

GLOBAL BIODIVERSITY FRAMEWORK'S TARGET 3: BIOGEOGRAPHIC CONSERVATION GAPS IN ARGENTINA'S PROTECTED AREAS TERRESTRIAL SYSTEM

Evangelina Natale^{*1,2}; Valeria Rodríguez Groves³ and M. Inés Fernández^{1,2}

* Corresponding authors: enatale@exa.unrc.edu.ar

¹ Instituto de Ciencias de la Tierra, Biodiversidad y Ambiente (UNRC-CONICET) – Ruta 36 Km 601–5800 – Río Cuarto, Córdoba, Argentina

² Fundación Conservación y Desarrollo (ConyDes) – Sobremonte 1653–5800 – Río Cuarto, Córdoba, Argentina

³ Administración de Parques Nacionales – Dirección Regional Patagonia Austral - Av. Libertador 1254 – 9405 – El Calafate, Santa Cruz, Argentina

ABSTRACT

Biodiversity loss demands conservation strategies that integrate evolutionary and ecological processes. Target 3 of the Kunming–Montreal Global Biodiversity Framework calls for conserving 30 per cent of terrestrial areas by 2030, emphasising ecological representativeness and areas of high conservation value. Using a biogeographical framework, we assessed Argentina's terrestrial protected area system through spatial analyses of coverage, representativeness and inclusion of Key Biodiversity Areas (KBAs). Argentina currently protects 11.06 per cent of its territory, well below the global target, with highly uneven representation across biogeographical provinces and districts, including critical gaps (<5 per cent coverage). Only 42 per cent of KBAs are protected, and their full inclusion would raise coverage to just 17.86 per cent. Achieving Target 3 will require not only expanding protected areas but also identifying other effective area-based conservation measures (OECMs), private conservation initiatives, and ecological connectivity across human-modified landscapes.

Keywords: biodiversity, KBA, OECM, private protected areas, SIFAP

INTRODUCTION

Land-use change, overexploitation, pollution, invasive species and climate change are the main direct drivers of environmental degradation and biodiversity loss (IPBES, 2021; Montoya-Sánchez et al., 2023). Their combined effects may be pushing ecosystems towards critical tipping points, contributing to a biodiversity crisis characterised by extinction rates comparable to a sixth mass extinction (Richardson et al., 2023; Rockström et al., 2009; Walter et al., 2019). This accelerated loss is particularly concerning given the fundamental role of biodiversity in sustaining ecosystem services (ES) and nature's contributions to people (NCP), which are essential for life on Earth (Díaz et al., 2018; Folke, 2004). In response, Rockström et al. (2009, 2023) propose safe and just Earth System Boundaries, noting that seven of eight boundaries have already been transgressed globally and suggesting that maintaining 50–60 per cent of the world's terrestrial surface as largely intact natural areas is necessary to sustain ES or NCP. Consistent with this perspective, the Kunming–Montreal Global Biodiversity

Framework (KMGBF), adopted in 2022 (CBD, 2022), establishes a set of goals and targets to halt and reverse biodiversity loss. In particular, Target 3 calls for the conservation and effective management of at least 30 per cent of terrestrial, inland water and marine areas by 2030 through ecologically representative, well-connected systems of protected and conserved areas, including other effective area based conservation measures (OECM), prioritising areas of particular importance for biodiversity and ensuring equitable governance arrangements that respect the rights and livelihoods of local communities (CBD, 2022; Watson et al., 2023), a commitment that applies to Argentina as a Party to the Convention, approved through National Law No. 24.375/94.

The KMGBF aims to guide and promote, at all levels, the review and updating of policies, objectives and targets, as well as to facilitate their monitoring in a more transparent and accountable manner (Watson, 2023). In this context, Target 3 goes beyond a purely spatial goal, integrating ecological, management, governance and

social equity dimensions, which implies that its implementation requires analytical approaches that transcend the mere quantification of protected area coverage (Geldmann, 2026). Nevertheless, the identification of specific territories remains essential, as it provides the basis for more detailed, context-specific analyses required to design effective conservation measures that are both ecologically sound and socially appropriate, ensuring tangible benefits for society and the long-term viability of conservation actions. In this regard, Argentina represents a case of particular interest due to its high biogeographical diversity and the complexity of its environmental governance system. Advancing towards spatially explicit assessments of its federal terrestrial conservation system is therefore important for evaluating progress towards Target 3 of the KMGBF. Analysing the extent of protected areas, their ecological representativeness and the inclusion of areas of particular importance for biodiversity enables the identification of conservation gaps and priority areas, providing a basis for the development of more informed conservation strategies in the national context.

In Argentina, several regionalisation schemes have historically been developed to characterise natural environments (Burkart et al., 1999; Cabrera, 1976; Morello et al., 2012; Oyarzábal et al., 2018), generally based on similarities in geomorphology, hydrology, soils, climate and broad biodiversity patterns. Consequently, conservation strategies have largely relied on species-based hotspots and ecoregional approaches (Brown et al., 2006; Nanni et al., 2020). In this study, we adopt the evolutionary biogeographical regionalisation of Argentina proposed by Arana et al. (2021), which emphasises the relationship between organisms and their environment by grouping biotas according to their common origin and reflecting their phylogenetic relationships.

This scheme delineates Argentina into 16 biogeographic provinces (BP), each comprising a set of biogeographic districts (BD), with a total of 41 across the country; both scales are defined by their endemisms representing the evolutionary history of geobiotas. Importantly, it enables analyses at a finer spatial resolution within bioregions, capturing intra-regional variation that is often overlooked in broader ecoregional frameworks (e.g. Burkart et al., 1999). It also differs from other high-resolution regionalisations, such as Oyarzábal et al. (2018), which, although providing fine spatial detail, are primarily physiognomic and do not explicitly incorporate an evolutionary component. This evolution-based biogeographic perspective contributes to addressing the representativeness component of Target 3, enabling the recognition of natural biotic units that support realistic

spatial delineation and the integration of ecological and evolutionary processes relevant to ecosystem functionality and stability, thereby contributing to the maintenance of ecosystem services (Arana et al., 2021, 2017; Martínez-Aquino et al., 2007). In relation to the identification of areas of particular importance for biodiversity, traditional approaches have primarily relied on species richness, combined with measures of irreplaceability and threat, leading to the widespread use of biodiversity hotspots to guide decision-making (Lim et al., 2023; Marchese, 2015; Walter et al., 2019). More recently, this approach has evolved towards more comprehensive frameworks through the adoption of standardised and scientifically robust criteria for identifying Key Biodiversity Areas (KBAs), defined as sites critical for the global persistence of biodiversity (IUCN, 2016, UNEP-WCMC & IUCN 2024). The Global KBA Standard incorporates dimensions beyond species richness, including threat status, geographically restricted biodiversity, ecological integrity, biological processes and irreplaceability, thereby recognising biodiversity as a multidimensional concept that requires the integration of ecological and evolutionary attributes in conservation planning. As such, KBAs provide an operational framework for identifying areas of particular importance for biodiversity (UNEP-WCMC & IUCN 2024; Plumpton et al., 2024).

