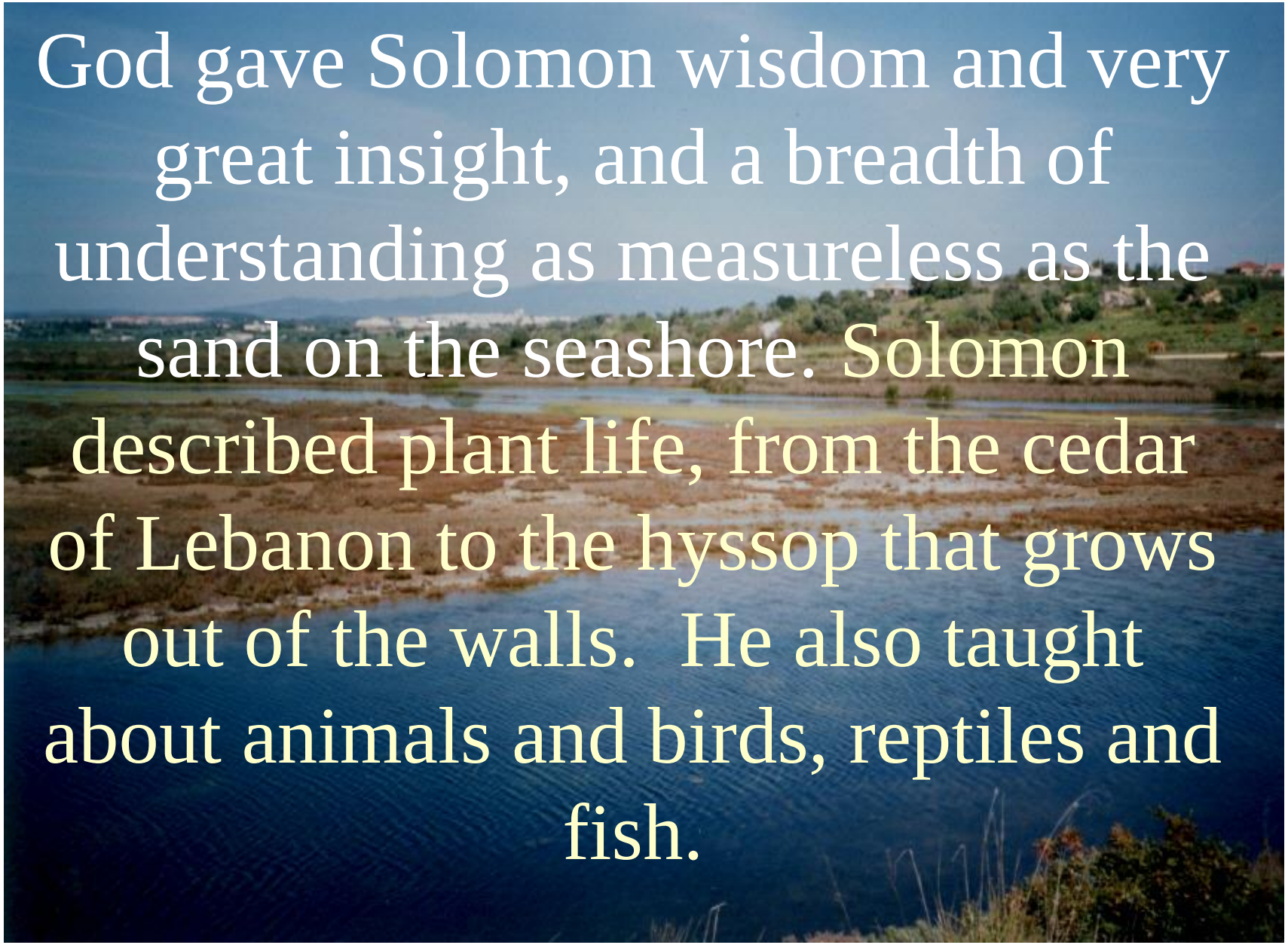
Species Conservation

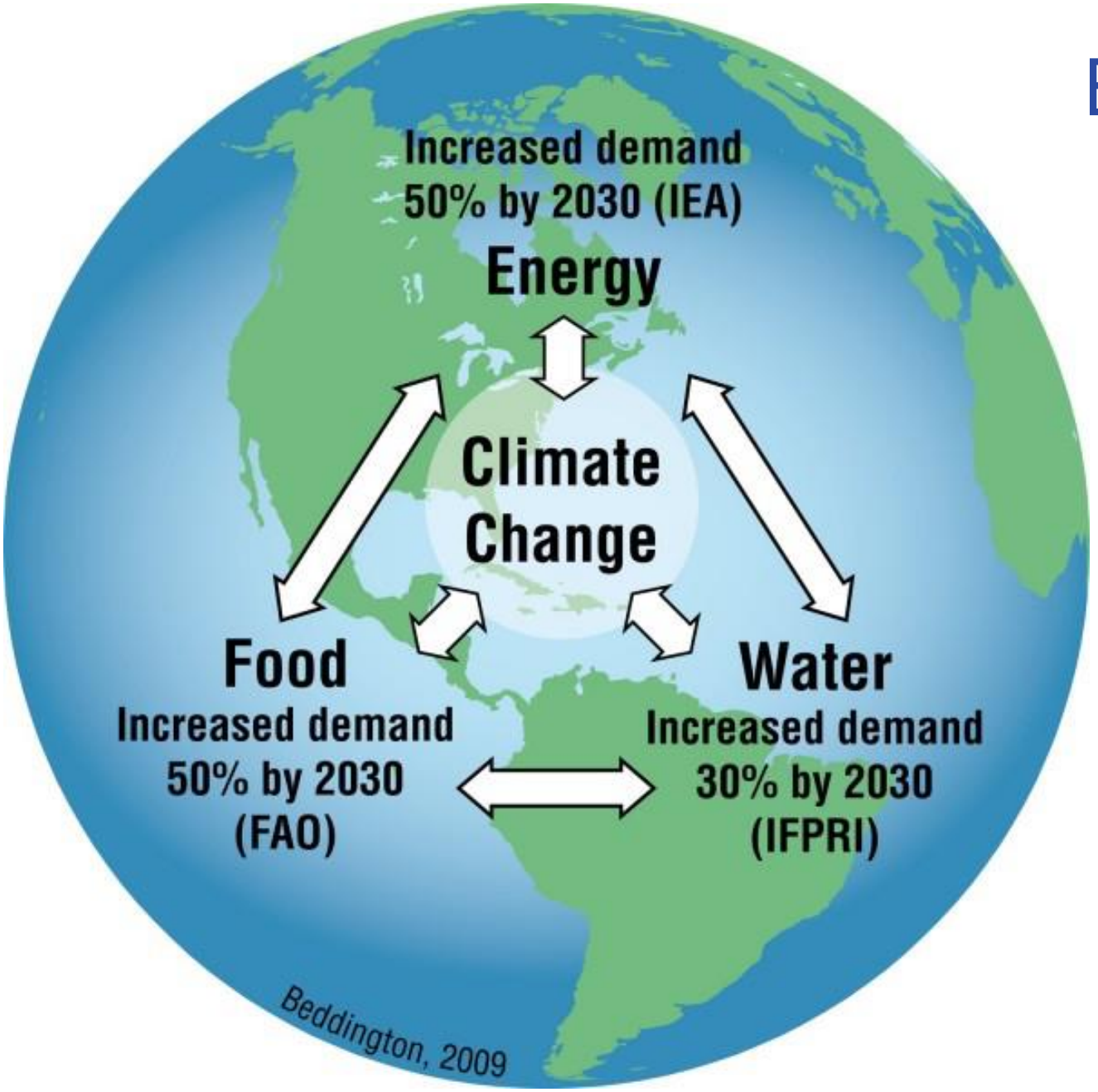
A Summary of Progress and Challenges for the Future

Simon N. Stuart
Director of Strategic Conservation, Synchronicity Earth
Trustee, A Rocha International





1 Kings 4:29, 33

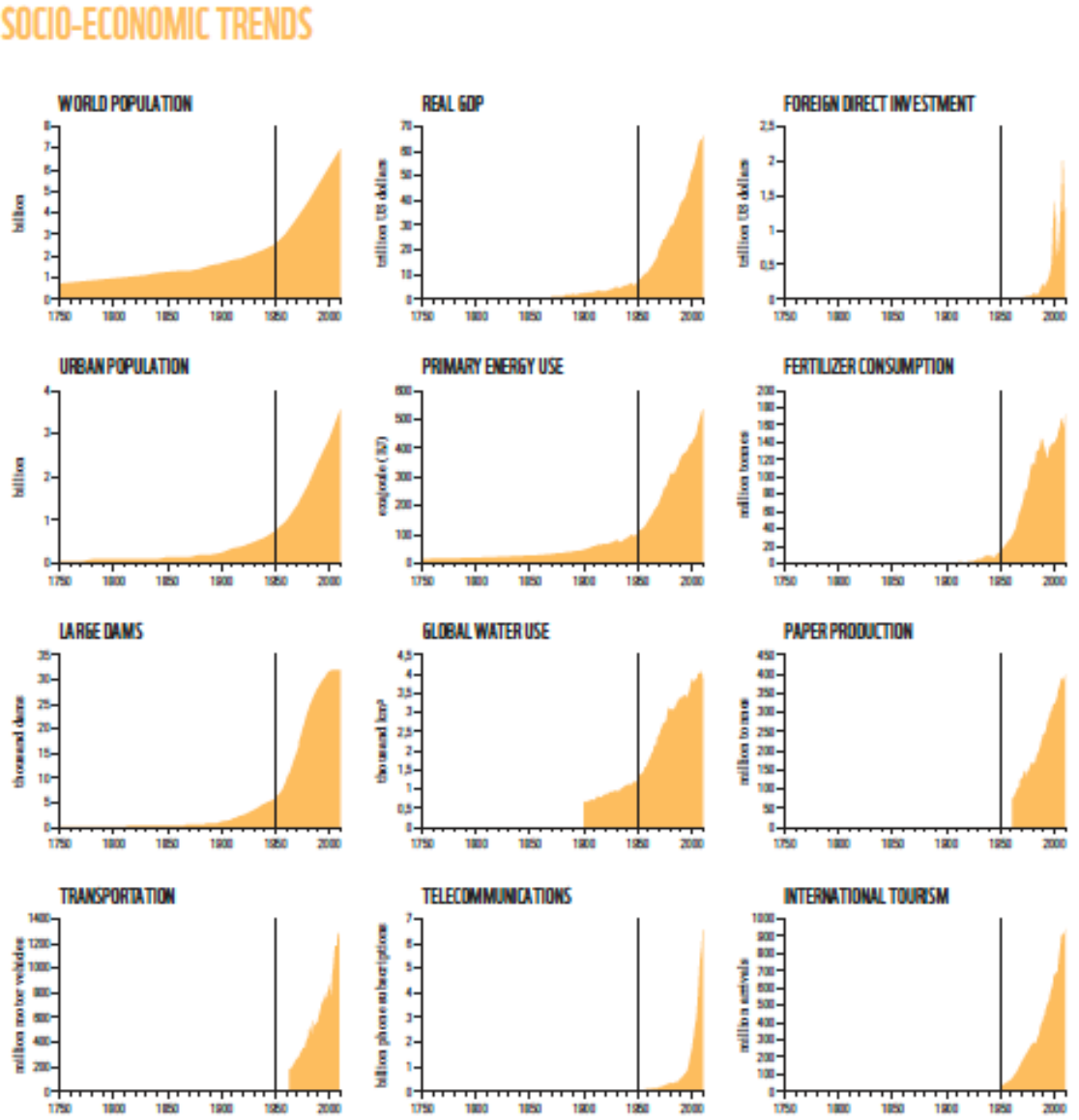


Beddington's Perfect Storm

All fueled by growing global economy and human population

Socio-economic trends, 1950 inflection points

(WWF Living Planet Report, 2018)



