



THE Species Protection Report

2024



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EXECUTIVE SUMMARY

Species are the key biological drivers of the diverse ecological functions that sustain our planet. Representing this ecological diversity within systems of protected and conserved areas is therefore central to the overarching ambition of the Global Biodiversity Framework and the outcome sought by its Target 3 to protect 30% of land, waters, and sea.

This report addresses the state of species protection in 2024. It reports on the progress of regions and countries in the adequate representation of species within networks of protected and conserved areas. These trends are measured through the Species Protection Index (SPI), the only formally adopted indicator for Target 3 that directly and quantitatively addresses the importance protected areas play for conserving species. For any region, and based on tens of thousands of detailed spatial species data, the index measures how well existing conservation areas include areas of biodiversity importance and contribute to species survival and ecological representation.

In 2024, global terrestrial SPI reached a score of 48 out of 100, meaning that on average, the assessed terrestrial species have achieved about half of their protection goals. Global marine SPI has advanced farther, reaching a score of 60. Terrestrial protected networks cover 14.4% of the total global land area while marine protected networks cover 6.7% of the oceans. In the past ten years, progress in species protection has been faster in the seas than on land and more efficient with regards to the proportion of additional area protected: terrestrial SPI has increased by 4 points with the additional protection of 2% of land area while marine SPI has increased by 17 points with the additional protection of 4% of ocean area. These 2024 results were based on ca. 46,000 species of marine and terrestrial vertebrates. Future updates will include plant and invertebrate taxa and highlight additional conservation needs.



INPUT DATA

We use best-available data on geographic occurrence and habitat preferences for tens of thousands of terrestrial and marine vertebrate species, recent environmental layers, and the WDPA.

DETAILED DISTRIBUTIONS

We integrate this data with models to arrive at high-resolution predictions of species habitat-suitable ranges.

SPECIES PROTECTION SCORES

We calculate individual species protection scores (SPS) by comparing the species protection target to the percent of the species range under protection. An SPS of 100 means the target has been achieved.

SPECIES PROTECTION INDEX

Finally, the National SPI is calculated as the average SPS of all species in a country or EEZ weighted by their stewardship, or the percent of their range that exists within the area.

WHAT IS THE SPECIES PROTECTION INDEX (SPI)?

Species are the key biological drivers of the diverse ecological functions that sustain our planet. Representing this ecological diversity within systems of protected and conserved areas is therefore central. The SPI measures how well species are represented within networks of protected and conserved areas and thereby assesses these areas' coverage of important areas for biodiversity and ecological representativeness.

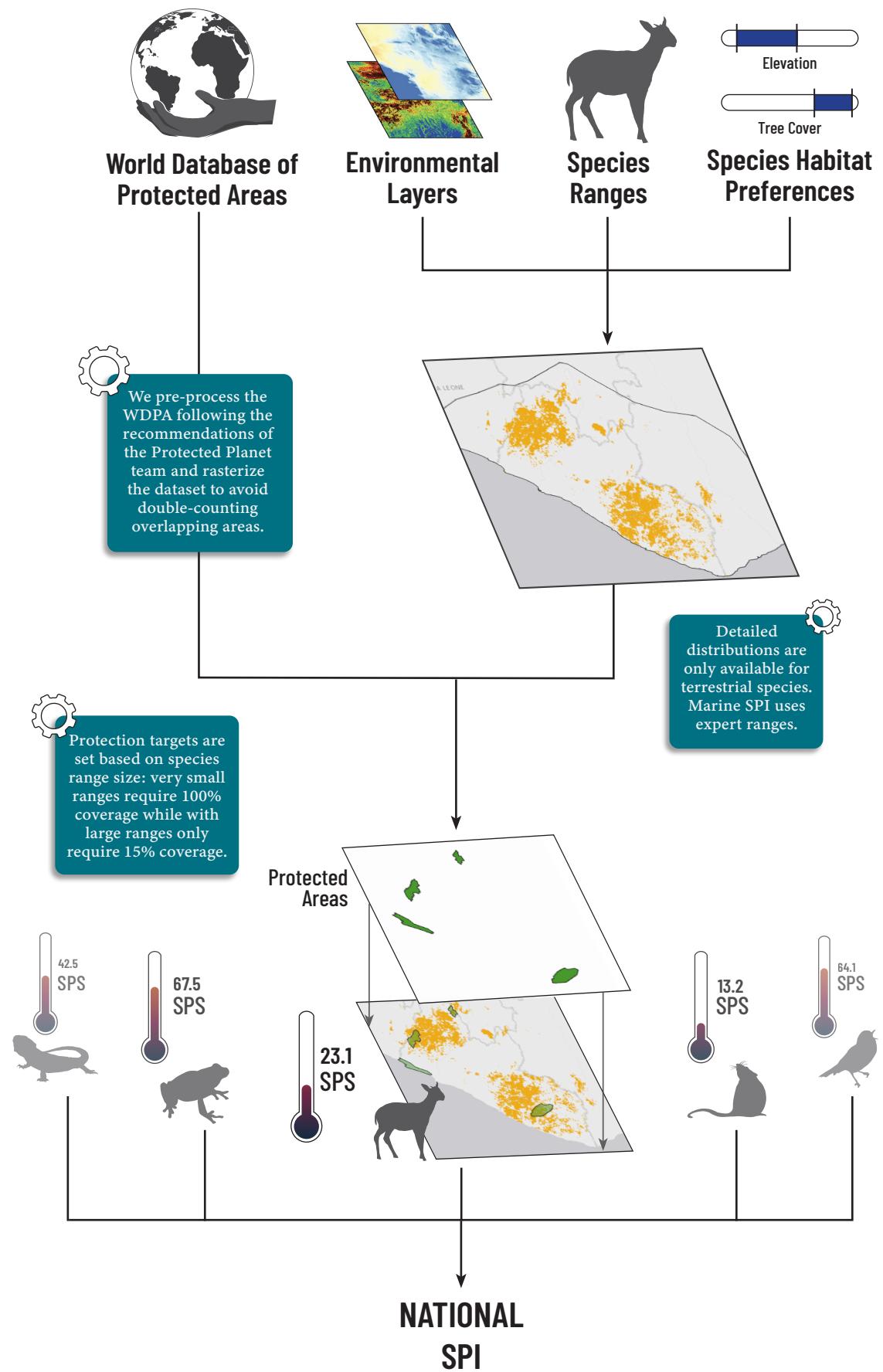
More than just a monitoring tool, the SPI is designed to actively support conservation decision making in support of Target 3 of the Kunming-Montreal Global Biodiversity Framework. In fact, the SPI is the only indicator for Target 3 that is rigorously derived from individual species assessments and is spatially quantitative.

This means that the SPI metric doesn't reward countries for setting up protected areas in biodiversity-poor regions. Only those protected areas

that actually include species habitat – particularly for species that are endemic to a country or have small ranges – will increase that country's SPI.

The SPI is calculated annually for all countries and (for marine SPI) exclusive economic zones (EEZ) following a standardized workflow based on the best-available species distribution information of Map of Life combined with the World Database on Protected Areas (WDPA). We also incorporate Other Effective area-based Conservation Measures (OECMs) in SPI calculations.

The 2024 SPI is based on ca. 46,000 species of terrestrial vertebrates and marine mammals and fish, and future updates will include select plant and invertebrate groups. The SPI is developed and maintained by the [Map of Life](#) in partnership with [GEOBON](#) and support from the [Half-Earth Project](#) and the [E.O. Wilson Biodiversity Foundation](#).



THE GLOBAL BIODIVERSITY FRAMEWORK

The SPI has been formally adopted in the Kunming-Montreal Global Biodiversity Framework (GBF) as a component indicator of Target 3, which calls

for the effective conservation and management of 30% of land and sea areas by 2030. The SPI directly addresses several of the central elements of Target 3:

Areas of particular importance for biodiversity

Target 3 calls for “areas of particular importance for biodiversity” to be prioritized in the conservation of land, waters, and sea. The SPI is the only indicator for the target adopted at the headline or component level that directly and quantitatively addresses the importance protected areas play for conserving species. It is also the only species-level indicator, meaning that aggregated metrics are derived from individual species’ assessments. A low SPI can therefore be traced to the exact species and places lacking protection coverage.

Ecologically representative

Target 3 states that 30% of the lands and seas must be “effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures.” The SPI assesses how effectively existing conservation areas incorporate species ranges, thus capturing an essential component of both ecosystems and ecological processes.

Effectively conserved and managed

Target 3 stipulates that protected areas and OECMs must be managed with the primary objective of achieving positive outcomes for biodiversity. Given its explicit nature and disaggregation to the level of single species and places, the SPI informs about the specific biodiversity aspects that make a conservation area high-value and supports their targeted monitoring and management.



HOW TO INTERPRET THE SPI

What causes changes in the SPI over time?

Real changes in WDPA coverage

The de-gazetting or addition of new protected areas or OECMS is the strongest and most obvious driver of SPI change. But location matters immensely – additions of ecologically redundant areas might not increase SPI while conservation additions in the highest-priority locations deliver outsized SPI gains.

Scope of species data included

To support an ecologically sound interpretation and comparison of regions, only species groups with data for all species are included in the SPI calculation. While the report is limited to vertebrates, SPI data for other taxa is available at mol.org/indicators and future SPI updates will include trees and other plant and invertebrate groups. This expansion will identify additional conservation needs and lower overall SPI values.

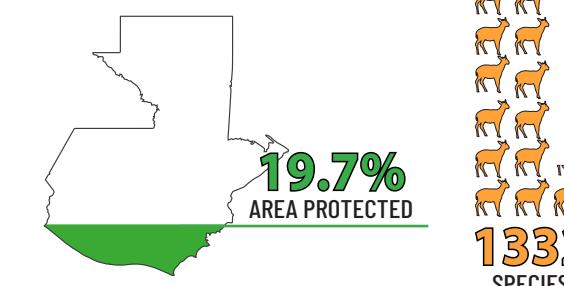
Changes in WDPA reporting

Some countries currently do not share all their protected area data with the WDPA, meaning their SPIs are likely underestimated. Additionally, so far only 15 countries have documented OECMs in the WDPA, but Indigenous and locally-managed conservation areas exist in many other places that, once formally included, will boost SPI.

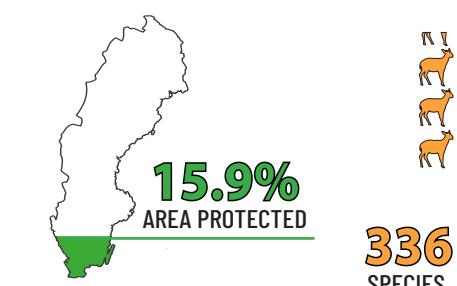
Methods updates

The SPI version in this report uses the data available at this point in time and follows specific decisions regarding the temporal and spatial scope and resolution of species and habitat information. Absolute SPI values in future versions might thus differ slightly due to methodology alone but remain temporally consistent.

Guatemala: SPI = 33.21



Sweden: SPI = 79.29



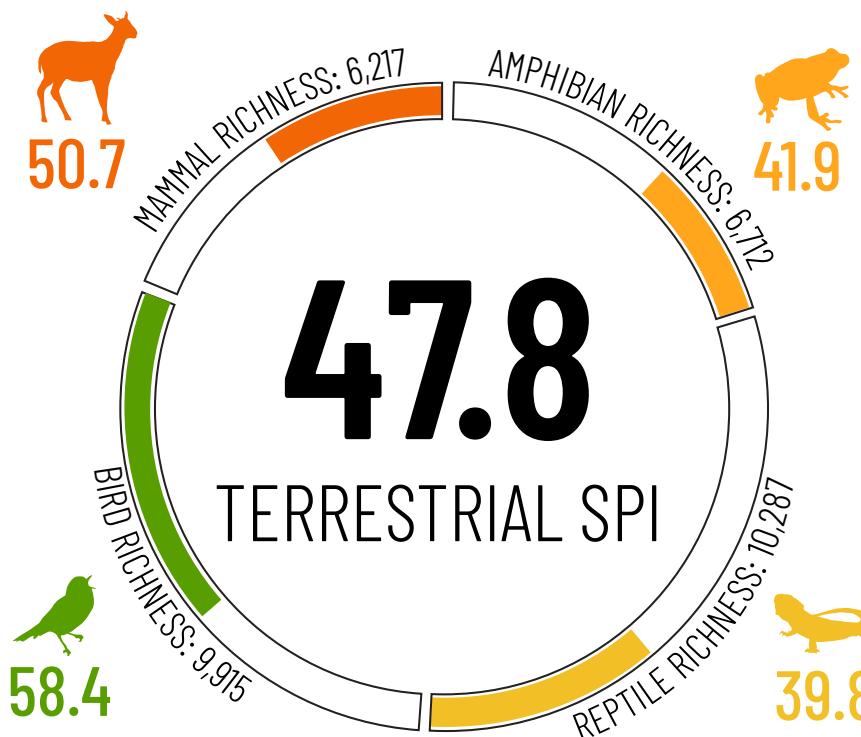
Contextualizing Uneven Burdens

One strength of the SPI is its ability to facilitate quantitative comparisons across different countries. However, since the SPI assesses individual species protection coverage, countries with higher species richness will have a greater “burden” of protection than countries with comparatively low species richness.

