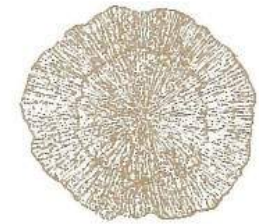


2019 (27th) International COSMOS Prize

awarded to

STUART L. PIMM

Professor of Conservation Ecology, Duke University, U.S.A.



INTERNATIONAL
COSMOS
P R I Z E

Pimm' pioneering work clarified the complexities of food webs that sustain life on earth and calculated rates of species extinction using quantitative mathematical models. Building on these foundations, he went on to empirically verify his theoretical findings in the field. Through such work, he has been an influential figure, contributing greatly to the shaping of policies to conserve biological diversity globally and to ecological habitat conservation practice in many parts of the world.

He has further extended the global outreach of his work by establishing the international non-profit foundation, "Saving Nature" (formerly "Saving Species"), which supports local conservation groups across the world, empowering them to reduce the risk of species extinction and better manage ecological habitats under threat. His considerable achievements, integrating science with practice, mark Stewart Pimm as a true giant in the field of conservation biology, whose contributions to the "Harmony of Man and Nature" make him a most worthy winner of the International COSMOS Prize for 2019.

2019 (27th) International COSMOS Prize: Prizewinner

Stuart Leonard Pimm

Professor of Conservation Ecology, Duke University, U.S.A.



- **Date of Birth:**

- 27 February 1949 (70 yrs)
- Born in Derbyshire, U.K.

- **Nationality:**

- U.S. Citizen

- **Current Position:**

- Professor (Conservation Ecology),
Duke University

- **Major:**

- Conservation Ecology

- **Academic Background:**

- 1971: B.Sc. Oxford University, U.K.
- 1974: Ph.D. New Mexico State University

- **Major International Awards Received:**

- 2006: Heineken Prize for the Environment
- 2010: Tyler Prize for the Environment



A PERSONAL SKETCH

THE GREAT OUTDOORS

With Oxford University field studies team

1970, Band-e-Amir, Afghanistan



PIMM'S EARLY YEARS

School photograph taken when Pimm started bird watching

1962, Bemrose School, Derby. U.K.