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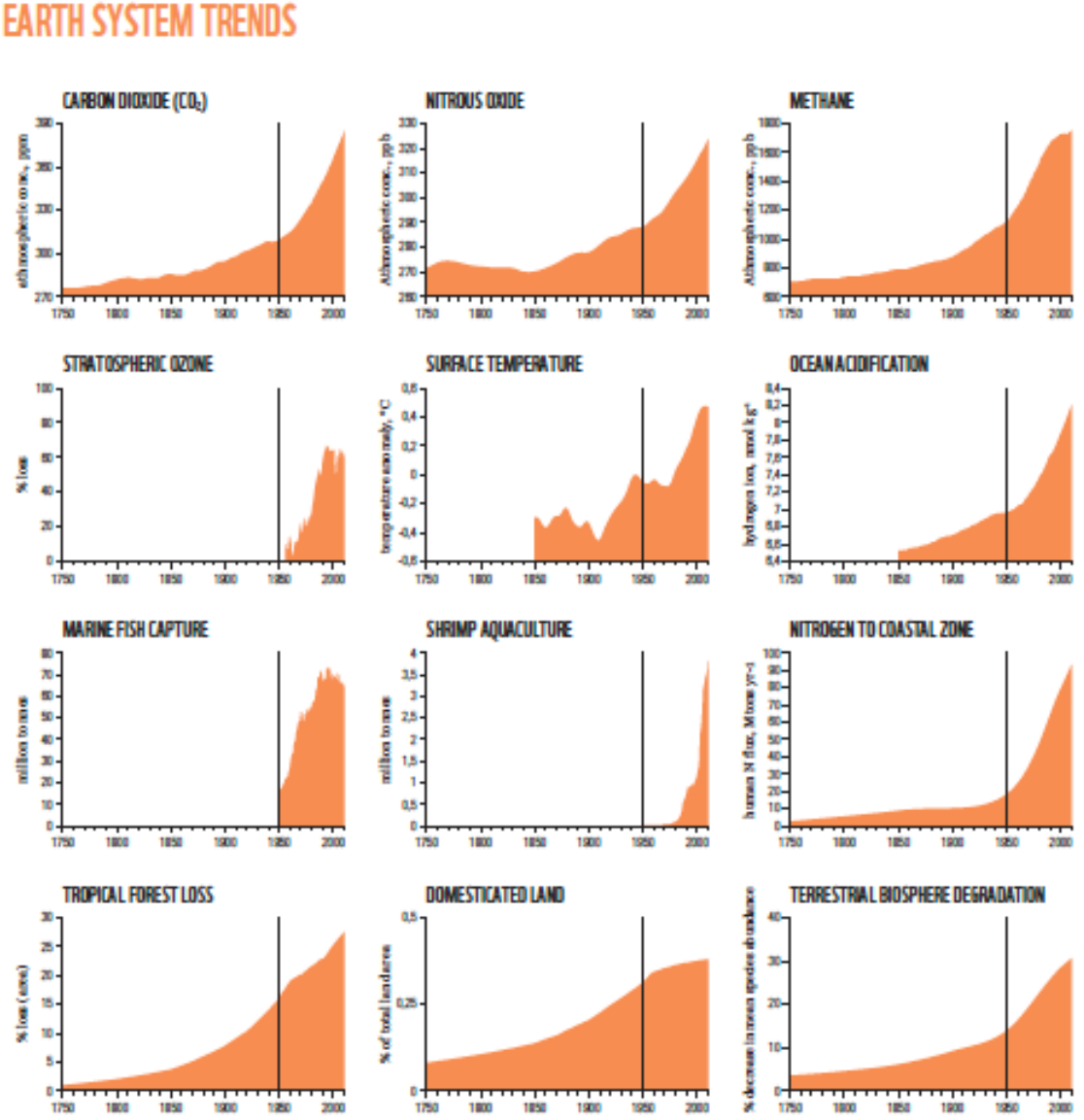
Earth system trends, 1950 inflection points

(WWF Living Planet Report, 2018)