Take the example above. Sweden has 15.9%

protection coverage while Guatemala has 19.7%, but Sweden’s SPI is more than twice that of Guatemala’s. This doesn’t necessarily mean that Sweden’s protected areas more effectively conserve biodiversity, however, because Guatemala has four times as many terrestrial vertebrate species as Sweden and therefore a greater burden of biodiversity protection. Both countries are making progress, but Guatemala from the start had a further way to go.

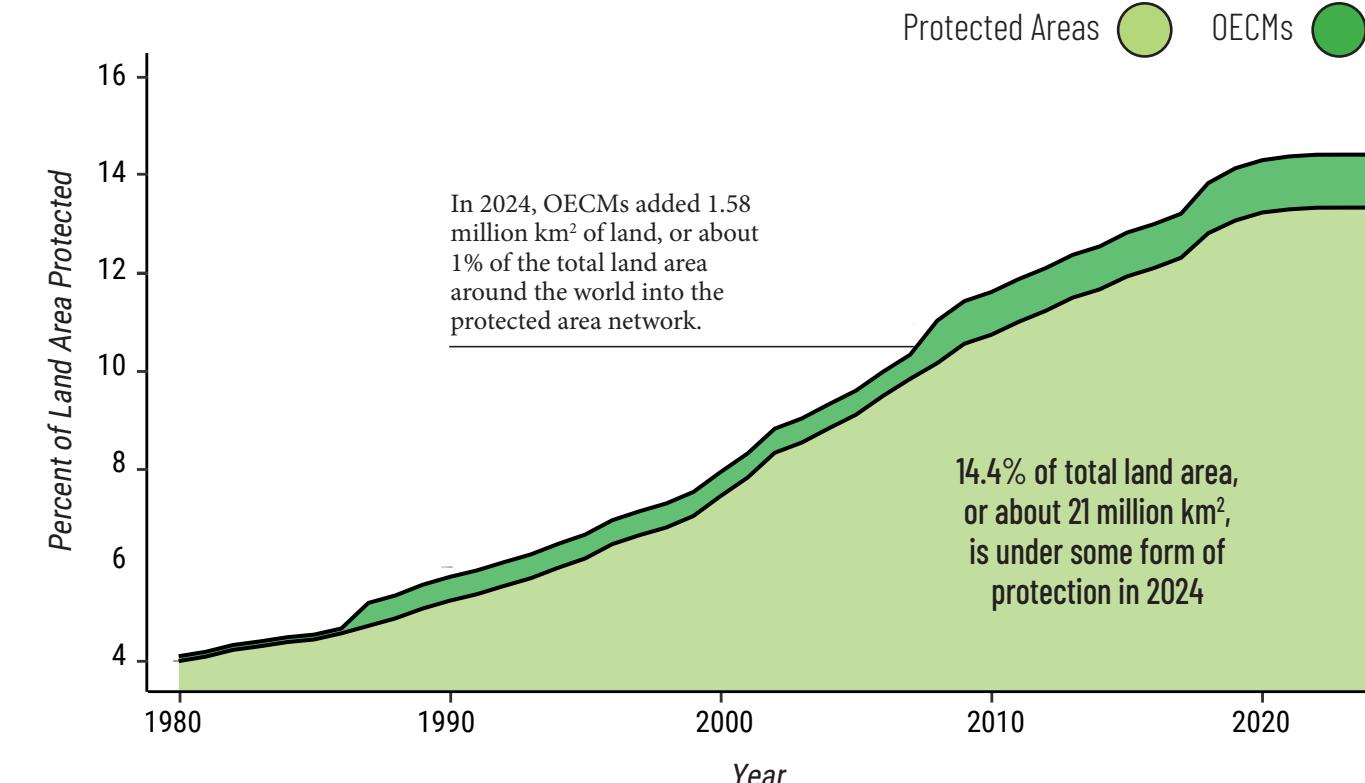
KEY GLOBAL TAKEAWAYS: TERRESTRIAL



QUICK STATS

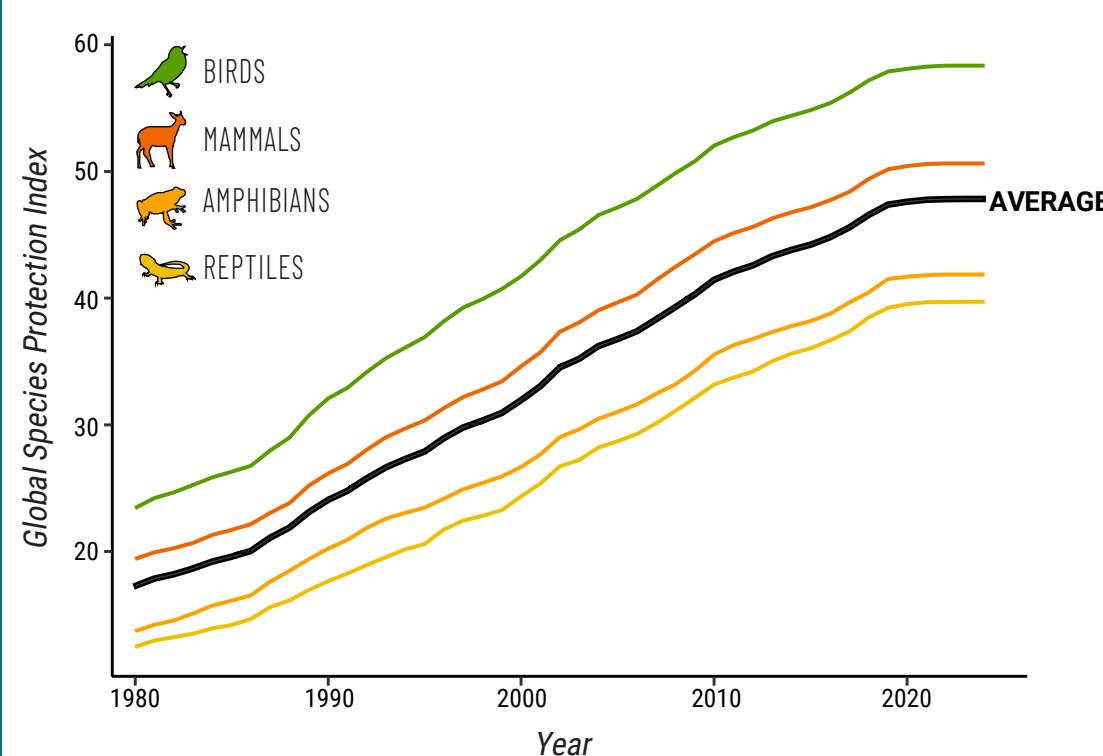
262 COUNTRIES AND TERRITORIES
14.4 % OF LAND AREA PROTECTED
33,131 SPECIES ASSESSED
176,818 UNIQUE SPECIES-COUNTRY PAIRS

Amount of land protected: Protected Areas and OECMs



Global terrestrial SPI has increased by 30 points since 1980.

But, this increase has not happened evenly across taxonomic groups. While birds and mammals have global SPIs higher than the average, amphibians and reptiles are falling behind. All average SPIs have slightly plateaued in the last five years, compared to the steady rate of increase in the decades prior.



Since 2014, 146 countries and territories have increased their SPI.

These three countries had some of the highest SPI increases in the world:



