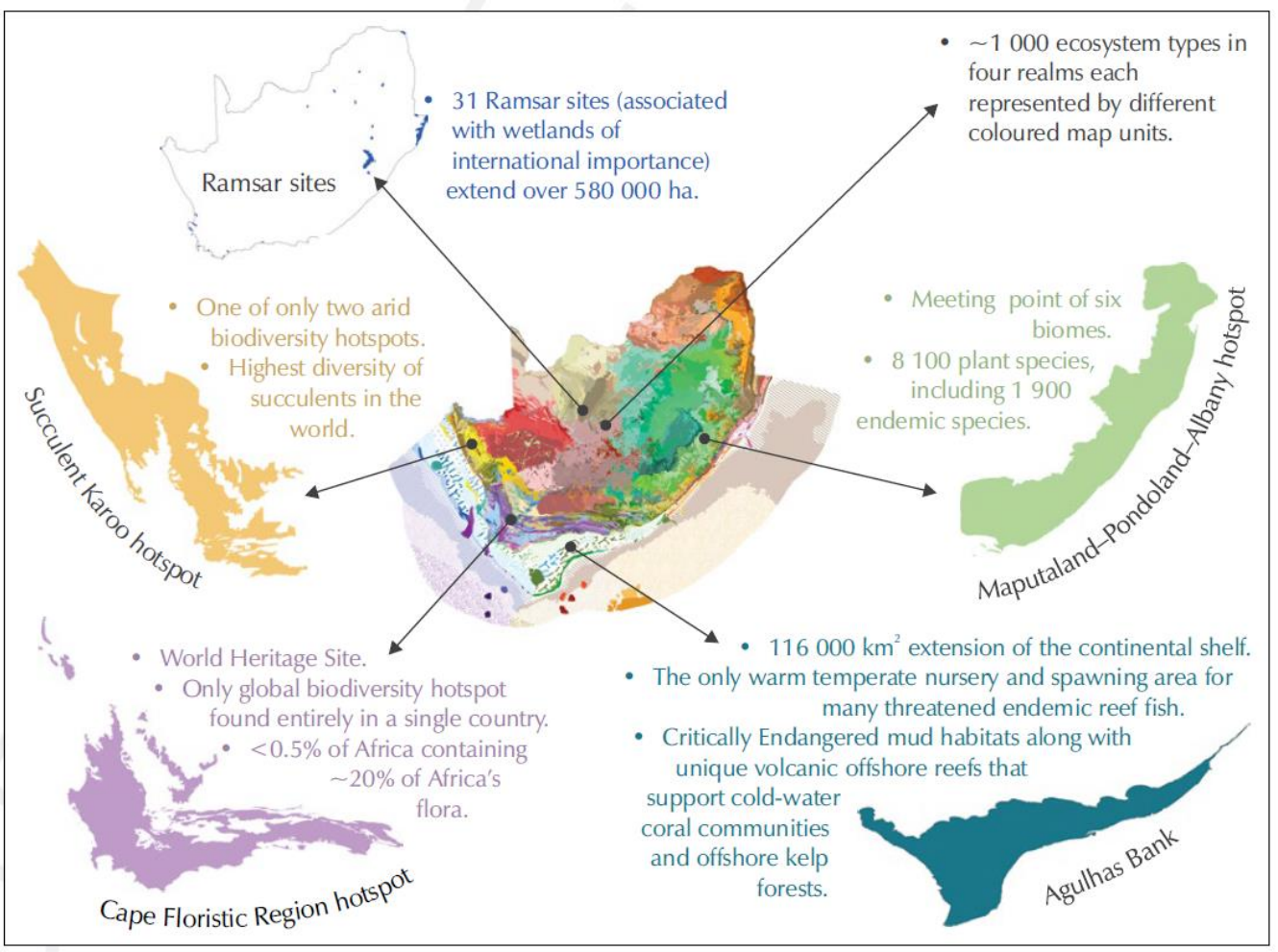
SOUTH AFRICA'S BIODIVERSITY PROFILE



SANBI
Biodiversity for Life
South African National Biodiversity Institute

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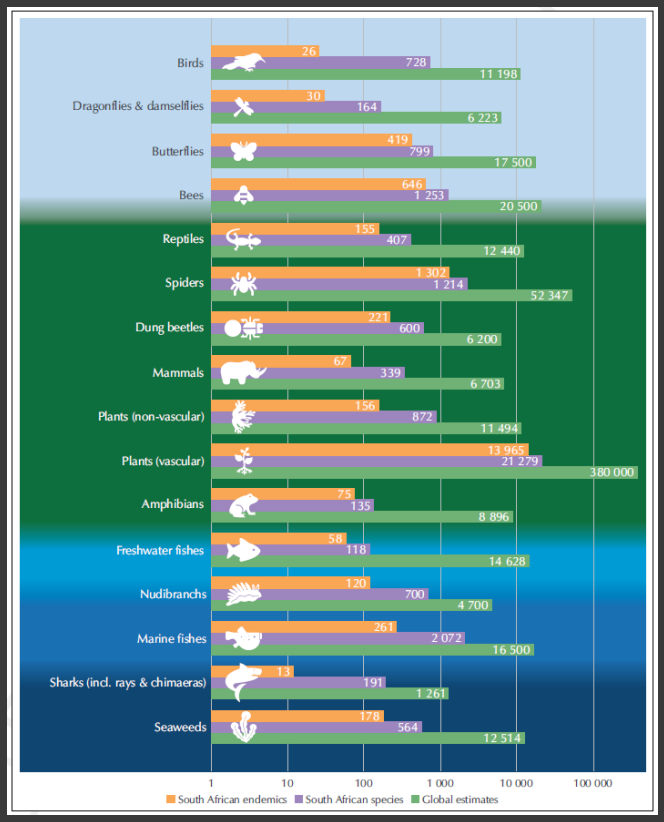

Background

South Africa has exceptional biodiversity that is globally recognised, characterised by high species richness, high rates of endemism and a wide variety of ecosystem types.

There are various measures of, and ranking systems for the earths most biologically diverse regions and nations; each with its own particular metrics, methods and biases. In regional diversity studies, where plant species richness and endemism are often considered, South Africa invariably makes the top three nations globally - due to extremely high species richness and endemism in its biodiversity hotspots. For biodiversity ranking systems that focus on vertebrates, South Africa rarely makes the top ten.

Global Rankings

The book *Megadiversity. Earth's Biologically Wealthiest Nations* (Mittermeier *et al*., 1997; Thomsen *et al*., 1997) ranked South Africa as the 15th most diverse country globally overall. To qualify as Megadiverse, a country needs to have over 1% of the world's vascular plants as endemics. However, this ranking system did not incorporate endemism or land area (thus favouring large countries such as the USA and China).

A more recent study that focussed on regions, not nations (Kier *et al*., 2009), supports the very high ranking for South Africa's vascular plant diversity and endemism – ranking the Cape Floristic Region second overall globally for 'endemism richness' (endemic species per 10 000km^2).

With a landmass of 1.21 million km^2 and surrounding seas of 1.1 million km^2, South Africa is among the smaller of the world's megadiverse countries which together contain more than two thirds of the world's biodiversity

Hotspots and other areas of biodiversity importance

Biodiversity Hotspots are regions rich in species, have levels of endemism and face significant threats (Reid 1998). The worlds Biodiversity Hotspots are home to about 44% of all vascular plant species and 35% of species in four groups of vertebrates (Myers et al. 2000). With approximately 37 in total globally, South Africa is unique in the fact that it is the only country in the world that has three distinct terrestrial global Biodiversity Hotspots: The Cape Floristic Region; the Succulent Karoo biome and the Maputaland-Pondoland-Albany region (Mittermeier et al., 2001, 2016), and one marine hotspot (Roberts et al. 2002, Hrdina & Romportl 2017). South Africa ranks in the top ten nations globally for plant species richness and third for marine species endemism. In addition, it is home to 31 Ramsar sites (wetlands of international importance, including the subantarctic Prince Edward Islands), and the Agulhas bank is an equivalently unique space in the marine realm. South Africa has identified 263 terrestrial Key Biodiversity Areas using the international standard, with more being identified in aquatic realms.