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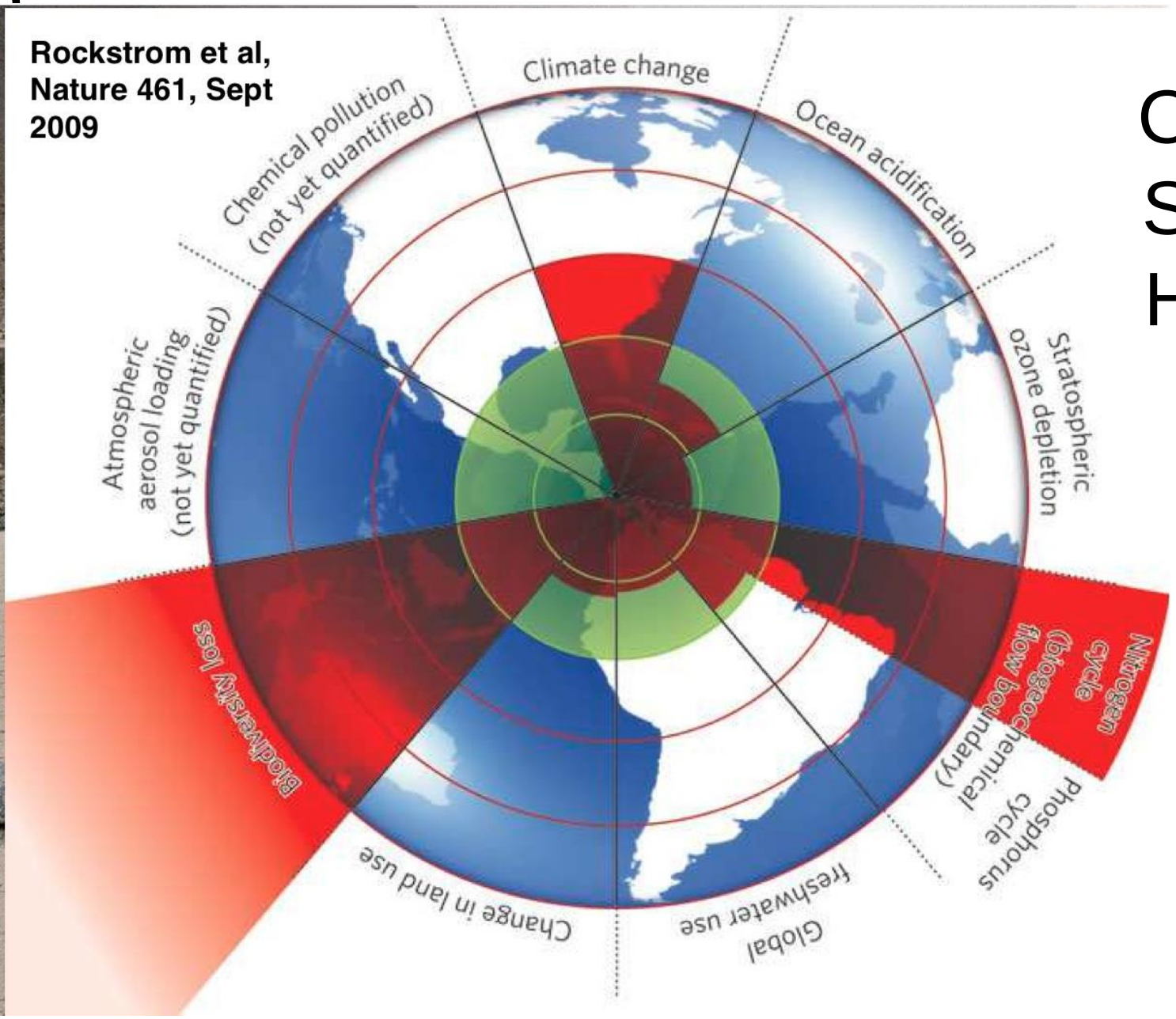
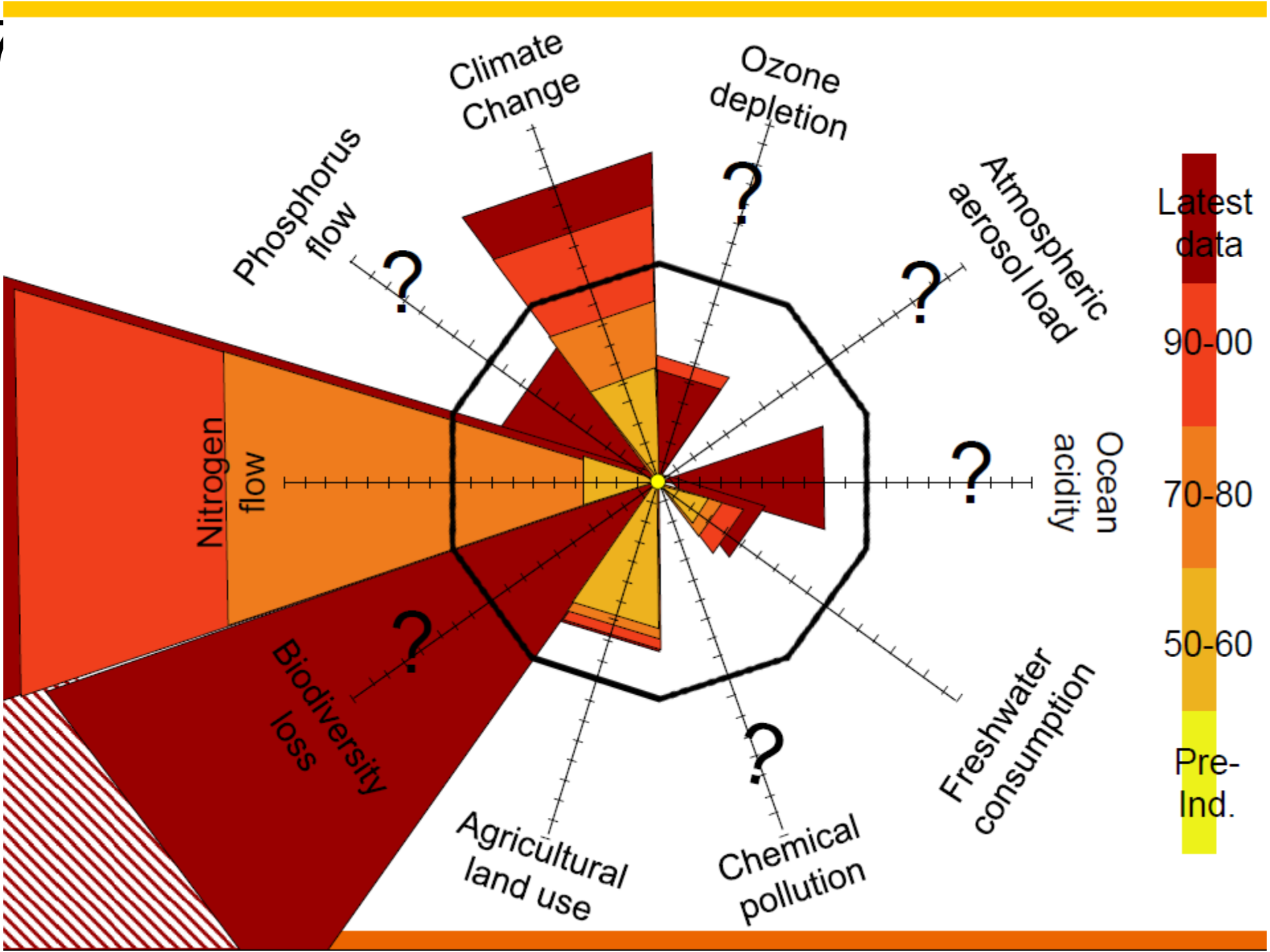
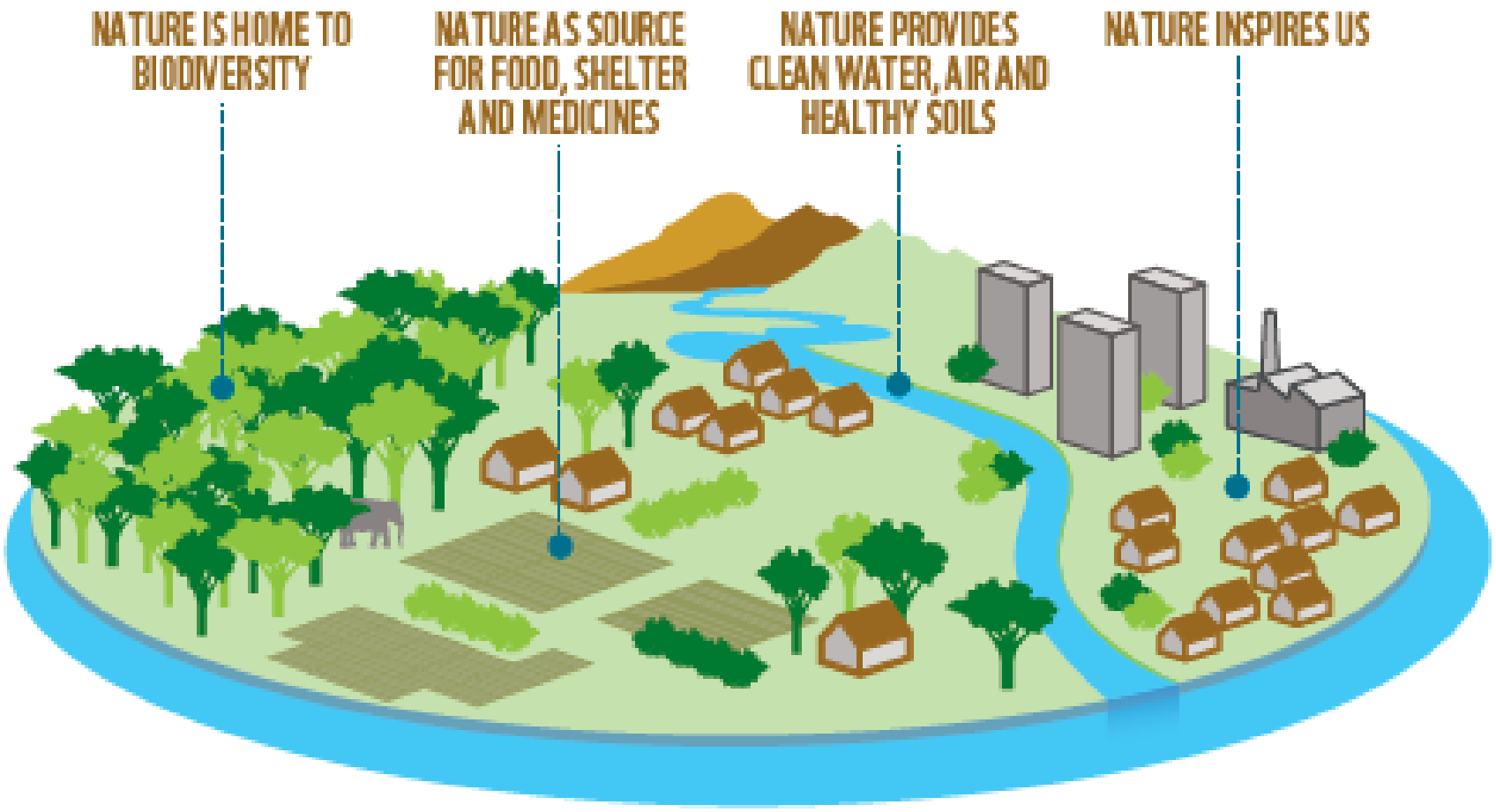
A Safe Operating Space for Humanity




Climate Change
Ozone depletion
Atmospheric aerosol load
Ocean acidity
Freshwater consumption
Chemical pollution
Agricultural land use
Biodiversity loss
Nitrogen flow
Phosphorus flow
?
Latest data
90-00
70-80
50-60
Pre-Ind.



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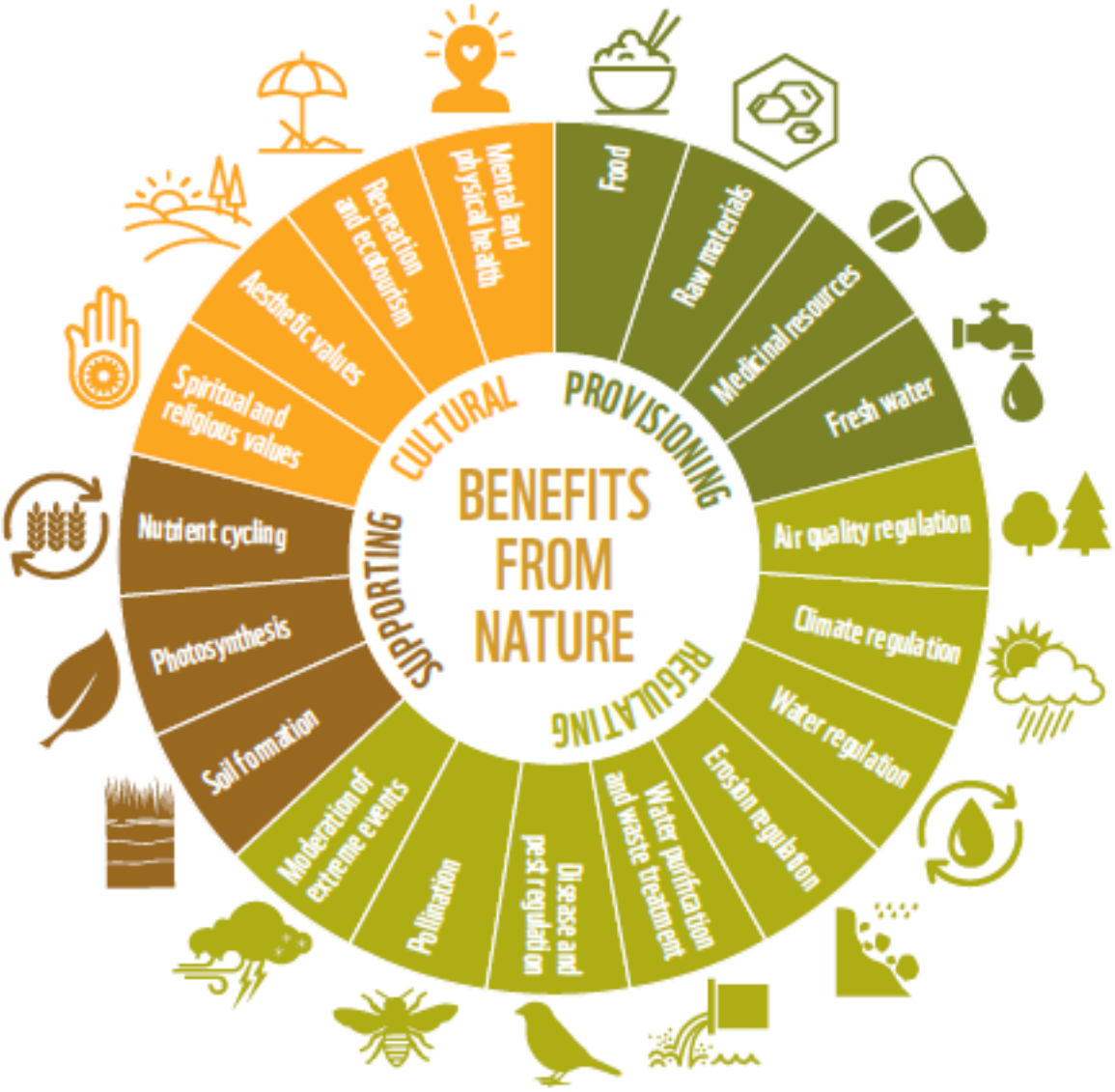

