Distribución de global de la biodiversidad y su amenaza

Material de lectura recomendado para esta clase

- Groom et al. (2006), cap. 2
- Sohdi & Ehrlich (2010), Conservation biology for all, cap. 2

Componentes de la biodiversidad

Table 2.1 Elements of biodiversity (focusing on those levels that are most commonly used). Modified from Heywood and Baste (1995).

Ecological diversity		Organismal diversity
Biogeographic realms		Domains or Kingdoms
Biomes		Phyla
Provinces		Families
Ecoregions		Genera
Ecosystems		Species
Habitats	Genetic diversity	Subspecies
Populations	Populations	Populations
	Individuals	Individuals
	Chromosomes	
	Genes	
	Nucleotides	

Fuente: Gaston KJ, en Sohdi & Ehrlich (2010), Conservation biology for all

¿Cuántas especies hay?

Table 2.2 Estimates (in thousands), by different taxonomic groups, of the overall global numbers of extant eukaryote species. Modified from Hawksworth and Kalin-Arroyo (1995) and May (2000).

	Overall species			
	High	**Low**	**Working figure**	**Accuracy of working figure**
'Protozoa'	200	60	100	very poor
'Algae'	1000	150	300	very poor
Plants	500	300	320	good
Fungi	2700	200	1500	moderate
Nematodes	1000	100	500	very poor
Arthropods	101 200	2375	4650	moderate
Molluscs	200	100	120	moderate
Chordates	55	50	50	good
Others	800	200	250	moderate
Totals	107 655	3535	7790	very poor

Fuente: Gaston KJ, en Sohdi & Ehrlich (2010), Conservation biology for all

La biodiversidad en el tiempo

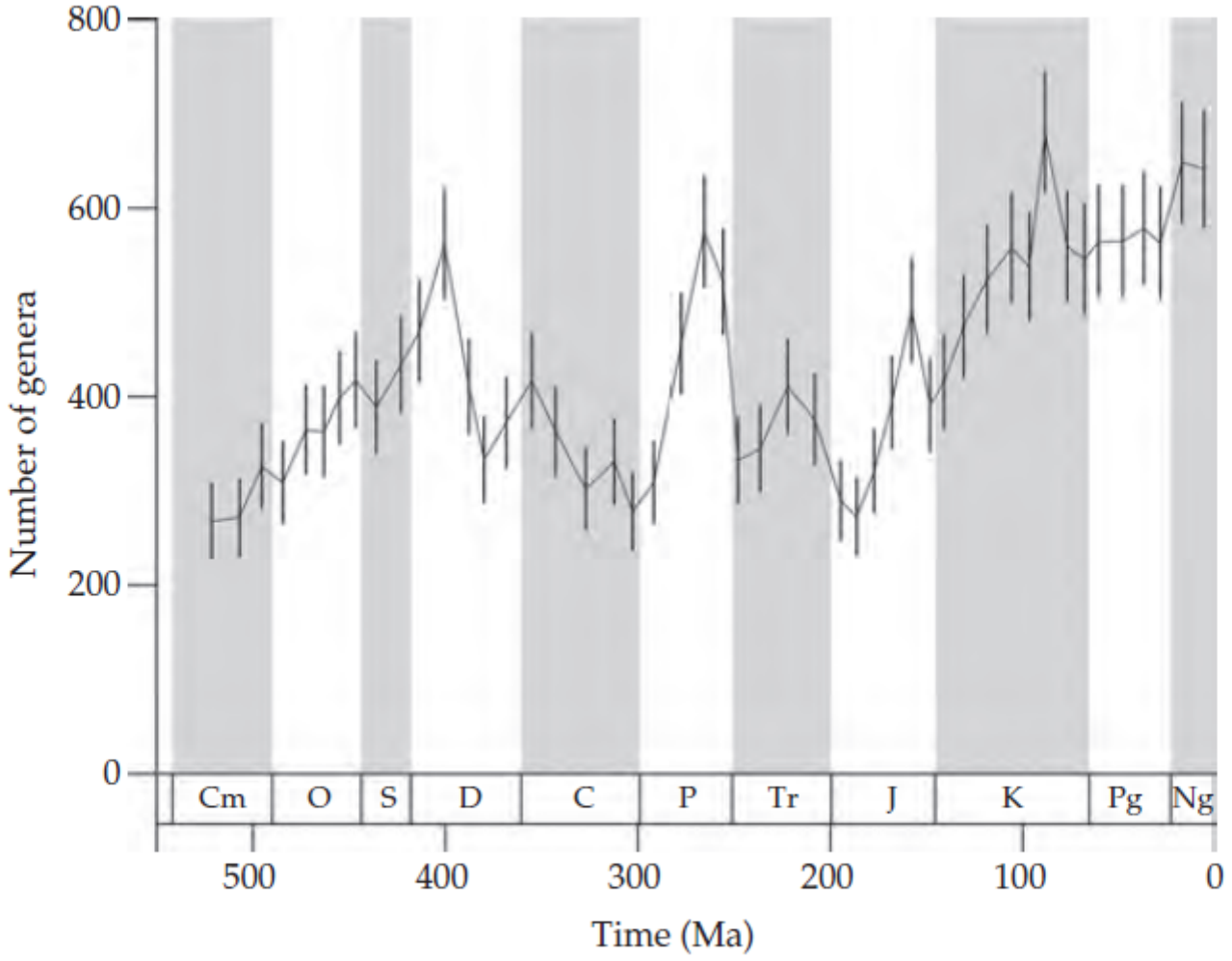


Figure 2.2 Changes in generic richness of marine invertebrates over the last 600 million years based on a sampling-standardized analysis of the fossil record. Ma, million years ago. Reprinted from Alroy *et al.* (2008) with permission from AAAS (American Association for the Advancement of Science).