Finland +70 SPI
40,000 km²/13% of additional total land area protected



New Caledonia +20 SPI
900 km²/5% of additional total land area protected



Morocco +50 SPI
138,000 km²/31% of additional total land area protected



Haiti +11 SPI
1200 km²/5% of additional total land area protected

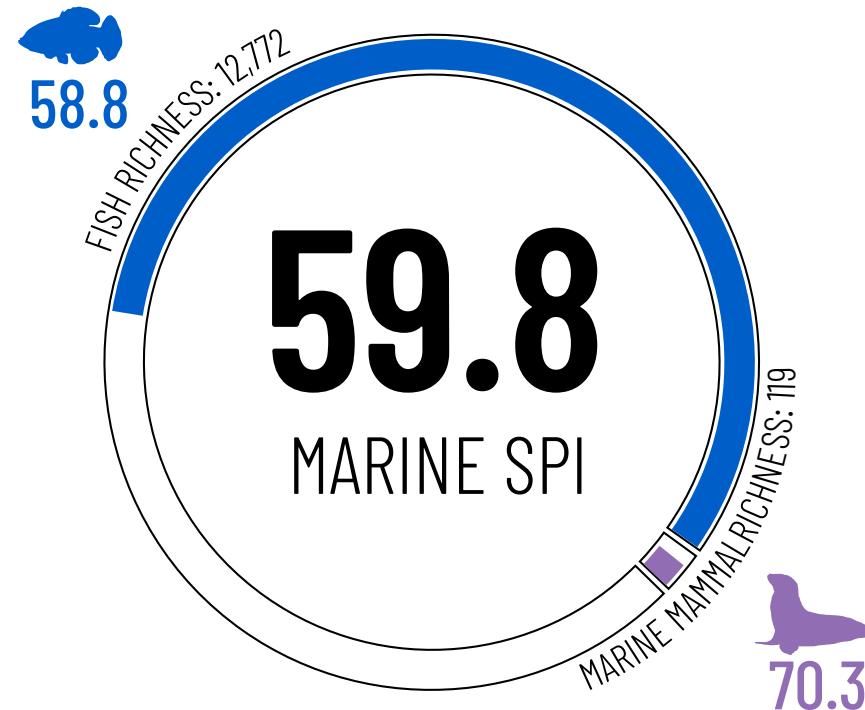


Saudi Arabia +42 SPI
292,000 km²/14% of additional total land area protected



Timor-Leste +6 SPI
500 km²/3% of additional total land area protected

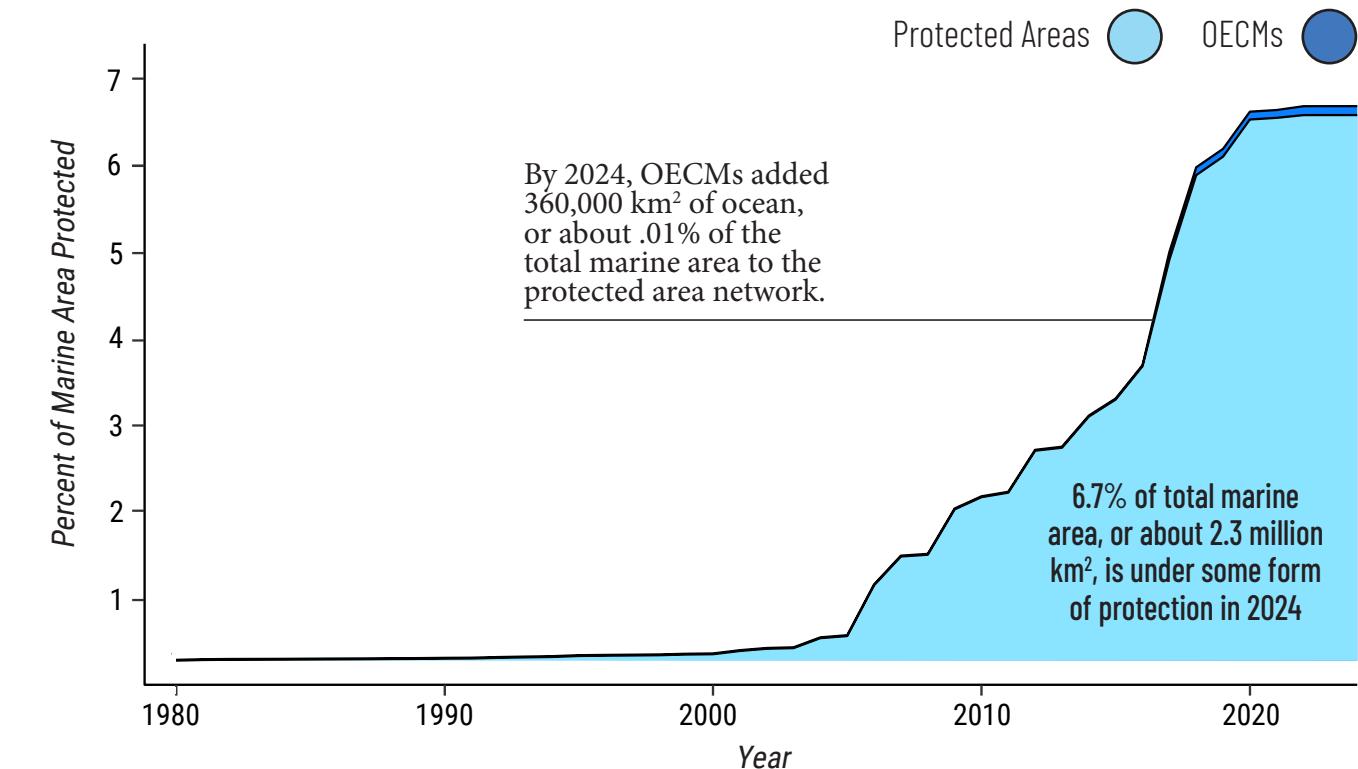
KEY GLOBAL TAKEAWAYS: MARINE



— QUICK STATS —

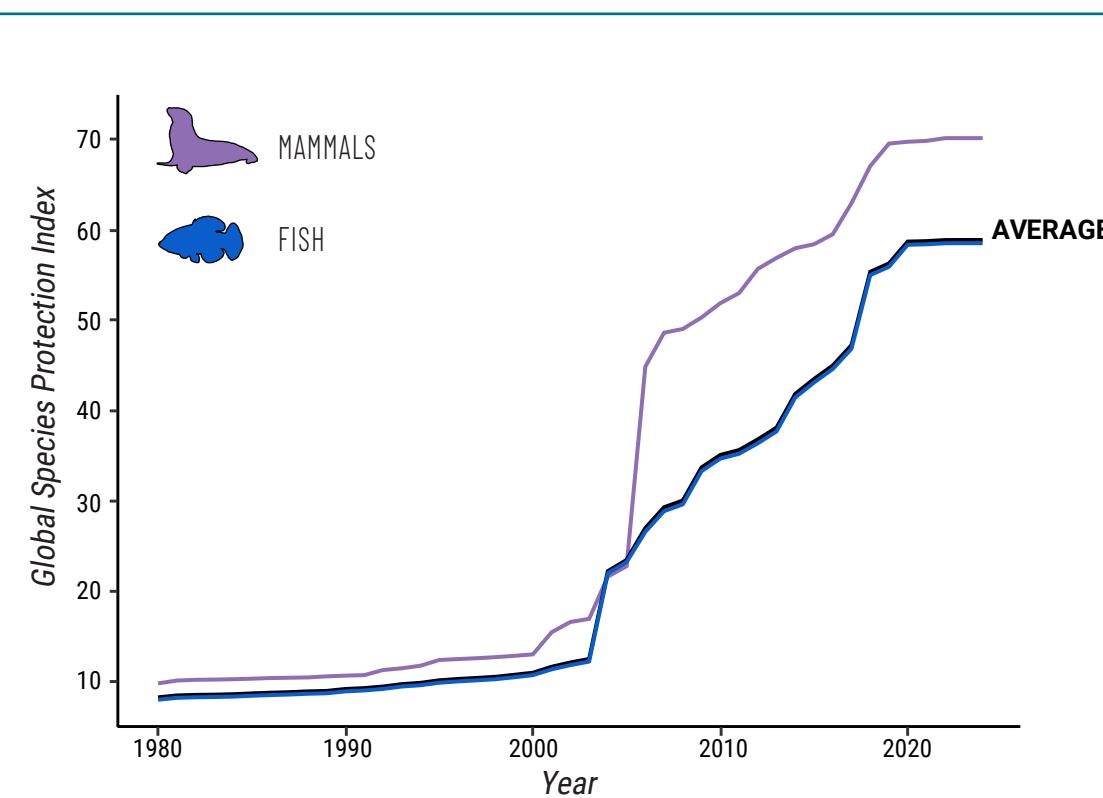
209 COUNTRIES AND TERRITORIES
6.70 TOTAL % OF MARINE AREA PROTECTED
12,891 VERTEBRATE SPECIES ASSESSED
301,039 UNIQUE SPECIES-COUNTRY PAIRS

Amount of land protected: Protected Areas and OECMs



Global marine SPI has increased by 51 points since 1980.

Marine SPI has increased faster than terrestrial SPI. Marine mammals have the highest SPI of all vertebrate groups, while marine fish are more than 10 points behind. Since there are more than 100 times as many marine fish as mammal species, the average marine SPI tracks the marine fish SPI closely.



Since 2014, 119 countries and territories have increased their SPI.

These three countries had some of the highest SPI increases in the world:

Pitcairn +100 SPI
841,000 km²/100% of additional total marine area protected

Martinique +100 SPI
47,000 km²/100% of additional total marine area protected

Norfolk Island +100 SPI
188,000 km²/44% of additional total marine area protected

These three countries had some of the greatest SPI increases relative to the amount of additional area protected:

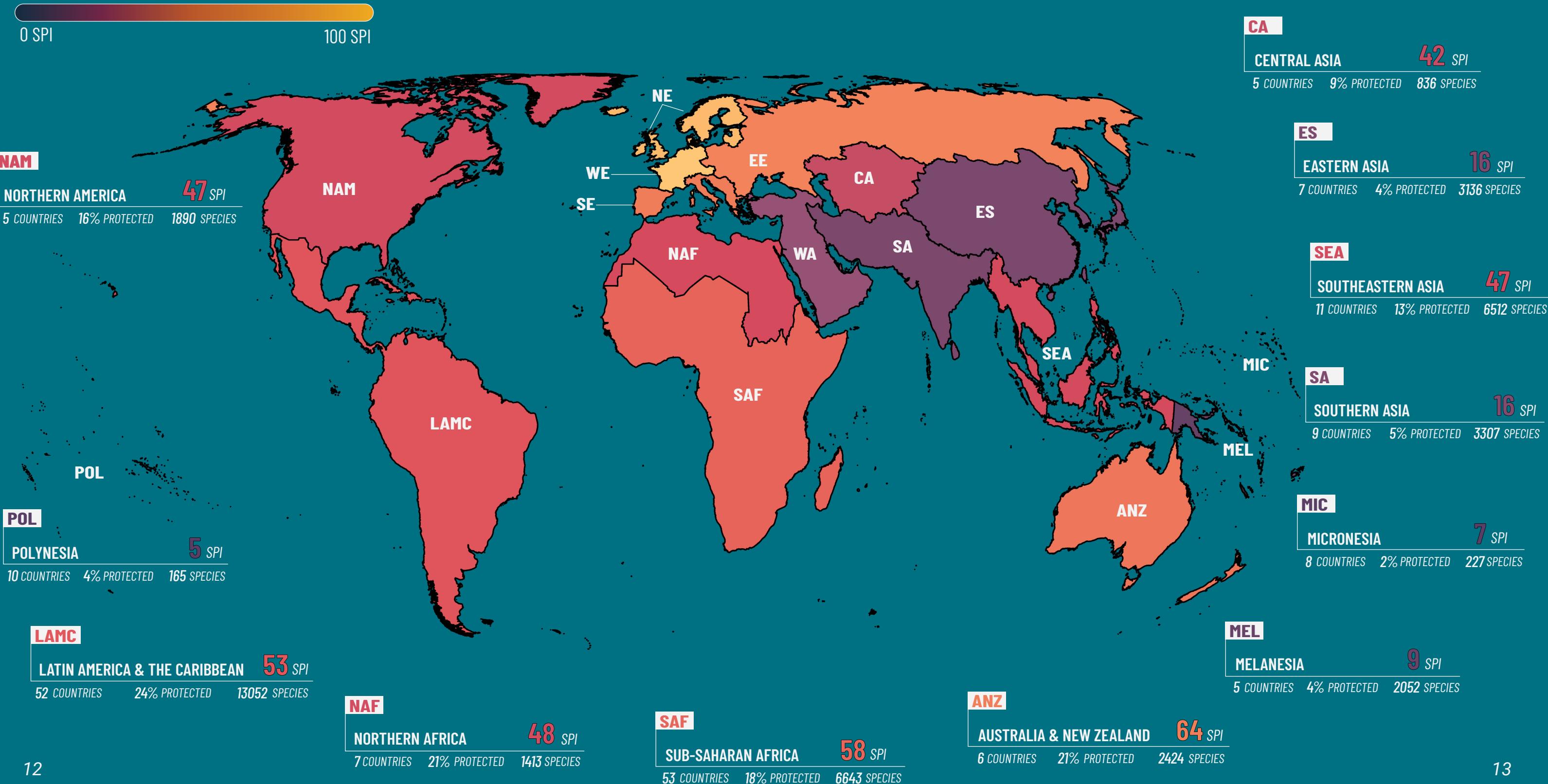
Madagascar +9 SPI
4,800 km²/0.4% of additional total marine area protected

Philippines +21 SPI
28,000 km²/1.4% of additional total marine area protected

Thailand +44 SPI
11,300 km²/4% of additional total marine area protected

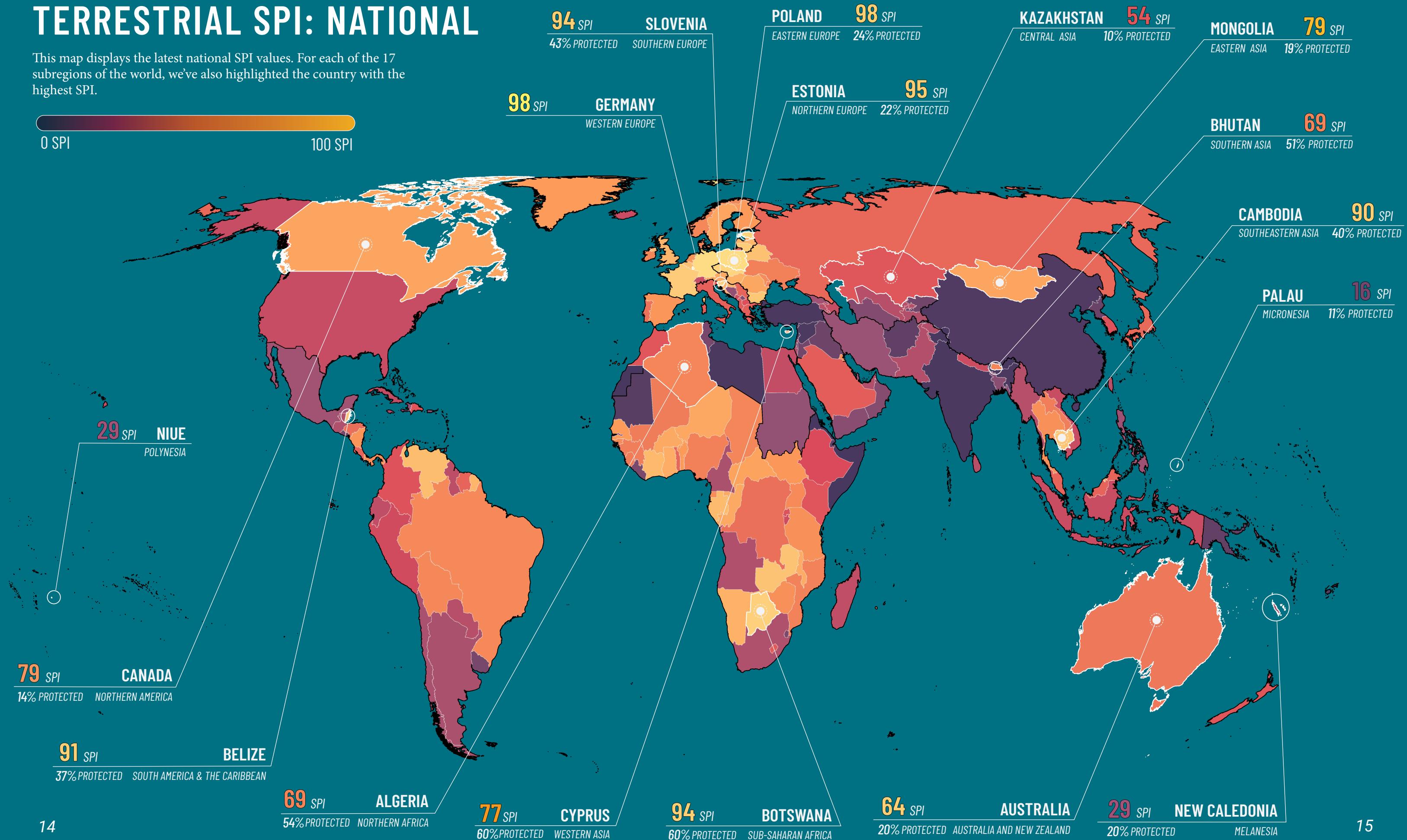
TERRESTRIAL SPI: REGIONAL

At the regional level, terrestrial SPI varies greatly across the globe, from a high of 91 in Western Europe to a low of 5 in Polynesia. Western Europe also has the highest percent of area protected, followed closely by Southern Europe, Northern Africa, Australia & New Zealand, and Latin America & the Caribbean.