Species Information for South Africa

South Africa is rich in species and is home to an estimated 67 000 animal species, although many invertebrates remain undescribed or undiscovered. The 2025 South African National Plant Checklist records 23 514 taxa and 21 539 species, of which 20 204 are indigenous. Remarkably, 60.5% of these indigenous species are endemic to the country.

Current estimates indicate that South Africa harbours approximately 8% of the world's non-vascular and 6% vascular plant species; and 10% of the world's dung beetle, 7% of bird, 6% of bee, 5% of mammal, 3% of reptile, 2% of amphibian and 1% of freshwater fish species. In the marine realm, South Africa supports 15% of the world's shark, ray and chimaera species, 15% of nudibranch, 13% of marine (bony) fish, and 5% of seaweed (including brown, green and red algae. Several terrestrial invertebrate groups have high richness relative to global statistics, with South Africa hosting nearly 5% of the world's butterfly, 4% of spider, and 3% of dragonfly and damselfly species. Two-thirds of South Africa's plant species are endemic, and its cycads represent 10% of the global species count with 92% endemism. Around half of the South African species of amphibians, butterflies, bees, spiders and freshwater fishes are endemic, as are nearly 40% of dung beetle and reptile species. Approximately 30% of seaweed species and 40% of South Africa's estimated 10 000 marine animal species are endemic, the vast majority being invertebrates (Table 1).

Microorganisms (e.g., bacteria, protozoa, fungi, viruses), an often-overlooked and largely unassessed group, are essential for healthy functioning of natural and agricultural systems in both terrestrial and aquatic environments. Given the country's immense diversity of floral and faunal species, and that each species has its own array of microbial species associated with it, it is likely that these are also diverse. For example, it has been estimated that each unique vascular plant species in South Africa is associated with at least seven unique fungal species, implying more than 171 000 fungi species (an underestimate, as fungi associated with invertebrates are not included).

Around half of the South African species of amphibians, butterflies, bees, spiders and freshwater fishes, and nearly 40% of dung beetle and reptile species are endemic (Table 2). Almost two-thirds of South Africa's plant species are endemic, and South African cycads account for 10% of the global species count, with 92% endemism. Approximately 30% of seaweed species and 40% of South Africa's estimated 10 000 marine animal species are endemic, the vast majority of which are invertebrates. National estimates of species richness and endemism for a range of taxonomic groups in South Africa (Table 1)were updated since 2018 estimates and in that time new species of vascular plants, mammals (+3), reptiles (+3)and amphibians (+10) have been discovered with many more taxonomic groups understudied. These improved estimates should be considered in a revised global ranking system for the world's most biodiverse

nations. It is, however, safe to say that South Africa is a truly Megadiverse country with exceptional species richness and endemism; our endemic plant species richness (plants found nowhere else on earth) is among the very highest on earth.

Table 1. Summary of species endemism, and global share of species richness for selected South African taxonomic groups. Numbers are accurate based on information available from experts and national statistics at the time of publication.

Taxonomic group	Species in SA as a % of global total	Endemics as % of total SA species
Amphibians	1.5%	56%
Bees	6.1%	52%
Birds	6.5%	4%
Butterflies	4.6%	52%
Cycads	10.0%	92%
Dung beetles	9.7%	37%
[illegible]	2.6%	18%
Freshwater fishes	0.8%	49%
Mammals	5.1%	20%
Marine fishes	12.6%	13%
Nudibranchs	14.9%	17%
Plants (non-vascular)	7.6%	18%
Plants (vascular)	5.6%	66%
Reptiles	3.3%	38%
Seaweed	4.5%	32%
Sharks (incl. rays & chimaeras)	15.1%	6%
Spiders	4.2%	59%

South Africa's realms and ecosystems

South Africa's wide range of bioclimatic, oceanographic, geological and topographical settings have resulted, not only in high species diversity and endemism, but also high ecosystem-level diversity and endemism across all realms with around 1000 ecosystem types currently described and mapped.