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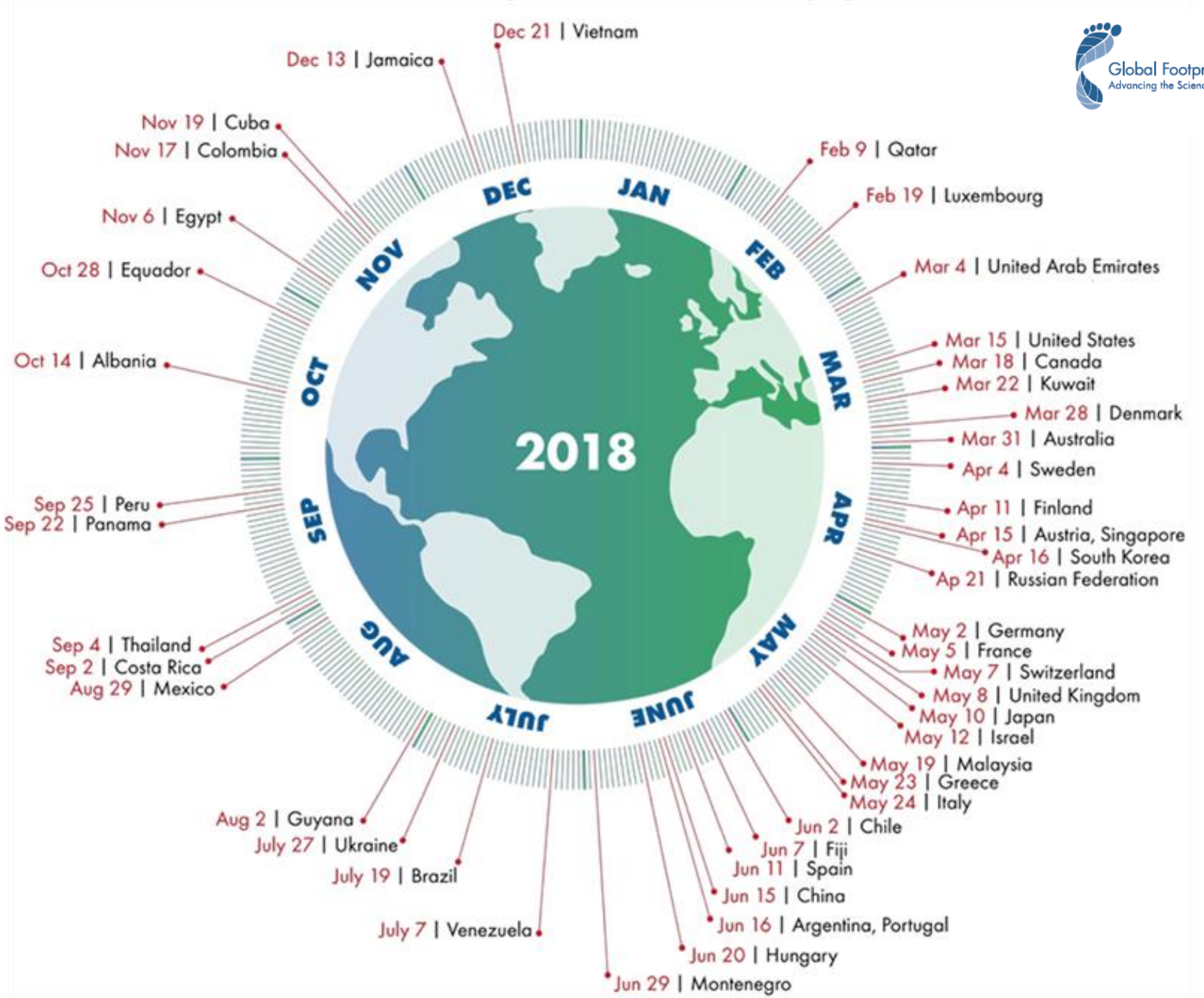
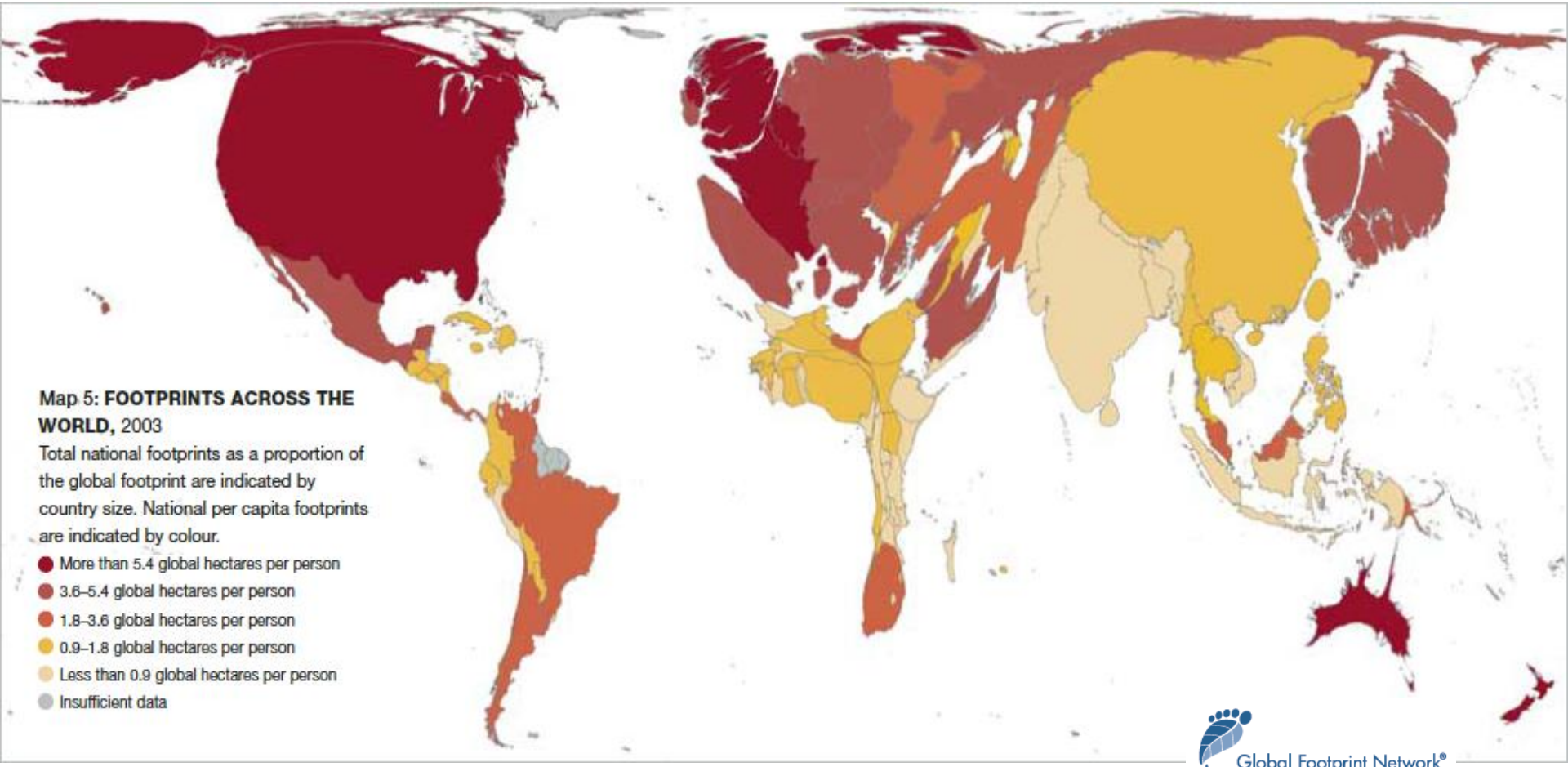
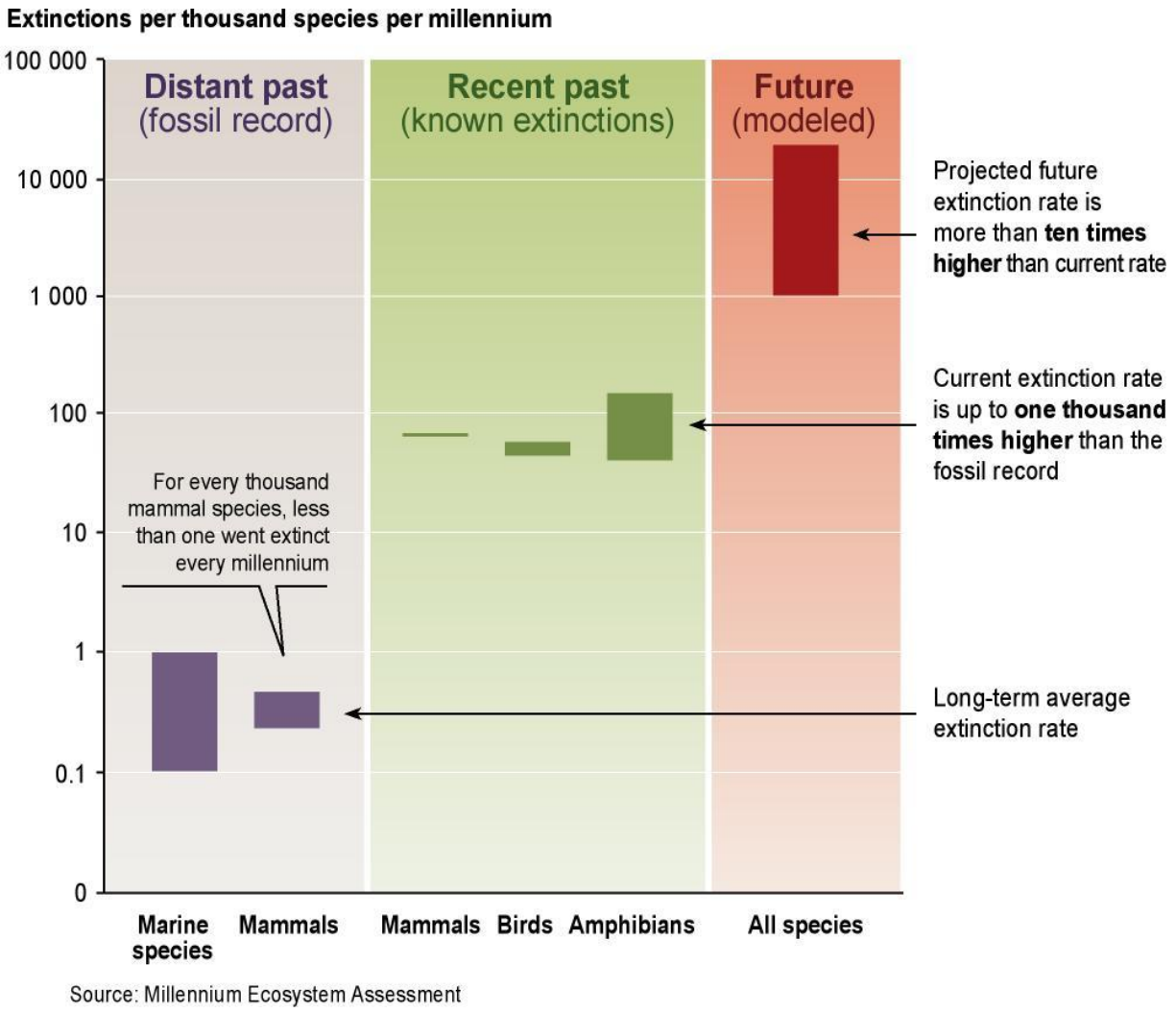