Fuente: Gaston KJ, en Sohdi & Ehrlich (2010), Conservation biology for all

Regiones biogegráficas

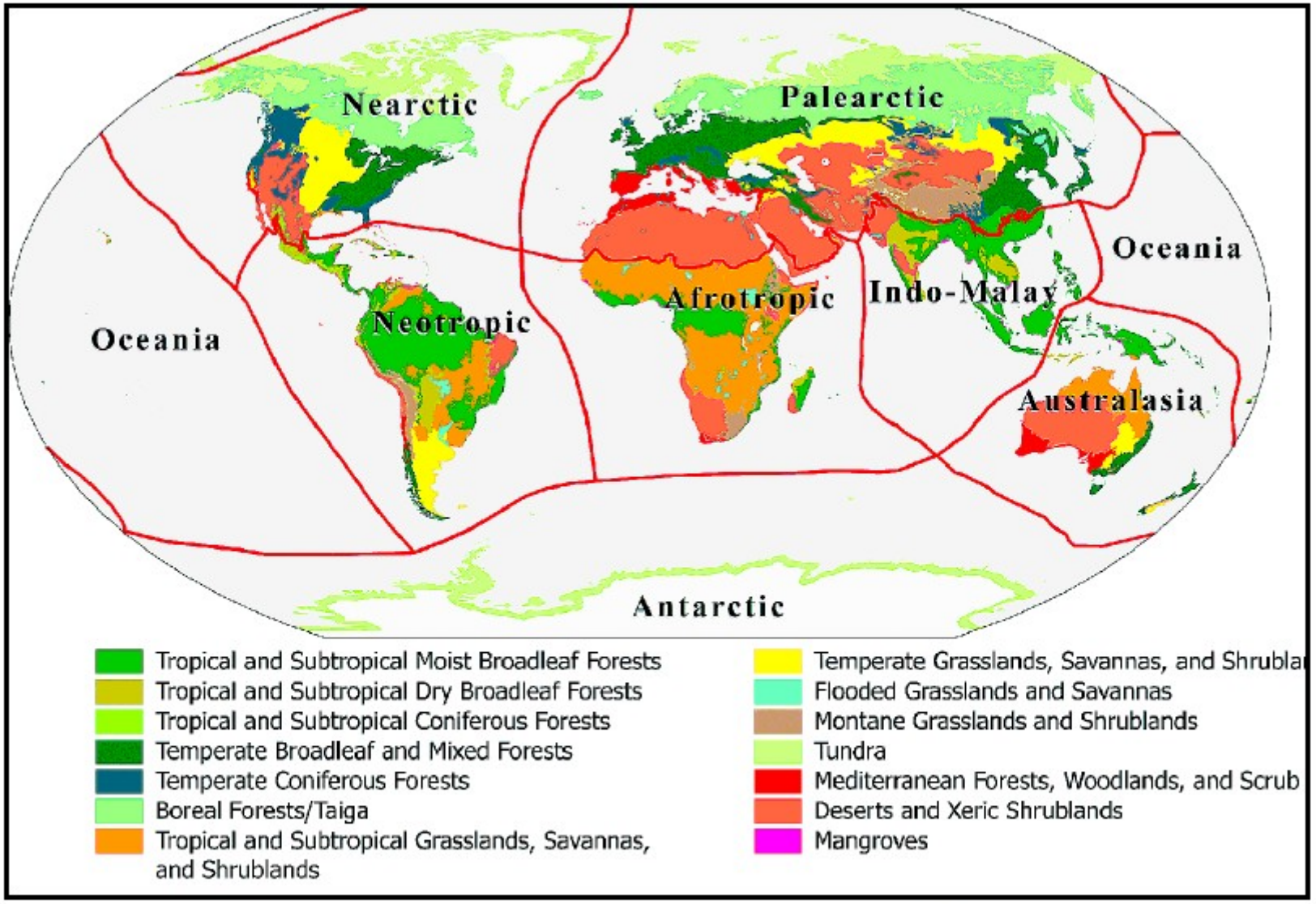


Figure 1. The ecoregions are categorized within 14 biomes and eight biogeographic realms to facilitate representation analyses.

Fuente: Olson et al. (2001) BioScience 51: 933-938

Regiones biogegráficas

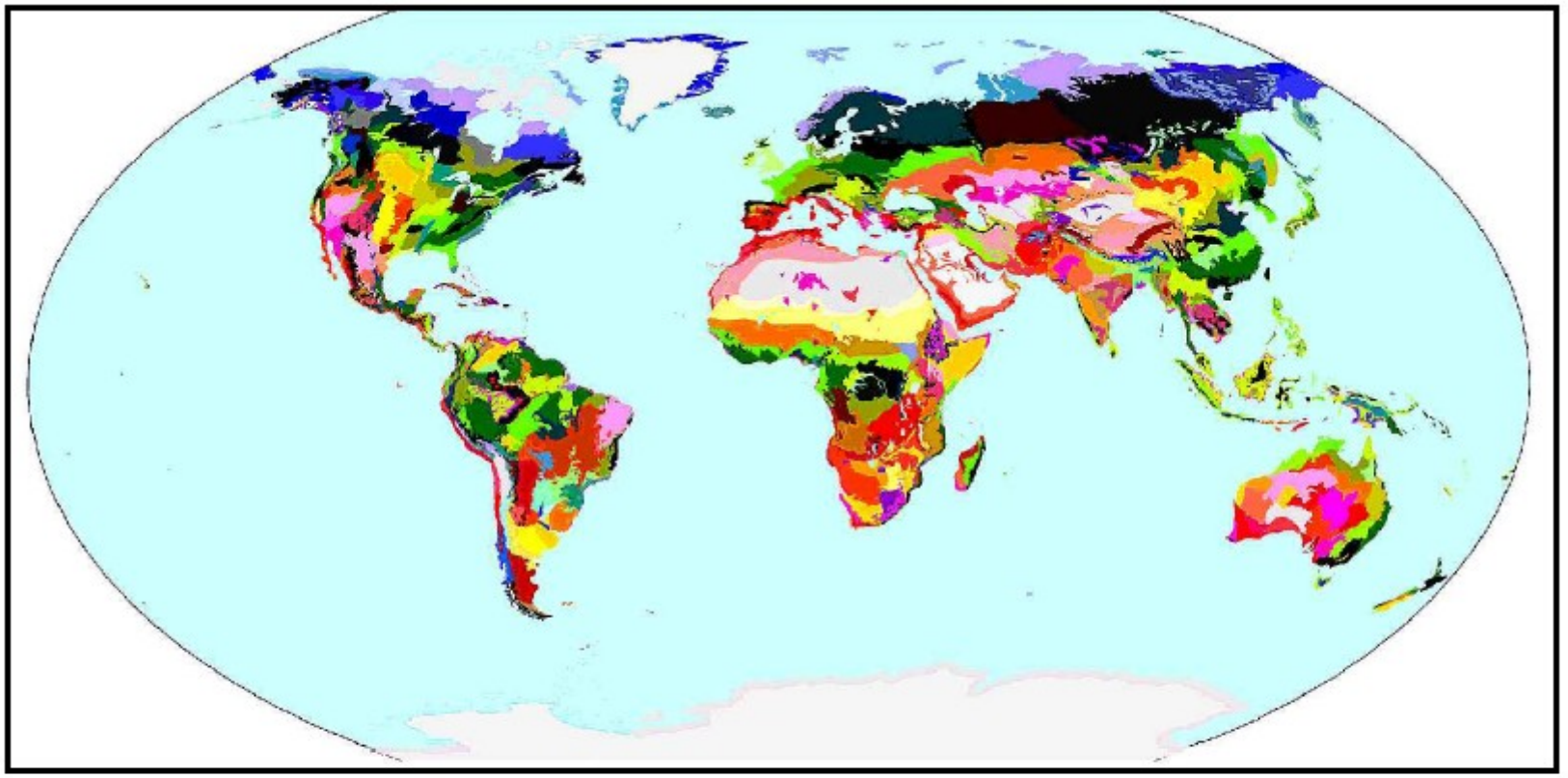


Figure 2. The map of terrestrial ecoregions of the world recognizes 867 distinct units, roughly a fourfold increase in biogeographic discrimination over that of the 193 units of Udvardy (1975). Maps of freshwater and marine ecoregions are similarly needed for conservation planning.