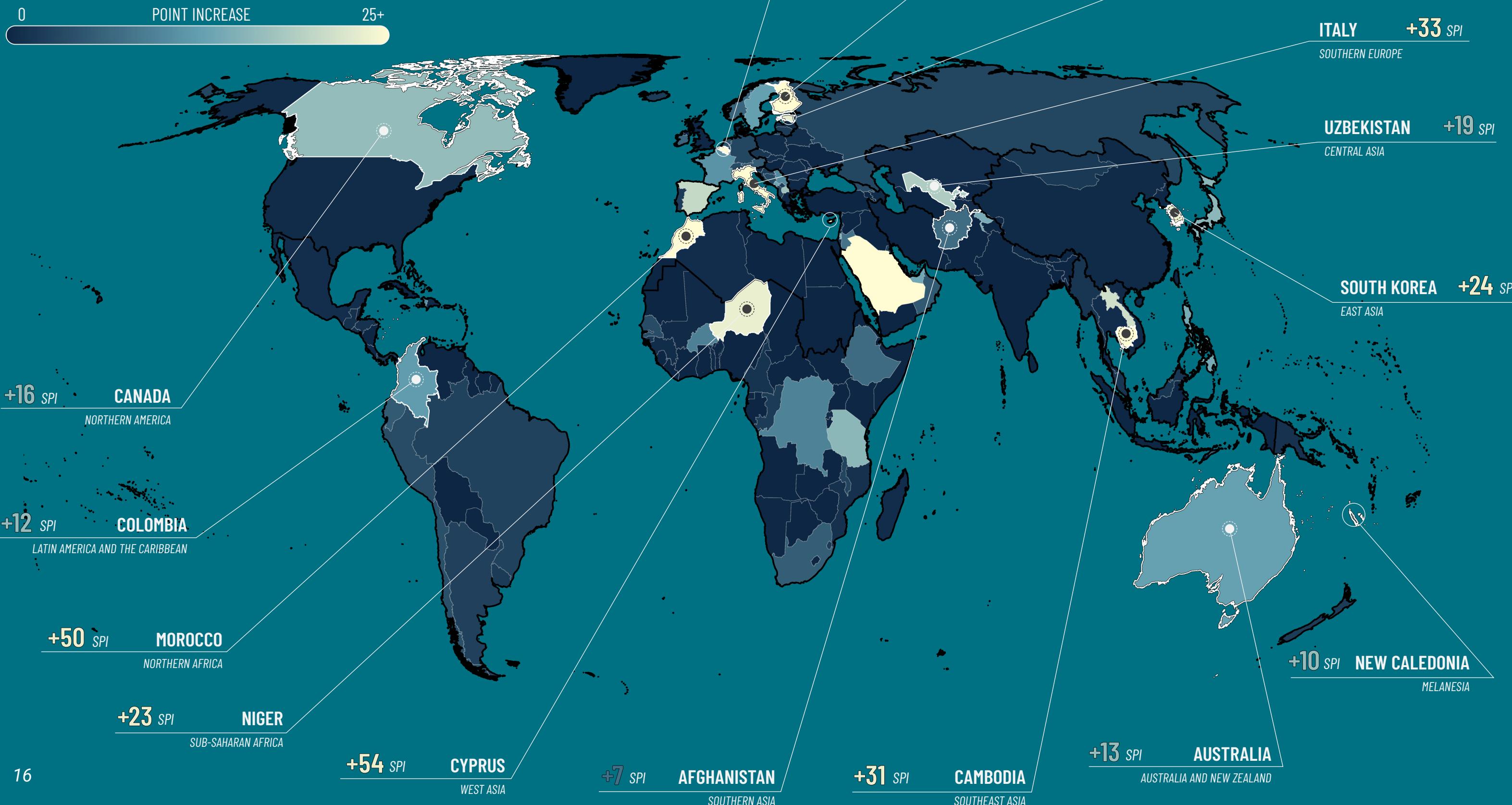
TERRESTRIAL SPI: NATIONAL

This map displays the latest national SPI values. For each of the 17 subregions of the world, we've also highlighted the country with the highest SPI.



TERRESTRIAL SPI: TEN-YEAR CHANGE

Global terrestrial SPI has increased by 4 points in the past ten years with the addition of about 2% of additional protected area. Explore how that change has manifested at the country level. Here, we highlight the country from each subregion that has the greatest SPI increase since 2014.



SPECIES GAPS

Despite much global progress in species conservation, several species around the world still have very low protection scores, meaning only a small portion of their suitable range is included in formal protected areas or OECMs. For some species, this may be due to a lack of documentation of existing protected areas, while for many others, there simply aren't any existing protected areas covering their habitat. Let's explore a few examples from around the world.

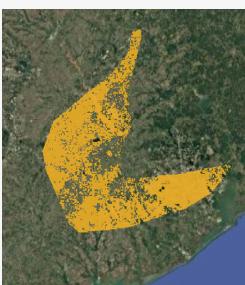
Houston Toad
Anaxyrus houstonensis



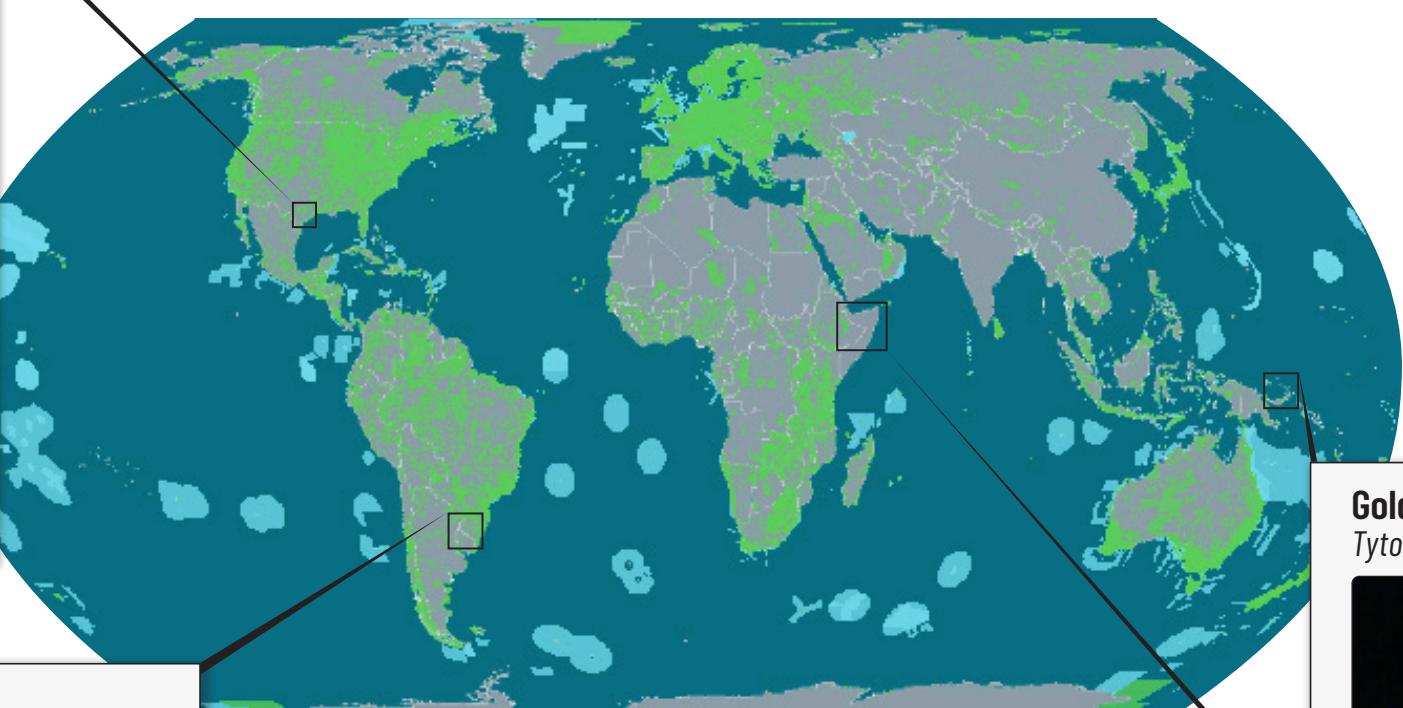
CR

0.51
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)



The Houston Toad is endemic to only a few counties in Texas, in the United States. Urbanization, construction of roads, and destructive agricultural practices have pushed this species, the first amphibian granted protection under the US Endangered Species Act, to the brink of extinction. Almost all of its range occurs on privately owned land, so Texas Fish & Wildlife is working with landowners to enact conservation measures beneficial to the survival of the species.



Uruguay Marked Gecko
Homonota uruguayensis



EN

6.19
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)



The Uruguay Marked Gecko is known from ten localities, mostly in northern and western Uruguay. Its range is heavily fragmented due to several anthropogenic threats, namely rock extraction, cattle grazing, and other agricultural activities, to the bare rocky substrates the species relies on for habitat. This gecko is recognized as a priority species for conservation in Uruguay and increased protection of its dwindling habitat is crucial for its survival. (IUCN)

Speke's Gazelle
Gazella spekei



EN

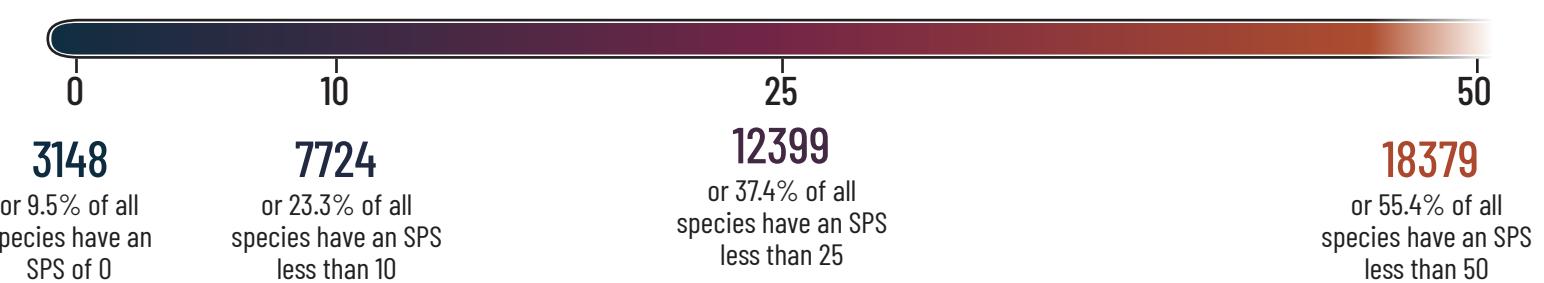
0.00
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)



Speke's Gazelle is one of many animal casualties of political instability and military conflict. Once widespread over the Horn of Africa, this species is now possibly extinct in Ethiopia and heavily exploited and threatened in Somalia, where hunting for the illegal wildlife trade and expanding agricultural pressure continue to threaten the population. Speke's Gazelle highlights the crucial fact that species protection cannot be achieved without peace and prosperity for all people.

SPECIES PROTECTION SCORES



More than half (55.5%, or over 18,000 species) of all assessed terrestrial vertebrate species have a Species Protection Score less than 50, and a shocking 9.5% have an SPS of 0. Many of these more than 3,000 species have small, limited ranges with no formal protection, and many of their populations are in decline. Since 2014, nearly 12,000 of the species with unmet protection targets have had no change in their protection scores.