LOVE OF NATURE

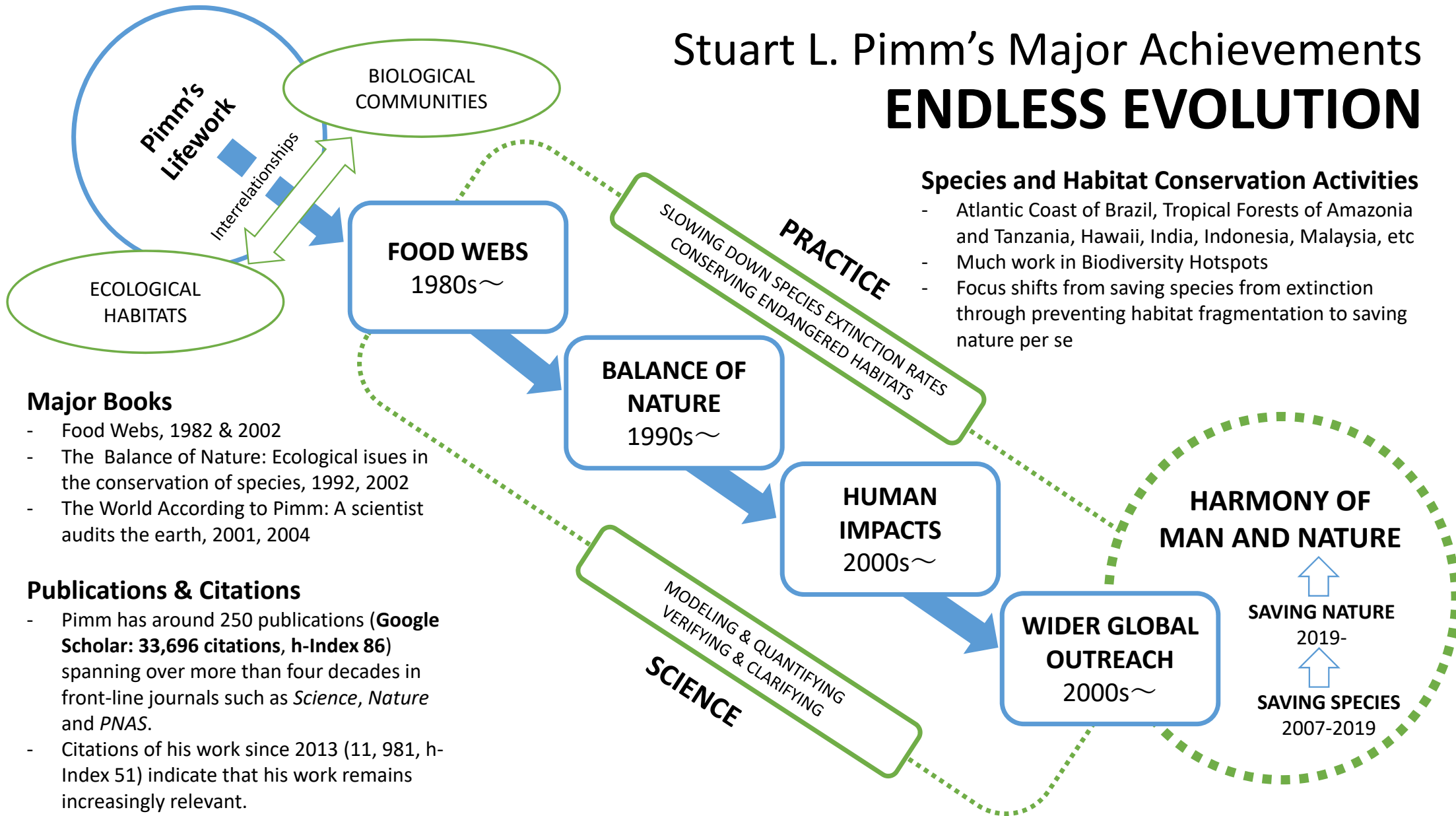
With mother on camping trip (left and right)

1957, North Wales, U.K.



Stuart L. Pimm's Major Achievements

ENDLESS EVOLUTION



Species and Habitat Conservation Activities

- Atlantic Coast of Brazil, Tropical Forests of Amazonia and Tanzania, Hawaii, India, Indonesia, Malaysia, etc
- Much work in Biodiversity Hotspots
- Focus shifts from saving species from extinction through preventing habitat fragmentation to saving nature per se