Global Footprint Network®
Advancing the Science of Sustainability
2018
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
Dec 21 | Vietnam
Dec 13 | Jamaica
Nov 19 | Cuba
Nov 17 | Colombia
Nov 6 | Egypt
Oct 28 | Equador
Oct 14 | Albania
Sep 25 | Peru
Sep 22 | Panama
Sep 4 | Thailand
Sep 2 | Costa Rica
Aug 29 | Mexico
Aug 2 | Guyana
July 27 | Ukraine
July 19 | Brazil
July 7 | Venezuela
Jun 29 | Montenegro
Jun 20 | Hungary
Jun 16 | Argentina, Portugal
Jun 15 | China
Jun 11 | Spain
Jun 7 | Fiji
Jun 2 | Chile
May 24 | Italy
May 23 | Greece
May 19 | Malaysia
May 12 | Israel
May 10 | Japan
May 8 | United Kingdom
May 7 | Switzerland
May 5 | France
May 2 | Germany
Ap 21 | Russian Federation
Apr 16 | South Korea
Apr 15 | Austria, Singapore
Apr 11 | Finland
Apr 4 | Sweden
Mar 31 | Australia
Mar 28 | Denmark
Mar 22 | Kuwait
Mar 18 | Canada
Mar 15 | United States
Mar 4 | United Arab Emirates
Feb 19 | Luxembourg
Feb 9 | Qatar

Our Ecological Footprint (by country)

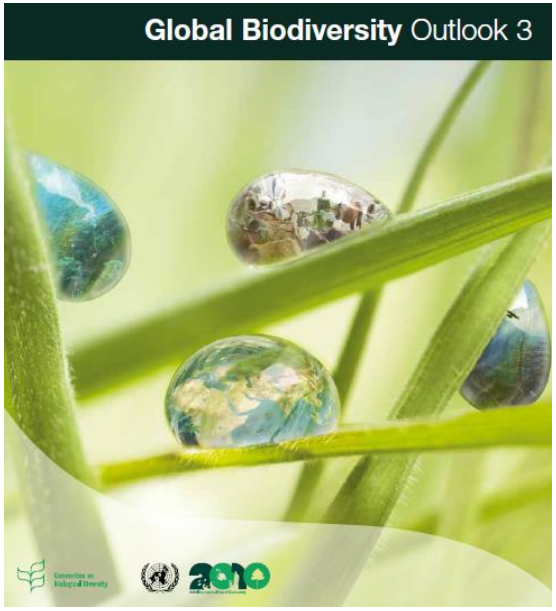


Significant changes to species diversity

- The distribution of species on Earth is becoming more homogenous
- Humans have increased the species extinction rate by as much as 1,000 times over background rates typical over the planet's history
- 10–40% of mammal, bird, and amphibian species are currently threatened with extinction

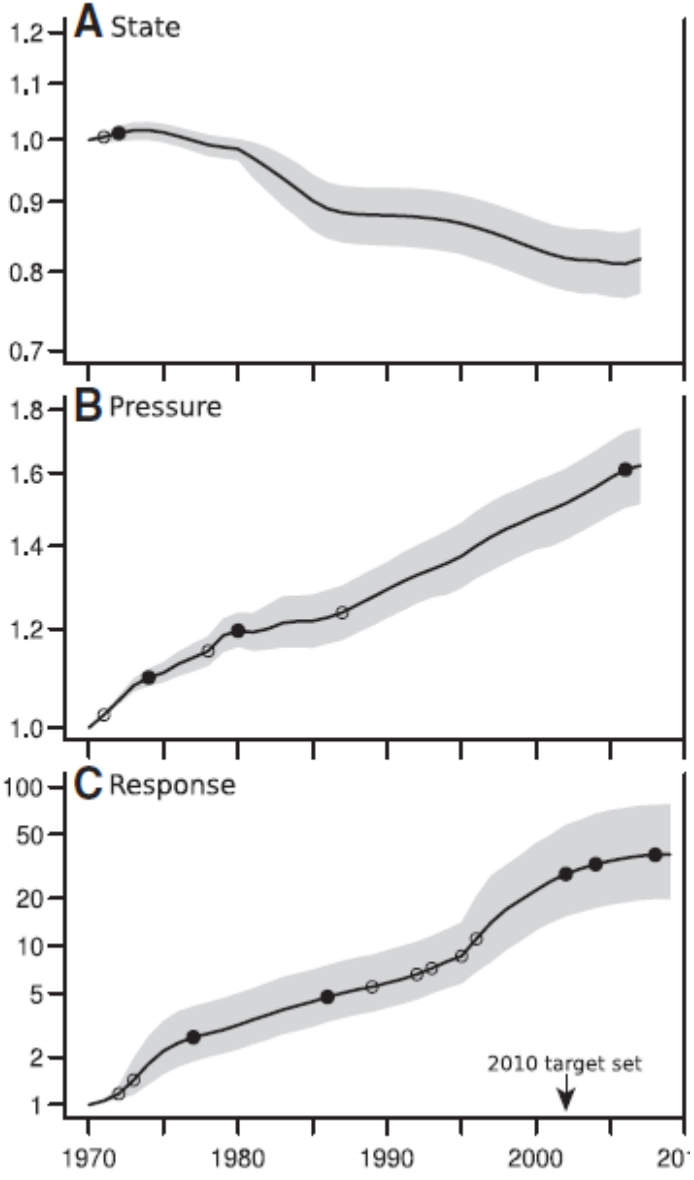


2010 Biodiversity Indicators Partnership



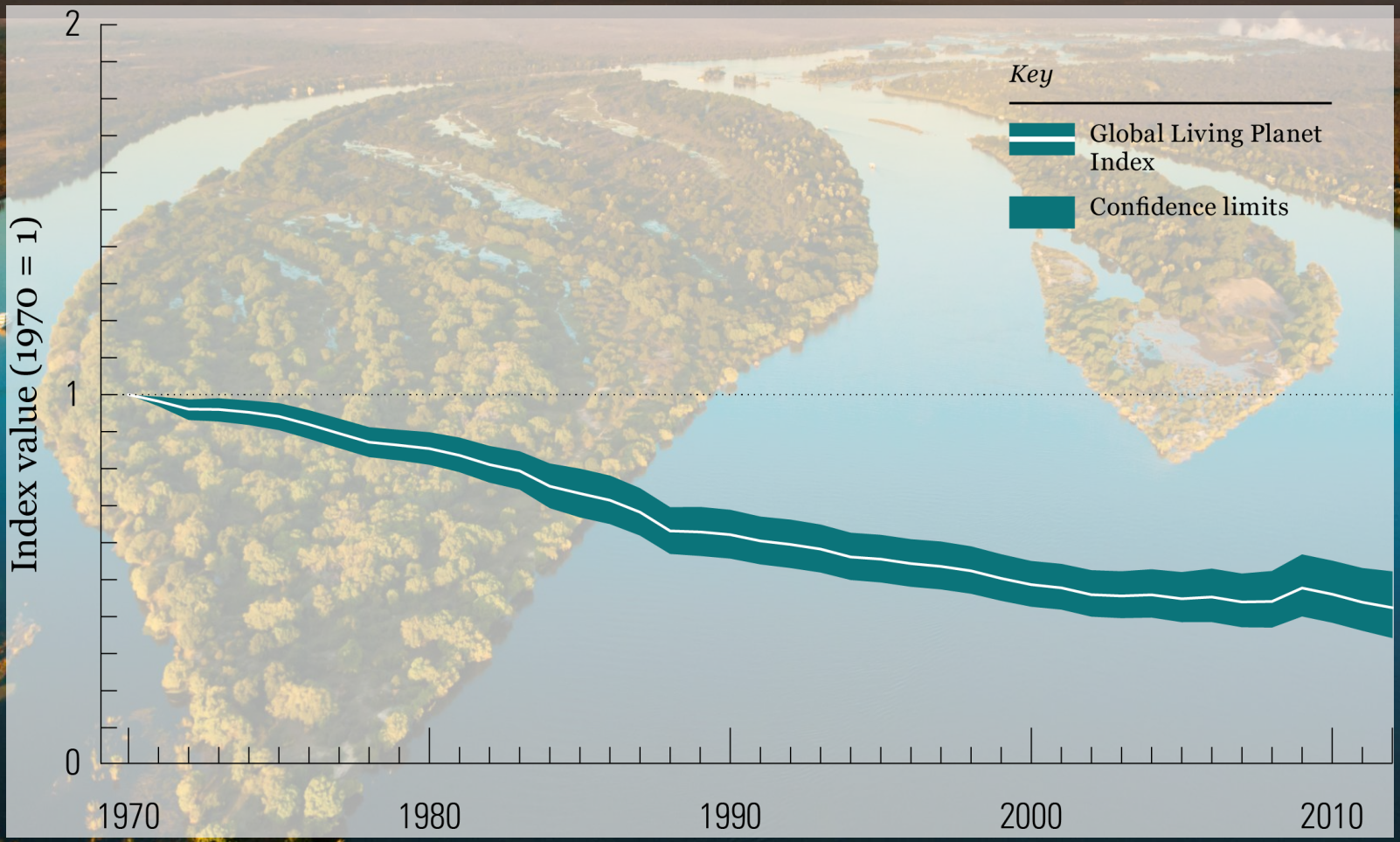
Global Biodiversity: Indicators of Recent Declines