South Africa's **terrestrial** realm can be categorised into nine biomes and 463 ecosystem types, approximately 80% of which are endemic.

South Africa's **marine** realm includes a diverse oceanographic setting combined with complex geology and topography, drive exceptional marine biodiversity and a wide array of ecoregions and ecosystem types in both the benthic and pelagic (163 distinct types).

South Africa is among the most water scarce countries per capita in the world and has a high temporal and spatial variability of rainfall. This results in highly variable runoff and river flow regimes, and a relative scarcity of **inland wetlands**. These wetlands are classified into 82 distinct types on the basis of hydro-geomorphology and bioregion. The diversity of river ecosystem types is driven by similar bioregional/bioclimatic variation and hydro-geomorphological and topographic factors – resulting in 222 distinct types.

South Africa has 290 **estuaries** and 42 micro-estuaries which have been classified into 22 estuarine ecosystems types. These represent a high diversity of estuary types stemming from our diverse climatic, oceanographic and geological drivers.

The South African **cross-realm coastal zone** comprises dunes, cliffs, beaches, rocky and mixed shores, estuaries, mangroves, kelp and reefs, bays, river influenced shelf regions and a wide range coastal vegetation types (from forests to arid shrublands). With this heterogeneity comes exceptionally high biodiversity and high levels of endemism, especially among dune plants and beach fauna. An ecological definition of the coast draws from the terrestrial marine and estuarine ecosystem maps and lists 190 coast ecosystem types from the terrestrial (83 types), estuarine (22 types) and marine (85 types) ecosystem maps to form a cross-realm coastal zone.

South Africa's **subantarctic territory** consists of Prince Edward Island, Marion Island and surrounding seas (collectively known as the Prince Edward Islands – PEI), and is situated 1700 km south east of the mainland. These tiny islands and surrounding seas have a very different biodiversity profile to that of the mainland and its oceans; largely considered subantarctic or polar. There are five terrestrial and 29 marine ecosystem types.

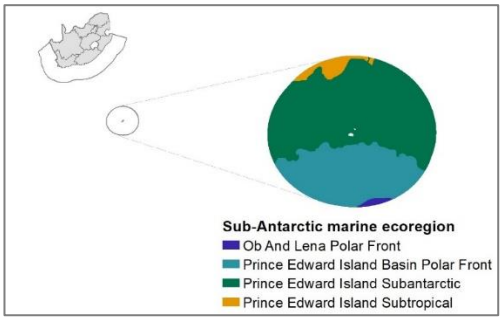

Figure 1. Map showing the location of the Prince Edward Island Group and the surrounding territorial waters and exclusive economic zone (EEZ).

Table 2. Number of species in South Africa, the number of species endemic to South Africa and the global estimate of species number for selected South African taxonomic groups.

Group	Species in	Endemic	Species
Amphibians	135	75	8896
Bees	1253	646	20500
Birds	728	26	11198
Butterflies	799	419	17500
Cycads	38	35	380
Dragonflies & damselflies	164	30	6223
Dung beetles	600	221	6200
Freshwater fishes	118	58	14628
Marine fishes	2072	261	16500
Mammals	339	67	6703
Nudibranchs	700	120	4700
Plants (vascular)	21279	13965	380000
Plants (non-vascular)	872	156	11494
Reptiles	407	155	12440
Seaweed	564	178	12514
Sharks (incl. rays & chimaeras)	191	13	1261
Spiders	2214	1302	52347

Data sources

Global richness

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South African richness

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