

Digital Distribution Maps of the Mammals of the Western Hemisphere

Version 1.0

by

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Introduction

Habitat for mammals and other organisms is disappearing quickly from the Earth's surface due to human activity. Conservationists are in a race against time to protect remaining habitat to stem the loss of biodiversity. Critical to these conservation efforts is focusing on-the-ground actions where threatened species where found. To aid conservationists in determining where these species occur, a group of conservation organizations joined forces in 2000 to develop a digital library of the distributions of the birds and mammals of the Western Hemisphere. These organizations, NatureServe (known then as the Association for Biodiversity Information), Conservation International – Center for Applied Biodiversity Science, The Nature Conservancy – Migratory Bird Program (known then as Wings of the Americas), and World Wildlife Fund – US, later joined by Environment Canada – WILDSPACE, wanted to make these maps easily accessible to conservation planners and other interested users. They signed a Memorandum of Understanding to govern work on the project and delegated NatureServe with the primary responsibility to compile the database. Many independent scientists are also collaborating in the project. This compact disk presents one product of this collaboration—a digital map library of the distributions of the mammals of the Western Hemisphere.

Coverage

Western Hemisphere. The project covers continental North, Central, and South America and associated islands, including all near shore islands in Canada and the United States, islands in the Bering Sea, and the U.S. Aleutian islands; the entire Caribbean; the Mexican islands of Guadalupe and the Revillagigedo archipelago; and the Falkland Islands. This coverage excludes Greenland, the Hawaiian Islands, and mid-Atlantic islands such as Bermuda, Tristan da Cunha, and South Georgia.

Terrestrial Ranges only. Because the goal of the project is to produce a tool to aid on-the-ground conservation, the maps show ranges of terrestrial species only. Conservation of marine mammals is dependent on management policies, so the geographic ranges of pelagic species is a less critical conservation issue. Also, pelagic ranges are poorly and unevenly known

throughout the hemisphere, making a balanced coverage of these ranges difficult.

Extant and Recently Extinct Species. Whenever data are available, the maps show ranges where species formerly occurred but are now extirpated. Note that many species have undergone range contractions, either historically or in recent years, that are not accurately recorded. We also included recently extinct species if data were available.

Introduced Species. To the extent that existing data allowed us, we mapped current distributions of species that have been introduced and established in the project area. Distributions of all mammals and especially introduced species are constantly changing, so data users should be aware that these maps reflect the situation at the time the data source was produced, not necessarily today's distribution.

Species not Included. We did not map several species for various reasons. They are:

Canis rufis (Red Wolf) – This species exists in the wild only as reintroduced individuals and its taxonomic status is unclear.

Mus musculus (House Mouse) – This introduced species is ubiquitous around human habitation.

Lama glama (Llama) -- This species exists only in domesticated populations.

Lama pacos (Alpaca) -- This species exists only in domesticated populations.

Nelomys unicolor (An Atlantic Tree Rat) – The geographic origin of the type specimens of this species is unclear and no extant populations are known.

Map Production

To produce the maps we used existing digital maps that were available to us (see Data Contributors) and digitized maps for all remaining species and portions of ranges. We digitized by first scanning published maps and then tracing on-screen over the georeferenced scans. Some maps were digitized by eye from published maps in books and other compilations. After initial digitization, B. D. Patterson reviewed printed versions of the South American maps and we incorporated these corrections to the digital maps.

We coded all polygons and points by whether the species is still present or extinct in the location, and by the species' origin (native, introduced). The key to the codes, all technical information about the maps, and a list of references cited in the database are contained in the accompanying metadata file.

Data Contributors and Sources

The source for most North American maps is Hall (1981) and Wilson and Ruff (1999). We digitized distributions of Caribbean mammals based largely on information in the Woods and Sergile (2001) volume. A major source for Mexican ranges was Ceballos and Oliva (2003). Central American mammal distributions generally follow Reid (1997). Information for South American ranges is drawn from Emmons and Feer (1997), the Eisenberg and Redford series (Eisenberg & Redford, 1989; Eisenberg & Redford, 1999; Redford & Eisenberg, 1992), Anderson (1997), Koopman (1982), Alberico et al. (2000), as well as hundreds of journal articles and other sources. The taxonomy follows B. Paterson's systematic database on Neotropical mammals and NatureServe's database on North American mammals (see www.natureserve.org/explorer). Primate taxonomy and distribution follow A. Rylands' database of Neotropical Primates. A complete list of references can be found on an accompanying file on this CD.

Use and Acknowledgement of the Data

This compilation of the digital library of mammal distributions is copyrighted © 2003 by NatureServe, 1101 Wilson Boulevard, 15th Floor, Arlington Virginia 22209, U.S.A. All Rights Reserved. NatureServe grants to the public a nonexclusive, irrevocable, royalty-free license to reproduce, translate, publish and use these data for noncommercial purposes.