Fuente: Olson et al. (2001) BioScience 51: 933-938

Regiones biogegráficas

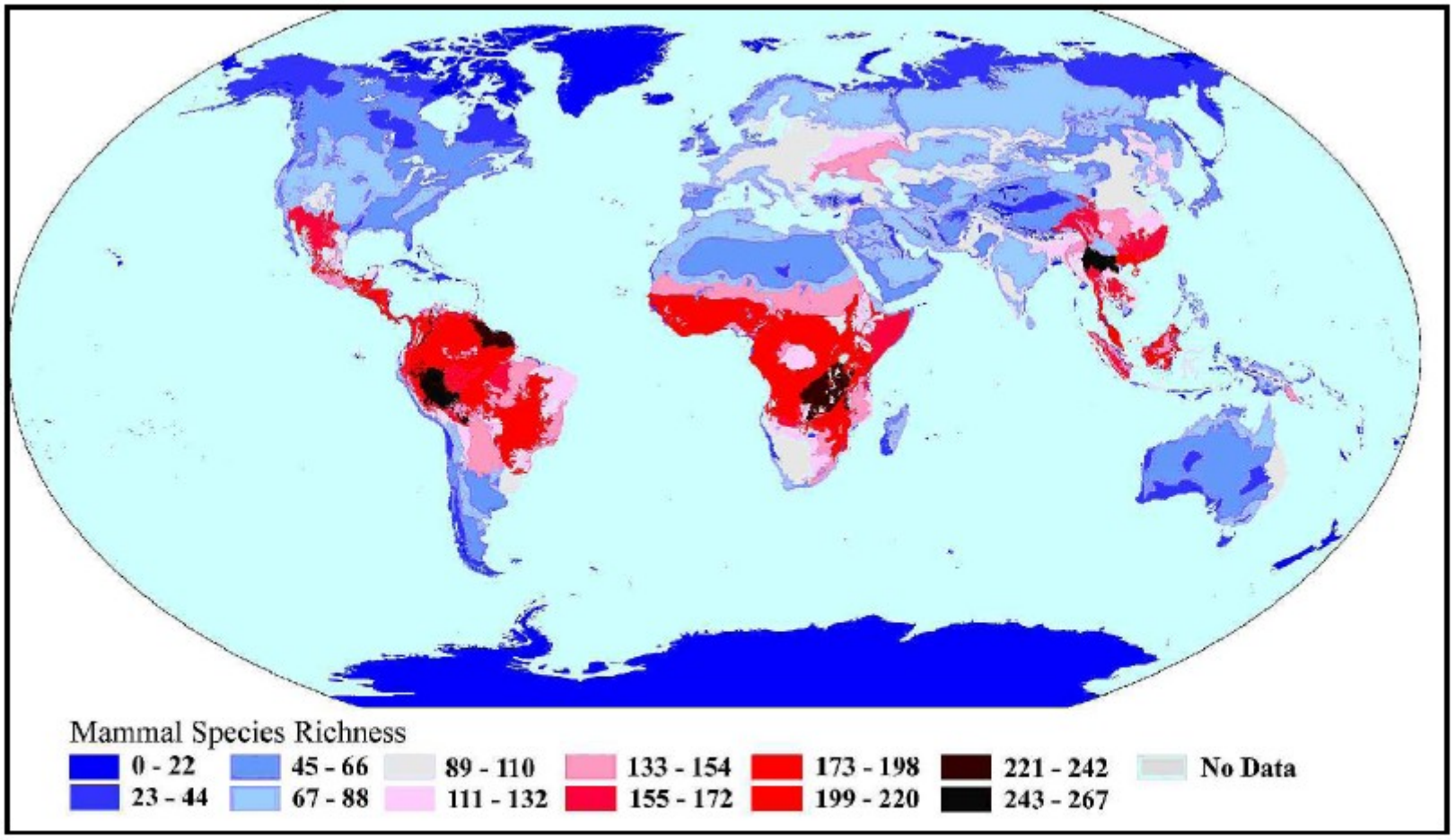


Figure 3. The relative richness of terrestrial mammal species by ecoregion is depicted. Warmer colors denote ecoregions containing richer assemblages.