On this basis, this study proposes a multi-scale spatial analysis as a central tool to guide territorial decision-making, providing a spatially explicit basis for identifying priority areas. Three spatial components are analysed: (i) the percentage of national territory under protected areas including international designations and its contribution to the target; (ii) ecological representativeness, assessed through a gap analysis based on a biogeographical approach; and (iii) the extent of areas of particular importance for biodiversity and their inclusion within protected areas.

METHODS

An exhaustive update of the cartographic information on Argentina's federal system of terrestrial protected area (PA) was carried out through the compilation, verification and screening of data obtained from multiple official sources (Supplementary Online Material: Table 1), complemented by direct consultations with provincial administrations and conservation organisations. This process was essential due to the inconsistencies detected among sources, including missing polygons, unreported overlaps and discrepancies in the boundaries of the same PA. Based on this review, a unified and updated spatial database was developed, classifying PA according to their jurisdiction as follows: (i) national areas, including military reserves; (ii) provincial areas officially

recognised and included in Argentina's Federal System of Protected Areas (SIFAP by its acronym in Spanish); and (iii) private protected areas (PPA) were compiled following Bauni et al. (2023), including not only the 62 sites officially recognised by SIFAP but also all areas with available cartographic references, regardless of formal recognition and (iv) terrestrial portions of internationally designated areas (IDA, Ramsar Sites, World Heritage Sites and Biosphere Reserves) were included; although considered protected areas by SIFAP, they were treated here as a distinct conservation instrument

Although Target 3 of the KMGBF recognises Other Effective Area-based Conservation Measures (OECMs) as contributors to conserved areas (CDB, 2022), they were not included in this analysis due to the absence of formally recognised OECMs and a consolidated national inventory with precise spatial delineation in Argentina (UNEP-WCMC 2026).

Spatial analyses were conducted using ArcGIS Pro version 3.3.2 (Esri, 2024), and all spatial layers were projected using the South America Albers Equal Area Conic Projection. The extent of PA coverage was calculated for each biogeographic province (BP) and biogeographic district (BD) following Arana et al. (2021) (Supplementary Online Material: Figure 1, Table 2). Overlaps among conservation designations (e.g. National Park coinciding spatially with a Ramsar Site) were quantified and subtracted from final calculations to avoid double counting.

For PPA for which only point-location data were available, they were assigned to the natural region declared by the landowner, or, if not specified, to the region in which the point was located. To analyse areas of particular importance for biodiversity, the percentage of KBAs (BirdLife International, n.d.) covered by protected and conserved areas was estimated as a component indicator for Target 3 (UNEP-WCMC & IUCN (2024)) (Supplementary Online Material: Table 3). Also, the percentage of each BD extent covered by KBA was calculated. To assess the adequacy of coverage, the UNEP-WCMC & IUCN (2024) scale was adapted to classify protection levels as insufficient (<5 per cent), moderate (5–17 per cent), acceptable (17–29.9 per cent) and optimal (≥ 30 per cent). Finally, based on the results, a set of priority areas for conservation was identified integrating information on coverage, biogeographical representativeness and the presence of KBA within a GIS-based framework, allowing these priorities to be spatially explicit and useful for delineating conservation strategies.

RESULTS

Current extent of terrestrial protected area coverage in Argentina

According to the data compiled up to November 2025, Argentina currently has a total of 634 PA and 45 IDA. Together, these conservation instruments cover 38,385,422 ha, equivalent to 13.7 per cent of the national terrestrial territory. However, 19.45 per cent of this area

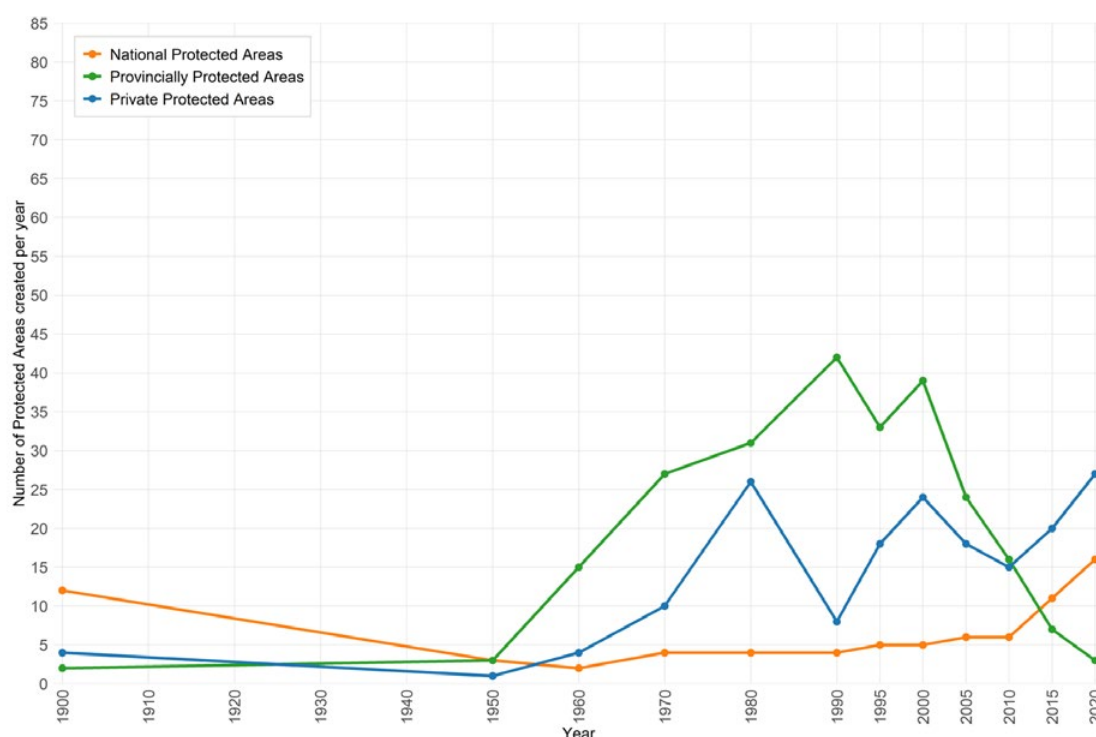


Figure 1. Number of protected areas of different jurisdiction and domain created per year

