



Scientists Concerned for Yasuní

Revised Statement on Biodiversity of Yasuní National Park

September 23, 2013

In 2010, scientists published the first comprehensive, peer-reviewed synthesis of biodiversity data for Yasuní National Park in the scientific journal PLOS ONE¹. That study concluded that Yasuní has a) outstanding global conservation significance due to its extraordinary biodiversity and b) potential to sustain this biodiversity in the long term if not degraded by human activities such as oil development and accompanying roads.

Here, we, the “Scientists Concerned for Yasuní,” review the principal findings from the 2010 study regarding species richness, present new information obtained in the 3.5 years since its publication, and reaffirm a set of science-based recommendations.

The Scientists Concerned for Yasuní consists of more than 100 scientists from Ecuador and around the world (Austria, Belgium, Bolivia, Brasil, Colombia, Denmark, Finland, Germany, Italy, Mexico, Panama, Paraguay, Peru, Spain, Switzerland, Turkey, United Kingdom, and United States) with experience in the park².

Key notes: For all text below, local scale refers to areas ≤ 100 km² and landscape scale refers to areas $\leq 10,000$ km². Data for Yasuní National Park includes findings from the Tiputini Biodiversity Station, which is directly adjacent to the park.

Species Richness

- Yasuní National Park occupies a unique biogeographic position where species richness of four major taxonomic groups – amphibians, birds, mammals, and vascular plants – all reach diversity maxima for the Western Hemisphere (*i.e.*, **quadruple richness center**, see Figure 1). For amphibians, birds, mammals, and trees, these are not just continental, but global, maxima of species richness at local scales.

¹ Bass MS, Finer M, Jenkins CN, Kreft H, Cisneros-Heredia DF, et al. (2010) Global Conservation Significance of Ecuador's Yasuní National Park. PLoS ONE 5(1): e8767. <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0008767>

² To contact the Scientists Concerned for Yasuní, write to Matt Finer (matt.finer@gmail.com) and Shawn McCracken (froga@gmail.com)

This relatively small quadruple richness center encompasses just 0.16% of South America and less than 0.5% of the Amazon Basin.

- The 150 **amphibian** species documented for Yasuní National Park in 2010 represented a world record at the landscape scale. Since publication, the number of species has risen to 153, including three newly described species. Several additional new species are currently in the process of being described.

- Adding the 121 documented reptile species, the total **herpetofauna** of Yasuní National Park —274 species of amphibians and reptiles—is the most diverse assemblage ever documented on a landscape scale.

- Yasuní National Park now contains at least 597 documented **bird** species, representing one-third of the Amazon's total native species. The park is part of a north-south stretch of forest in the western Amazon that appears to be the richest known globally at the local scale.

- Yasuní National Park now has 176 documented **mammals**, adding 7 additional species of bats since the 2010 study. It is estimated that Yasuní National Park is one of the few places in the world with over 200 coexisting mammal species.