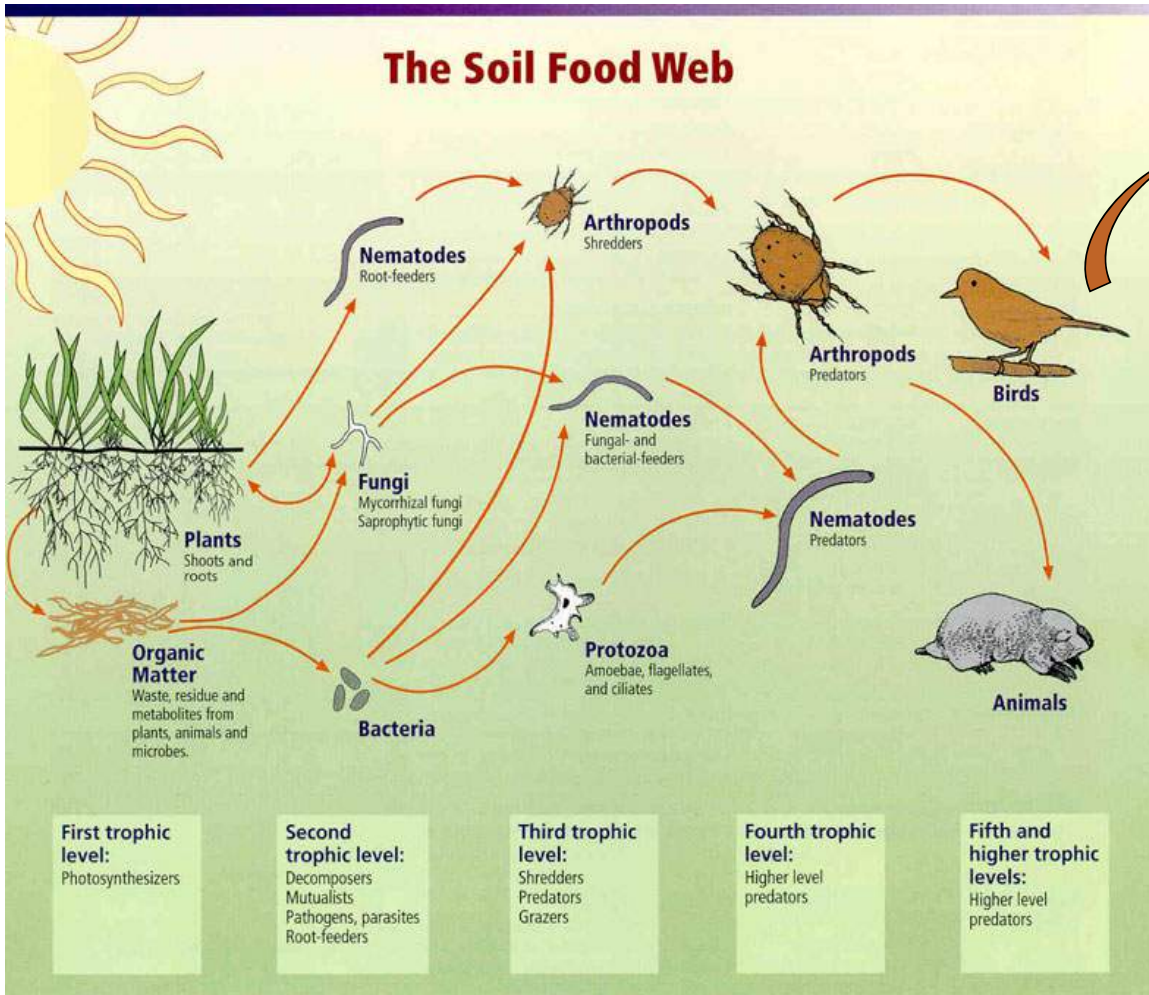
Major Books

- Food Webs, 1982 & 2002
- The Balance of Nature: Ecological issues in the conservation of species, 1992, 2002
- The World According to Pimm: A scientist audits the earth, 2001, 2004

Publications & Citations

- Pimm has around 250 publications (**Google Scholar: 33,696 citations, h-Index 86**) spanning over more than four decades in front-line journals such as *Science*, *Nature* and *PNAS*.
- Citations of his work since 2013 (11, 981, h-Index 51) indicate that his work remains increasingly relevant.

FOOD WEBS



Relationships between soil food web, plants, organic matter, and birds and mammals
 Image courtesy of USDA Natural Resources Conservation Service
http://soils.usda.gov/sqi/soil_quality/soil_biology/soil_food_web.html.



- **PIMM'S CONTRIBUTIONS**

- There are key patterns of food webs across trophic levels which are shaped by: (1) Population Dynamics; (2) Biomass Productivity; (3) Environmental Regulatory Processes; (4) Nutrient Cycles; (5) Energy Flows

- The above analysis was used to show where ecosystems are vulnerable

- **CRITIQUE OF ECOLOGICAL CONSERVATION RESEARCH**

- Pimm decries focus as being too narrow in temporal, spatial and biological terms;
- Temporal: Timelines too short; Spatial: Habitats too small; Biological: Taxonomic focus too narrow

BALANCE OF NATURE

- **DEFINITIONAL RIGOUR**

- Pimm adds scientific rigour to clarify terms used to assess how robust/vulnerable ecological habitats are
- The key terms (above) are: (1) Stability; (2) Resilience; (3) Variability; (4) Persistence; (5) Resistance