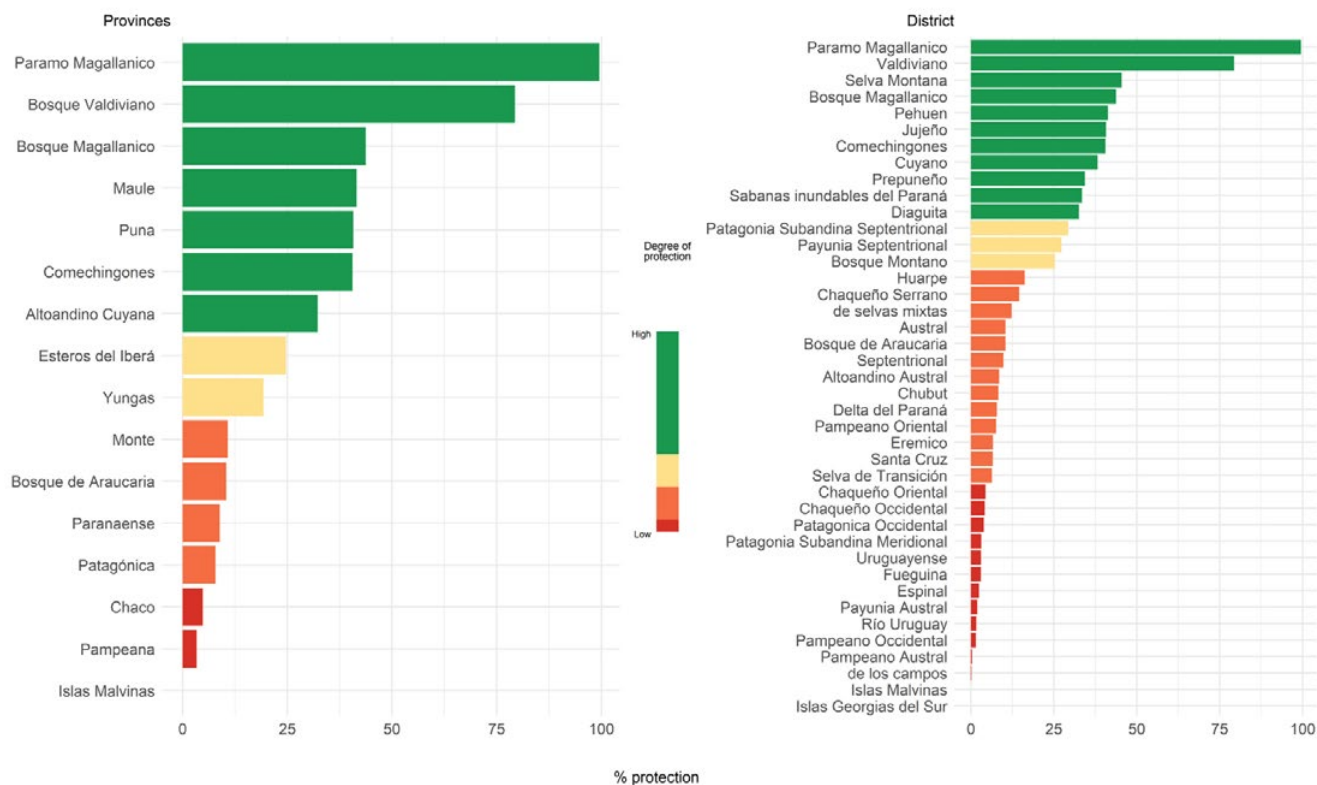


Figure 2. Percentage of protected land area of the Provinces and Biogeographic Districts of Argentina

overlaps with other area-based conservation instruments; once these overlaps were removed, the net protected and conserved area was reduced to 11.06 per cent. From a jurisdictional perspective, provincial PA account for more than 75 per cent of the protected land area, followed by national PA (Supplementary Online Material: Table 1, Figure 1, Table 3). Temporal analysis reveals a marked increase in the creation of PA during the 1990s, both at national and provincial levels. PPAs represent approximately four per cent of the total, showing steady growth since the 1980s, with peaks in the early 2000s and the 2020s (Figure 1).

Biogeographical representativeness of the SIFAP

Biogeographical representativeness within SIFAP shows marked spatial variation. In several cases, PA coverage is adequate at the scale of BP, while significant gaps persist at the BD level. For example, within the Esteros del Iberá BP, a wetland-dominated region, overall PA coverage reaches approximately 25 per cent; however, specific wetland districts such as Delta del Paraná and Río Uruguay remain below 10 per cent. The opposite pattern is observed in the Monte Province, a desert and arid shrubland region, where overall PA coverage is slightly above 10 per cent, while the Prepuna district exceeds 30 per cent. Within the Patagónica BP, a cold temperate steppe region, total PA coverage reaches 7.86 per cent, while districts such as Subandina Septentrional and Payunia Septentrional (volcanic desert) approach 30 per cent. The Yungas BP, a

subtropical montane forest region, shows a heterogeneous pattern at the BD level, with Selva Montana exceeding 40 per cent coverage, Bosque Montano exceeding 25 per cent, and Selva de Transición remaining below 10 per cent (Figure 2; Supplementary Online Material: Table 3). At the other end of the spectrum, BPs with less than 5 per cent PA coverage include the Chaco, the Pampeana, and the Islas Malvinas, representing subtropical dry woodlands, temperate grasslands, and subantarctic grasslands, respectively. At the district scale, critically low values occur in De los Campos (subtropical grasslands), Patagonia Occidental and Patagonia Subandina Meridional (steppe–forest ecotones), Fueguino (subantarctic forest–tundra mosaic), and Payunia Austral.

Regarding conservation instruments, most districts exhibit high levels of PA coverage; however, Valdiviano, Selva Montana and Patagonia Subandina Septentrional, representing temperate rainforest, subtropical montane rainforest, and sub-Andean steppe ecosystems, respectively, have more than 25 per cent of their land area protected exclusively through IDA. These are followed by Bosque Montano (subtropical montane forest), with over 15 per cent coverage, and the Jujeño (high-altitude arid shrubland) and Sabanas Inundables del Paraná (seasonally flooded savanna) districts, both exceeding 10 per cent. With respect to PPA, the Huarpe district (arid shrubland) stands out, with more than 5 per cent of its area under this conservation instruments (Figure 2; Supplementary Online Material: Table 3).