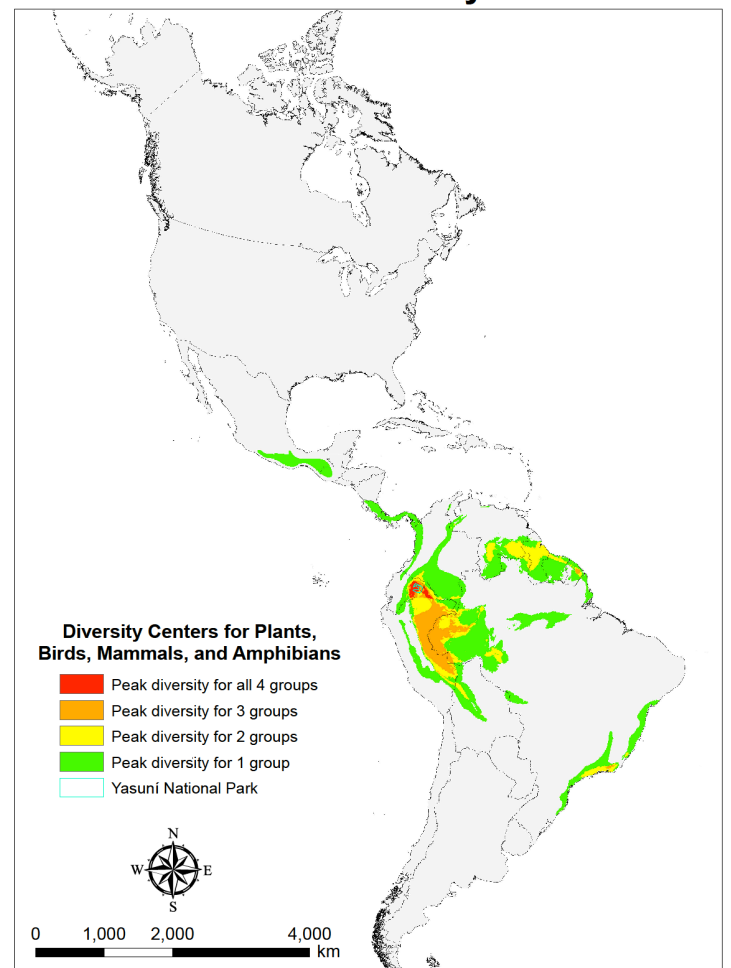
- Ten **primate** species (in fact, 10 genera) are confirmed to coexist near Tiputini Biodiversity Station, a remarkable diversity at the local scale. Three additional species may inhabit the park, but they are currently unconfirmed. This upper estimate of 13 monkey species approaches the richest known sites in the world.

- Yasuní National Park has among the highest local **bat** diversity for any site in the world, with over 100 coexisting species expected at Tiputini Biodiversity Station.

- Yasuní National Park contains 382 documented **fish** species, more than the entire Mississippi River Basin. The lower Yasuní River Basin, which passes through the ITT oil block, has 277 confirmed fish species. The estimated fish diversity for the park is around 500 species.

- A single hectare of forest in Yasuní National Park is estimated to contain at least 100,000 **arthropod** species, approximately the same number of insect species as is found throughout all of North America. This represents the highest estimated biodiversity per unit area in the world for any taxonomic group. Since 2010 nearly two dozen new species of insects have been described from Yasuní National Park.

Yasuní Biodiversity Center



Map prepared by Drs. Clinton Jenkins (North Carolina State University), Matt Finer (Save America's Forests), and Holger Kreft (University of Göttingen) using data from the Global Amphibian Assessment, Global Mammal Assessment, bird distribution data from NatureServe, and plant data by Dr. Kreft. Map uses a Fuller Projection. A version of this map appeared in the scientific journal PLoS ONE: Bass MS, Finer M, Jenkins CN, Kreft H, Cisneros-Heredia DF, McCracken SF, Pitman NCA, English PH, Swing K, Villa G, Di Fiore A, Voigt CC, Kartz TH (2010) Global Conservation Significance of Ecuador's Yasuni National Park. PLoS ONE 5(1): e8767. <http://www.plosone.org/article/info:doi/10.1371/journal.pone.008767>

- Yasuní National Park is among the richest areas globally for **vascular plants** at the landscape scale. At least 3,135 vascular plant species are currently documented, a substantial increase from the 2,700 species reported in 2010. This updated data includes over 2,300 trees and shrubs and 800 lianas, epiphytes, and ferns. Over 3,200 species are expected in the park based upon current collections.
- Yasuní National Park holds a number of global records for **woody plant (trees, shrubs, and lianas)** species richness at the local scale. For example, it has the highest average number of tree and shrub species per hectare of anywhere in the world. The park is part of an equatorial band of forest (stretching from the Ecuadorian Andes to Manaus in Brazil) that contains the richest 1-hectare tree plots in the world.
- A typical hectare of terra firme forest in Yasuní National Park contains at least 655 **tree** species, more than are native to the continental United States and Canada combined, and over 900 **plant** species overall.
- Yasuní National Park **50-hectare Forest Dynamics Plot** update: In 2010, the plot had over 1,100 species-level taxa of trees and shrubs in the first 25 hectares. With the census completion of an additional 25 hectares, a conservative estimate of the current number of documented species is ~1,150. Over 30 new species of trees, including two new genera, have been described from the plot. Four of the new species and both new genera have been described since 2010. Additional new species await formal description.
- Specifically regarding **lianas** (woody climbers), 350 species have been documented in 14 hectares of censused plots in the park, more than double the amount of species reported in 2010. Just one hectare contains an average of 200 liana species. Liana biologists estimate that the park is home to around 550 species in total.