Fuente: Olson et al. (2001) BioScience 51: 933-938

Regiones biogegráficas

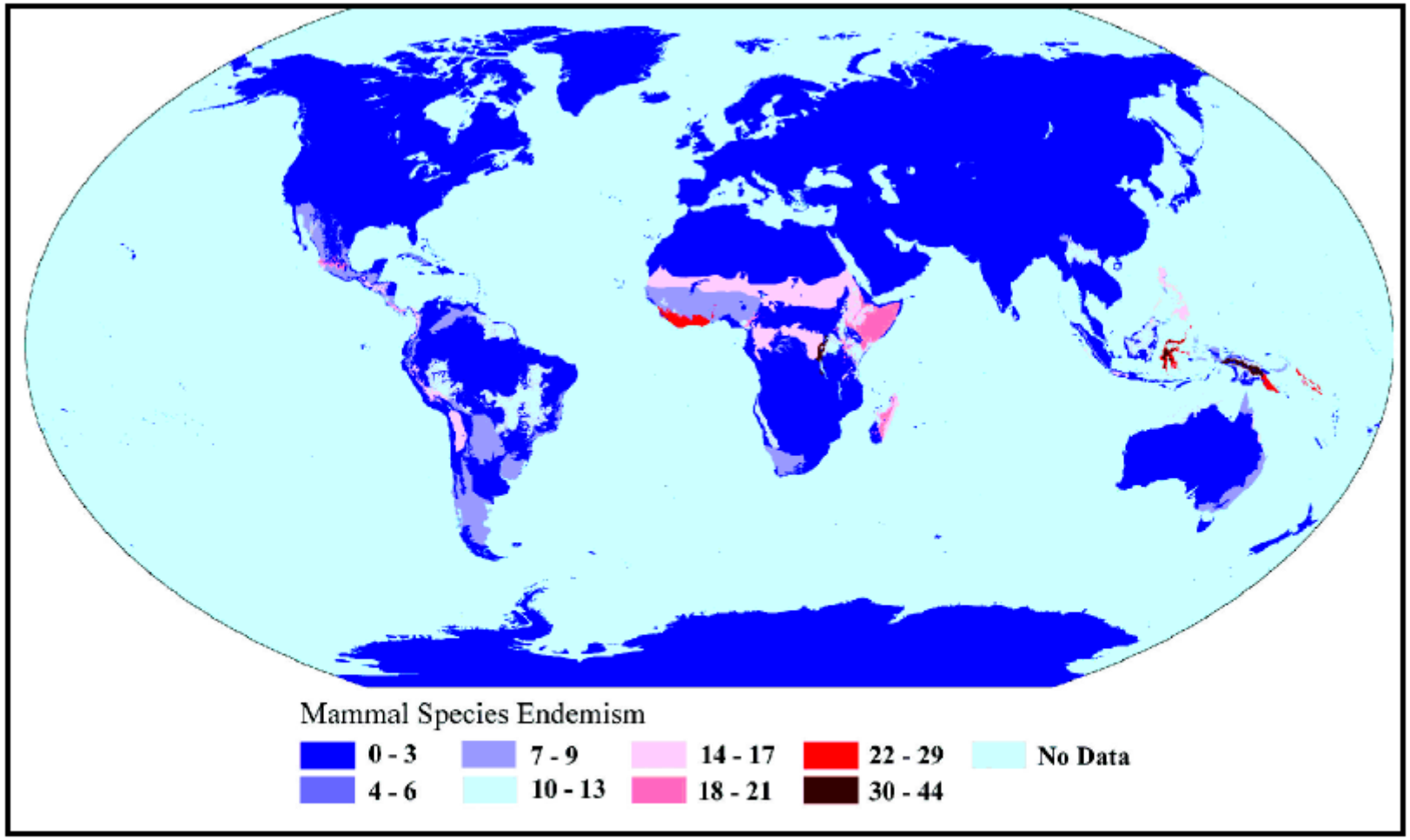


Figure 4. The level of species endemism for terrestrial mammals shows different patterns than that of richness. Warmer colors denote ecoregions containing more endemic species.

Fuente: Olson et al. (2001) BioScience 51: 933-938

Biomas antropogénicos

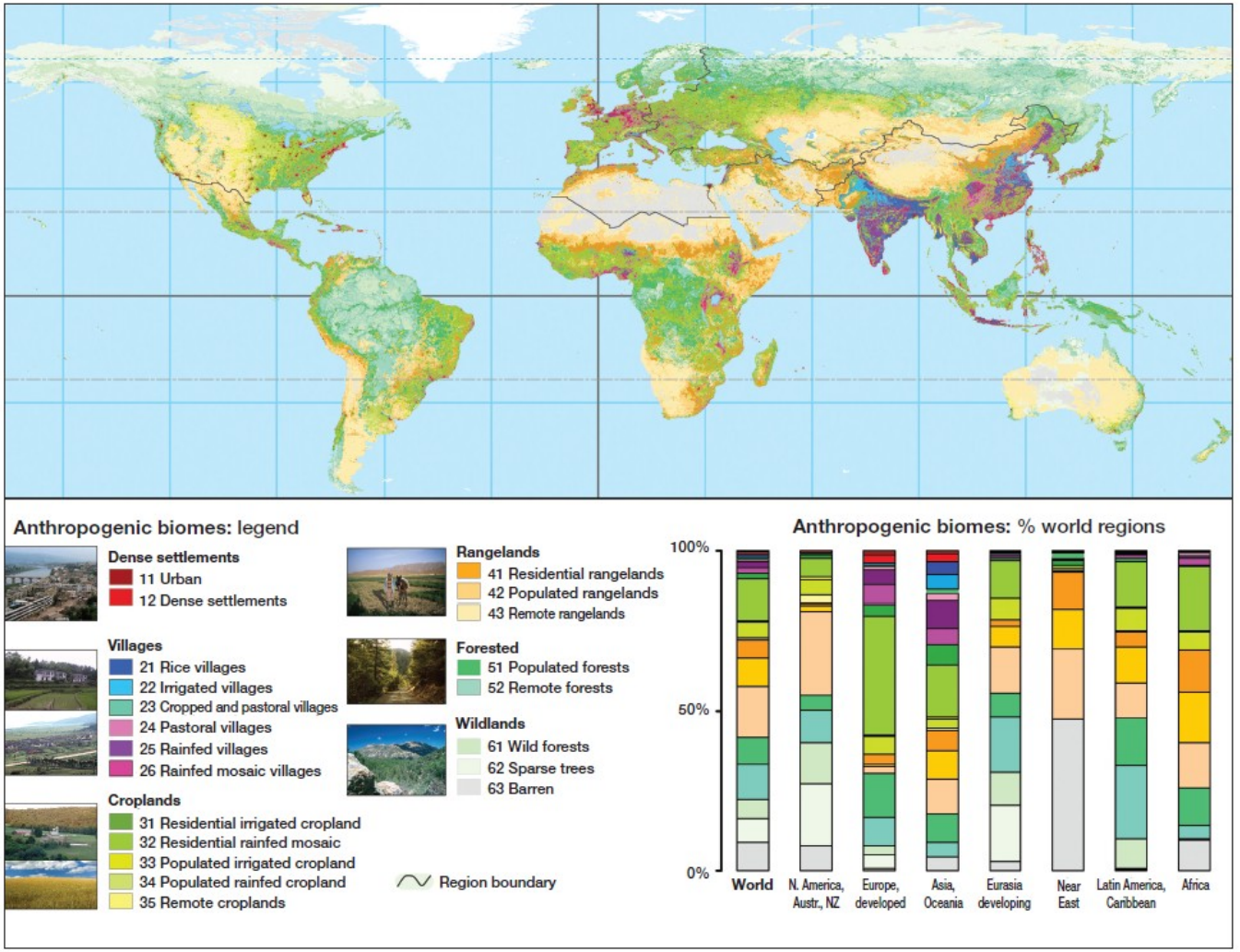
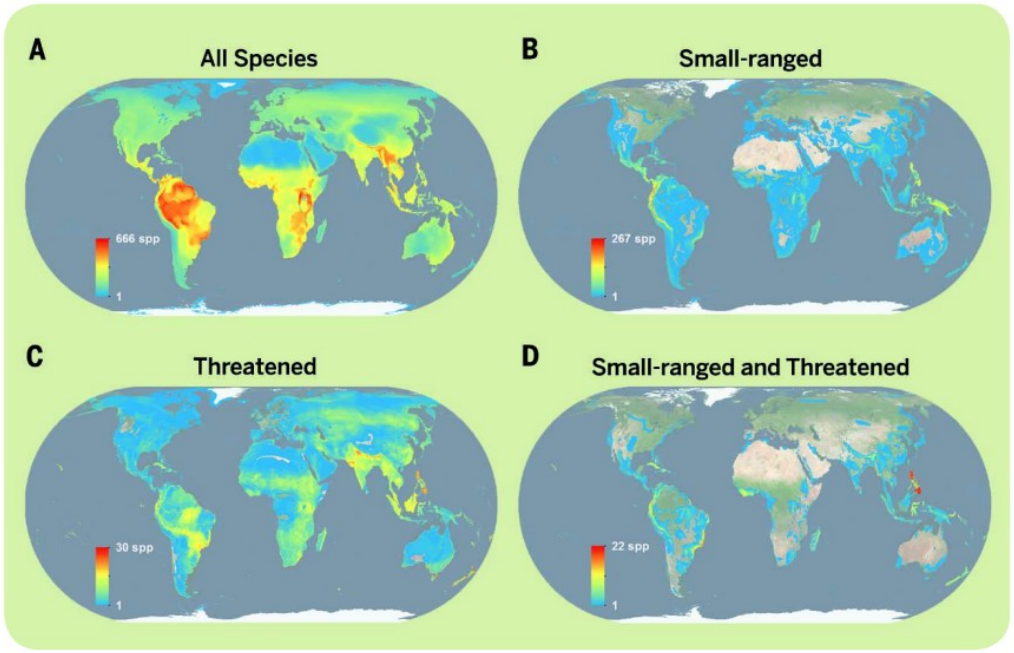


