

# YASUNÍ

## TIPUTINI

& THE WEB OF LIFE



PETE OXFORD, RENÉE BISH  
& KELLY SWING  
foreword: E.O. WILSON

Tiru

Anangu

Serenu

R Tipu

Rio Napo

Yutur-yacu

S Juan  
Nepomuceno

Nombre de Jesus

tini



# YASUNÍ

## TIPUTINI

& THE WEB OF LIFE

*This we know: the earth does not belong to man,  
man belongs to the earth.  
All things are connected like blood that unites us all.  
Man did not weave the web of life, he is merely a strand in it.  
Whatever he does to the web,  
he does to himself.*

Chief Seattle





















# YASUNÍ

## TIPUTINI

& THE WEB OF LIFE

PETE OXFORD  
RENEÉ BISH  
KELLY SWING  
Foreword: E.O. WILSON

Additional Texts: Anthony Di Fiore, Terry Erwin, Jaime Guerra, Shawn McCracken, Diego Mosquera



## USFQ PRESS

Universidad San Francisco de Quito USFQ  
Campus Cumbayá USFQ, Quito 170901, Ecuador

USFQ PRESS is the editorial department at Universidad San Francisco de Quito USFQ. It furthers the University's mission by disseminating knowledge to educate, edify, research and serve the community in accordance with the Liberal Arts philosophy.

### Yasuní, Tiputini & The Web of Life

Authors: Pete Oxford, Renéé Bish, Kelly Swing

Editorial production: Valentina Bravo, Diego F. Cisneros-Heredia  
Design and layout: Azuca (www.azucaingenio.com)  
Design concept: Renéé Bish  
Text edition: Mary Ellen Fieweger  
Color correction: Gustavo Moya  
Prepress: Jaime Mosquera, Krushenka Bayas

1st edition, 2012

2nd edition, December 2018

Print run: 1000 copies

Author registration: 038604

ISBN: 978-9978-68-133-6

Printed in Quito, Ecuador by Imprenta Mariscal

More information available at: <http://libros.usfq.edu.ec>

© Universidad San Francisco de Quito USFQ, 2018

© Pete Oxford, 2018, for the chapter '*Yasuní, a personal view*'

© Kelly Swing, 2018, for the chapter '*Ecuador's Yasuní*' and all subchapters, except those listed below:

© Anthony Di Fiore, 2018, for the text '*Primates*'

© Terry Erwin, 2018, for the text '*Documenting diversity at different scales*'

© Jaime Guerra, 2018, for the text '*Bats*'

© Shawn McCracken, 2018, for the text '*Canopy research*'

© Diego Mosquera, 2018, for the text '*Camera traps*'

© E.O. Wilson, 2018, for the Foreword

© Pete Oxford and Renéé Bish, 2018, for all photos, except those listed below:

© Kelly Swing, 2018, for photos in pages 189 TL, 203 BR, BL, Back cover treehopper.

© Diego Mosquera, 2018, for photos in pages 216 and 217 BL

© Juan Lorenzo Barragán, 2018, for map endpapers (from Pedro Vicente Maldonado, 1750)

© Bejat McCracken, 2018, for photos in page 242 BL

© Pablo Cabrera and Susana Crespo, 2018, for map, page 256-257

© Leo Zurita and María Olga Borja (GeoCentro UNIGIS-USFQ), 2018, for Landsat imagery, pages 258-259

© Margot Bass, Matt Finer, Clinton Jenkins, Holger Kreft, Diego Cisneros-Heredia, Shawn McCracken, Nigel Pitman, Peter English, Kelly Swing, Gorky Villa, Tony Di Fiore, Christian Voigt, and Tom Kunz, 2018, for map, page 260

All rights reserved. No part of this publication may be reproduced, distributed, incorporated into a computer system, or transmitted in any form or by any means (including photocopying, recording, or other electronic or mechanical methods), without the prior written permission of the copyright owners. Infringement of these rights may constitute an offense against intellectual property.

Cataloguing-in-Publication record provided by the Universidad San Francisco de Quito USFQ Library.