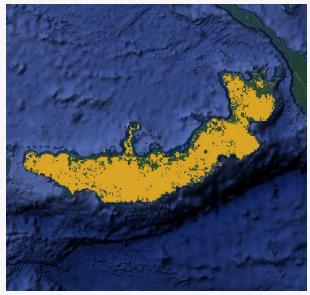
Golden Masked Owl
Tyto aurantia



VU

1.14
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)

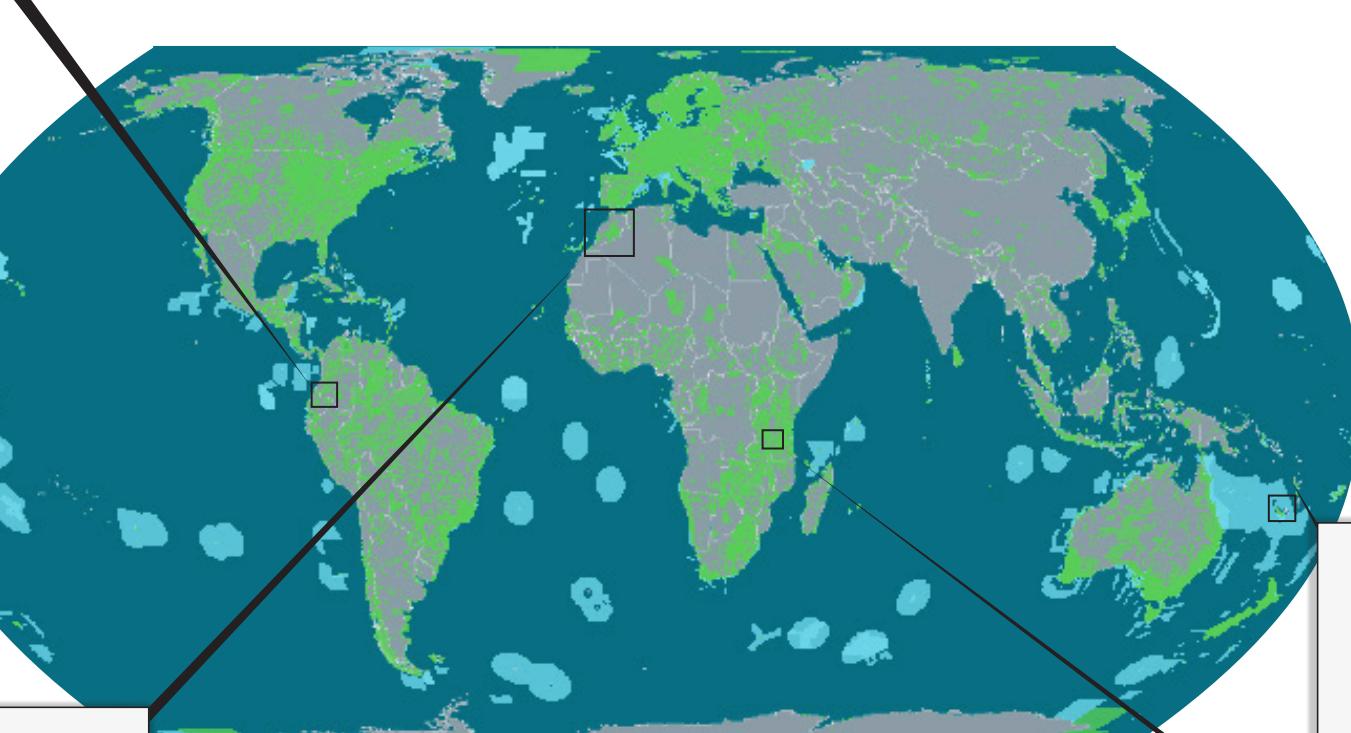
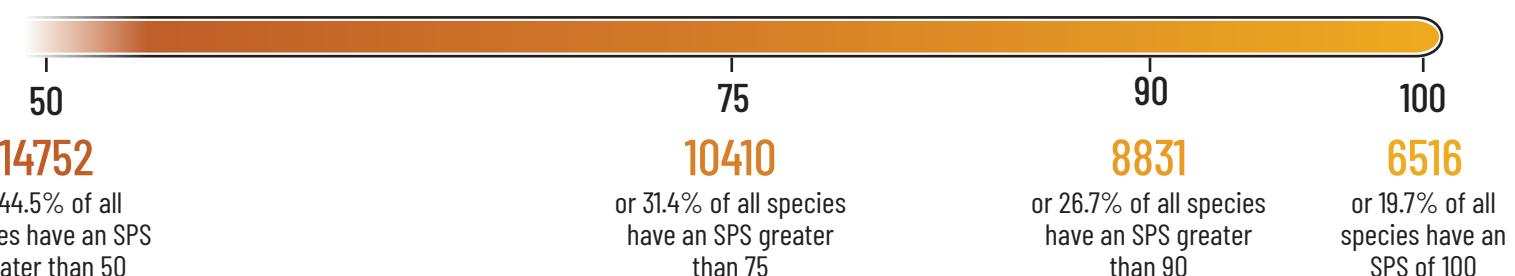


This enigmatic owl is endemic to the New Britain island of Papua New Guinea, where only a few thousand are estimated to remain in forest habitats. While its exact habitat needs are still uncertain to researchers, it is likely that forest clearance for palm oil and industrial logging threaten the owl's survival. A well-managed network of preserves on the island is crucial to halting forest loss and conversion trends, which would be beneficial to the conservation of the Golden Masked Owl and many of its neighbors.

SPECIES SUCCESSES

Over the last ten years, the establishment of new conservation areas and the upgrading protection status of existing conservation areas has led to hundreds of terrestrial vertebrate species reaching or nearly reaching their protection targets. Let's explore a few examples of species from around the world whose protection scores greatly increased since 2014 and the conservation measures that led to these successes.

SPECIES PROTECTION SCORES



Cocha Antshrike
Thamnophilus praecox

NT

6 → 99
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)

The Cocha Antshrike is a near-threatened bird found only in the forests of northeastern Ecuador and in small areas across the Colombian border. In 2017, the Cuyabeno-Lagartococha-Yasuní Wetlands complex, which covers a large part of this species' suitable range, was officially recognized as a wetland of international importance under the RAMSAR Convention.

Less than half (45.5%, or nearly 15,000 species) of all assessed terrestrial vertebrate species have a Species Protection Score greater than 50 and one-fifth of all species protection targets have been met. Since 2014, we have fully reached the protection target of nearly one thousand species, 363 species gained some amount of protection for the first time, and 415 species have had their protection scores increase by at least 50 points.

Barbary Ground Squirrel
Atlantoxerus getulus

LC

31 → 100
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)

The Barbary Ground Squirrel is widespread across much of Morocco. In recent years, it has met its protection target in part thanks to efforts by the Moroccan government to officially recognize OECMs. Currently, Morocco has 130,000 km² of land protected through OECM status. Although all OECMs may not achieve the same conservation outcomes, their recognition is an important step toward achieving 30x30.

Loveridge's Forest Frog
Probreviceps loveridgei

EN

5 → 97
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)

This endangered frog lives in severely fragmented and isolated patches of montane forest habitats of Tanzania's Eastern Arc Mountains. The largest part of its range is protected by the Uzungwa Scarp Nature Reserve, which was upgraded in 2017 by Tanzania's Ministry of Natural Resources and Tourism from the previous forest reserve status to increase the level of protection.

Crested Gecko
Correlophus ciliatus

VU

41 → 90
SPECIES PROTECTION SCORE

[VIEW ON MOL](#)

The Crested Gecko, like many New Caledonian species, is threatened by invasive species and land use change, particularly the destructive nickel mining industry which harms Indigenous communities and biodiversity alike. In 2019, the Natural Park of the Forgotten Coast (Woen Vùù – Pwa Pereèù) was established in the Southern Province across nearly 100,000 hectares of land and nearly 30,000 hectares of marine area, providing significant additional protection to this gecko and many other species. This designation led to the freezing of 102 mining concessions.

MARINE SPI: REGIONAL

At the regional level, marine SPI varies greatly across the globe, from a high of 97 in Western Europe to a low of 2 in Southern Asia.