Stuart H. M. Butchart,[1,2*] Matt Walpole,[1] Ben Collen,[3] Arco van Strien,[4] Jörn P. W. Scharlemann,[1] Rosamunde E. A. Almond,[1] Jonathan E. M. Baillie,[3] Bastian Bomhard,[1] Claire Brown,[1] John Bruno,[5] Kent E. Carpenter,[6] Geneviève M. Carr,[7†] Janice Chanson,[8] Anna M. Chenery,[1] Jorge Csirke,[9] Nick C. Davidson,[10] Frank Dentener,[11] Matt Foster,[12] Alessandro Galli,[13] James N. Galloway,[14] Piero Genovesi,[15] Richard D. Gregory,[16] Marc Hockings,[17] Valerie Kapos,[1,18] Jean-Francois Lamarque,[19] Fiona Leverington,[17] Jonathan Loh,[20] Melodie A. McGeoch,[21] Louise McRae,[3] Anahit Minasyan,[22] Monica Hernández Morcillo,[1] Thomasina E. E. Oldfield,[23] Daniel Pauly,[2] Suhel Quader,[25] Carmen Revenga,[26] John R. Sauer,[27] Benjamin Skolnik,[28] Dian Spear,[29] Damon Stanwell-Smith,[1] Simon N. Stuart,[1,12,30,31] Andy Symes,[2] Megan Tierney,[1] Tristan D. Tyrrell,[1] Jean-Christophe Vié,[32] Reg Watson[24]



Between 1970-2012, there was a 58% drop of populations of mammals, birds, reptiles, amphibians and fish.

(Living Planet Index, WWF/Zoological Society of London, 2016)



WWF

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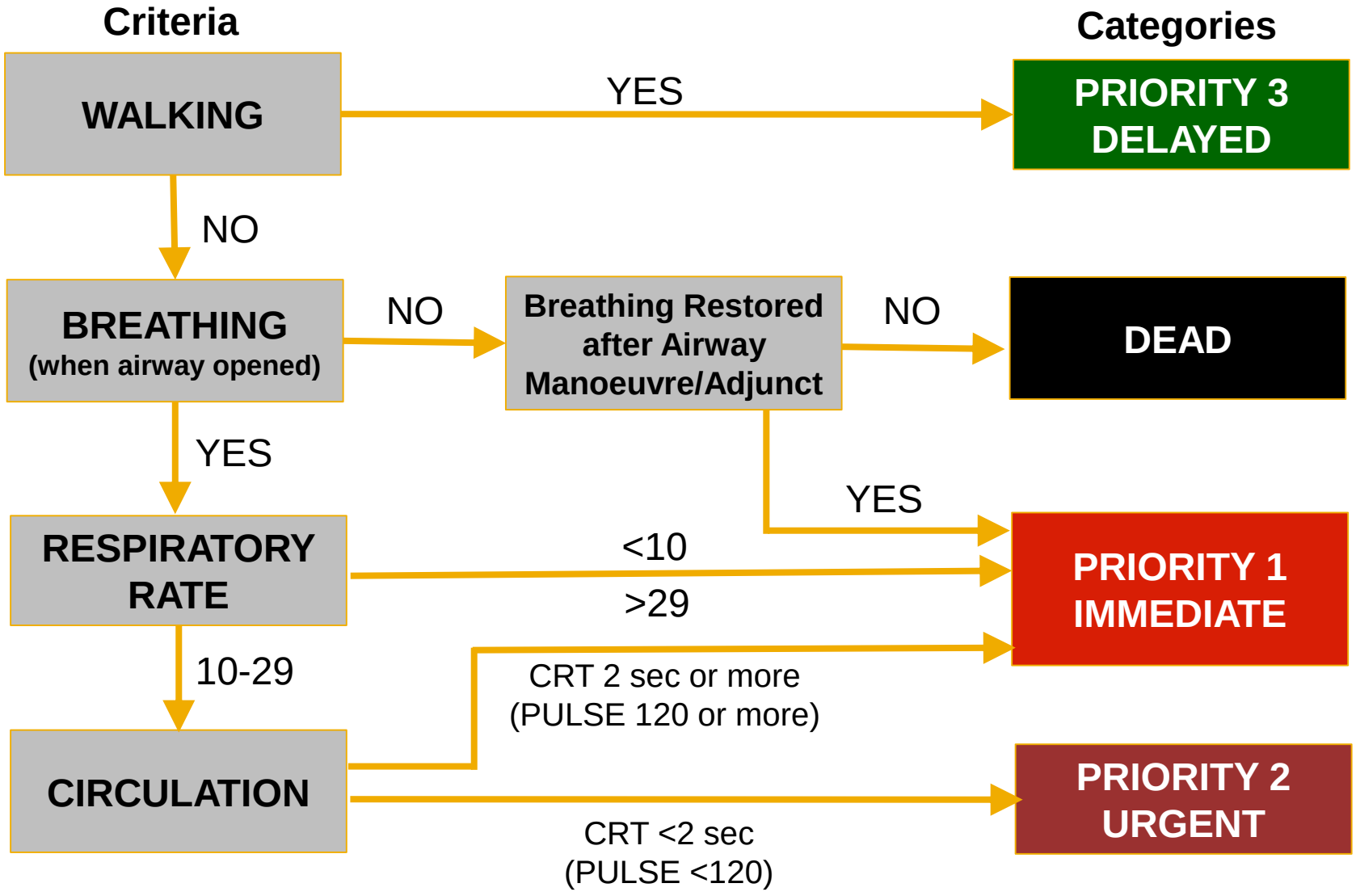
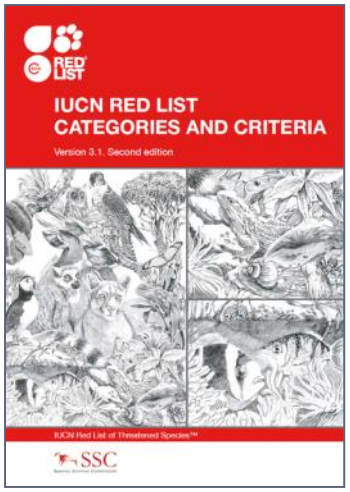
Hospital


Criteria
Categories
WALKING
YES
PRIORITY 3
DELAYED
NO
BREATHING
(when airway opened)
NO
Breathing Restored
after Airway
Manoeuvre/Adjunct
NO
DEAD
YES
YES
RESPIRATORY
RATE
<10
>29
PRIORITY 1
IMMEDIATE
10-29
CRT 2 sec or more
(PULSE 120 or more)
CIRCULATION
PRIORITY 2
URGENT
CRT <2 sec
(PULSE <120)

RED LIST Guiding Conservation for 50 Years

IUCN Red List Categories & Criteria



Criteria

- A. Population reduction
- B. Restricted geographic range
- C. Small population size and decline
- D. Very small or restricted population
- E. Quantitative risk analysis

Thresholds

Categories

All species

Evaluated

Adequate data

- Extinct (EX)
- Extinct in the Wild (EW)

Threatened categories

- Critically Endangered (CR)
- Endangered (EN)
- Vulnerable (VU)

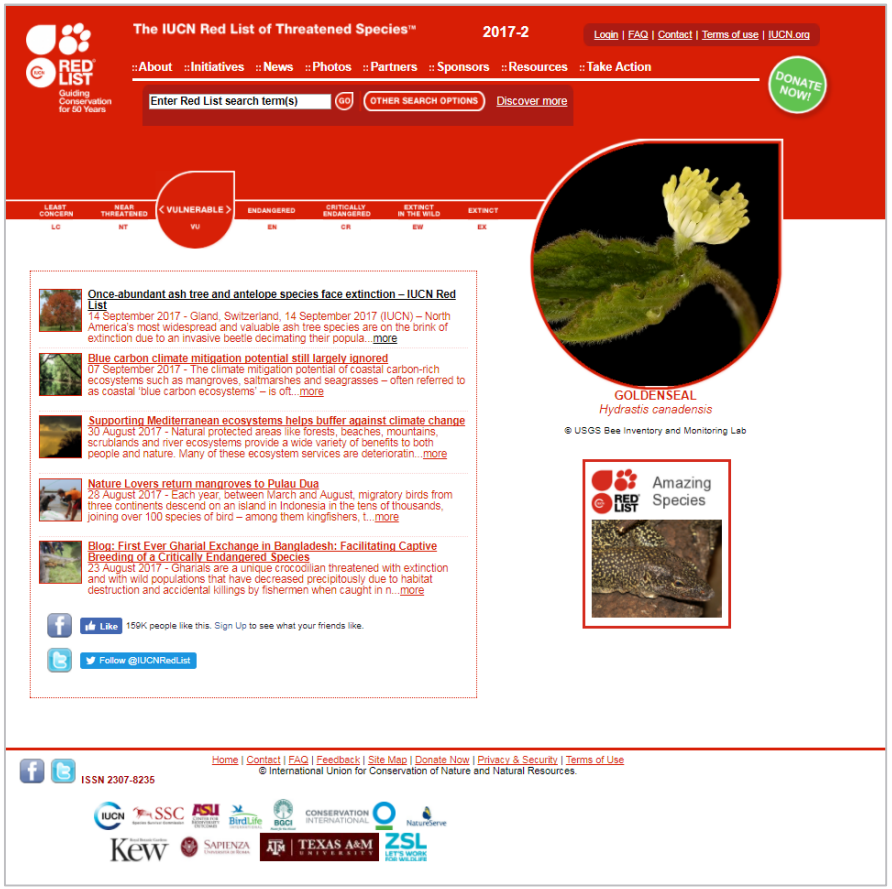
- Near Threatened (NT)
- Least Concern (LC)
- Data Deficient (DD)
- Not Evaluated (NE)

Extinction Risk

What is the IUCN Red List?

World's most comprehensive information source for extinction risk of species.

- Not just a list, but a compilation of the conservation status of species at the global level
- Based on the best scientific information available
- Widely used to inform and influence biodiversity conservation



What is the IUCN Red List?