Oxford, Pete

Yasuní, Tiputini & The Web of Life / Pete Oxford, Renéé Bish, Kelly Swing ; foreword, E. O. Wilson ; additional text, Anthony Di Fiore ... [y otros cuatro]. – 2nd edition. – Quito : USFQ Press, ©2018  
p. cm.

ISBN: 978-9978-68-133-6

1. Parque Nacional Yasuní (Ecuador) – Investigaciones – Obras ilustradas. – 2. Ecología de selva lluviosa – Conservación – Parque Nacional Yasuní (Ecuador). – 3. Biodiversidad – Parque Nacional Yasuní (Ecuador). – I. Bish, Renéé. – II. Swing, Kelly. – III. Wilson, E. O., pról. – VI. Di Fiore, Anthony. – V. Título.

CLC: QH 77 .E2 O94 2018

CDD: 333.951 609 866

OBI-070

The use of general descriptive names, trade names, registered trademarks, etc. in this publication does not imply, even in the absence of a specific declaration, that these names are exempt from the relevant laws and regulations of protection and, therefore, free for their general use.

The information presented in this book is entirely the responsibility of its authors. USFQ PRESS presumes that the information is true and accurate as of the date of publication. Neither the Publisher nor the authors provide a guarantee, express or implied, with respect to the materials contained in this document or any errors or omissions that may have been included.

To everyone with children. *Pete and René*

To all who depend on Nature, whether they know it or not. *Kelly*



While special efforts have been made to provide accurate and current taxonomy for as many organisms as possible, the purpose of this publication is not to serve as a definitive source for scientific names or classifications. The extreme diversity of this area means that many species have not been catalogued by science or given scientific names. Taxonomic revisions are underway for various groups, resulting in ongoing adjustments of names; this will continue well into the future.

Photographer's note: Some of the invertebrates and herpetofauna photographed in this book were handled to best photograph them, a very few were captive individuals from a public educational collection (pages 16, 20 TL and BL, 57, 93 BR, 102, 103, 156, 188 TR, 191 TR, 192, 244 TR, BR and BL; 84 BR and TR were mist-netted during research, 101 was free range in a hotel in Coca). We returned the silky anteater on page 61 to the wild from captivity in Guyana and photographed it on release. As stated in the opening chapter, the front cover image was a captive animal. Otherwise, all other images were taken in wild and free conditions, unless stated in the photo captions.

In the photo captions TL means top left, TR top right, BL bottom left and BR bottom right.

#### **Photo captions for opening spreads:**

**Pages 2-3:** A view over the canopy from within the crown of a large kapok tree (*Ceiba pentandra*).

**Pages 4-5:** A curious black panther (*Panthera onca*) peers from behind a tree at the photographer.

**Pages 6-7:** The startling eyespots on the underwings of an *Automeris* moth.

**Pages 8-9:** Aerial view of the sinusoidal Tiputini River in the Yasuní Biosphere Reserve.

**Page 10:** A *Brownea* flower blooms directly from its trunk, typical of cauliflorous plants.

#### **Photo captions for back cover. Clockwise from top right:**

Hoatzin, *Opisthocomus hoazin*.

Tree frog, *Osteocephalus* sp.

Yellow leaf katydid, *Agaurella mirabilis*.

White-bellied spider monkeys, *Ateles belzebuth*.

Treehopper, *Heteronotus lineata*.

Lettered aracari, *Pteroglossus inscriptus*.

Yellow-spotted river turtle and butterflies.

Black panther, *Panthera onca*.

Yellow-nosed calico snake, *Oxyrhopus formosus*.

Squirrel monkey, *Saimiri sciureus*.

Mother and baby tapir, *Tapirus terrestris*.

Leaf mimic katydid, *Typophyllum* sp.

#### **Photo captions for authors' biographies**

**Page 256:** TL, Pete Oxford on the TBS canopy walkway.

BR, Renéé Bish on the Maxus Road with luggage.

**Page 257:** TL, Kelly Swing seine netting in the Tiputini River.

BR, Dr. E.O. Wilson.