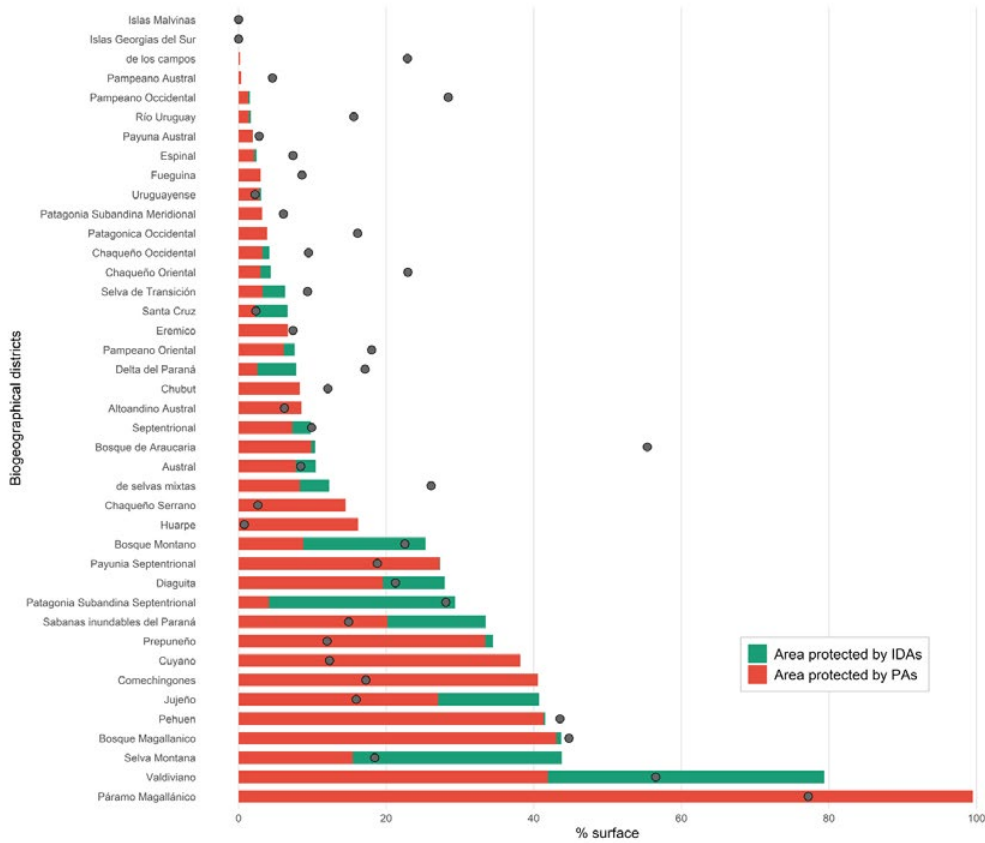


Figure 3: Percentage of Biogeographic District land area covered by KBAs (points) and percentage of KBA land area protected by PAs and by IDAs (bars)

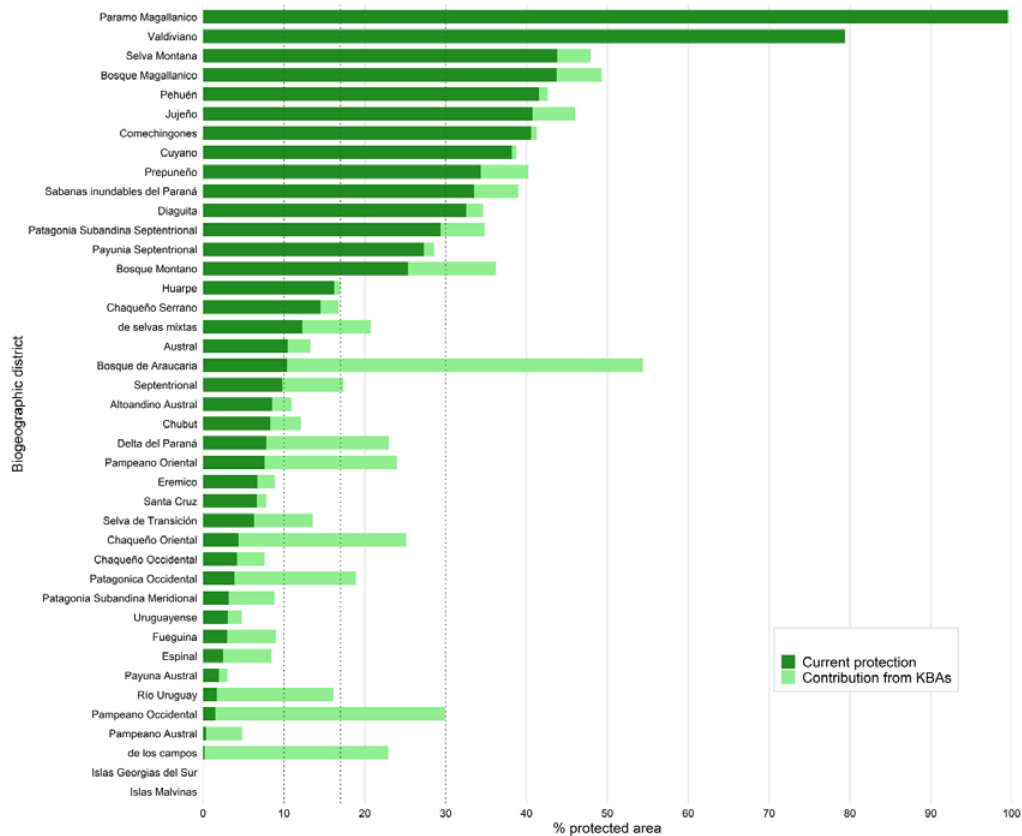


Figure 4: Contribution to the protection percentage, at the biogeographic district level, incorporating the KBAs identified under some conservation category.

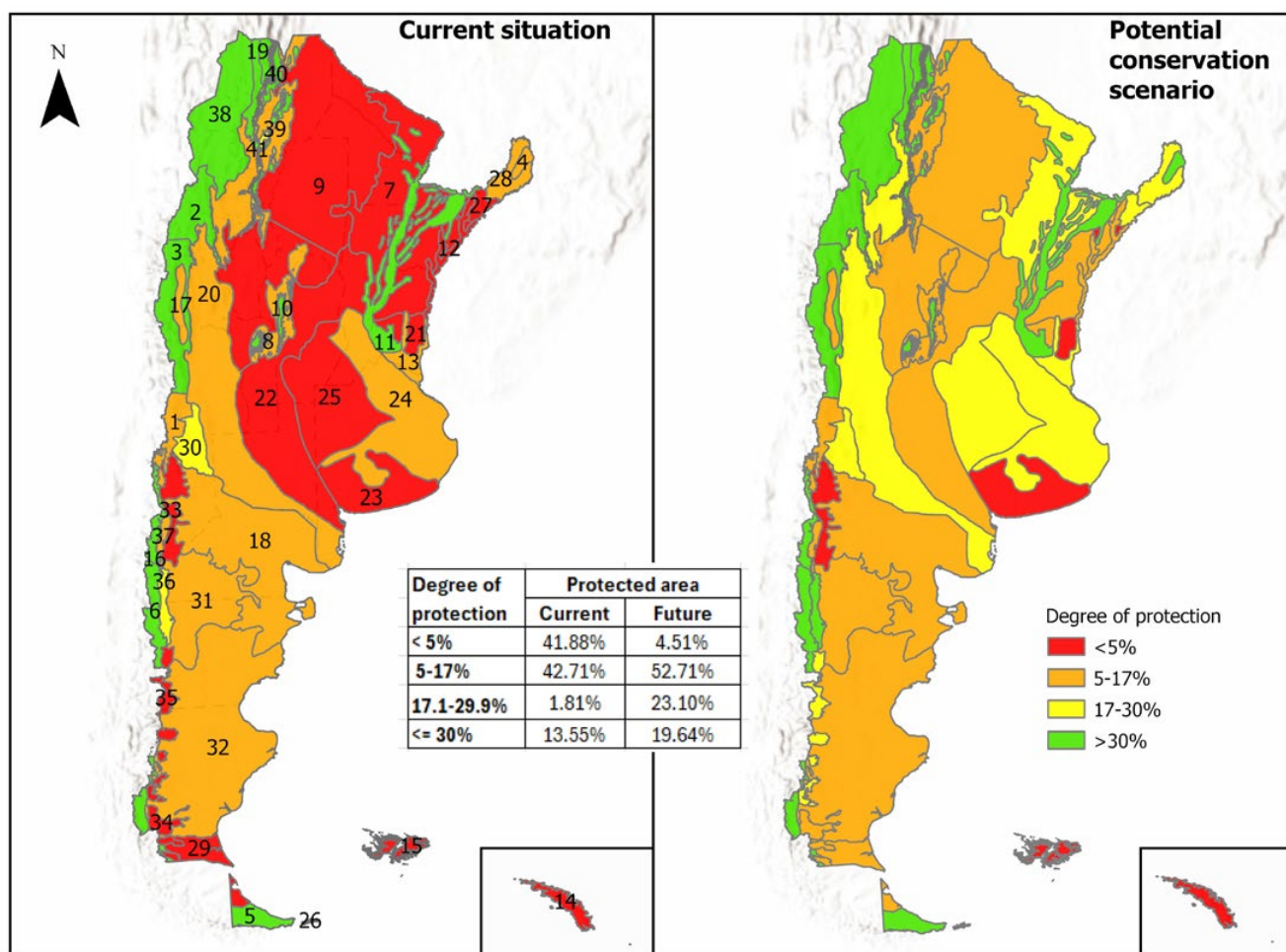


Figure 5: Current and potential conservation scenarios in Argentina considering the incorporation of KBAs under some conservation instrument (Supplementary Online Material: Figure 1)).