Figure 1. Anthropogenic biomes: world map and regional areas. Biomes are organized into groups (Table 1), and sorted in order of population density. Map scale = 1:160 000 000, Plate Carrée projection (geographic), 5 arc minute resolution (5' = 0.0833°). Regional biome areas are detailed in WebTable 3; WebPanel 2 provides interactive versions of this map.

Fuente: Ellis & Ramakutty (2008) Front. Ecol. Environ. 8: 439-447

The biodiversity of species and their rates of extinction, distribution, and protection

S. L. Pimm,[1]* C. N. Jenkins,[2] R. Abell,[3]† T. M. Brooks,[4] J. L. Gittleman,[5] L. N. Joppa,[6] P. H. Raven,[7] C. M. Roberts,[8] J. O. Sexton[9]



Different visualizations of species biodiversity. (**A**) The distributions of 9927 bird species. (**B**) The 4964 species with smaller than the median geographical range size. (**C**) The 1308 species assessed as threatened with a high risk of extinction by BirdLife International for the Red List of Threatened Species of the International Union for Conservation of Nature. (**D**) The 1080 threatened species with less than the median range size. (D) provides a strong geographical focus on where local conservation actions can have the greatest global impact. Additional biodiversity maps are available at www.biodiversitymapping.org.

Fuente: Pimm et al. (2014) Science 344: 1246752

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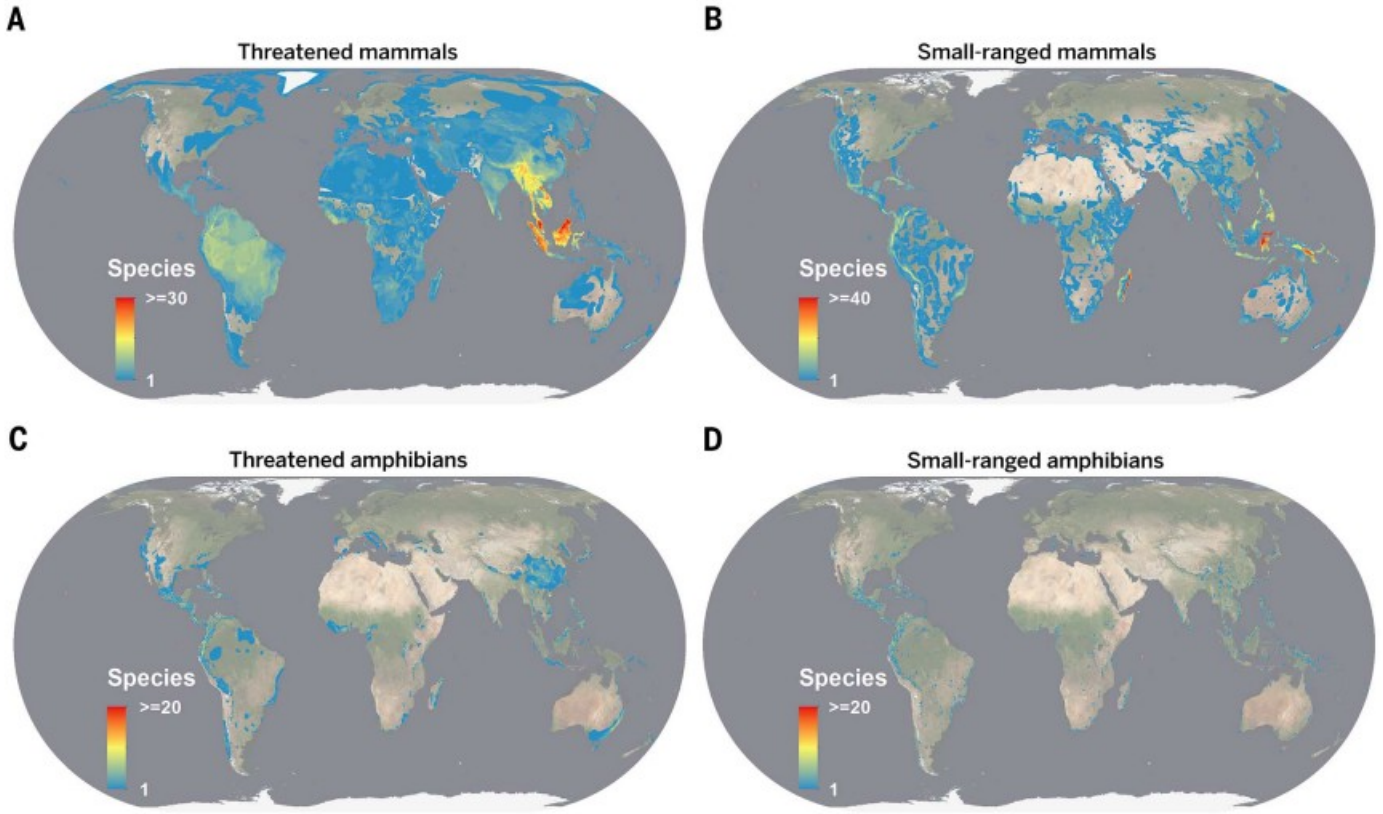

Fig. 2. Fine-scale patterns of terrestrial vertebrate diversity. (**A**) The numbers of threatened mammal species and (**B**) those with ranges smaller than the median range size. (**C**) and (**D**) show the corresponding maps for amphibians. See details in (*53*).