- More than just names and threat categories
- Includes information on threats (e.g. invasive species), ecological requirements, and conservation actions
- Species assessments are generated through the knowledge of thousands of the world's leading scientists through a peer review process.

IUCN Red List assessment: an estimate of extinction risk

What is the likelihood of a species becoming extinct in the near future, given current knowledge about **population trends**, **range**, and recent, current or projected **threats**?

It is not a list of species that are priorities for conservation action

Assessing the State of Biodiversity

941 species EX or EW

26,834 threatened species

The IUCN Red List (ver. 2018-2)

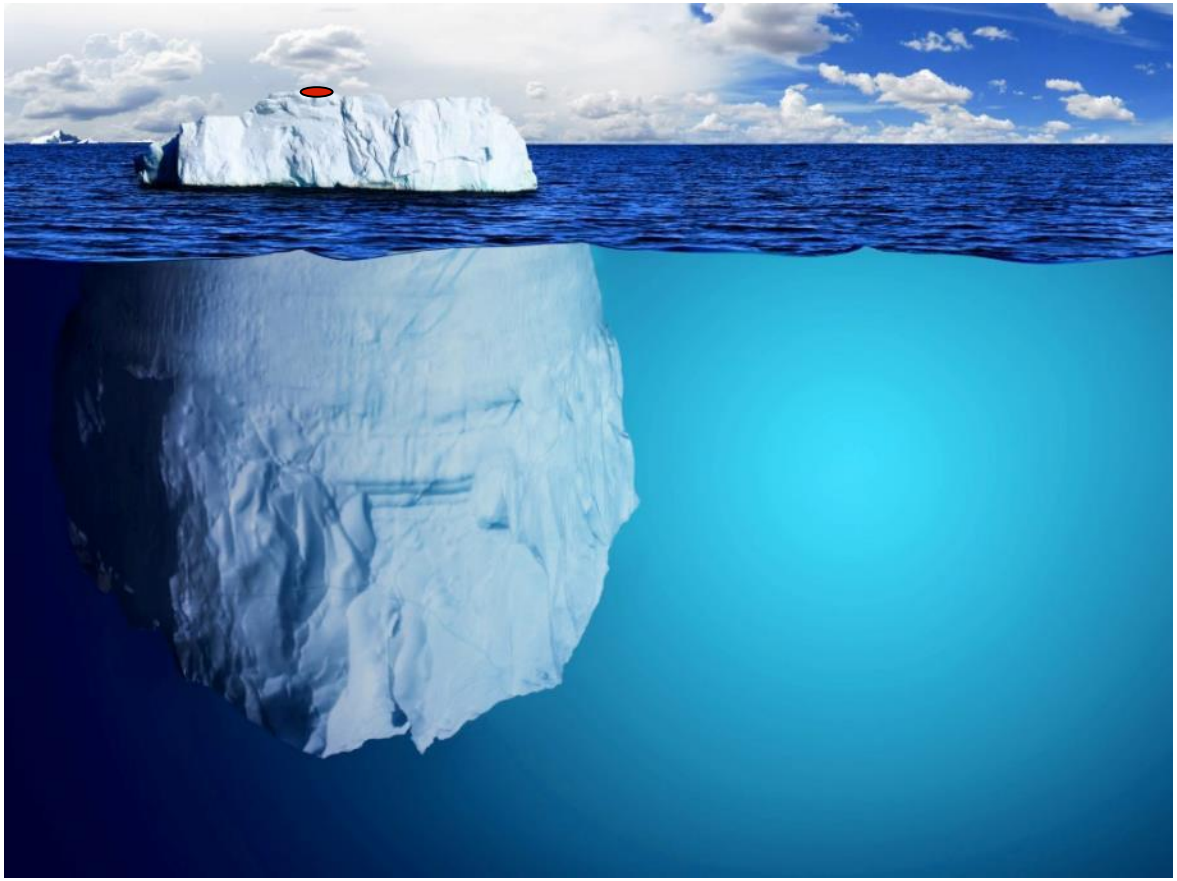
96,936 species assessed (around 5% of described species)

1.8 million described species

In the world:

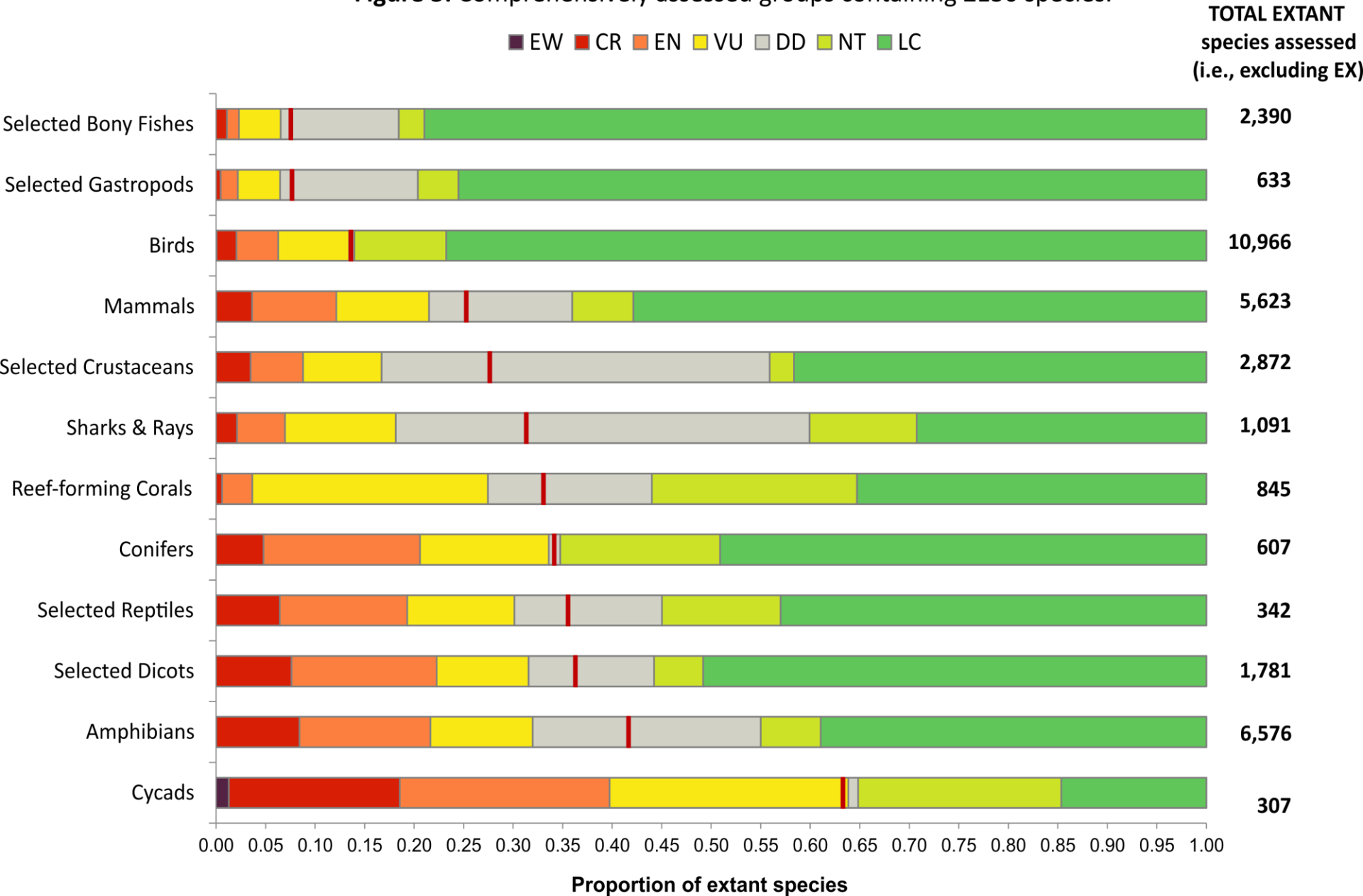
10–100 million?

8–15 million species



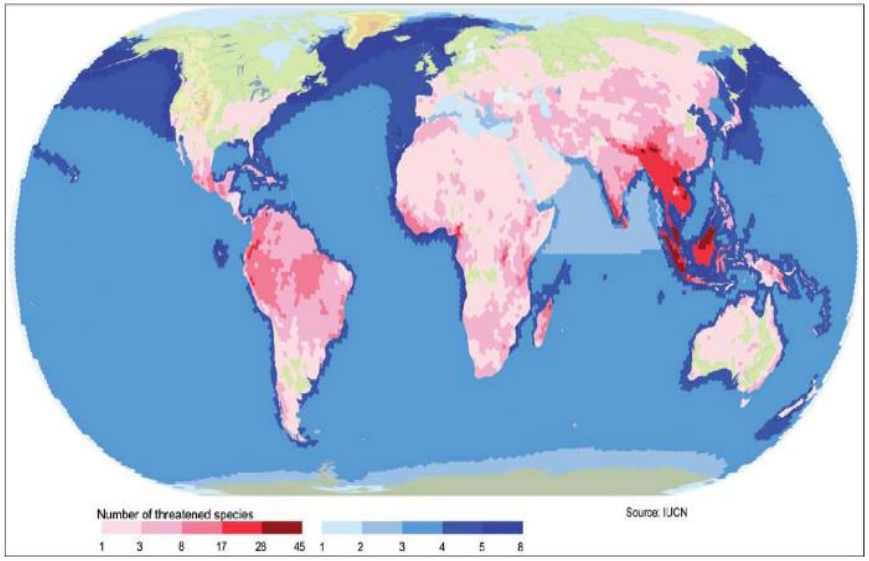
Comparison of threat levels between species groups

Figure 3: Comprehensively assessed groups containing ≥150 species.