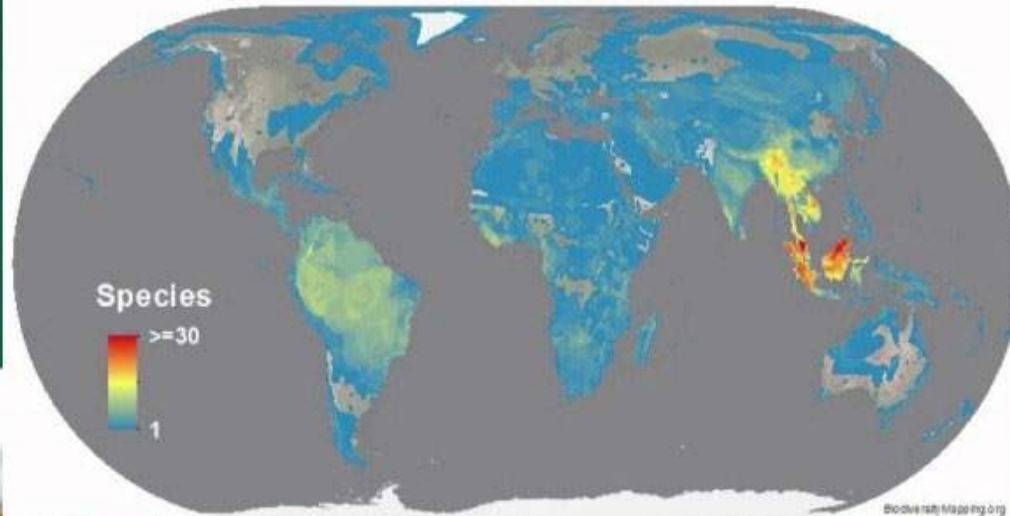
- **CALCULATING SPECIES EXTINCTION RATES**

- Pimm estimated in 1995 that modern species extinction rates are around 1000 times greater than what natural extinction rates would be if there was no human impact on ecological habitats
- His early work activated interest among others, leading to estimations in the “Global Biodiversity Outlook” and “Millennium Ecosystem Assessment”
- These pioneering works by Pimm highlighted the extent of human impact on biodiversity loss and complexities characterizing the habitats of threatened species.

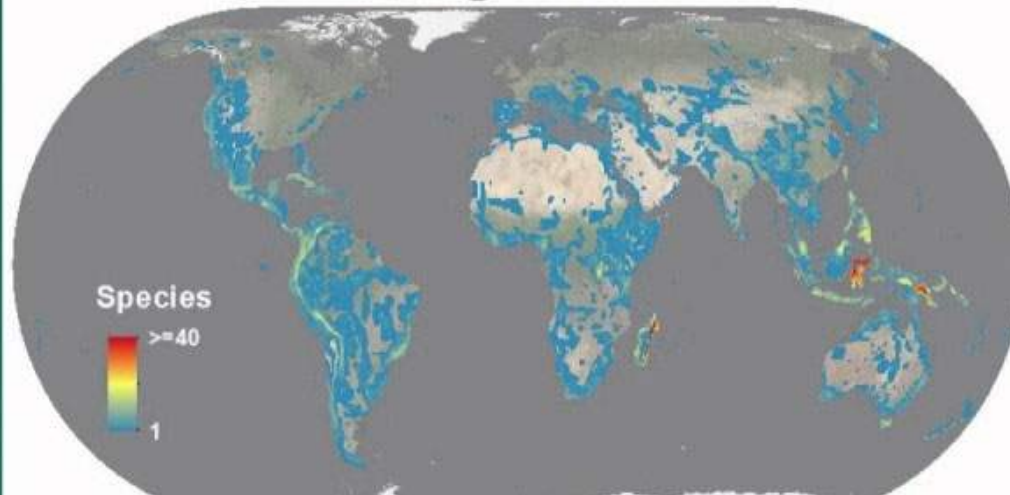
there are two kinds of threatened species