Current level of protection of Key Biodiversity Areas in Argentina

Argentina has 285 KBA recognised by IUCN, collectively covering 31,526,222 ha (BirdLife International, n.d.; UNEP-WCMC & IUCN, 2024). Of these, approximately 42 per cent are currently under some form of conservation instrument, although the percentage of protection is highly heterogeneous across biogeographic regions (Figure 3). Districts such as Páramos (subantarctic peat bog and tundra) and Bosques Magallánicos, Bosques Valdivianos, Pehuén, Puna and Comechingones (high altitude grasslands) show KBA protection levels ranging from 66 to nearly 100 per cent. In contrast, the Islas Malvinas province, representing subantarctic grasslands, has no protected areas within the national system, despite containing two KBAs that encompass its entire territory. Other districts with very low levels of KBA protection include Huarpe, where two KBAs together cover only 0.78 per cent of the district, and none of them are currently protected. In contrast, in Pampeano Occidental (dry grassland) and De los Campos, more than 20 per cent of each district

corresponds to KBAs, but only 0.12 and 0.72 per cent, respectively, are protected. At the biogeographic province level, KBA protection generally ranges between 20 and 50 per cent, with the exception of the Pampeana province (7.04 per cent). Finally, Río Uruguay, Patagonia Subandina Meridional, Patagonia Occidental, Chaco Oriental (humid woodland), Pampeano Austral and Oriental (humid grassland) districts have less than 10 per cent of their KBAs protected (Supplementary Online Material: Table 4)

SIFAP coverage increase if unprotected KBAs are incorporated

The potential scenario, which assumes the incorporation of all currently unprotected KBAs into the conservation system, shows variable outcomes at the BD level (Figure 4; Supplementary Online Material: Table 5). Districts such as Espinal (temperate thorn woodland), Uruguayense (humid subtropical savanna), Chaco Occidental (dry woodland), Erémico (desert shrubland) and Santa Cruz (steppe), as well as Patagonia Subandina Meridional, Payunia Austral and Fueguina, would not

reach 10 per cent coverage even if all of their KBAs were protected. In contrast, the Pampeano Occidental district would increase its PA coverage from less than 2 to 30 per cent, while Bosques de Araucaria would rise from 10 to over 50 per cent. Similarly, De los Campos would increase from 0.19 to 22.9 per cent. A particular case is the Huarpe district, where incorporating KBAs would not significantly increase the overall level of protection. Finally, at the national scale, 41.88 per cent of the territory currently has less than 5 per cent protection; under a scenario in which KBAs are incorporated, this proportion decreases markedly to 4.51 per cent. This indicates an increase in the number of districts and biogeographic provinces with higher levels of protection, reflecting a redistribution of the national territory towards higher protection classes (Figure 5).

DISCUSSION

This study developed a consistent territorial and biogeographical baseline to assess key spatial components of Target 3. The evolutionary biogeographical approach serves as an encompassing analytical framework for conservation planning, enabling the identification of areas characterised by high biological complexity and phylogenetic diversity, and thereby ensuring the protection of territorial units that genuinely represent the ecological and evolutionary processes underpinning the functioning of biotas (Arana et al., 2021). While expanding the system necessarily requires increasing the total protected area, improving representativeness demands a strategic approach that prioritises areas of high irreplaceability. Within this framework, the identification of KBAs introduces an explicit focus on sites of high conservation value. Accordingly, and in line with the recommendations of Dudley and Parrish (2006) and UNEP-WCMC & IUCN, 2024, the analysis identifies those KBAs that are currently unprotected within the SIFAP, directly contributing to the recognition of critical gaps and spatially explicit strategic opportunities to guide biodiversity safeguarding in Argentina over the next five years.

Regarding the extension of the protected area network in Argentina, our results indicate that 11.06 per cent of Argentina's terrestrial territory is currently protected, a value comparable to that reported by SIFAP (12 per cent) and to the estimate of Baldi et al. (2025) (10.41 per cent), but approximately two percentage points higher than the value reported by the World Database on Protected Areas (UNEP-WCMC, 2026). Discrepancies among estimates reflect over- or underestimation of PA extent due to overlapping conservation designations, differences in cartographic data sources, and inconsistencies between

published polygons and legally designated boundaries, including mismatches between national and provincial PA. In addition, municipal and private PA remain poorly documented and are rarely available through open-access platforms (Bauni et al., 2023). As highlighted by Baldi et al. (2025) and Visconti et al. (2013), the lack of clearly defined spatial criteria constitutes a structural limitation for accurately assessing system-wide coverage.

Beyond these technical discrepancies, current coverage remains well below the 30 per cent target established by Target 3 of the KMGBF (UNEP-WCMC & IUCN, 2024), implying that Argentina would need to place approximately 53 million additional hectares under conservation. Our analysis indicates that achieving this expansion will require more than the incorporation of currently unprotected KBAs. In many districts, even the full incorporation of unprotected KBAs would fall short of minimum coverage thresholds, whereas in others it would generate substantial gains.

In the case of OECMs, as noted above, none have yet been formally reported in Argentina, largely due to the recent approval of a detailed procedure (República Argentina, 2024; Resolution 446/2025) for their recognition. This procedure is aligned with the criteria for the identification and recognition of OECMs established under CBD Decision 14/8, and is expected to enable their formal recognition, thereby contributing to increased conserved area coverage and progress towards Target 3.

Regarding the representativeness of different jurisdictions within the conservation system, the results show that coverage in several districts depends largely on international designations, which in many cases rely on governance arrangements involving multiple jurisdictions, stakeholders and management objectives. This situation introduces an additional layer of institutional and operational complexity, as it requires coordination across scales, alignment of sometimes divergent priorities, and the integration of different legal and management frameworks (Schaaf & Clamote Rodrigues, 2016). At the same time, the presence of private protected areas highlights the role of diverse governance arrangements in contributing to conservation (Bauni et al., 2023), underscoring the need to strengthen their formal integration into the SIFAP to more effectively support Target 3.

On the other hand, area-based targets must be complemented by effective management in order to move towards an ecologically functional and socially viable conservation system. Territories identified through biogeographic and ecological criteria are not 'empty' or devoid of people; rather, they are shaped by diverse social, productive and cultural trajectories (Cebrián-

Piqueras et al., 2025; González-Urango et al., 2025). Therefore, identifying sites that retain natural features while also having conservation potential represents a major challenge. From this perspective, defining conservation priorities is not a neutral exercise, but one that requires integrating ecological and social dimensions through dialogue across concepts and scales of analysis, while acknowledging the partial nature of all analytical frameworks.