NE
NORTHERN EUROPE **55 SPI**
16 COUNTRIES 9% PROTECTED 747 SPECIES

EE
EASTERN EUROPE **3 SPI**
10 COUNTRIES 2% PROTECTED 677 SPECIES

WE
WESTERN EUROPE **97 SPI**
9 COUNTRIES 38% PROTECTED 1003 SPECIES

SE
SOUTHERN EUROPE **62 SPI**
16 COUNTRIES 11% PROTECTED 1196 SPECIES

WE
WESTERN ASIA **10 SPI**
18 COUNTRIES 1% PROTECTED 2869 SPECIES

NAM
NORTHERN AMERICA **31 SPI**
5 COUNTRIES 8% PROTECTED 2972 SPECIES

ES
EASTERN ASIA **62 SPI**
7 COUNTRIES 10% PROTECTED 5203 SPECIES

POL
POLYNESIA **33 SPI**
10 COUNTRIES 29% PROTECTED 4487 SPECIES

SEA
SOUTHEASTERN ASIA **45 SPI**
11 COUNTRIES 3% PROTECTED 5587 SPECIES

LAMC
LATIN AMERICA & THE CARIBBEAN **42 SPI**
52 COUNTRIES 18% PROTECTED 5021 SPECIES

SA
SOUTHERN ASIA **2 SPI**
9 COUNTRIES 0.3% PROTECTED 3846 SPECIES

NAF
NORTHERN AFRICA **19 SPI**
7 COUNTRIES 2% PROTECTED 2946 SPECIES

MIC
MICRONESIA **87 SPI**
8 COUNTRIES 21% PROTECTED 5299 SPECIES

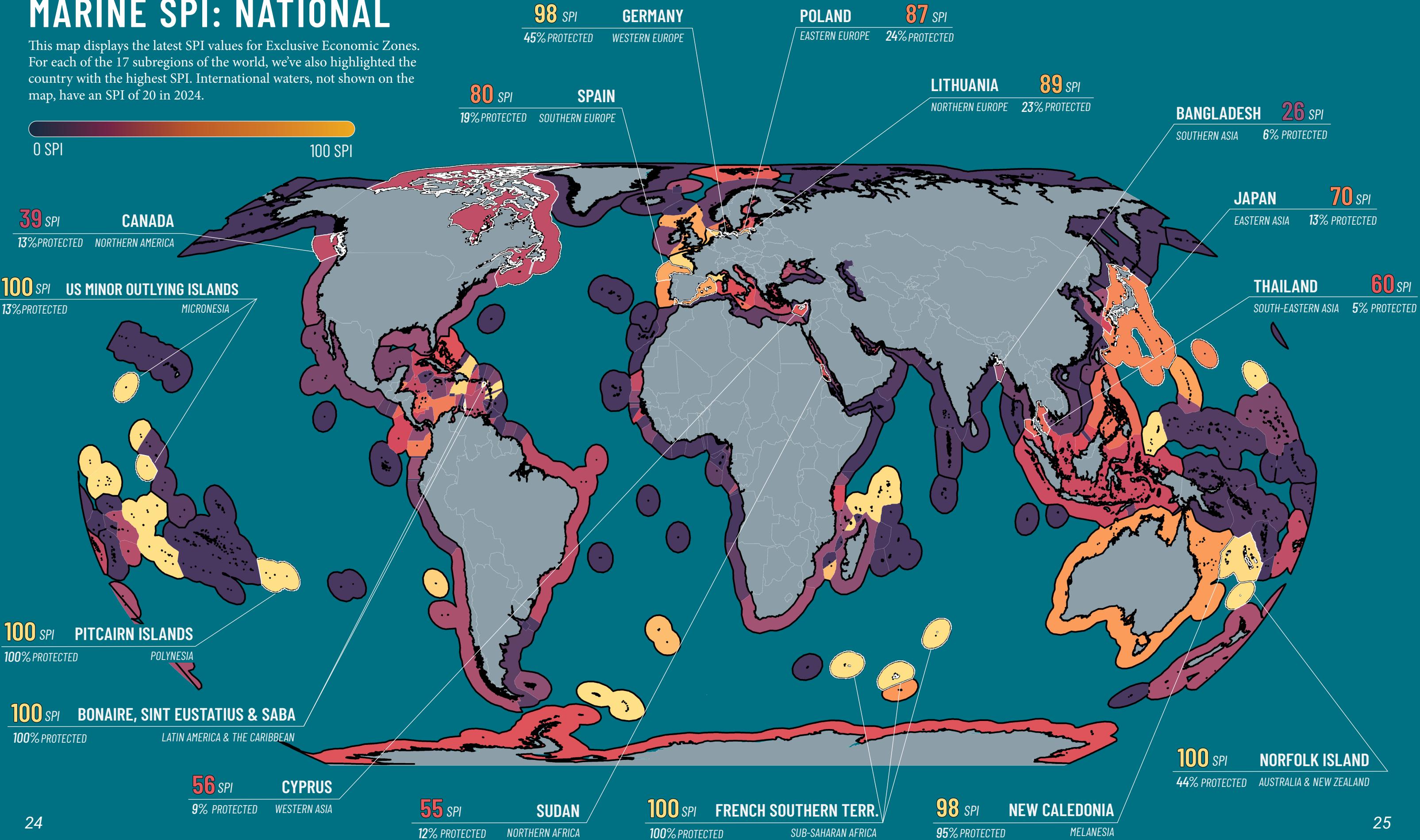
SAF
SUB-SAHARAN AFRICA **47 SPI**
53 COUNTRIES 22% PROTECTED 4446 SPECIES

ANZ
AUSTRALIA & NEW ZEALAND **35 SPI**
6 COUNTRIES 35% PROTECTED 6705 SPECIES

MEL
MELANESIA **55 SPI**
5 COUNTRIES 16% PROTECTED 5055 SPECIES

MARINE SPI: NATIONAL

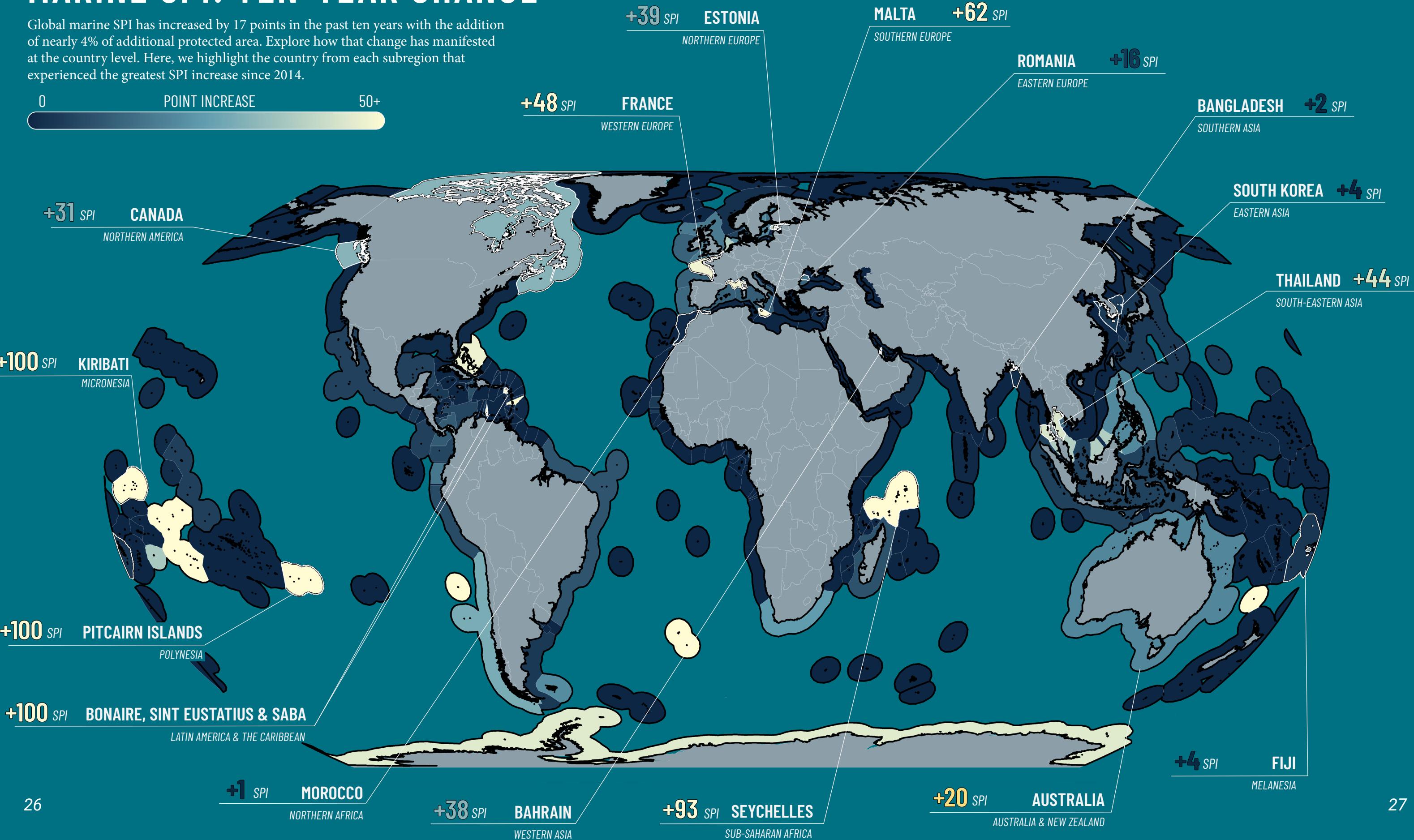
This map displays the latest SPI values for Exclusive Economic Zones. For each of the 17 subregions of the world, we've also highlighted the country with the highest SPI. International waters, not shown on the map, have an SPI of 20 in 2024.



MARINE SPI: TEN-YEAR CHANGE

Global marine SPI has increased by 17 points in the past ten years with the addition of nearly 4% of additional protected area. Explore how that change has manifested at the country level. Here, we highlight the country from each subregion that experienced the greatest SPI increase since 2014.

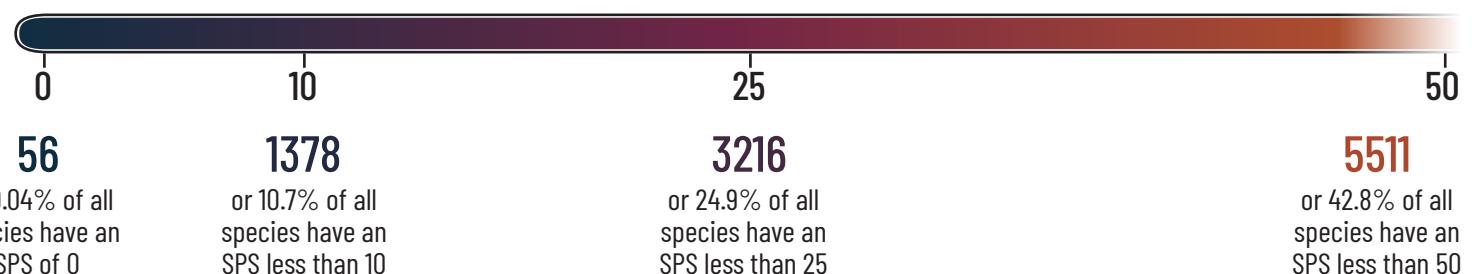
0 POINT INCREASE 50+



SPECIES GAPS

Despite much global progress in marine species conservation, several species around the world still have very low protection scores, meaning only a small portion of their suitable range is included in formal marine protected areas or OECMs. The added challenge for many marine species is that most of their ranges are in international waters, meaning multinational collaboration is required in order to establish effective protected areas in their habitats, but many areas within countries' exclusive economic zones are still also underprotected. Let's look at a few examples.

SPECIES PROTECTION SCORES



Three-Banded Butterflyfish

Chaetodon robustus



9
SPECIES
PROTECTION
SCORE

[VIEW ON MOL](#)



The Three-Banded Butterflyfish lives in the central Atlantic Ocean off the coast of western Africa, often inhabiting rocky shallow waters. While some marine protected areas occur across its range along the Western Africa coast, Cameroon, and Gabon, protection is extremely limited along the northern coast of the Gulf of Guinea. Thankfully, this species does not face significant fishing pressure.

Franciscana

Pontoporia blainvilliei



10
SPECIES
PROTECTION
SCORE

[VIEW ON MOL](#)



This dolphin inhabits the shallow coastal waters of southeastern Brazil, Uruguay, and Argentina where it is listed as vulnerable due to threats from fishing bycatch, particularly by gillnet fisheries which pose the mortality for this species. While some marine protected areas occur over its range, the Franciscana is still far from meeting its protection target. The most effective protected areas would reduce or halt the bycatch of this vulnerable species.

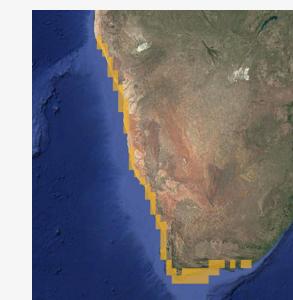
Heaviside's Dolphin

Cephalorhynchus heavisidii



11
SPECIES
PROTECTION
SCORE

[VIEW ON MOL](#)



Heaviside's Dolphin inhabits the shallow coastal waters of Angola, Namibia, and western South Africa. The threats impacting this species are not well understood, but it's likely that fisheries, industrial coastal development, and mining projects all pose risks for this species' survival. Marine protected areas over Heaviside's Dolphin's habitat are sparse and scattered, leading to the species' low protection score.

Brown Numbfish

Narcine timlei



16
SPECIES
PROTECTION
SCORE

[VIEW ON MOL](#)

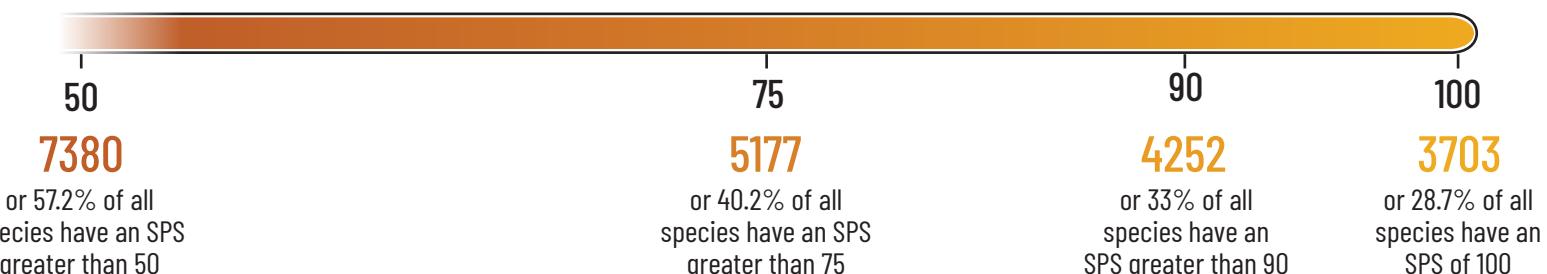


Though widespread across the shallow waters of southern and southeastern Asia, this small fish is classified as vulnerable due to the high incidence of bycatch it experiences in industrial and artisanal fisheries. Several small marine protected areas exist across its range, but the combined area is not sufficient to meet this species' protection target, and in many of these existing areas, fishing regulations are not strictly enforced.

SPECIES SUCCESSES

Over the last ten years, the establishment of new marine conservation areas and the upgrading protection status of existing conservation areas has led to hundreds of marine vertebrate species reaching or nearly reaching their protection targets. Let's explore a few examples of species from around the world whose protection scores greatly increased since 2014 and the conservation measures that led to these successes.

SPECIES PROTECTION SCORES



Atlantic White-Sided Dolphin

Lagenorhynchus acutus



54→90
SPECIES PROTECTION SCORE



[VIEW ON MOL](#)

This species occurs across the North Atlantic ocean with the majority of its habitat occurring in international waters. In 2021, the multinational Convention for the Protection of the Marine Environment of the NorthEast Atlantic (OSPAR) established the North Atlantic Current and Evlanov Sea Basin marine protected area covering nearly 600,000 km² of international ocean. Initially aimed at supporting seabird conservation, this new area also protects substantial portions of this dolphin's habitat along with many other marine species.

Pygmy Beaked Whale

Mesoplodon peruvianus



10→86
SPECIES PROTECTION SCORE



[VIEW ON MOL](#)

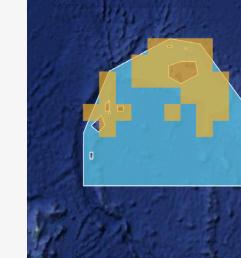
The Pygmy Beaked Whale lives in the tropical eastern Pacific Ocean, from Mexico down to Peru. This species got a big boost in its protection score thanks to the protection of the Revillagigedo Archipelago off the coast of Mexico. The Archipelago was designated a World Heritage Site in 2016 and declared a national park in Mexico the following year, making it the largest marine protected area in Mexican waters at 150,000 km².

Seychelles Anemonefish

Amphiprion fuscocaudatus



0→86
SPECIES PROTECTION SCORE



[VIEW ON MOL](#)

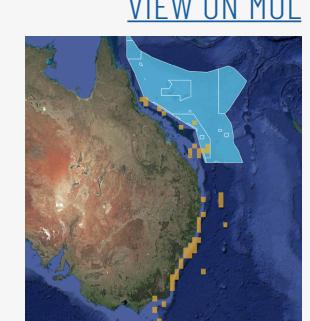
The Seychelles Anemonefish is found in the shallow tropical waters of the western Indian Ocean, primarily off the coast of the Seychelles. Thanks to huge progress in the Seychellois marine protection efforts, this species has nearly met its protection target. Notably, the Amirantes to Fortune Bank area was designated an Area of Outstanding Natural Beauty in 2018 protecting over 170,000 km², and the Aldabra National Park was also established in 2018 covering a similar area size.

Saddled Swellshark

Cephaloscyllium variegatum



2→54
SPECIES PROTECTION SCORE



[VIEW ON MOL](#)

The Saddled Swellshark is a rare, near threatened species endemic to the benthic oceans off the coast of western Australia, where it is threatened by trawling activities. A large portion of its northern range is covered by the Coral Sea Marine Reserve. Initially established in 2013 as a Marine Park, this protected area – Australia's largest single marine protected area clocking in at 680,000 km² – received official protection measures and a formal management plan in 2018, thus improving the conservation of many species within, including the Saddled Swellshark.

SUBNATIONAL SPI

Since calculation of the SPI begins at the individual species level, we can aggregate this data into regional metrics at any subnational or regional levels that are meaningful for biodiversity conservation monitoring and decision making. We have recently updated our global SPI calculations to include province- and state-level SPI metrics, which we now calculate annually for the entire world.

