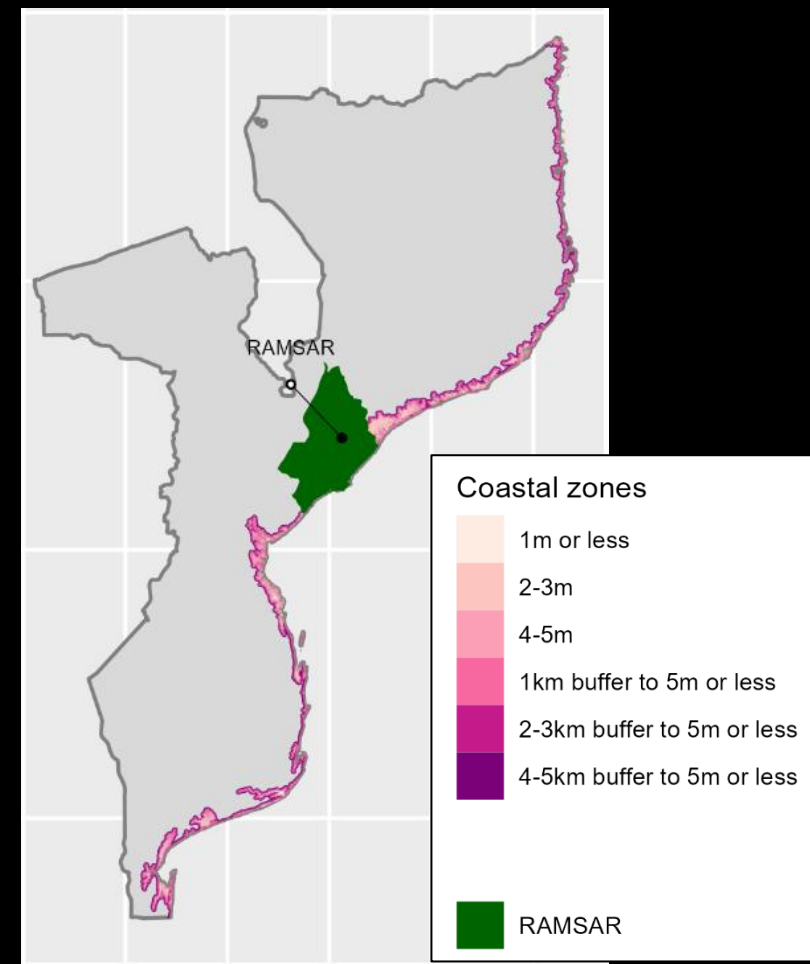
Vietnam



Tunisia



Mozambique



Illustrative Use of Data 3 of 3

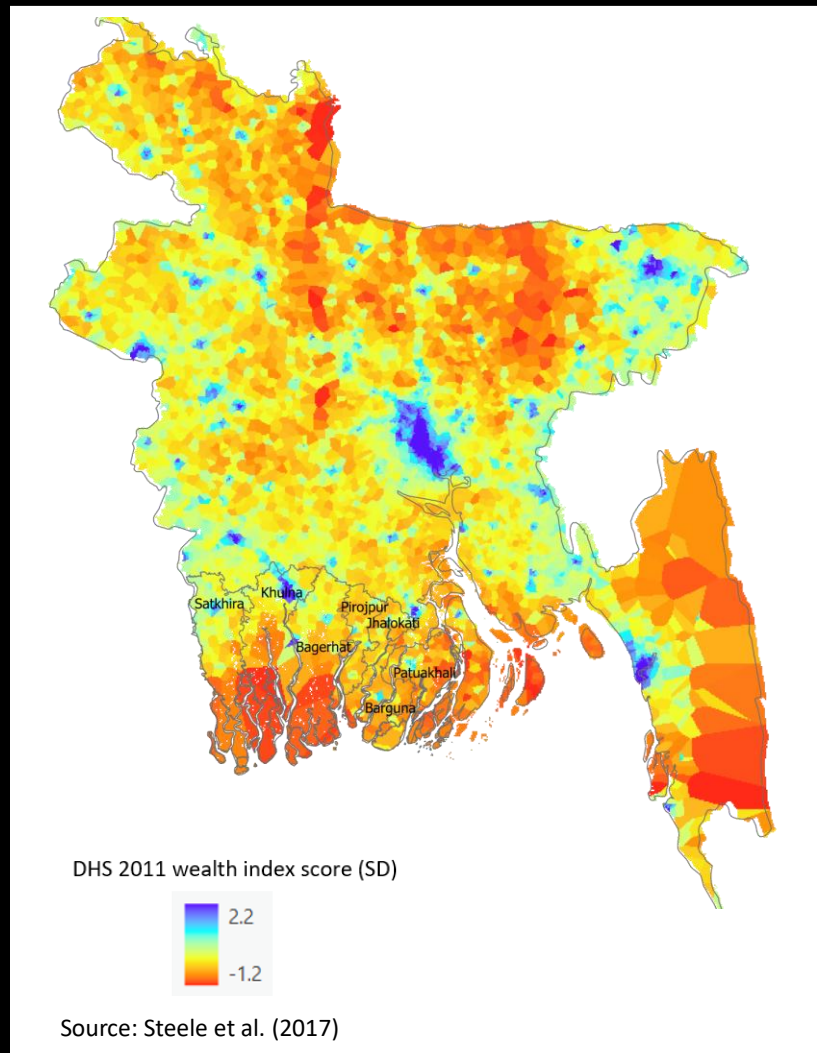
- Impact of Rising Water Salinity due to climate change on Fish Availability, Nutrition, and Health in Coastal Bangladesh