Threatened Species and Endemism

- Yasuní National Park is home to 28 **Threatened or Near Threatened vertebrate species**, such as White-bellied Spider Monkey, Giant Otter, Poepig's Woolly Monkey, Amazonian Manatee, Lowland Tapir, Giant Armadillo, and Harpy Eagle³. Nearly half of these 28 species are facing a high to extremely high risk of extinction in the wild.
- Oil-related activities and contamination may impact the **Giant Otter and Amazonian Manatee**, two Threatened large aquatic mammals. Both species have been documented in the Tiputini and Yasuní Rivers, which would likely be the principal access routes and infrastructure sites for oil development in ITT and Block 31.
- Yasuní National Park is likely home to over 100 Threatened or Near Threatened **plant** species. Over half of these species are facing a high to extremely high risk of extinction in the wild.
- Yasuní National Park is home to 43 **vertebrate species that are regional endemics** (i.e. endemic to the Napo Moist Forests ecoregion), including 2 monkeys, 19 birds, and 20 amphibians.
- Yasuní National Park is likely home to hundreds of **plant species that are regional endemics**.

³ *Ateles belzebuth*, *Pteronura brasiliensis*, *Lagothrix poeppigii*, *Trichechus inunguis*, *Tapirus terrestris*, *Priodontes maximus*, and *Harpia harpyja*, respectively.

Conclusion

In 2010, the authors of the PLOS ONE study generated a number of **science-based policy recommendations**, including:

- 1) Permit no new roads nor other transportation access routes—such as new oil access roads, train rails, canals, and extensions of existing roads—within Yasuní National Park or its buffer zone;
- 2) Permit no new oil exploration or development projects in Yasuní, particularly in the remote and relatively intact Block 31 and ITT Block.
- 3) Establish a protected corridor between Yasuní and Cuyabeno Wildlife Reserve that, together with the Peruvian reserves, would form a trans-boundary mega-reserve with Yasuní National Park at its core.

Here, we, the “Scientists Concerned for Yasuní”, reaffirm these recommendations. The Scientists Concerned for Yasuní consists of more than 100 scientists from Ecuador and around the world (Austria, Belgium, Bolivia, Brazil, Colombia, Denmark, Finland, Germany, Italy, Mexico, Panama, Paraguay, Peru, Spain, Switzerland, Turkey, United Kingdom, and United States), including:

Stuart Pimm
Doris Duke Professor of Conservation
Nicholas School of the Environment
Duke University
USA

Terry Erwin
Curator of Coleoptera
National Museum of Natural History
Smithsonian Institution
USA

Kelly Swing
Director Estación Tiputini
Colegio de Ciencias Biológicas y Ambientales
Universidad San Francisco de Quito
Ecuador

Anthony Di Fiore
Professor, Department of Anthropology
Director, Primate Molecular Ecology and Evolution Laboratory
University of Texas at Austin
USA

Bette Loiselle
Director, Tropical Conservation and Development Program
Center for Latin American Studies
Professor, Wildlife Ecology and Conservation
University of Florida
USA

Phyllis Coley
Distinguished Professor of Biology
University of Utah
USA
Smithsonian Tropical Research Institute
Panama

Michael Forstner
Regent's Professor
Alexander Stone Chair in Genetics
Department of Biology
Texas State University
USA