All products produced on any media, including but not limited to publications, databases, theses, websites, and oral presentations should acknowledge the data contributors:

“Data provided by NatureServe in collaboration with Bruce Patterson, Wes Sechrest, Marcelo Tognelli, Gerardo Ceballos, The Nature Conservancy – Migratory Bird Program, Conservation International – CABS, World Wildlife Fund – US, and Environment Canada – WILDSPACE.”

All scientific research that makes extensive use of the maps offer co-authorship to Wes Sechrest or the compiler listed for the individual maps.

The proper citation for this CD is:

“Patterson, B. D., G. Ceballos, W. Sechrest, M. F. Tognelli, T. Brooks, L. Luna, P. Ortega, I. Salazar, and B. E. Young. 2003. Digital Distribution Maps of the Mammals of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.”

Please contact Bruce Young (bruce_young@natureserve.org) if you are interested in using this database or any of the data contained therein in a commercial product.

Software Compatibility

The shapefiles on this compact disk are compatible with ArcView 3.X software produced by the Environmental Systems Research Institute, Inc. To purchase ArcView software, check the ESRI website (www.esri.com) for a distributor near you. Alternatively, you can download ArcExplorer, software that allows you to view but not modify the range maps, for free at <http://www.esri.com/software/arcexplorer/index.html>.

Errors and Updates

Although we feel we did the best job possible to produce an accurate database, some errors surely remain in the data. Our knowledge of mammal distribution and taxonomy continues to improve, so some of these maps may be out of date by the time you see them. Please alert Bruce Young (bruce_young@natureserve.org) of any errors you detect in the data or of newly published information that would serve to update the maps. We will be constantly reviewing the scientific literature to keep abreast of taxonomic and distributional changes. Updated maps will be available for download at NatureServe's website (www.natureserve.org).

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Acknowledgments

For their generous financial support, we thank Conservation International – Center for Applied Biodiversity Science, the Oracle Corporate Giving Program, The Seaver Institute, and NatureServe. We are indebted to the GIS wizardry of Pilar Hernandez whose scripts allowed the project to finish this century and with a manageable number of errors. We thank Anthony Rylands for reviewing the taxonomy and distribution of the primates. The Monteverde Institute kindly made their GIS facility available to us. We especially thank the librarians of the Field Museum for making obscure references available to us. We thank Alberto Guindon and Missy Martin for digitizing some of the maps. Paul Velazco answered a large number of last-minute queries after Luna moved to the University of Michigan. Mark Wainwright painted the CD cover illustration. Finally, thanks to Larry Master for believing in this project and supporting it for the duration.

Literature Cited

- Alberico, M., A. Cadena, J. Hernández-Camacho, Y. Muñoz-Saba. 2000. Mamíferos (Synapsida: Theria) de Colombia. *Biota Colombiana* 1:43-75.
- Anderson, S. 1997. Mammals of Bolivia: Taxonomy and distribution. *Bulletin of the American Museum of Natural History*, No. 231.
- Ceballos, G. and G. Oliva . 2003. Los mamíferos silvestres de México. Conabio - Fondo de Cultura Económica, Mexico D.F.
- Eisenberg, J. F. 1989. *Mammals of the Neotropics: The northern Neotropics*. The University of Chicago Press, Chicago, Illinois.
- Eisenberg, J. F. and K. H. Redford. 1992. *Mammals of the Neotropics: The central Neotropics*. The University of Chicago Press, Chicago, Illinois.

- Emmons, L. H. and F. Feer. 1997. Neotropical rainforest mammals, a field guide. Second edition. Chicago, The University of Chicago Press, Chicago, Illinois.
- Hall, E.R. 1982. The mammals of North America, volumes 1 and 2. John Willey & Sons, New York.
- Koopman, K. F. 1982. Biogeography of the bats of South America. Pages 273-302, *in* Mammalian Biology in South America (M. A. Mares y H. H. Genoways, eds.). Special Publication Series, vol. 6, Pymatuning Laboratory of Ecology, University of Pittsburgh, Linesville, PA.
- Redford, K. H. and J. F. Eisenberg. 1992. Mammals of the Neotropics: The southern cone. The University of Chicago Press, Chicago, Illinois.
- Reid, F. A. 1997. A field guide to the mammals of Central America and southern Mexico. Oxford University Press, New York.
- Wilson, D. E. and S. Ruff. 1999. The Smithsonian book of North American mammals. Smithsonian Institution Press, Washington, DC.
- Woods, C. A. and F. E. Sergile. 2001. Biogeography of the West Indies. CRC Press, Boca Raton, Florida.

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