About a tenth have large geographical ranges

Threatened Mammals



Small-ranged Mammals



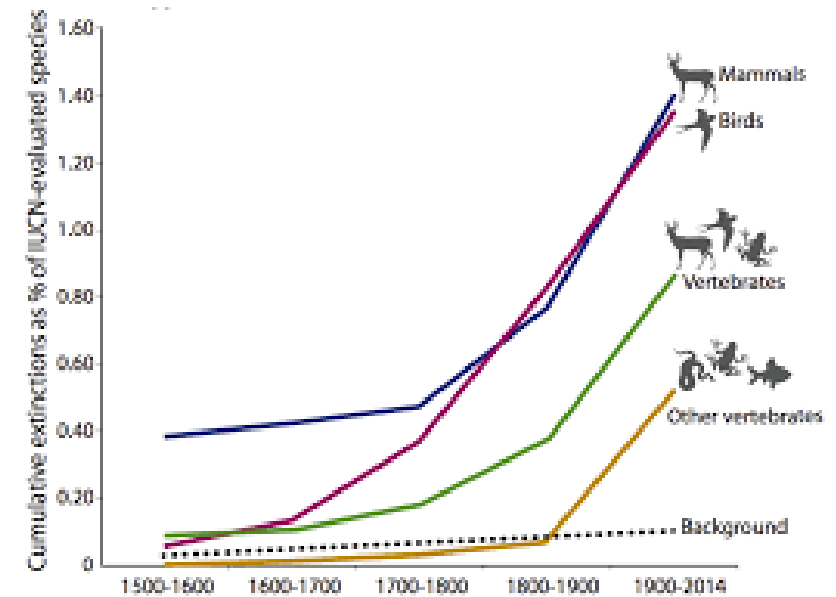
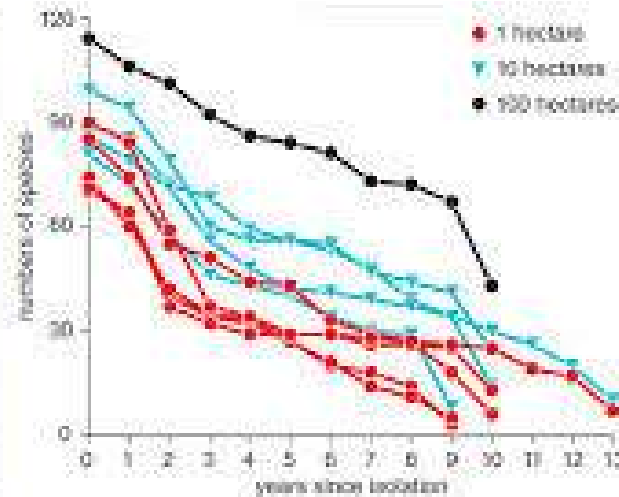
The great majority have small breeding ranges
They are most vulnerable to habitat destruction
The destruction is largely anthropogenic in origin



HUMAN IMPACTS

- **QUANTIFYING HUMAN IMPACTS**

- Pimm conducts quantitative environmental audits to assess human impact on ecological habitats and sees himself as an “investment banker of global biological accounts”
- This enables practical application on a global scale but with an understanding of vulnerability to species extinction at the local habitat level
- The above leads to practical steps to slow down the speed of species extinction by conserving ecological habitats of endangered species in biodiversity hotspots



