

Review: The Atlantic Forest of South America: Biodiversity Status, Threats, and Outlook

By Carlos Galindo-Leal and Ibsen de Gusmão Câmara (Eds.)

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Carlos Galindo-Leal is senior director for the State of the Hotspots Program, Center for Applied Biodiversity Science at Conservation International. Ibsen de Gusmão Câmara is an NGO advisor, admiral, and member of the National Environmental Council in Brazil. Both editors "hope that this book contributes to the process of halting destruction of the South American Atlantic Forest hotspot and beginning its restoration" (p. xvii).

This initial volume of the State of the Hotspots series is a solid collection of opinions by 60 scientific minds with credentials, education, and experience on biodiversity and habitat loss within the Atlantic Forest. Its 39 chapters in six parts address biodiversity status, threats, and outlook. The book begins with a description of the status of the Atlantic Forest: over 93% of the original range is gone, leaving less than 7% in fragmented places within the remaining 1.35 million square kilometers.

The Atlantic Forest is home to about 70% of Brazilians and three of the largest urban centers on the continent, with thousands of plant, mammal, and bird species threatened for eternal extinction. Even so, it has the "best capacity to respond to the plethora of insults it has withstood over many centuries" (p. xi), with 40-some protected areas created in the last 12 years.

This book alerts us to solutions: significant conservation efforts, effective governance, affordable monitoring and assessment of land-use trends, raised awareness of resource risk, and mechanisms to track progress. By following the book's agenda the Atlantic Forest could become the "first success story among the global biodiversity hotspots" (p. xiii).

VITAL SIGNS	
Hotspot Original Extent (sq. km.)	1,477,500
Hotspot Vegetation Remaining (sq. km.)	121,600
Area Protected (sq. km.)	33,000
Plant Species	20,000
Endemic Plant Species	8,000
Terrestrial Vertebrate Species	1,666
Endemic Terrestrial Vertebrate Species	563
Threatened Species*	116
Critically Endangered Species*	28
Extinct Species*	1
* Endemic terrestrial vertebrates. Extinct species since 1500.	
Table borrowed from Conservation International website, http://www.biodiversityhotspots.org/xp/Hotspots/atlantic_forest/ .	

The book promotes "conservation activities that are strategic, transparent and economically and environmentally sustainable" (p. 11). Loss of biodiversity means loss of ecosystems, populations, genetic variability, species, evolution, cultures, and indigenous knowledge. Collected thoughts from 23 Ph.D.s, 5 Ph.D. candidates, 10 researchers, and another

20 experts in academia, commerce, and NGOs are offered, with supporting facts from hundreds of sources.

The text of this first State of the Hotspots volume is, in places, poetic, as in their inclusion of a quote from Warren Dean's *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest*, published in 1995, that describes the Atlantic Forest as "like some remote, antique empire, its origins mythical, its dynasties extending over epochs, its splendor astonishing, its inhabitants luxurious, shrewd, and conservative in their exploitation of its bounteous resources, for millennia unchallenged and unchallengeable in its perfect and total dominion, yet at its foundations utterly brittle and vulnerable" (p. [xxi]).

Part I, "Introduction," is an overview of the status and dynamics of biodiversity loss. Remnant forest percentages in 10 different biogeographic areas are compared. Biodiversity corridors to mitigate loss-Bahia (Central) Corridor and Sierra do Mar Corridor-are flagged as critically important for their endemic species. "Biodiversity loss begins with the diminishing of genetic variability and the lessening of ecological interactions" (p. 13). The loss ends with plant and animal extinctions. Tangible components of biodiversity such as landscape, communities, and populations (cultural diversity) are impacted directly by human activities that reduce populations and change or eliminate habitats, sometimes because of government policies.

Part II, "Brazil," is comprised of 10 chapters on the Brazilian Atlantic Forest, a "biodiversity mosaic" (p. 27). *Atlantic Forest* is a popular term with no real

scientific basis" (p. 31). It is a colossal forest, diversified but continuous, extending from northeast Brazil down into Paraguay and Argentina, perhaps once connected to the Amazon Forest. The first biome to be exploited following European colonization of Brazil, this forest is now isolated from the Amazon region by the Caatinga and the Cerrado and from the Andean Forests by the Chacao. This isolation offers a unique opportunity to study the "numerous related species (presumably descended from a common ancestor)" (p. 44). Extremely diverse, "the region is believed to harbor 1 to 8 percent of the world's total biodiversity" (p. 44).

Latitude and longitude are each an important axis of variation. Altitude results in gradients of diversity. It is an endemic biota with areas of transition in homogeneity. Five endemic areas are discussed-Brejos Nordestinos, Pernambuco, Diamantina, Bahia and the Serra do Mar-and three areas of transition-São Francisco, the Interior Forests, and the Brazilian Pine or Araucaria Forests. Part II identifies two indicators for monitoring biodiversity and loss (natural capital) in terms of quantity and quality: status of biodiversity measured by the Natural Capital Index, and, society's efforts to prevent loss measured by the Biodiversity Protection Index.