Sara Alvarez
Universidad Complutense de Madrid
Spain

Christian Miguel Pinto Báez
The City University of New York
Ecuador

Robyn J. Burnham
Associate Professor of Ecology & Evolutionary Biology
University of Michigan
USA

Kenneth Chapin
University of California, Los Angeles
USA

Laura M. Cisneros
University of Connecticut
USA

Jim Dalling
Professor
Department of Plant Biology
University of Illinois at Urbana-Champaign
USA

Juan F. Dueñas-Serrano
Lincoln University New Zealand
Ecuador

Andrea C. Encalada
Cornell University
Ecuador

Maria Jose Endara
Department of Biology
The University of Utah
USA

Peter English
College of Natural Sciences
University of Texas at Austin
USA

Matt Finer
Senior Scientist
Center for International Environmental Law
USA

Ola Fincke
University of Oklahoma
USA

Paul Fine
Department of Integrative Biology
University of California
USA

Carla Garzon
Oklahoma State University
USA

Juan M. Guayasamin
University of Kansas
Ecuador

Juan E. Guevara
Department of Integrative Biology
University of California
USA

Clinton N. Jenkins
Principal Research Scholar
North Carolina State University

Ted R. Kahn
Executive Director
Neotropical Conservation Foundation
USA

Jordan Karubian
Tulane University
USA

Ryan P. Killackey
Filmmaker / Biologist
USA

Holger Kreft
University of Göttingen
Germany

Anjali Kumar
Massachusetts Institute of Technology
USA

Thomas A. Kursar
Department of Biology
University of Utah
USA

Omar R. Lopez
Researcher. Centro de Biodiversidad y Descubrimiento de Drogas
INDICASAT
Panama

Massimo De Marchi
Professor of Environmental Assessment
University of Padova
Italy

Shawn F. McCracken
Department of Biology
Texas State University
USA

Patricio Mena Vásquez
Wageningen University
Ecuador

Eliot Miller
University of Missouri, St. Louis
USA

Hugo Mogollon
Endangered Species Coalition
Ecuador

Julio Molineros
Associate Staff Scientist
Oklahoma Medical Research Foundation
Adjunct Assistant Professor
Oklahoma State University
USA

Melissa Moreano
Department of Geography
King's College London
United Kingdom

Mark Mulligan
Department of Geography
King's College London
United Kingdom

Priscilla M. Muriel
Universidad Catolica del Ecuador
Ecuador

Manuel V. Sánchez Nivicela
Eng. Ecotourism (Escuela Politécnica del Chimborazo)
Ecuador

Sean O'Donnell
Associate Department Head
Biodiversity, Earth & Environmental Science
Drexel University
USA

Maria Olga Borja
Universidad San Francisco de Quito
Ecuador

Ana Cristina Palma
School of Marine and Tropical Biology
James Cook University
Australia
Fundación Proyecto Primates
Colombia

Salvatore Eugenio Pappalardo
University of Padova
Italy

Jefferson Mecham Parson
Utah State University
Ecuador

Nigel C.A. Pitman
Center for Tropical Conservation
Nicholas School of the Environment
Duke University

Amy Porter
University of California Davis

USA
Paulo C. Pulgarín-R –
Universidad de Los Andes
Colombia

Tom Quesenberry
El Monte Owner/Naturalist
Ecuador

Morley Read
Investigador Asociado
Pontificia Universidad Catolica del Ecuador
Ecuador

Andrés Esteban León Reyes
Biodiversity and Conservation in Tropical Areas (España)
Ecuador

Jose Luis Rivera
Pontificia Universidad Catolica del Ecuador
Ecuador

Thomas Brandt Ryder
Research Associate
Smithsonian National Zoological Park
USA

Ingo Schlupp
Professor
Brian and Sandra O'Brien Presidential Professor
Assistant Chair of Biology
University of Oklahoma
USA

Cagan H. Sekercioglu
Assistant Professor
Department of Biology
University of Utah
USA
President & Associate Professor
KuzeyDoga Society
Turkey