# CONTENTS

Foreword by E.O. Wilson .....	17
Yasuní, a personal view, by Pete Oxford .....	19
Ecuador's Yasuní, by Kelly Swing .....	65
Introduction to Ecuador's Yasuní: biodiversity and concerns .....	66
What is rainforest? .....	73
The three pillars of conservatio .....	84
Bats, by Jaime Guerra .....	87
Camouflage .....	89
The inherent problem with sustainable development .....	99
Fishes .....	118
The value of nature – species and ecosystems .....	129
Human cultures in the mix .....	139
Primates, by Anthony Di Fiore .....	142
Aposematic coloration .....	149
Collateral implications of oil .....	161
Foreseeable chain reactions .....	167
Salt licks .....	175
Chemical warfare .....	183
Research in the Yasuní .....	189
Diversity studies .....	197
Impact studies and indicator species .....	210
Camera traps, by Diego Mosquera .....	219
Grandpa's perspective .....	221
Documenting diversity at different scales, by Terry Erwin .....	233
Canopy research, by Shawn McCracken .....	247
Will we indeed choose to save anything? .....	253
Authors' biographies .....	256
Maps .....	258
Acknowledgements .....	263
Bibliography .....	264
Useful contacts and friends of Yasuní .....	265

Our reasons for publishing this book were many but, in essence, we felt a need to document what Yasuní and the Tiputini represent for the human race, a need to provide evidence demonstrating “What it is” before it becomes “What it was.” This book will either become a celebration of exuberance, complexity, biodiversity, and wildness or an historic document. We sincerely hope that it will be the former.

*Pete Oxford, Reneé Bish, and Kelly Swing*  
Tiputini Biodiversity Station  
Yasuní, Amazon, Ecuador

# FOREWORD

The Yasuní National Park of Ecuador, which encloses a magnificent rain forest between the Rio Napo and Rio Curaray, is reputed to be the biologically richest place on Earth, including both terrestrial and marine habitats. More precisely, its 9,820 square kilometers are believed to contain more species of plants and animals than any other place of comparable area. The known facts support the claim: for the whole park, 596 bird species, 150 amphibian species (more than the number in all of North America), as many as 100,000 insect species per hectare, and also, growing in just a single average upland hectare, 655 tree species, once again, more than occur in all of North America. The only question about Yasuní's supremacy is whether there might exist some other, less explored segment along the Amazon and Orinoco Basins that will prove even more diverse. At the very least, the Yasuní National Park is very close to the extreme of its kind. And in the world outside the Amazon-Orinoco region, nothing in the world can approach it.

Why should numbers like these matter? First, because they give a limit of one dimension of existence on the surface of Earth. We are rightfully fascinated by the highest mountain (Everest), the deepest point in the oceans (the Challenger Deep near the Mariana Islands), the lowest temperature ever recorded (on Antarctica), and the biggest animal that ever lived (blue whale). Why should we not find equally important the world's greatest concentration of plant and animal species? Even if Yasuní someday slips to second or third among contenders in the Amazon-Orinoco region (which I'm inclined to doubt), it will still stand out as a place deserving global renown.

Here is another reason to pay attention, not yet widely recognized: the Yasuní National Park may harbor the highest species numbers that have ever existed. Throughout the entire history of life from the Paleozoic Era forward, 544 million years, the number of plant and animal species worldwide has been very slowly rising. Thus at the breakout from Africa and worldwide spread of *Homo sapiens*, beginning about 60,000 years before the present, Earth's biodiversity was likely at its all time maximum. Then, extinction by extinction, human activity began to whittle the number down, and today the pace of destruction is accelerating. For the time being, Yasuní holds its own, and that is why it is a world treasure.

With supremacy in species comes another ultimate: the number of niches created and occupied. And with density of niches at Yasuní comes a spread in the variety of specialized adaptations, life cycles, anatomy, and behavior. It is the extremes of this variation, captured by the superb photography, that makes this book, *Yasuní*, *Tiputini* and the *Web of Life*, stand out. Although I am very experienced in tropical life, and previous illustrated essays on the subject, I found this one breathtaking—literally in this case, since I held my breath a moment on opening each page, in order to examine each startling detail. May the subjects thus depicted be saved for all generations to come.

*Edward O. Wilson*  
University Research Professor Emeritus,  
Harvard University