- **PRINCIPLES OF SOUND PRACTICE**

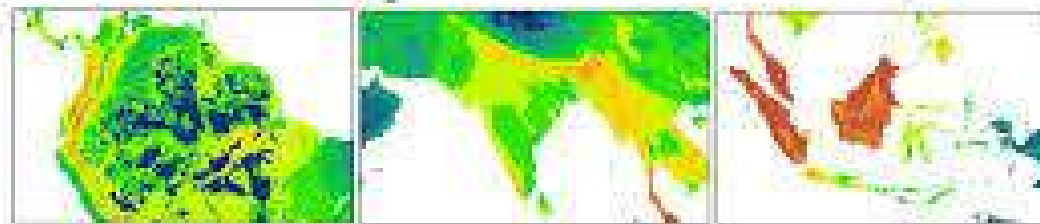
- Threatened species with smaller breeding ranges are more vulnerable to extinction than those with larger ranges
- Fragmented ecological habitats accelerate the speed of species extinction
- Creating ecological corridors to connect fragmented habitats is a practical and economical solution to slow down the rate of species extinction

- **ARRESTING BIODIVERSITY LOSS**

- Pimm's practical solutions are of great value for arresting biodiversity loss in hotspots across the world (right).
- His work has contributed to calculating numbers of species under threat due to human impact (below) and prioritizing where action is most urgently required.



- **BIODIVERSITY HOTSPOTS**



DEFINITION:

A biodiversity hotspot is a region which must have:

- (1) At least 1,500 vascular plants as endemics — which is to say, it must have a high percentage of plant life found nowhere else on the planet. A hotspot, in other words, is irreplaceable.
- (2) 30% or less of its original natural vegetation. In other words, it must be threatened.

SIGNIFICANCE:

Around the world, 36 areas qualify as hotspots. They represent just 2.4% of Earth's land surface, but they support more than half of the world's plant species as endemics — i.e., species found no place else — and nearly 43% of bird, mammal, reptile and amphibian species as endemics

WIDER GLOBAL OUTREACH

- **SAVING SPECIES, est. 2007**
- Pimm establishes a non-profit foundation, “Saving Species” in 2007 to help local communities purchase land to connect fragmented habitats and empowering them to manage these larger contiguous biodiversity conservation areas where species extinction is found to be slower.
- The conservation practices are based on “sound scientific foundations”.
- The Scientific Board of “Saving Species” advises on this and has on it Edward Wilson and Peter Raven (both past winners of the International COSMOS Prize), indicating Pimm’s continued commitment to put the “science back into environmental science



[Saving Species](http://www.savingspecies.org) confirms that science makes a difference
www.savingspecies.org

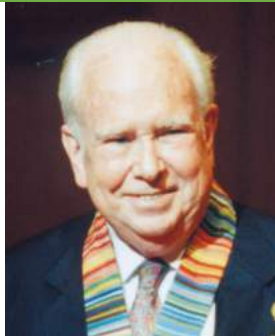


- **SAVING NATURE est. 2019**
- Saving Species was reborn this year as Saving Nature, with the latter’s mandate expanded from “saving species” to “saving nature” per se
- “Saving Nature” aims to empower local communities to carry out “CPR for the Earth”, viz to: (1) Connect (fragmented habitats), (2) Protect (endangered species), and (3) Restore (damaged habitats)
- Award of the International COSMOS Prize to Stuart Pimm is therefore most timely to support the wider global outreach of his work through this newly established institution.

Saving Species’ Scientific Advisors and the International COSMOS Prize



Stuart L. Pimm, President

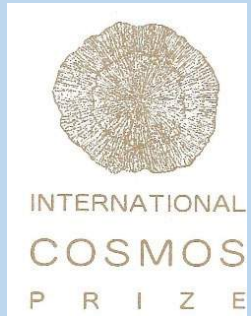


Dr. Peter H. Raven
(2003 Prizewinner)



Dr. Edward O. Wilson
(2012 Prizewinner)