Project Contribution

- Estimating food, nutrition, and health vulnerabilities with changing fish consumption in coastal Bangladesh with increasing water salinity with climate change

Poverty/Environment Nexus in Southwest Coastal Bangladesh

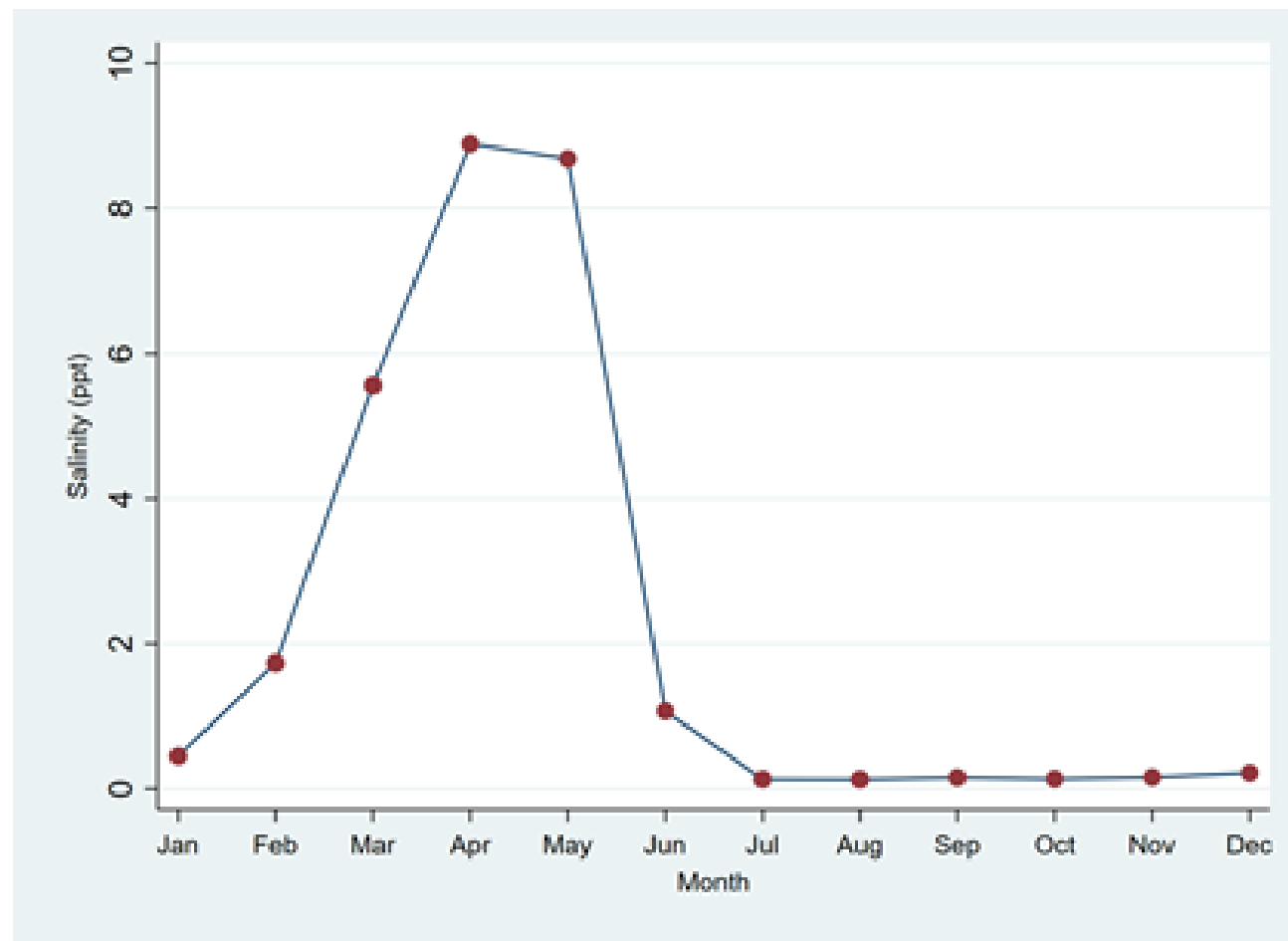


- High poverty levels in southwest coastal Bangladesh.
- Despite national poverty reduction, this remains Bangladesh's poorest region.
- Fishing is a major livelihood source.
- Fish provides essential protein and micronutrients, especially for children, women, and the elderly (World Bank 2000; Alam and Thomson 2001; Thilsted 2010; Thisted 2012; Fernandes et al., 2015).

Impacts of Sea-Level Rise on Fisheries in a Changing Climate