A clear example is the Espinal BD (temperate thorn woodland), where nearly 50 per cent of the territory has been modified, mainly due to productive land uses (Nanni et al., 2020). As a result, most natural and semi-natural environments are highly fragmented, persisting as small, isolated remnants typically associated with fluvial systems where agricultural expansion has been constrained by soil fragility (Natale et al., 2019). Even more concerning are the levels of modification in the Pampeano Austral (humid grassland) and Occidental districts (dry grassland) and in the Uruguayense BD (humid subtropical savanna), where more than 75 per cent of the territory has been converted (Nanni et al., 2020). This scenario raises the question of whether it is still feasible to conserve the large number of KBAs identified in these districts, which, according to our results, would allow protection levels to exceed the 17 per cent threshold.

Based on the analysis of biogeographic representativeness across provinces and districts within the SIFAP, two primary lines of action were identified. On the one hand, efforts should focus on consolidating and improving management effectiveness in districts where conservation coverage already exceeds 30 per cent. In these cases, priorities should include the assessment of management effectiveness and assurance of adequate management of unprotected KBA. On the other hand, system expansion should be prioritised in BD with low levels of protection, particularly those located within BP with limited overall coverage. These include the Islas Malvinas and Georgia del Sur (subantarctic grassland), where territorial management faces specific challenges related to the sovereignty dispute with the United Kingdom (UNEP-WCMC & IUCN, 2024); the Pampeana Province (temperate grasslands), where most districts show very limited protection; the Chaco Province (dry woodlands and shrublands), especially the Chaco Occidental and Oriental districts; and the Patagonia Province (cold temperate steppe), with emphasis on Payunia Austral, Fueguino, Patagonia Subandina Meridional and Occidental, and particularly De los Campos district

(humid subtropical forests and wetlands) one of the least protected units nationwide.

Considering that the overlap between low representativeness and high levels of landscape modification generates a differentiated conservation urgency that cannot be addressed through biogeographical criteria alone, it becomes necessary to advance towards integrated spatial analyses that incorporate indicators of anthropogenic pressure, fragmentation and land use. This approach would enable a more precise identification of priority areas for conservation and ecological restoration, recognising that conservation cannot be separated from local ways of inhabiting, producing and assigning meaning to territory (Dudley et al., 2018).

Integrating this social and territorial dimension into ecological diagnostics is essential for advancing towards more inclusive, effective and sustainable conservation strategies (CBD, 2024; Lécuyer et al., 2024). In this regard, in order to address the increasing human modification of natural areas, OECM and ecological corridors emerge as strategic tools for guiding urban and agricultural expansion and for restoring ecological connectivity among areas of high conservation value, thereby helping to mitigate the cumulative effects of fragmentation (Dudley et al., 2018; Hilty et al., 2020; Natale et al., 2025).

Finally, a set of general recommendations is proposed, arising from both the analysis of the results and the broader national context. Regarding OECMs, recent advances represent a key opportunity to strengthen conservation efforts. In this context, identifying areas with potential to qualify as OECMs – such as Indigenous and community-managed territories, protected forests, and even internationally designated areas – could significantly expand conserved area coverage. It is also necessary to strengthen private conservation by consolidating and harmonising provincial regulatory frameworks, improving existing instruments where they are in place and promoting their development where they are absent, to ensure a more coherent and comprehensive national system.

CONCLUSION

Argentina, one of the world's largest and most biogeographically diverse nations (Wabö, 2016), faces profound socio-environmental challenges driving unprecedented biodiversity loss (Nori et al., 2024), making the question of where to conserve central to conservation planning debates. In this context, this study provides an integrated, multi-scale perspective that

identifies conservation gaps across biogeographical provinces and districts, as well as Key Biodiversity Areas (KBAs), thereby supporting the strategic targeting of conservation efforts to halt and reverse biodiversity loss in natural and semi-natural environments. This perspective aims to enhance existing diagnostic tools by integrating previous efforts to assess ecological representativeness with novel conceptual contributions. Rather than establishing absolute priorities, this study offers a framework for rethinking where and how conservation actions should be implemented, providing conceptual and analytical inputs to advance more integrated, coherent and sustainable conservation strategies in Argentina.

ABOUT THE AUTHORS

Evangelina Natale has a PhD in Biological Sciences and has a Master's degree in Wildlife Management. Her areas of expertise are the design and management of protected areas, the management of invasive species, land use planning, and ecological restoration. She is an independent researcher at CONICET and a lecturer at the National University of Río Cuarto.

Valeria Rodríguez Groves is a biologist and holds a Master's degree in Wildlife Management. She works as a specialist in applied science for natural areas conservation at Argentina's National Parks Administration, with over two decades of experience in protected area planning, management, effectiveness evaluation and environmental impact assessment. She is a lecturer in the Master's Programme in Wildlife Management at the National University of Córdoba.

Ines Fernandez is a biologist specialising in ecological restoration. Her areas of expertise are the social aspects of land management and ecological restoration. She is a technician at the ConyDes Foundation and an independent consultant.