COEXISTENCE OF MAN AND NATURE

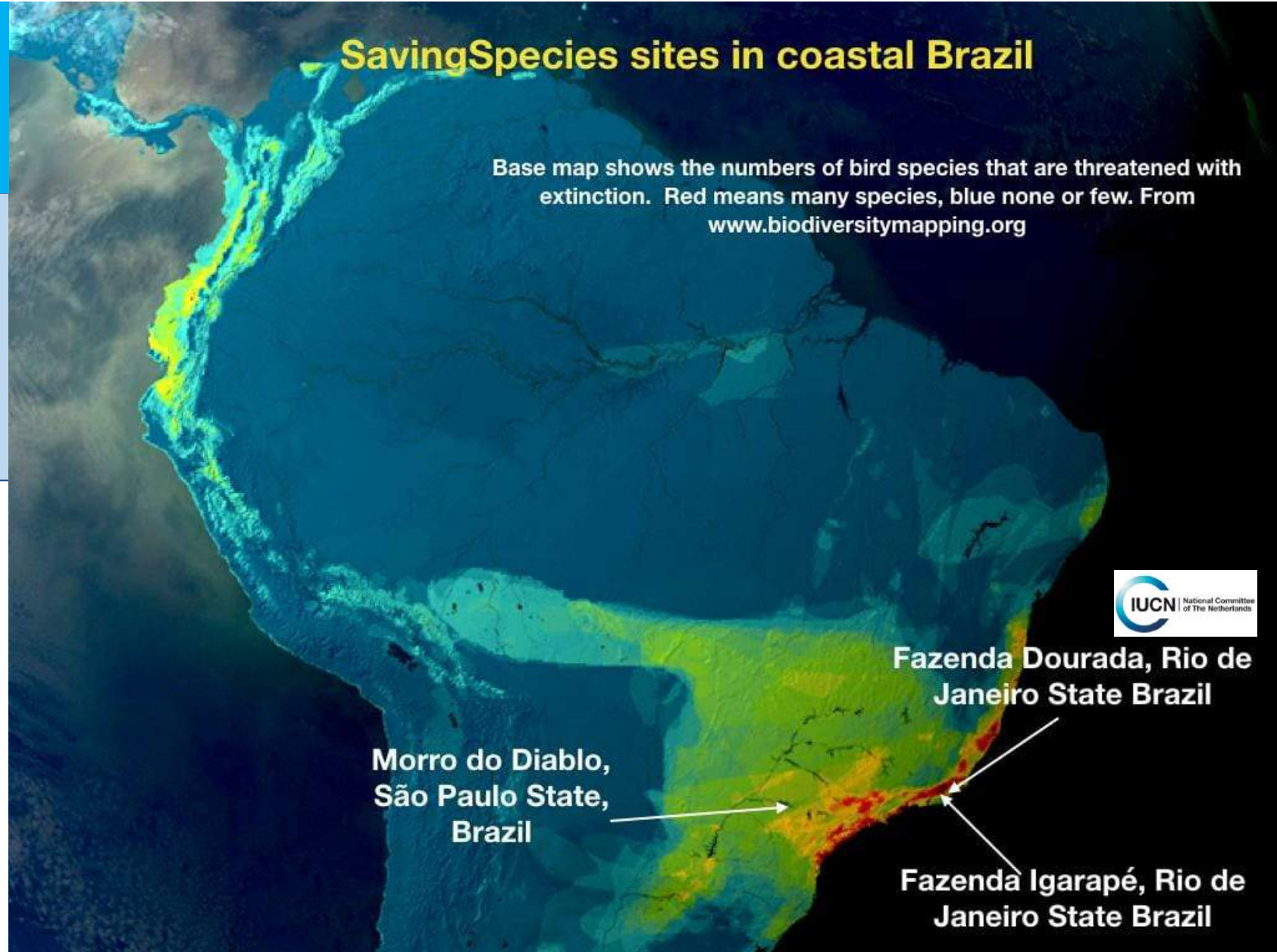


Supporting local conservation groups to connect, protect and restore habitats under the threat of species extinction