Fuente: Pimm et al. (2014) Science 344: 1246752

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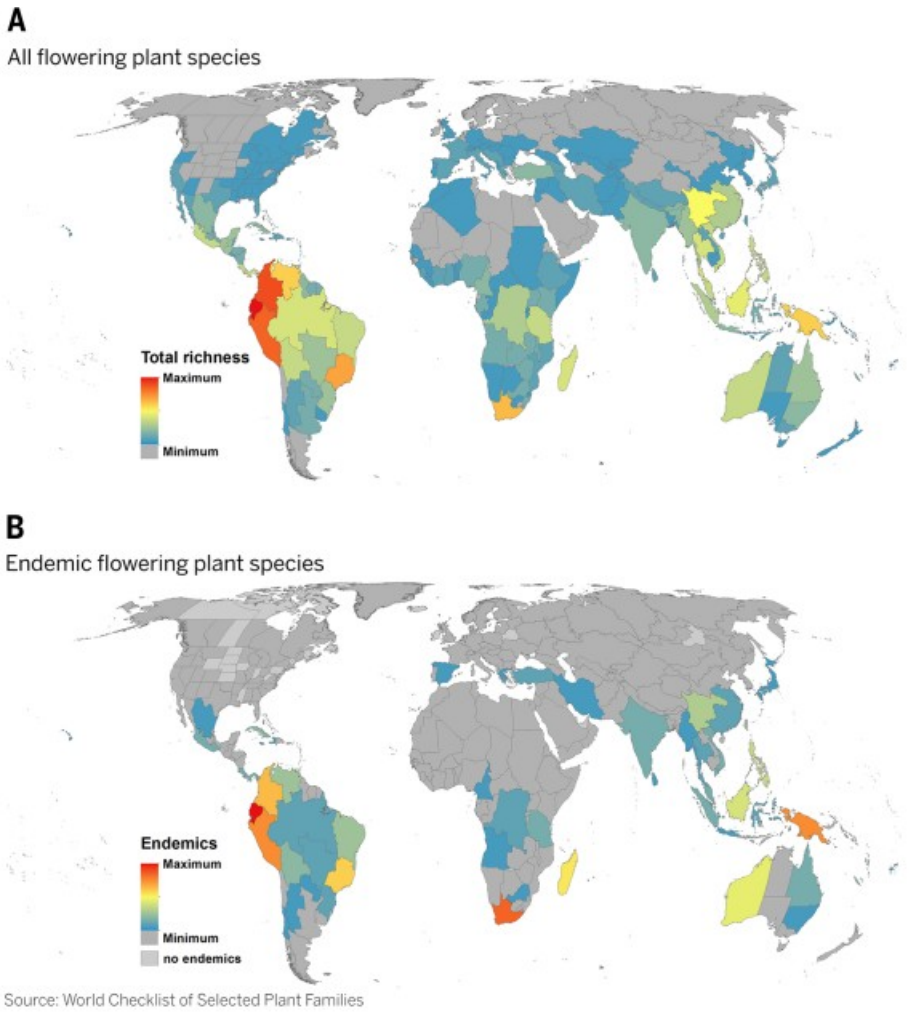

Fig. 3. Relative numbers of flowering plant species in the different regions used by the World Checklist of Selected Plant Families (*43*). (**A**) All species and (**B**) endemic species. See details in (*53*).

Fuente: Pimm et al. (2014) Science 344: 1246752

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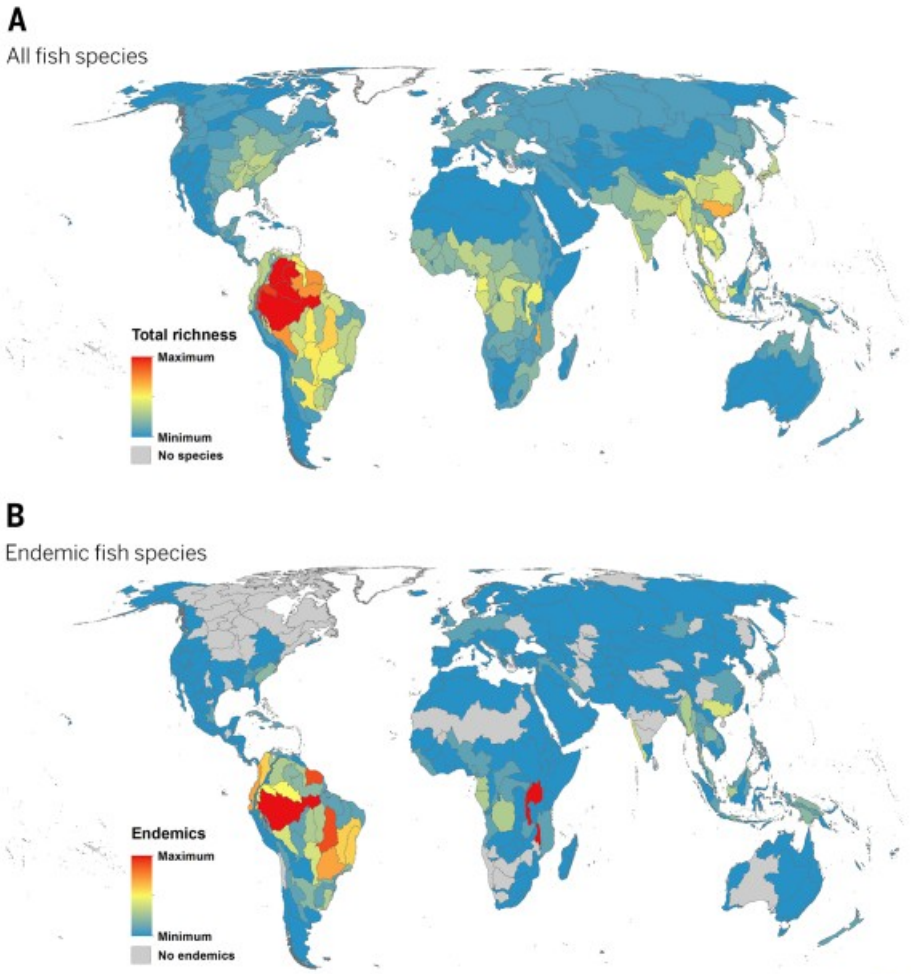

Fig. 4. Relative numbers of freshwater fish species in the different freshwater ecoregions (*52*). (**A**) All species and (**B**) endemic species. See details in (*53*).