Alejandro Solano
Arizona State University
USA

Stephanie Spehar
Associate Professor of Anthropology
University Leadership Fellow for Sustainability
University of Wisconsin Oshkosh

USA
Inty Felipe Arcos Torres
Centro Agronomico Tropical de Investigación y Enseñanza (CATIE, Costa Rica)
Ecuador

Ursula Valdez
University of Washington
Peru

Andrés Vallejo
editor, revista Ecuador Terra Incognita
Universidad Católica del Ecuador
University of Cambridge
Ecuador

Varsha Vijay
Duke University
USA

Christian C. Voigt
Senior Research Scientist
Leibniz Institute for Zoo and Wildlife Research
Germany

Peter Wetherwax
Assistant Professor
Department of Biology
University of Oregon
USA

Catherine Woodward
Faculty Associate
Institute for Biology Education
University of Wisconsin – Madison
USA

Leo Zurita-Arthos
Environmental Monitoring and Modelling Research Group
Department of Geography
King's College London
United Kingdom

Tatiana Lucía Santander García
Universidades Autónoma, Complutense y de Alcalá, Madrid
Spain

Todd Mitchell
University of Washington
USA

Ross Furbush
University of Washington
USA

Alison Sienkiewicz
University of Washington
USA

Pablo Felipe Serrano Montesinos
Universidad del Azuay
Ecuador

Kimberly S. Sheldon
University of Washington
USA

Federico David Brown Almeida
University of Washington
Brazil

Marisol Ayala Valdivieso
York University
Austria

James V. Remsen
McIlhenny Distinguished Professor of Biological Sciences
Louisiana State University
USA

Jose Fabara Rojas
University of Missouri-St Louis
Ecuador

Jaime García Domínguez
Universidad Internacional Menéndez Pelayo
Spain

Jaime Antonio Salas Zambrano
Universidad de Guayaquil
Ecuador

Maria Veronica Troya Suarez
University of Geneva
Switzerland

Francisco Villamarín
Australian Rivers Institute, Griffith University
Ecuador

Berit Kamp Kragh
Aarhus University
Denmark

Sébastien Haye
University of Geneva
Switzerland

Borja Milá
Museo Nacional de Ciencias Naturales
Spain

Marco Rodrigo Calderón Loor
The University of Melbourne
Ecuador

Andreas Futschik
Assoc. Professor, Dept. of Statistics
University of Vienna
Austria

Niels Kaare Krabbe
University of Copenhagen
Denmark

Rosa Isela Meneses Q.
Universidad Mayor de San Andrés, La Paz
Bolivia

Kalle Ruokolainen
University of Turku
Finland

Scott T. Olmstead
University of Arizona
USA

Francisco Xavier Cuesta Camacho
University of Amsterdam
Ecuador

Raúl Ortiz-Pulido
Universidad Autónoma del Estado de Hidalgo
Mexico

Karim Musálem Castillejos
Universidad Autónoma Chapingo, México
Paraguay

Robert S. Ridgely
President, Rainforest Trust
USA

David Bartelle McDonald
University of Arizona
USA

Nathan Muchhala
University of Miami
USA

Nelly Llerena
University of Turku
Peru

Geovanna Lasso
University of Leeds
Ecuador

Rob Williams
Frankfurt Zoological Society
Peru

Judit Torres Fernández del Campo
Universidad de León
Spain

Johan Ingels
Ghent University
Belgium

Paul J. Greenfield
Temple University
Ecuador

Guy M. Kirwan
University of East Anglia
England

Glenda Marisol Pozo Zamora
Universidad Central del Ecuador
Ecuador

Elisa Bonaccorso Sánchez
University of Kansas
Ecuador

David Santiago Parra Puente
Universidad Católica del Ecuador

Ecuador
Mark Higgins
Carnegie Institution for Science, Stanford
USA

María del Carmen Vizcaíno Barba
Universidad Católica del Ecuador
Ecuador

Paola Moscoso Rosero
Universidad Católica del Ecuador
Ecuador