- Climate change is raising aquatic salinity in SW coastal Bangladesh (Dasgupta et al., Gain et al.)
- Fish species will shift based on varying salinity tolerances (Dasgupta et al.)
- Changes in fish distribution will impact fishing livelihoods and food security for poor households

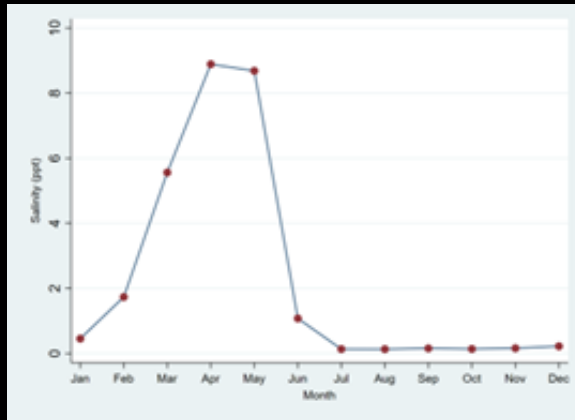
Monthly Salinity Readings – Rupsha River, Khulna District



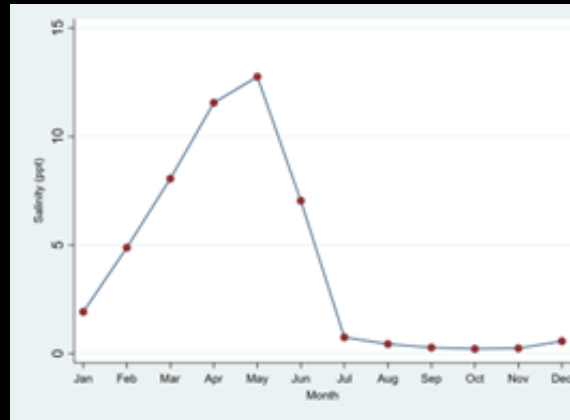
Source: The Institute of Water Modeling, Bangladesh

Monthly Salinity Readings

Khulna [Min 0.13; Max 8.89]



Mongla [Min 0.21; Max 12.75]



Sarankhola [Min 0.13; Max 1.18]



Amtali [Min 0.06; Max 0.23]



Galachipa [Min 0.07 Max 0.58]