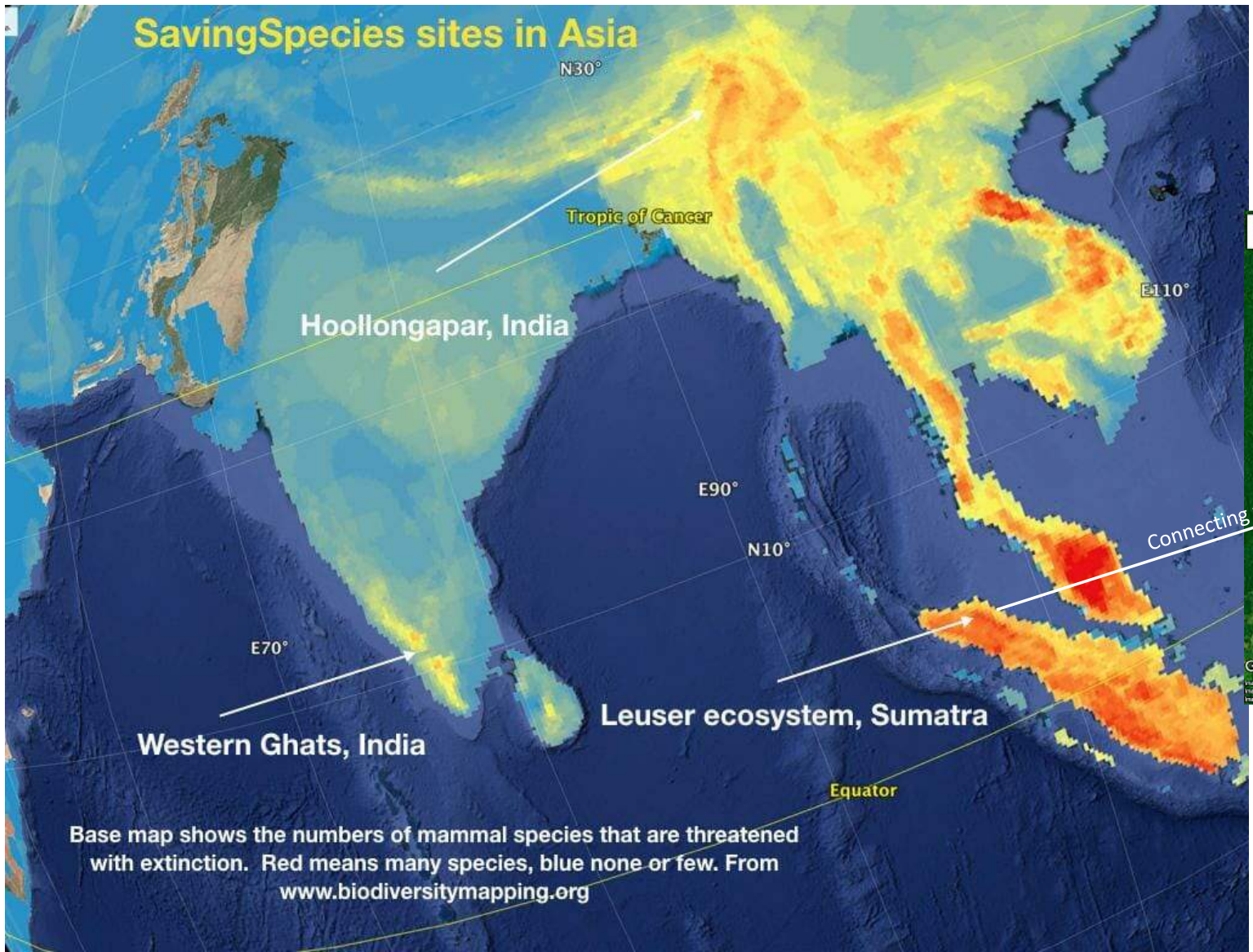


SavingSpecies sites in coastal Brazil

Base map shows the numbers of bird species that are threatened with extinction. Red means many species, blue none or few. From www.biodiversitymapping.org



COEXISTENCE OF MAN AND NATURE





THE CORE TEAM

THANK YOU



I think we must ask ourselves if this is really what we want to do with God's creation, to drive it to extinction? Because extinction really is irreversible: species that go extinct are lost forever. This is not like Jurassic Park. We can't bring them back.

— Stuart L. Pimm —

AZ QUOTES