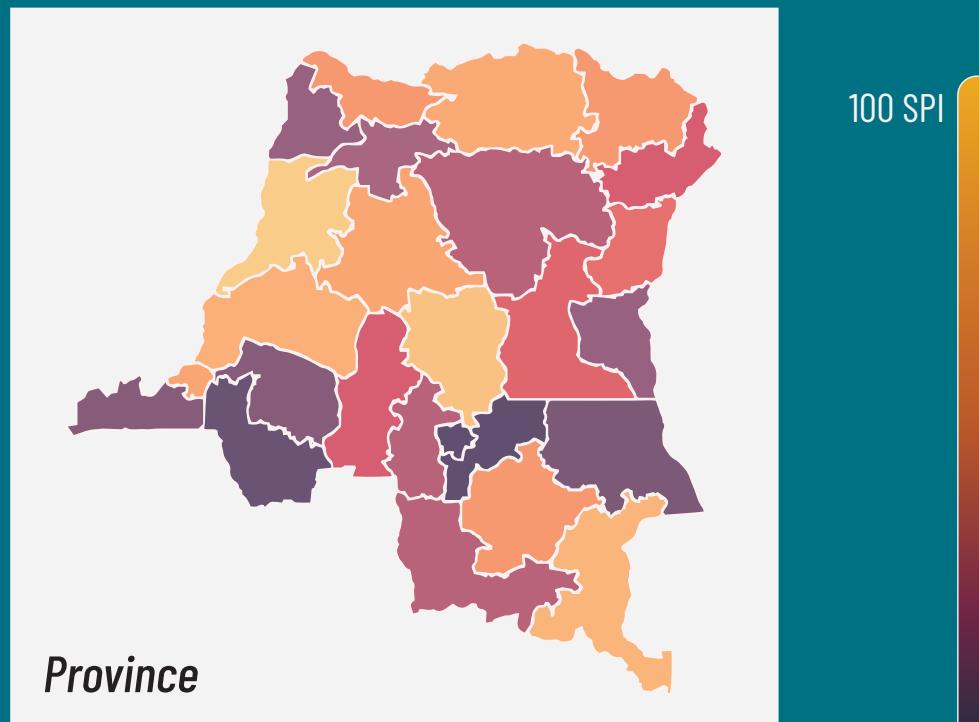
Province-level SPI allows us to explore spatial patterns in the SPI at subnational levels. This kind of exploration can reveal areas of a country that are still severely lacking in effective protected area coverage even when the national SPI is high.

Let's look at an example of a subnational SPI breakdown and what it can reveal about the state of species protection within a country.

The Blue Monkey, *Cercopithecus mitis*, is native to Central and East Africa, including large parts of eastern DRC. It has met its protection target with an SPS of 100.

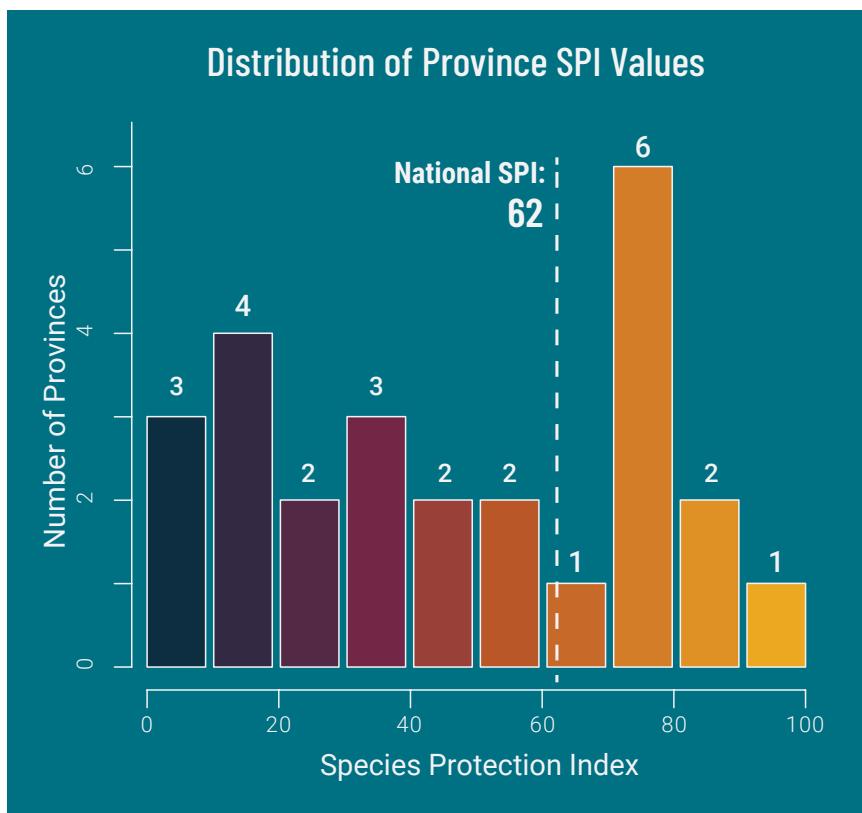


Democratic Republic of the Congo (DRC)



100 SPI
0 SPI

Distribution of Province SPI Values



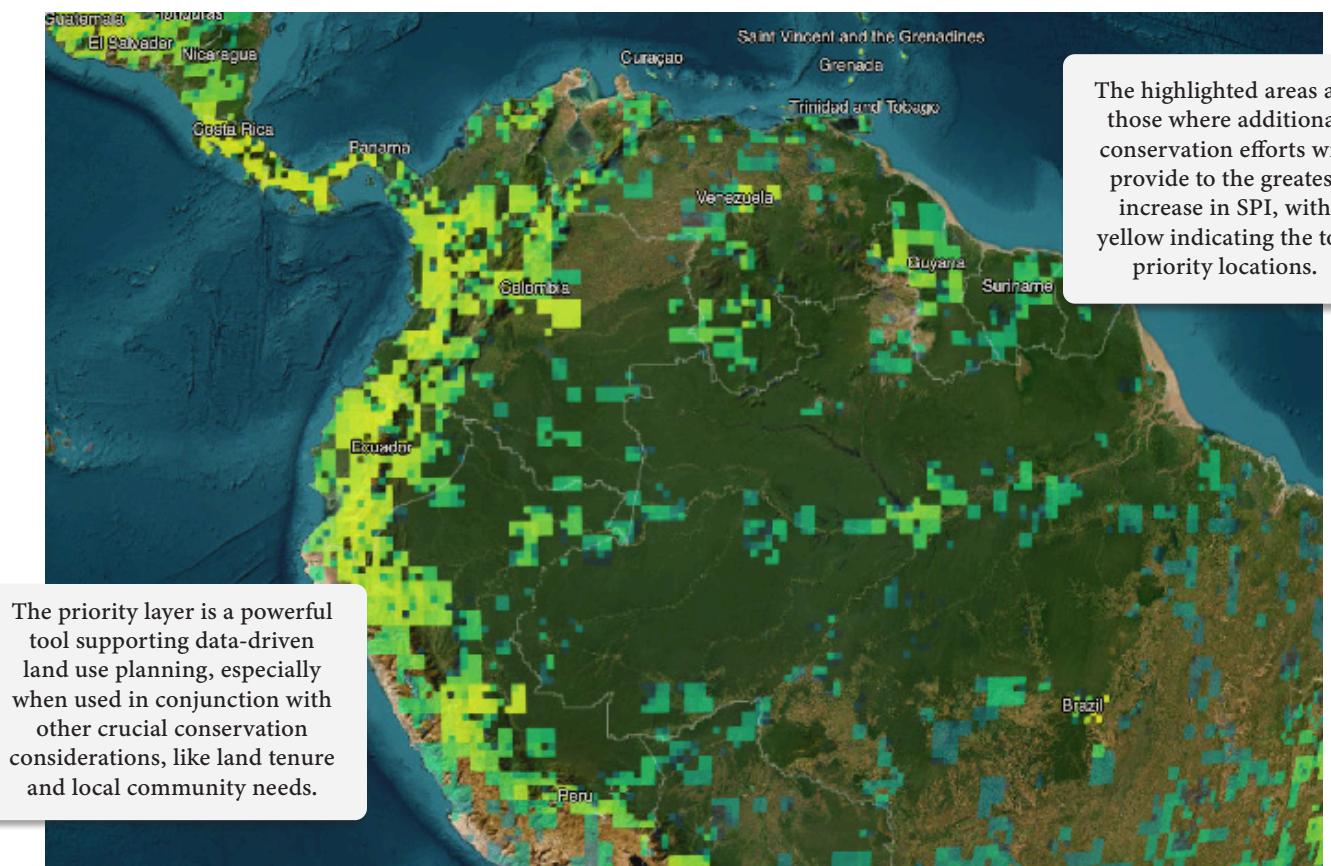
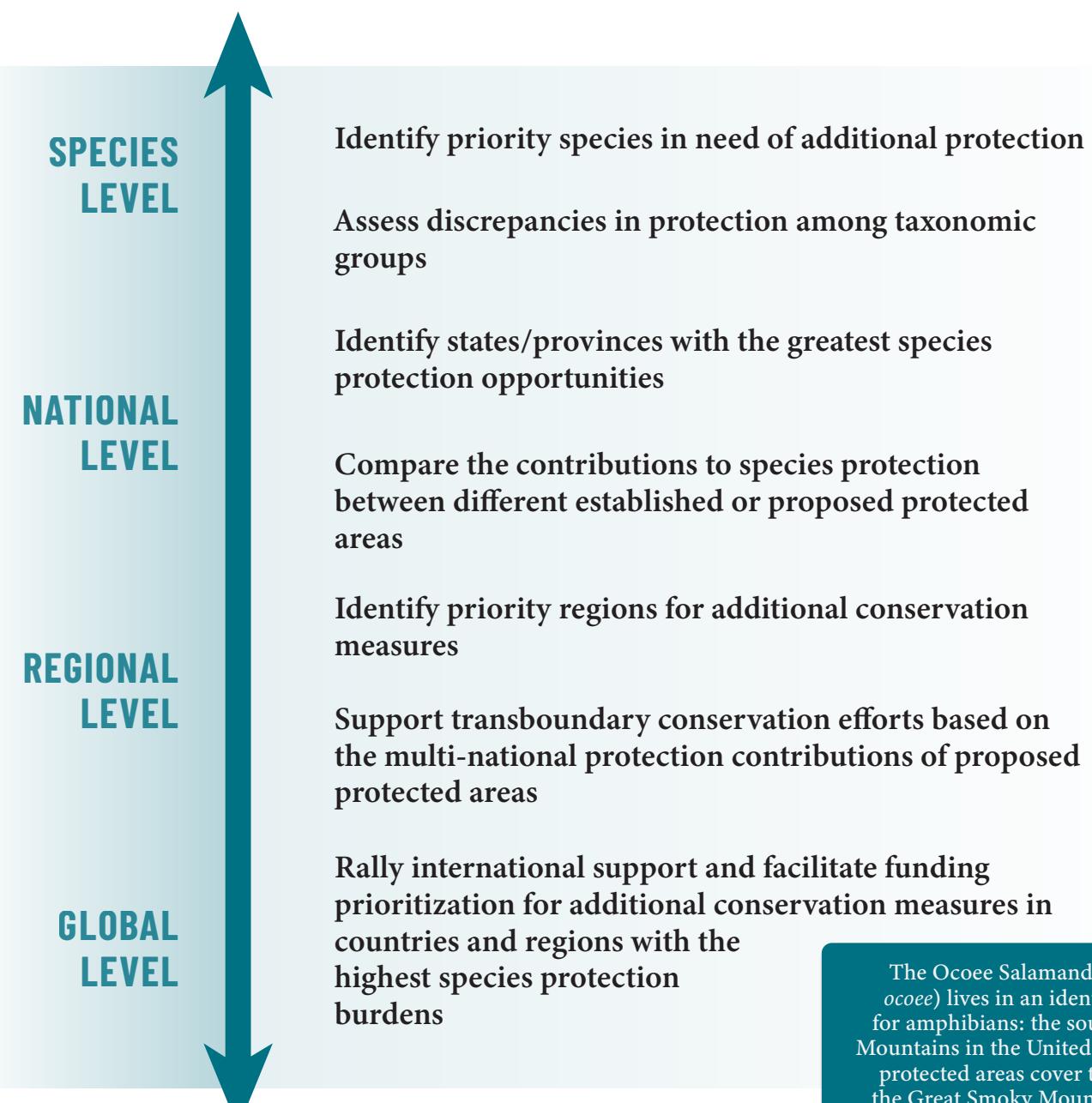
This side-by-side of the DRC's national and province level SPI reveals a large diversity of province-level SPI values – from the Kasai-Oriental province's SPI of 0 to the Équateur province's SPI of 91. Ten provinces have an SPI greater than the national average of 62 while the remaining 16 provinces have an SPI lower than the national average. This kind of analysis might suggest that additional conservation measures could be focused in certain provinces in order to achieve the greatest biodiversity conservation outcomes.