Fuente: Pimm et al. (2014) Science 344: 1246752

Hotspots: conservación de endemismos

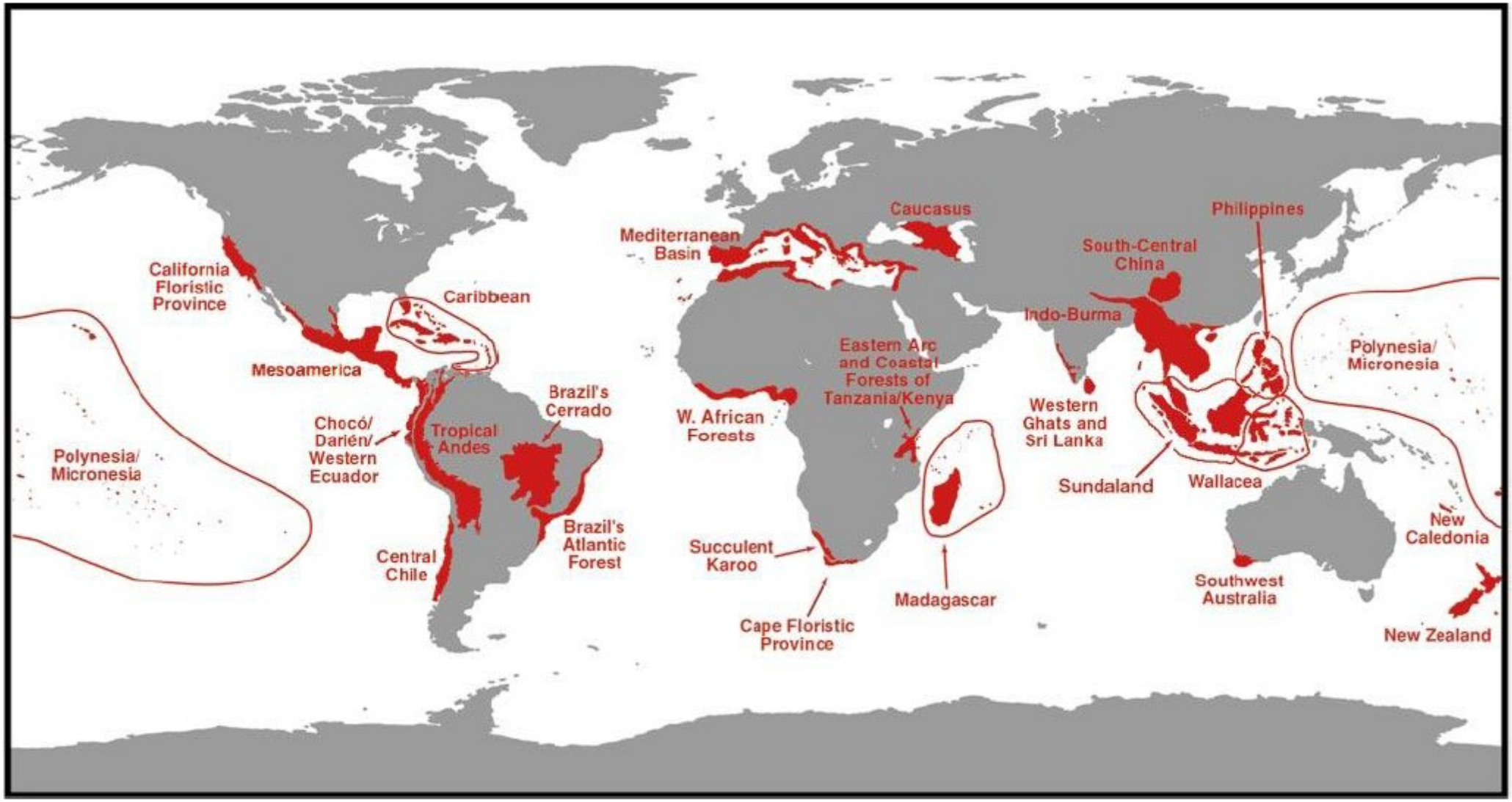

Figure 1 The 25 hotspots. The hotspot expanses comprise 30–3% of the red areas.

Fuente: Myers et al. (2000) Nature 403: 853-858

Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines

Gerardo Ceballos[a,1], Paul R. Ehrlich[b,1], and Rodolfo Dirzo[b]

The population extinction pulse we describe here shows, from a quantitative viewpoint, that Earth's sixth mass extinction is more severe than perceived when looking exclusively at species extinctions. Therefore, humanity needs to address anthropogenic population extirpation and decimation immediately. That conclusion is based on analyses of the numbers and degrees of range contraction (indicative of population shrinkage and/or population extinctions according to the International Union for Conservation of Nature) using a sample of 27,600 vertebrate species, and on a more detailed analysis documenting the population extinctions between 1900 and 2015 in 177 mammal species. We find that the rate of population loss in terrestrial vertebrates is extremely high—even in "species of low concern." In our sample, comprising nearly half of known vertebrate species, 32% (8,851/27,600) are decreasing; that is, they have decreased in population size and range. In the 177 mammals for which we have detailed data, all have lost 30% or more of their geographic ranges and more than 40% of the species have experienced severe population declines (>80% range shrinkage). Our data indicate that beyond global species extinctions Earth is experiencing a huge episode of population declines and extirpations, which will have negative cascading consequences on ecosystem functioning and services vital to sustaining civilization. We describe this as a "biological annihilation" to highlight the current magnitude of Earth's ongoing sixth major extinction event.