Surveyed Fish Species

Species

Coilia dussumieri

Thunnus obesus

Johnius coitor

Ilisha elongata

Escualosa thoracata

Setipinna phasa

Setipinna taty

Euthynnus affinis

Labeo bata

Sillaginopsis panijus

Pseudapocryptes elongatus

Platycephalus indicus

Scomberomorus guttatus

Pomadasys maculatus

Mystus gulio

Common Name

Goldspotted anchovy

Bigeye tuna

Coitor croaker

Herring

White sardine

Gangetic hairfin anchovy

Scaly hairfin anchovy

Kawakawa

Bata labeo

Flathead silago

Pointed-tail goby

Bartail flathead

King mackerel

Blotched grunter

Gulio catfish

Species

Stigmatogobius sadanundio

Otolithoides pama

Scomberomorus commerson

Lobotes surinamensis

Rastrelliger kanagurta

Parastromateus niger

Otolithes ruber

Plotosus canius

Polynemus paradiseus

Pangasius pangasius

Pampus argenteus

Lates calcarifer

Tenualosa ilisha

Arius arius

Common Name

Knight goby

Pama croaker

Spanish mackerel

Tripletail

Indian mackerel

Black pomfret

Tigertooth croaker

Eeltail catfish

Paradise threadfin

Fatty catfish

Silver pomfret

Lates perch

Hilsa shad

Catfish

Fish Species Surveyed in Southwest Coastal Bangladesh in August-September, 2024

	Range of Mean Wholesale Price (Bangladesh Taka /kg)	Range of Total Catch Quantity (kg)	Range of Maximum Salinity Tolerance (ppt)
Low-price Fish	100-200	549-4,183	20-30
Medium-price Fish	201-500	171-9,917	10-30
High-price Fish	501-891	105-41,826	20-30

Surveyed Fish Species

GBIF Occurrence Maps

Coilia dussumieri (Goldspotted Anchovy)



Source:

https://commons.wikimedia.org/wiki/File:Coilia_dussumieri.jpg

Mystus gulio (Gulio catfish)



Source:

https://commons.wikimedia.org/wiki/File:Mystus_gulio.jpg

Lates calcarifer (Lates perch)



Source:

https://commons.wikimedia.org/wiki/File:Lates_calcarifer%2C_2014-09-19a.jpg

Salinity Response of Fish Species

- Combined river salinity data with wholesale fish sales to assess 2023 salinity impacts on fishing
- Econometric analysis reveals species-specific catch variations despite similar salinity tolerances:
 - Higher salinity sharply reduces catch for some species
 - For others, fish relocation and targeted fishing increase catch

Health Effects of Increased Salinity on Children: Insights from Bangladesh Demographic Health Survey

Year	Peak Salinity Birth Month	Prob. Death	% Difference	Prob. Stunted	% Difference
2018	0	0.039		0.258	
2018	1	0.048	25.187	0.280	8.787
2022	0	0.025		0.100	
2022	1	0.028	13.333	0.127	26.543

Health Effects of Increased Salinity: Insights from Bangladesh Demographic Health Survey

- High salinity periods can lead to sudden drops in low-price fish supply, affecting protein and micro-nutrient consumption in low-income households.
- This may have negative impacts on maternal and child nutrition and health, particularly in the southwest coastal region of Bangladesh.
- Household resilience to these impacts depends on the availability of alternative sources of protein and micronutrients.
- Despite national poverty reduction, the southwest coastal region remains relatively poor.
- Analysis of 2,500 case records from the 2018 and 2022 DHS surveys shows: Higher child mortality and malnutrition, with increased stunting rates, for children born during peak salinity months.

Project Outputs

Research Papers:

- [Revisiting Global Biodiversity: A Spatial Analysis of Species Occurrence Data from the Global Biodiversity Information Facility](#), World Bank Policy Research Working Paper 10821.
- [Estimating Extinction Risks with Species Occurrence Data from the Global Biodiversity Information Facility](#), World Bank Policy Research Working Paper 10822.
- [Bridging Conflicts and Biodiversity Conservation: The Critical Role of Reliable and Comparable Data](#). World Bank Policy Research Working Paper 11076.
- [Implementing 30 x 30: Lessons from Country Case Studies](#) World Bank Policy Research Working Paper 11045.
- [Fishing and Climate Change in Coastal Bangladesh: The Economic and Health Impacts of Increasing Salinity](#). World Bank Policy Research Working Paper 11048.

Project Outputs (continued)

Spatial Datasets:

- [Gridded level Database of Global Biodiversity](#)
- [Global Biodiversity Species Endemism and Small Occurrence data](#)
- [Gridded level database of composite Terrestrial Human coexistence Index and individual indicators.](#)
- [Gridded level database of composite Marine Human coexistence Index and individual indicators.](#)
- [Gridded level database of composite Freshwater Human coexistence Index and individual indicators](#)
- [Species Richness and Count of Species at Risk in Transboundary River Basins](#)
- [Species Richness and Count of Species at Risk in Fragile and Conflict-Affected Situations](#)

Blog Post:

- [A new World Bank database to support a new era in biodiversity conservation](#)
- [Bridging Conflicts and Protecting Global Biodiversity,](#)
- [Revisiting Protected Areas for Biodiversity Conservation](#)
- [Fostering Human-Wildlife Coexistence to Protect Biodiversity: Introducing the Human-Coexistence Indicators](#)



Thank You