THE SPI AS A DECISION-SUPPORT TOOL

Beyond just a tool for monitoring species conservation, the SPI actively supports conservation decision making at multiple scales. The SPI can fit a variety of institutional and management needs, from individual species prioritization to global resource allocation. Many of these uses are already met by the calculations we run annually at a global scale at the Map of Life, which are also accessible on the

[Half-Earth Project Map](#). Finer needs can be explored through additional partnership with us (see *Case Studies* section for examples).

Here, we provide several examples of decision support the SPI can provide and explore in depth how the SPI can support land-use planning through priority region identificaiton.



Land Use Planning with Priority Layers

In conjunction with the SPI, Map of Life generates a global conservation prioritization layer that identifies areas of the Earth's land and ocean surface most important for biodiversity protection. This map uses the SPI, distribution data for vertebrates and trees, and the latest annual version of the WDPA to identify those currently unprotected areas in the biosphere that, if given effective protection, would

maximize species conservation impact and therefore the SPI. Furthermore, our priority layers can be disaggregated into each component taxonomic group, thus identifying the highest priority areas for each. These layers can all be explored on the Half-Earth Project Map. Above, we look at an example of the combined priority layer centered in the Amazon Basin.

The Ocoee Salamander (*Desmognathus ocoee*) lives in an identified priority area for amphibians: the southern Appalachian Mountains in the United States. Though some protected areas cover this region, such as the Great Smoky Mountain National Park, protection coverage is still inadequate for many species, including the Ocoee Salamander, which currently has an SPS of 32.

CASE STUDY: NATURE & CULTURE INTERNATIONAL, ECUADOR

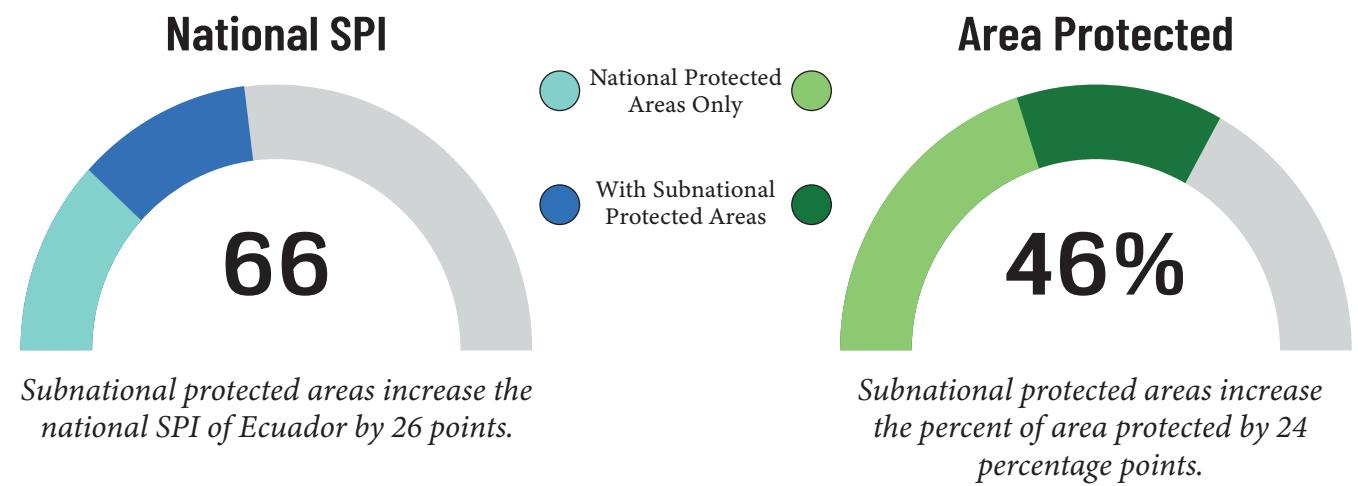
The WDPA is the most authoritative source on global protected areas, but some conservation areas remain undocumented in the database for various reasons, so their contribution to species protection isn't being recorded in our globally calculated SPI.

Nature and Culture International (NCI) is an organization working with local communities to protect biodiverse ecosystems in Central and South America. An important part of their work is the creation and maintenance of subnational protected areas that, while important to people and

biodiversity, are not yet formally recognized at the national level and therefore not in the WDPA.

We partnered with NCI to assess the impact of subnational protected areas on species protection in Ecuador. Our SPI analysis revealed the substantial effect that subnational protected areas have on national and province-level species protection. For 153 terrestrial vertebrate species, subnational areas provided the only protection coverage, and for 35 of these species, subnational areas completely met their protection targets.

Key results of the NCI-MOL SPI analysis:



Protecting Biodiversity and Key Ecosystem Services of Gualaceo County in the Andean Corridor

The Reserva Municipal Gualaceo, established in 2014, spans 16,440 hectares of diverse montane forests and Páramo ecosystems east of Cuenca, Ecuador. It lies within the Andean Corridor, a key biodiversity hotspot. Home to the spectacled bear and mountain tapir, two iconic umbrella species, this reserve is essential for the connectivity of their populations. It also harbors other endangered and endemic species and provides critical water resources for surrounding communities. The protection of

this area has contributed to a 24% reduction in deforestation rates, protecting countless species and securing ecosystem services for local communities.

The region is under threat from agricultural expansion, mining, and other human activities, which jeopardize biodiversity through habitat loss and fragmentation and by intensifying human-wildlife conflict.

Nature and Culture's Response

NCI worked with the local government to designate the Reserva Municipal Gualaceo as a subnational area for conservation and sustainable use. This move was pivotal in safeguarding vital habitats and ensuring connectivity between the Sangay and Podocarpus National Parks within the Andean Corridor for the region's most at-risk species and resources.

NCI's approach involves supporting local leaders to engage the community in biodiversity protection. Trained rangers from local communities now actively patrol the reserve to ensure the enforcement of conservation measures. In collaboration with local research

institutions, NCI has deployed camera traps to track the populations of several key species.



The Cuenca jambota frog (*Atelopus bomolochos*), a critically endangered species living inside the Reserve.

A Model for Biodiversity Conservation

The creation of this reserve and the strategic focus on protecting key umbrella species are critical steps in safeguarding the region's biodiversity. NCI's commitment to habitat protection and restoration, local leadership, and inter-institutional collaboration continues to generate long-term positive outcomes for the Andean corridor for species and for the people of Gualaceo and surrounding municipalities.

Achievements and Impact: Restoring Critical Habitats

NCI's conservation activities in the Reserva Municipal Gualaceo have:

- Conserved endemic and threatened species
- Protected habitat connectivity for umbrella species, particularly the mountain tapir and spectacled bear
- Reduced deforestation rates by 24% since 2014
- Integrated environmental education programs in local schools, reaching 1,900 students annually



ORGANIZATIONS SUPPORTING THE SPI

THE E.O. WILSON BIODIVERSITY FOUNDATION

The E.O. Wilson Biodiversity Foundation's core program, the Half-Earth Project (HEP), aims to identify and protect sufficient species habitats to safeguard global biodiversity. The HEP Map includes the SPI as a critical component and is a high-resolution, dynamic world map and decision-support tool that guides where places-based species conservation activities are needed most to protect Earth's species. Several key features of the HEP Map help support this mission:



Priority Place 933 on the Places for a Half-Earth Future layer on the Half-Earth Project Map.

Half-Earth Educator Ambassadors

The Foundation's Educator Ambassadors program engages learners around biodiversity conservation with the help of the SPI and the HEP Map. Using data from these tools in the classroom, students apply their mathematical and statistical thinking to a real-world context to explore the species living in and around their communities and discover to what levels of protection they have. Educator ambassadors have reported that students quickly recognize that the rarest species with the smallest ranges need the most protection. Through these exercises, students advance their biodiversity knowledge, develop data literacy, and gain a more concrete understanding of the vast interconnectedness between themselves and the biosphere.

Places for a Half-Earth Future

The Places layer uses the SPI to identify each nation's top priority areas for biodiversity conservation. This layer stems from a global conservation model that minimizes the additional protected land required to safeguard the evaluated species. Combined with local knowledge, it can provide important guidance when identifying new areas for biodiversity conservation. The HEP Map also showcases many of the outstanding conservation activities occurring in these places.

National Report Cards

Visualizing scientific advances in understanding the health and habitats of species makes biodiversity tangible for global, national, and local policymakers. Hence, the Foundation created SPI National Report Cards (NRCs) to summarize conservation efforts at the national level. The report cards can be used to explore different national indicators measuring conservation needs and progress, and to understand the unique challenges faced by each country. NRCs focus on a single country and can be viewed on the HEP Map or as individual report cards.



Teachers at a workshop in Salisbury, North Carolina, identifying places where species need greater protection.



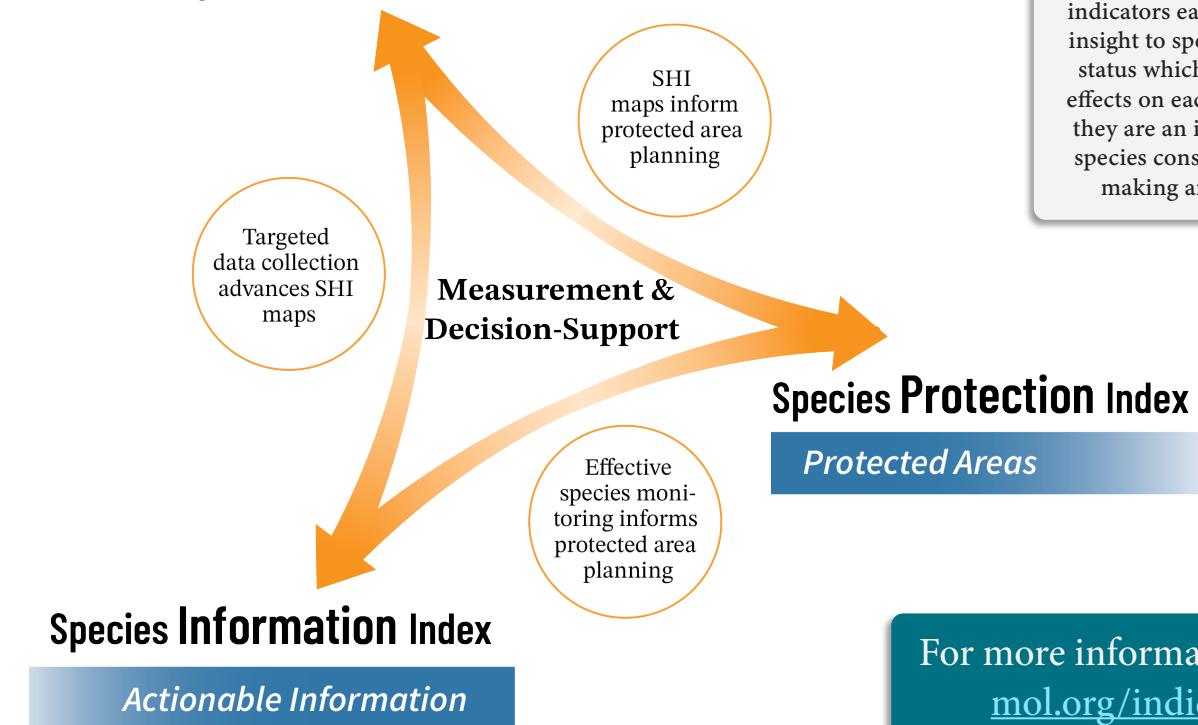
THE MAP OF LIFE

In collaboration with data and impact partners worldwide, Map of Life (MOL) leverages the latest approaches and technologies to deliver authoritative and detailed information on the distribution of species and their change.

MOL (mol.org) produces and maintains the SPI along with two other biodiversity indicators, the Species Habitat Index (SHI) and the Species Information Index (SII), both of which are formally adopted by the GBF. The SHI assesses change in species suitable habitat, and the SII assesses completeness of species occurrence record coverage. Like the SPI, the SHI and SII are both quantitative, species-level indicators that can be aggregated to national and regional indices. The SHI reveals the state of species habitat change in a given area while the SII reveals the extent of species monitoring coverage.

Ecosystems & Species Populations

Species Habitat Index



The three MOL biodiversity indicators each provide crucial insight to species conservation status which have synergistic effects on each other. Together, they are an important tool for species conservation decision making and monitoring.



GEO BON

GEO BON, or the Group on Earth Observations Biodiversity Observation Network, is a global network of biodiversity researchers dedicated to expanding and improving global biodiversity monitoring efforts.

GEO BON networks generate and maintain Essential Biodiversity Variables (EBVs). EBVs advance the collection, sharing, and use of biodiversity information. EBVs can be visualised as biodiversity observations at one location over time, or in many locations, aggregated in a time series of maps.

The SPI is recognized by GEO BON as a species-specific EBV to improve our understanding of biodiversity change across local, national and global spatial scales.

For more information, go to
mol.org/indicators

ACKNOWLEDGEMENTS

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