REFERENCES

- Arana, M., Martínez, G., Oggero, A., Natale, N., & Morrone, J. J. (2017). Map and shapefile of the biogeographic provinces of Argentina. *Zootaxa*, 4341 (3), 420–422. <https://doi.org/10.11646/zootaxa.4341.3.6>
- Arana, M. D., Natale, E., Ferretti, N. E., Romano, G. M., Oggero, A. J., Posadas, P., Martínez, G., & Morrone, J. J. (2021). *Esquema biogeográfico de la República Argentina*. Opera Lilloana 56. Argentina: Fundación Miguel Lillo.
- Baldi, G., Aguilar, A. G., Cirignoli, S., Falabella, V., González Roglich, M., Gómez Vinassa, M. L., Juliá, M. S., Názaro, G., Nori, J., ... Aragón, R. (2025). La red de áreas protegidas en la Argentina: análisis de extensión, sesgos espaciales y desafíos para la conservación. *Ecología Austral*, 35, 1–20. <https://doi.org/10.25260/EA.25.35.2.0.2520>
- Bauni, V., Carminati, A., Schiaffino, K., Schivo, F., Milkovic, M., González Lanzillotta, S., Schutt, F., & Morales, F. (2023). Conservación voluntaria: actualización y caracterización de las áreas bajo protección privada de la Argentina. *Revista Museo Argentino de Ciencias Naturales*, 25(2), 315–332. <https://doi.org/10.22179/REVMACN.25.812>
- BirdLife International. (n.d). World Database of Key Biodiversity Areas. Retrieved September 1, 2023. <http://keybiodiversityareas.org/kba-data/request>
- Brown, A., Martínez Ortiz, U., Acerbi, M., & Corcuera, J. F. (2006). *La situación ambiental argentina 2005*. Fundación Vida Silvestre Argentina.
- Burkart, R., Bárbaro, N. O., Sánchez, R. O., & Gómez, D. A. (1999). *Eco-regiones de la Argentina. Administración de Parques Nacionales*. Secretaría de Recursos Naturales y Desarrollo Sustentable, Presidencia de la Nación.
- Cabrera, A. L. (1976). Regiones fitogeográficas argentinas. In W. F. Kugler (Ed.), *Enciclopedia Argentina de Agricultura y Jardinería II* (1st ed., pp. 1–85). Argentina: ACME.
- CBD (Convention on Biological Diversity). (2022). *Kunming–Montreal Global Biodiversity Framework*. <https://www.cbd.int/doc/c/e6d3/cd1d/daf663719a03902a9b116c34/cop-15-l-25-en.pdf>
- Cebrián-Piqueras, M. A., van Riper, C. J., Andrade, R., Raymond, C. M., Goodson, D. J., Keller, R., & Plieninger, T. (2025). Weaving values, knowledge and context to care for human–nature relationships in protected areas. *People and Nature*, 7(8), 1952–1971. <https://doi.org/10.1002/pan3.70083>
- Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K.M.A., Baste, I.A., ... Shirayama, Y. (2018). Assessing nature's contributions to people. *Science*, 359, 270–272. <https://doi.org/10.1126/science.aap8826>
- Dudley, N. & Parrish, J. (2006) Closing the Gap. Creating Ecologically Representative Protected Area Systems: A Guide to Conducting the Gap Assessments of Protected Area Systems for the Convention on Biological Diversity. (Technical Series N°24). <https://www.cbd.int/doc/publications/cbd-ts-24.pdf>
- Dudley, N., Jonas, H., Nelson, F., Parrish, J., Pyhälä, A., Stolton, S., & Watson, E. M. (2018). The essential role of other effective area-based conservation measures in achieving big bold conservation targets. *Global Ecology and Conservation*, 15, 1–7. <https://doi.org/10.1016/j.gecco.2018.e00424>
- Esri. (2024). ArcGIS Pro (Version 3.6.2) [Software]. Environmental Systems Research Institute. <https://www.esri.com>
- Folke, C. (2004). Traditional knowledge in social–ecological systems. *Ecology and Society*, 9(3), 7. <https://doi.org/10.5751/ES-01237-090307>
- Geldmann, J. (2026). The world could reach 30% protection by 2030 and still fail to conserve biodiversity without effective and well-located protected areas. *Conservation Letters*, 19(2), e70030. <https://doi.org/10.1111/con4.70030>
- González-Urango, H., Ligardo-Herrera, I., Jácome-Enríquez, W., & Lozano, T. (2025). Designing participatory planning processes for protected areas, promoting the social and economic development of the stakeholders involved: the case of Cotopaxi National Park (PNC) in Ecuador. *Regional Environmental Change*, 25, 55–73. <https://doi.org/10.1007/s10113-025-02376-y>
- Hilty, J., Worboys, G. L., Keeley, A., Woodley, S., Lausche, B., Locke, H. Carr, M., Pulsford, I., Pittock, J., ... Tabor, G. M. (2020). *Guidelines for conserving connectivity through ecological networks and corridors. Best Practice Protected Area Guidelines Series No. 30*. IUCN. <https://portals.iucn.org/library/sites/library/files/documents/PAG-030-En.pdf>
- IPBES (Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services). (2021). *Report of the Plenary of the Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services on the work of its eighth session*. IPBES Secretariat. <https://ipbes.net/plenary/ipbes-8>
- IUCN (International Union for Conservation of Nature). (2016). *A global standard for the identification of key biodiversity*