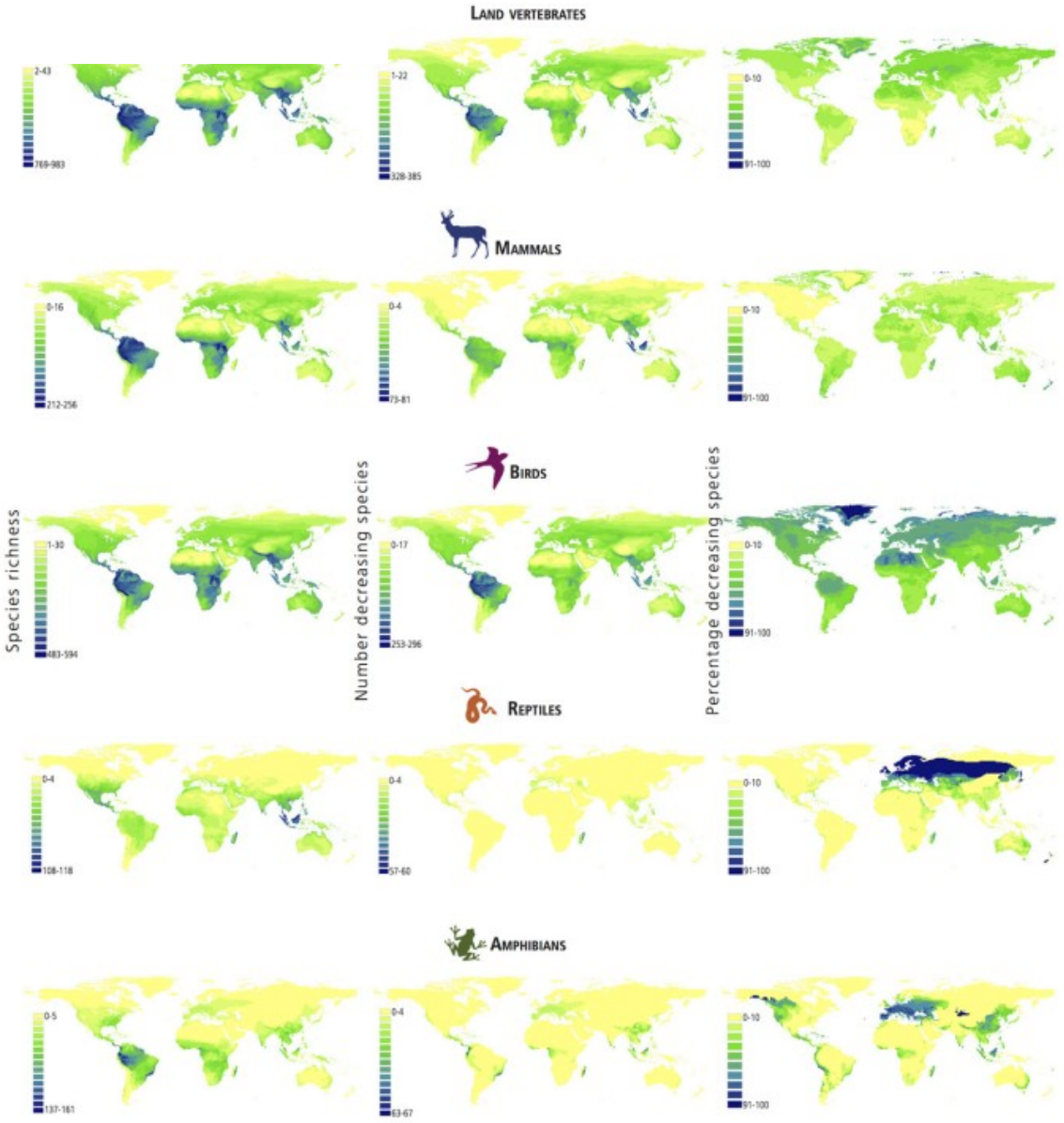

Fig. 2. Global distribution of terrestrial vertebrate species according to IUCN (28). (*Left*) Global distribution of species richness as indicated by number of species in each 10,000-km^2 quadrat. (*Center*) Absolute number of decreasing species per quadrat. (*Right*) Percentage of species that are suffering population losses in relation to total species richness per quadrat. The maps highlight that regions of known high species richness harbor large absolute numbers of species experiencing high levels of decline and population loss (particularly evident in the Amazon, the central African region, and south/southeast Asia), whereas the proportion of decreasing species per quadrat shows a strong high-latitude and Saharan Africa signal. In addition, there are several centers of population decline in both absolute and relative terms (Borneo, for example).

Fuente: Ceballos et al. (2017) PNAS 114: E6089-E6096

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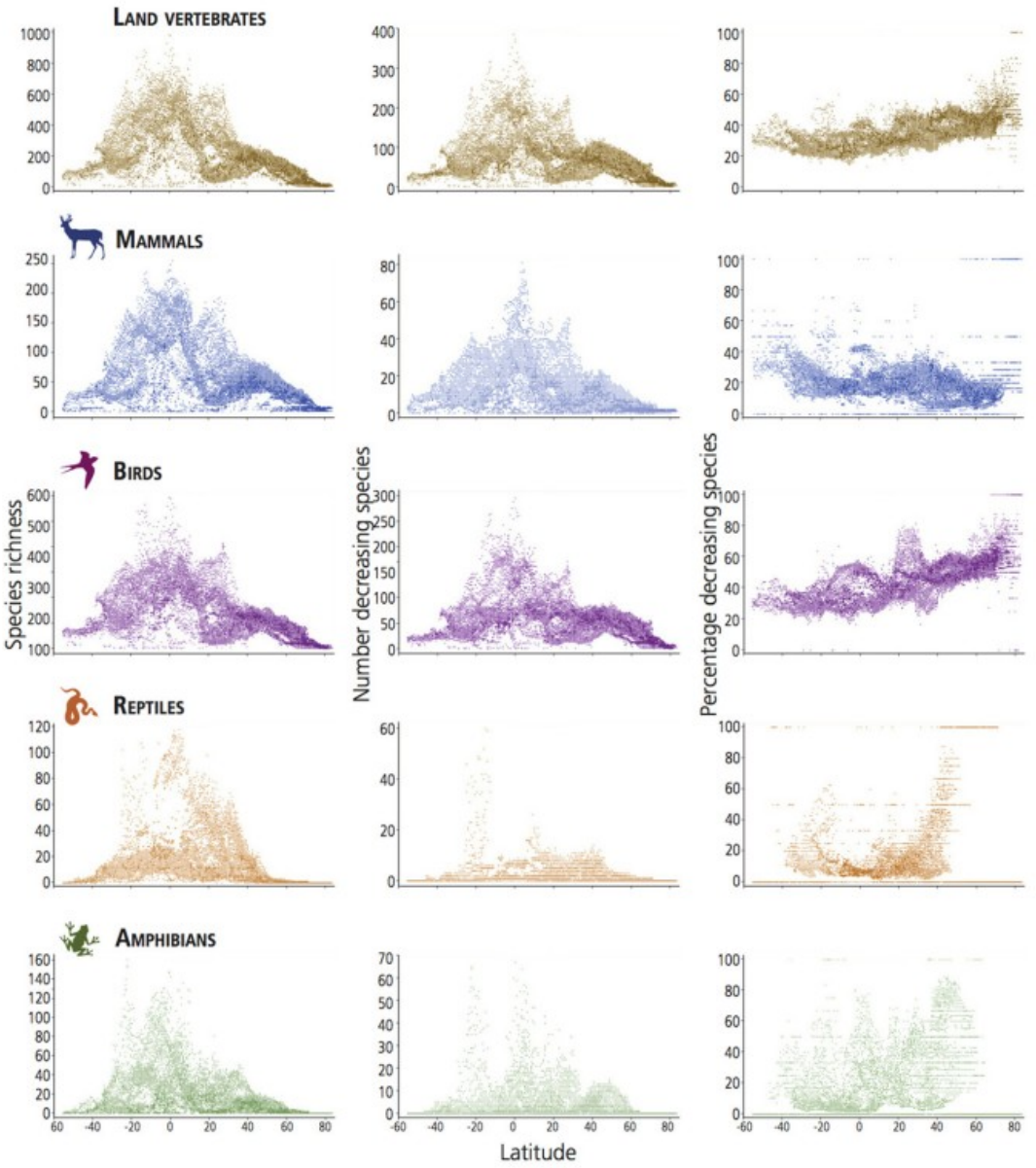

Fig. 3. Latitudinal distribution of species richness (*Left*), decreasing species (*Center*), and the percentage of species (*Right*) that are suffering population losses in relation to total species richness, in each 10,000-km^2 quadrat. Patterns of species richness in relation to latitude are similar in all vertebrates, although there are more species per quadrat in birds and mammals and, as expected, a scarcity of reptiles and amphibians at high latitudes. The patterns of number of species with decreasing populations indicate that regions with high species richness also have high numbers of decreasing species, but the percentage of decreasing species in relation to species richness shows contrasting patterns between mammals and birds compared with reptiles and amphibians. In mammals and birds, the percentage of decreasing species is relatively similar in regions with low and high species richness. In contrast, there are proportionally more decreasing species of reptiles and amphibians in regions with low species richness.

Fuente: Ceballos et al. (2017) PNAS 114: E6089-E6096

Conclusiones

- La diversidad biológica (biodiversidad) tiene componentes genéticos, organísimicos y ecológicos.
- La biodiversidad está distribuida en forma heterogénea en el especio y en el tiempo.
- La humanidad tiene la capacidad de generar fuertes cambios en la biodiversidad global.