Part III, "Argentina," includes 10 chapters similar to those on Brazil-biodiversity loss dynamics, conservation history, biodiversity status, threats and outlook, and analysis of opportunity. Of interest is a brief discussion of conservation within the Paraná (Interior) Forest (a.k.a., Misiones Forest) where one indigenous group remains, the Mbyá, while recorded history shows inhabitants dating back some 60 centuries to the Alto Paraná, followed by the Guaraní groups from the Amazon region. Ignorance "has proven to be a terrible enemy of the forest. . . . At the provincial level, people are slowly becoming aware of the forest's importance and the need to conserve it. . . . The province still has contradictory policies and lacks a common strategy for forest conservation" (pp. 155-156). The writers surmise "Argentina is still not a forest-conscious country" (p. 156). Even so, the Misiones Forest, a major tourist attraction, demonstrates a "rooted environmental consciousness" (p. 262) as evidenced by the first national park, created in 1937, and the recent enactment of the Green Corridor Law, "an ambitious legal instrument that provides for the conservation of this unparalleled natural heritage" (p. 262). This law is to be followed by the Trinational Initiative, to enlarge the core area.

Part III alerts us that "Environmental assessment and monitoring are almost nonexistent in Argentina, so physical, chemical, and biological pollution go unabated, with problems concentrated in major cities" (p. 149). The Green Corridor of Misiones is an attempt to prevent further fragmentation in the

protected areas of the region and hopefully result in increased ecotourism. For monitoring biodiversity, the authors propose a "robust set of indicators" (p. 173) to include representative communities, groups of species, and individual species. Indicators of loss to measure fragment characteristics and those of isolation and connectivity; structure, composition, status and trends of communities of species; and, degrees of land protection by extent, percentage, and effectiveness.

Part IV, "Paraguay," is a more condensed treatment of similar issues- biodiversity loss dynamics, history of conservation, and status of capacity. Paraguay is "one of the least-known South American countries. It is small in comparison, its history of war and dictatorships keeping it from developing until the early 1980s" (p. 267). Its biodiversity is unique because of location, with the Atlantic Forest, Cerrado, Pampa and the Great Chaco ecoregions merging in Paraguay. Peculiar to its conservation approach is its landlocked economy "rooted in extractive practices" (p. 267) while the country sits atop the Guaraní aquifer, the most economical and flexible source of fresh water supply for human consumption in the region.¹ There is a "critical misconception that the forest is unproductive" (p. 281). "Overall, both the state and the public as a whole seem apathetic toward Paraguay's biodiversity crisis" (p. 306). The country has no national environmental policy.

Part IV recommends monitoring biodiversity loss by measuring systems, organizations, and individuals, based on strong evidence of a general lack of conservation in Paraguay. In light of indicators suggested for Brazil and Argentina, it is clear the threat to the Atlantic Forest of Paraguay has received the least attention so far. "The prevailing trend toward deforestation in Paraguay reflects a lack of conservation capacity and ineffective national public and transfrontier policies," write Alberto Yanosky and Elizabeth Cabrera (p. 351). "Institutions are made up of people, and it is these people who bring about change and who, through their priorities and actions, are responsible for the current situation. Therefore, indicators must be developed that make it possible to evaluate capacity at the individual level" (p. 351).

Part V, "Trinational Issues," is on the dynamics of biodiversity loss from a Trinational point of reference, status of endangerment and fragmentation, and the overall challenge to conservation. The forest extends across political boundaries of three separate sovereignties sharing the stretch of continent that is South America. Each country is evolving "from its own unique and rich history" (p. 357), maintaining its own "distinct social, political, economic, and cultural realities" (p. 357). Links between countries are where to look for solutions-shared, effective conservation measures;

dynamic and mutual environmental policies based on strong institutional structures; and strong, agreed-biodiversity safeguard agreements. The number of species teetering on the edge of extinction earns this biodiversity hotspot #1 out of 25 worldwide. The "destruction of this hotspot's habitat is leading to a mass extinction. . . . With a concerted effort, it is still possible to achieve a goal of zero extinction in the Atlantic Forest" (p. 360).

Part V discusses how "vanishing peoples" endanger the forest fragments, as indigenous human societies disappear along with their "intimate knowledge of how to use and manage the environments in which they live" and their ingenious "approaches to human, plant, and animal coexistence" (p. 381). This is not unique to the Atlantic Forest or to South America but is a global condition with impact on the continued evolution of most if not all species in some way. Preservation of indigenous know-how is fundamental to conservation everywhere, the Atlantic Forest perhaps the most flagrant example today.

Part V provides insight into the challenge for conservation throughout the Atlantic Forest but deals with the challenge limited to protected areas. Agreeing with the United Nations, this text promotes nine conservation measures:

- Promote scientific research
- Protect wilderness
- Preserve species and genetic diversity
- Maintain environmental services
- Protect specific natural and cultural features
- Promote tourism and recreation
- Educate
- Encourage sustainable use of resources from natural ecosystems, and
- Maintain cultural and traditional attributes

Part VI, "Conclusion," contains one chapter: "Outlook for the Atlantic Forest." After 460 pages, this chapter's four pages read like a denouement; in fact, the brevity of the conclusion is disappointing from a research view and journalist perspective. Here's a lost opportunity for the editors to highlight lessons learned and catalogue contributing, direct, and root causes. Instead, the editors flag only three "basic causes of biodiversity destruction" they consider "insidious and surprisingly easy to overlook" (p. 463): national and international subsidies that promote growth without strategic long-term conservation planning; expanding human populations; and the "colonial development model" of the quest for material wealth and comfort through "wanton extraction and consumption of natural resources" (p. 464).

This first State of the Hotspots volume promises a valuable series forthcoming on biodiversity loss, continued threats to conservation, and what future generations of human and other species can expect.

Note

¹ The Guaraní Aquifer extends over an area of approx. 1.1 million square kilometers under Brazil, Argentina, Paraguay and Uruguay, with depths from a few meters to nearly 1000 meters.

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