- areas. Version 1.0. <https://portals.iucn.org/library/node/46259>
- Lécuyer, L., Balian, E., Butler, J. R. A., Barnaud, C., Calla, S., Locatelli, B., Newig, J., Pettit, D., Pound, F., ... Young, F. C. (2024). The importance of understanding the multiple dimensions of power in stakeholder participation for effective biodiversity conservation. *People and Nature*, 6(4), 1407–1420. <https://doi.org/10.1002/pan3.10672>
- Lim, D. Y. H., Starnes, T., & Plumpton, A. J. (2023). Global priorities for biodiversity conservation in the United Kingdom. *Biological Conservation*, 277, 1–8. <https://doi.org/10.1016/j.biocon.2022.109798>
- Marchese, C. (2015). Biodiversity hotspots: a shortcut for a more complicated concept. *Global Ecology and Conservation*, 3, 297–309. <https://doi.org/10.1016/j.gecco.2014.12.008>
- Martínez-Aquino, A., Aguilar-Aguilar, R., Santa Anna del Conde-Juárez, H. O., & Contreras-Medina, R. (2007). Empleo de herramientas panbiogeográficas para detectar áreas para conservar: un ejemplo con taxones dulceacuícolas. In I. Luna, J. J. Morrone, & D. Espinosa (Eds.) *Biodiversidad de la Faja Volcánica Transmexicana* (1st ed., pp. 449–460). FES-UNAM. https://www.ies.unam.mx/laboratorios/restauracion-ambiental/wp-content/uploads/2022/10/taxones_dulceacuícolas.pdf
- Montoya-Sánchez, V., Krefth, H., Arimond, I., Ballauff, J., Berkelmann, D., Brambach, F., Rolf, D., Grass, I., Hines, J., ... Guerrero-Ramírez, N. (2023). Landscape heterogeneity and soil biota are central to multi-taxa diversity for oil palm landscape restoration. *Communications Earth & Environment*, 4, 1–9. <https://doi.org/10.1038/s43247-023-00875-6>
- Morello, J., Matteucci, S. D., Rodríguez, A. F., & Silva, M. E. (2012). Ecorregiones y complejos ecosistémicos argentinos. Argentina: Orientación Gráfica Editora.
- Nanni, A. S., Piquer-Rodríguez, M., Rodríguez, D., Nuñez Regueiro, M., Perriago, M. E., Aguiar, S., Ballari, S., Blundo, C., Derlindati, E., ... Gasparri, N. I. (2020). Presiones sobre la conservación asociadas al uso de la tierra en las ecorregiones terrestres de la Argentina. *Ecología Austral*, 30, 304–320. <https://doi.org/10.25260/ea.20.30.2.0.1056>
- Natale, E., Arana, M., Villalba, G., Reinoso, H., de la Reta, M., & Oggero, A. (2019). Caracterización y estado de conservación de la vegetación ribereña de la cuenca media del Río Cuarto (Córdoba, Argentina). *Boletín de la Sociedad Argentina de Botánica*, 54, 105–123. <http://dx.doi.org/10.31055/1851.2372.v54.n1.23589>
- Natale, E., Fernández, M. I., Astudillo, C., Rodríguez Candela, L., & Oggero, A. (2025). Integrating ecological and social dimensions for the restoration of ecosystem services in agricultural landscapes of Central Argentina. [Manuscript submitted for publication]. ICBA (UNRC-CONICET).
- Nori, J., Valenzuela, A. E. J., Camino, M., Abraham, E., Agostini, M. G., Aizen, M. A., Roldán-Alonso, V., Arcamone, J. R., Arsamendia, Y., ... Anderson, C. B. (2024). Argentina's rejection of the 2030 Agenda undermines environmental sustainability and human well-being. *Biological Conservation*, 299, 1–5. <https://doi.org/10.1016/j.biocon.2024.110832>
- Oyarzábal, M., Clavijo, J., Oakley, L., Biganzoli, F., Tognetti, P., Barberis, I., Maturo, H. M., Aragón, R., Campanello, P. I., ... León, R. (2018). Unidades de vegetación de la Argentina. *Ecología Austral*, 28, 40–63. <https://doi.org/10.25260/EA.18.28.1.0.399>
- Plumpton, A. J., Baisero, D., Brooks, T. M., Buchanan, G., Butchart, S. H. M., Bowser, A., Boyd, C., Carneiro, A. P., Davies, T., ... Uppgren, A. (2024). Targeting site conservation to increase the effectiveness of new global biodiversity targets. *One Earth*, 7(1), 11–17. <https://doi.org/10.1016/j.oneear.2023.12.007>
- República Argentina (Comisión Nacional Asesora para la Conservación y Utilización de la Diversidad Biológica. Subsecretaría de Ambiente de la Nación Argentina. Secretaría de Turismo, Ambiente y Deportes). (2024). *Estrategia Nacional sobre la Biodiversidad y Plan de Acción*. https://s3.amazonaws.com/km.documents_attachments/af5a75c3/bf3ff7b1121367ac68bbab46
- República Argentina. (2025). Resolution N° 446/2025 approving the procedure for recognition of Other Effective Area-Based Conservation Measures (OECM) in Argentina. Jefatura de Gabinete de Ministros, Secretaría de Turismo, Ambiente y Deportes. *Boletín Oficial de la República Argentina*. <https://www.boletinoficial.gob.ar/detalleAviso/primera/330291/20250825>
- Richardson, K., Steffen, W., Lucht, W., Bendtsen, J., Cornell, S. E., Donges, J. F., Drüke, M., Fetzer, I., Bala, G., ... Weber, L. (2023). Earth beyond six of nine planetary boundaries. *Science Advances*, 9(37), 1–16. <https://doi.org/10.1126/sciadv.adh2458>
- Rockström, J., Gupta, J., Qin, D., Lade, S. J., Abrams, J. F., Andersen, L. S., Armstrong McKay, D. I., Bai, X., Bala, G., ... Zhanb, X. (2023). Safe and just earth system boundaries. *Nature*, 619, 102–111. <https://doi.org/10.1038/s41586-023-06083-8>
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F. S., Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., ... Foley, J. (2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society*, 14(2), 1–32. <https://www.ecologyandsociety.org/vol14/iss2/art32/>
- Schaaf, T. & Clamote Rodrigues, D. (2016). *Gestión de ADIM – Armonización de la gestión de áreas de designación internacional múltiple: sitios Ramsar, sitios del Patrimonio Mundial, Reservas de Biosfera y Geoparques Mundiales de la UNESCO*. Gland, Switzerland: IUCN.
- UNEP-WCMC & IUCN (2024). Protected Planet Report 2024. UNEP-WCMC and IUCN: Cambridge, United Kingdom; Gland, Switzerland. <https://pp-digital-report-document.s3.eu-west-2.amazonaws.com/Protected+Planet+Report+2024.pdf>
- UNEP-WCMC (2026). Protected Area Profile for Argentina from the World Database on Protected Areas, April 2026. Available at: www.protectedplanet.net
- Visconti, P., Butchart, S. H. M., Brooks, T. M., Langhammer, P. F., Marnewick, D., Vergara, S., Yanosky, A., & Watson, J. E. M. (2013). Effects of errors and gaps in spatial data sets on assessment of conservation progress. *Conservation Biology*, 27(6), 1000–1010. [10.1111/cobi.12095](https://doi.org/10.1111/cobi.12095)
- Wabö, E. (2016). Argentina. In: C. Vidal, I. Alberdi, L. Hernández Mateo, & J. Redmond (Eds) *National Forest Inventories* (pp. 121–133). Springer Cham. https://doi.org/10.1007/978-3-319-44015-6_6
- Walter, A. D., Brown, M. A., Cerbie, G. M., Williams, M. G., Banta, J. A., William, L. R., Ford, N. B., & Berg, D. J. (2019). Do hotspots fall within protected areas? A geographic approach to planning analysis of regional freshwater biodiversity. *Freshwater Biology*, 64(11), 2046–2056. <https://doi.org/10.1111/fwb.13394>
- Watson, J. E. M., Venegas-Li, R., Grantham, H., Dudley, N., Stolton, S., Rao, M., Woodley, S., Hockings, M., Burkart, K., ... Ward, M. (2023). Priorities for protected area expansion so nations can meet their Kunming–Montreal Global Biodiversity Framework commitments. *Integrative Conservation*, 2(3), 140–155. <https://doi.org/10.1002/inc3.24>

RESUMEN:

La pérdida de biodiversidad exige estrategias de conservación que integren procesos evolutivos y ecológicos. La Meta 3 del Marco Mundial de Biodiversidad Kunming–Montreal propone proteger el 30 por ciento de las áreas terrestres para 2030, enfatizando la representatividad ecológica y la conservación de áreas de alto valor. Mediante un enfoque biogeográfico, se evaluó el sistema de áreas protegidas terrestres de Argentina a partir de análisis espaciales de cobertura, representatividad e inclusión de Áreas Clave para la Biodiversidad (KBA). Argentina protege actualmente el 11.06 por ciento de su territorio, muy por debajo del objetivo global, con una representación altamente desigual entre provincias y distritos biogeográficos, incluyendo vacíos críticos (<5 por ciento de cobertura). Solo el 42 por ciento de las KBA se encuentra protegido, y su incorporación total elevaría la cobertura apenas al 17.86 por ciento. Alcanzar la Meta 3 requerirá no solo ampliar la superficie protegida, sino también fortalecer otras medidas eficaces de conservación basadas en áreas (OMECE), la conservación privada y la conectividad ecológica en paisajes altamente transformados.

RÉSUMÉ

La perte de biodiversité exige des stratégies de conservation qui intègrent les processus évolutifs et écologiques. L'objectif 3 du Cadre mondial pour la biodiversité de Kunming-Montréal prévoit la conservation de 30 pour cent des zones terrestres d'ici 2030, en mettant l'accent sur la représentativité écologique et les zones à haute valeur de conservation. À l'aide d'un cadre biogéographique, nous avons évalué le système d'aires protégées terrestres de l'Argentine par le biais d'analyses spatiales portant sur la couverture, la représentativité et l'inclusion des zones clés pour la biodiversité (ZCB). L'Argentine protège actuellement 11.06 pour cent de son territoire, ce qui est bien en deçà de l'objectif mondial, avec une représentation très inégale entre les provinces et les districts biogéographiques, y compris des lacunes critiques (couverture < 5 pour cent). Seules 42 pour cent des ZCB sont protégées, et leur inclusion totale ne porterait la couverture qu'à 17.86 pour cent. Pour atteindre l'objectif 3, il faudra non seulement étendre les zones protégées, mais aussi identifier d'autres mesures de conservation efficaces par zone (OECM), des initiatives de conservation privées et assurer la connectivité écologique à travers les paysages transformés.

Traduit avec DeepL.com (version gratuite)