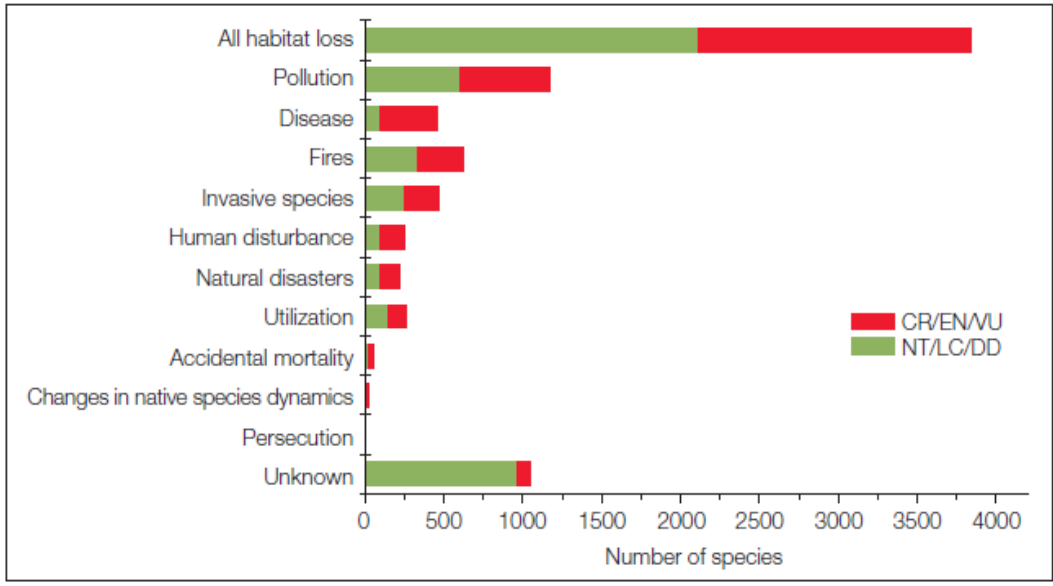


Red List Data Analyses

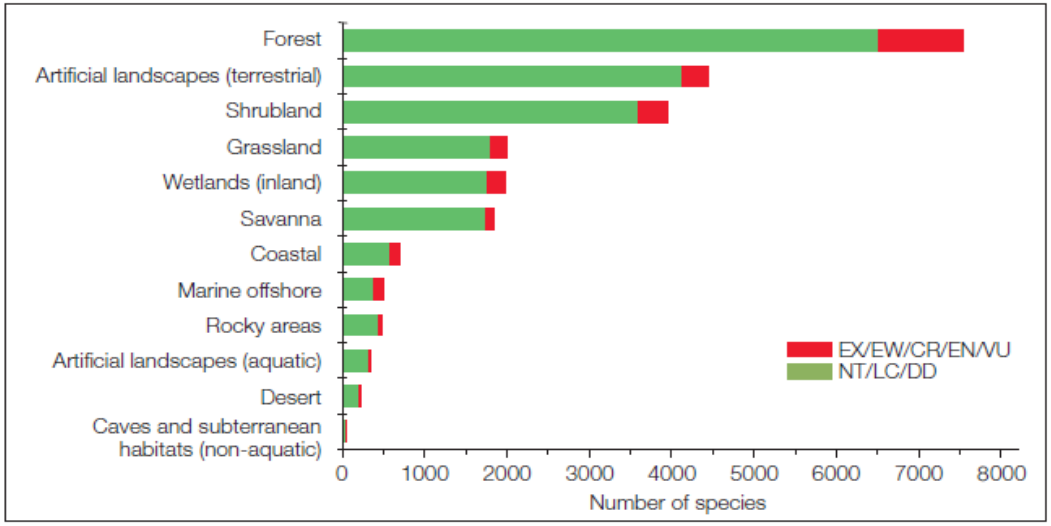
RED LIST Guiding Conservation for 50 Years



Global distribution of threatened mammals



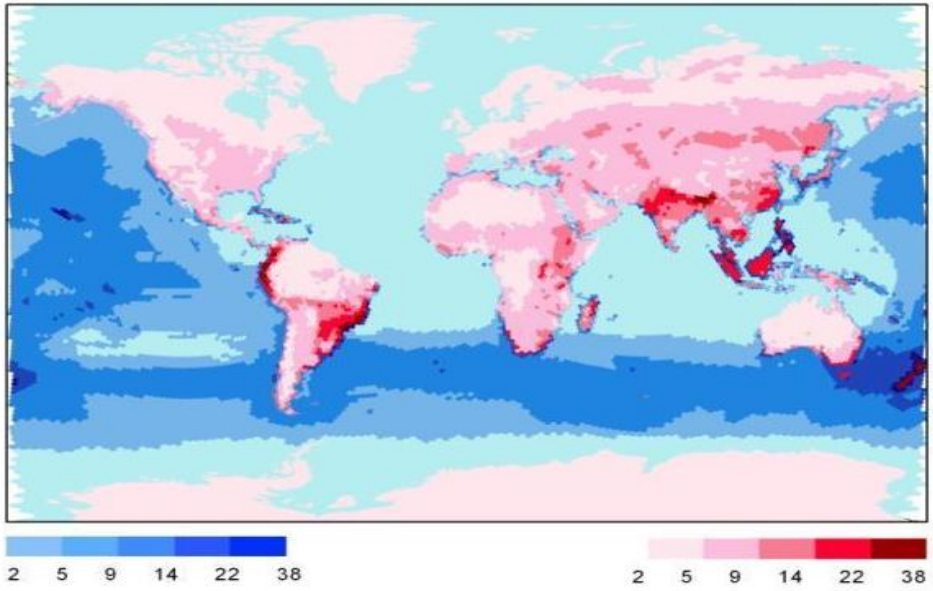
Major threats to amphibians



Major habitat preferences of birds

Main threats to freshwater fishes (with % of freshwater species assessed coded as threatened by this activity) (based on version 2017-2 of the Red List)

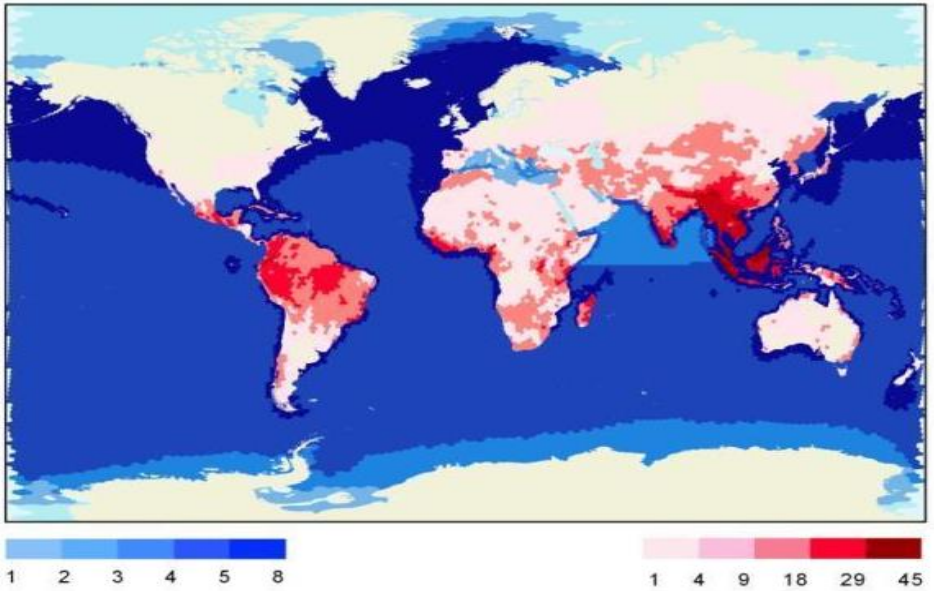
Threatened bird richness



2 5 9 14 22 38

2 5 9 14 22 38

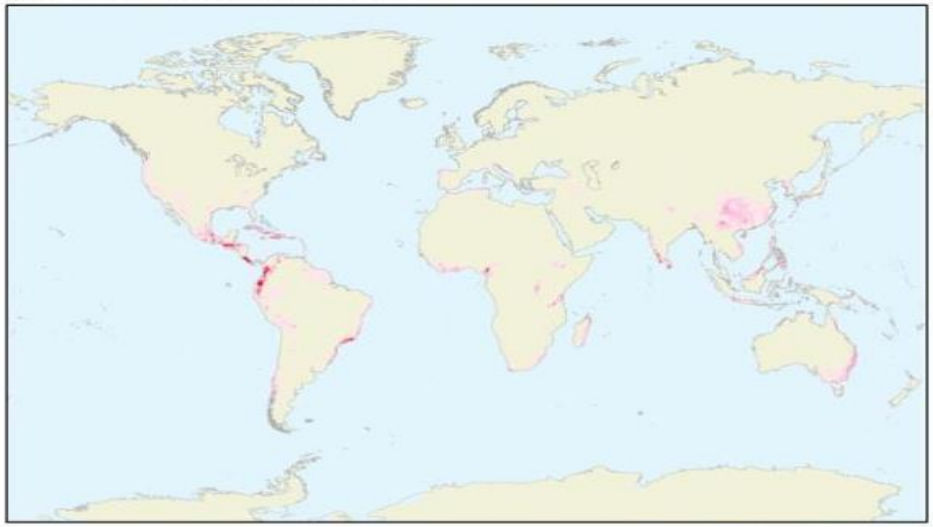
Threatened mammal richness



1 2 3 4 5 8

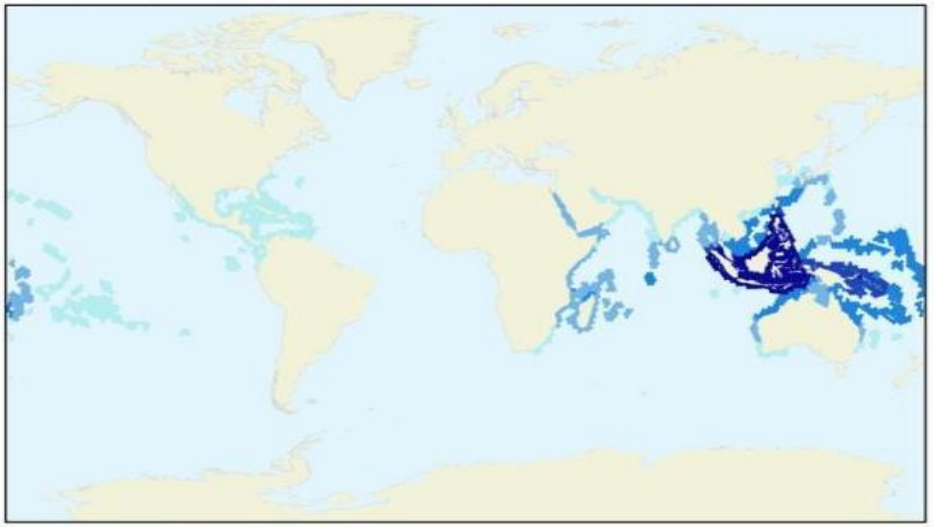
1 4 9 18 29 45

Threatened amphibian richness



1 5 9 20 33 42

Threatened coral richness



1 26 58 98 143 176

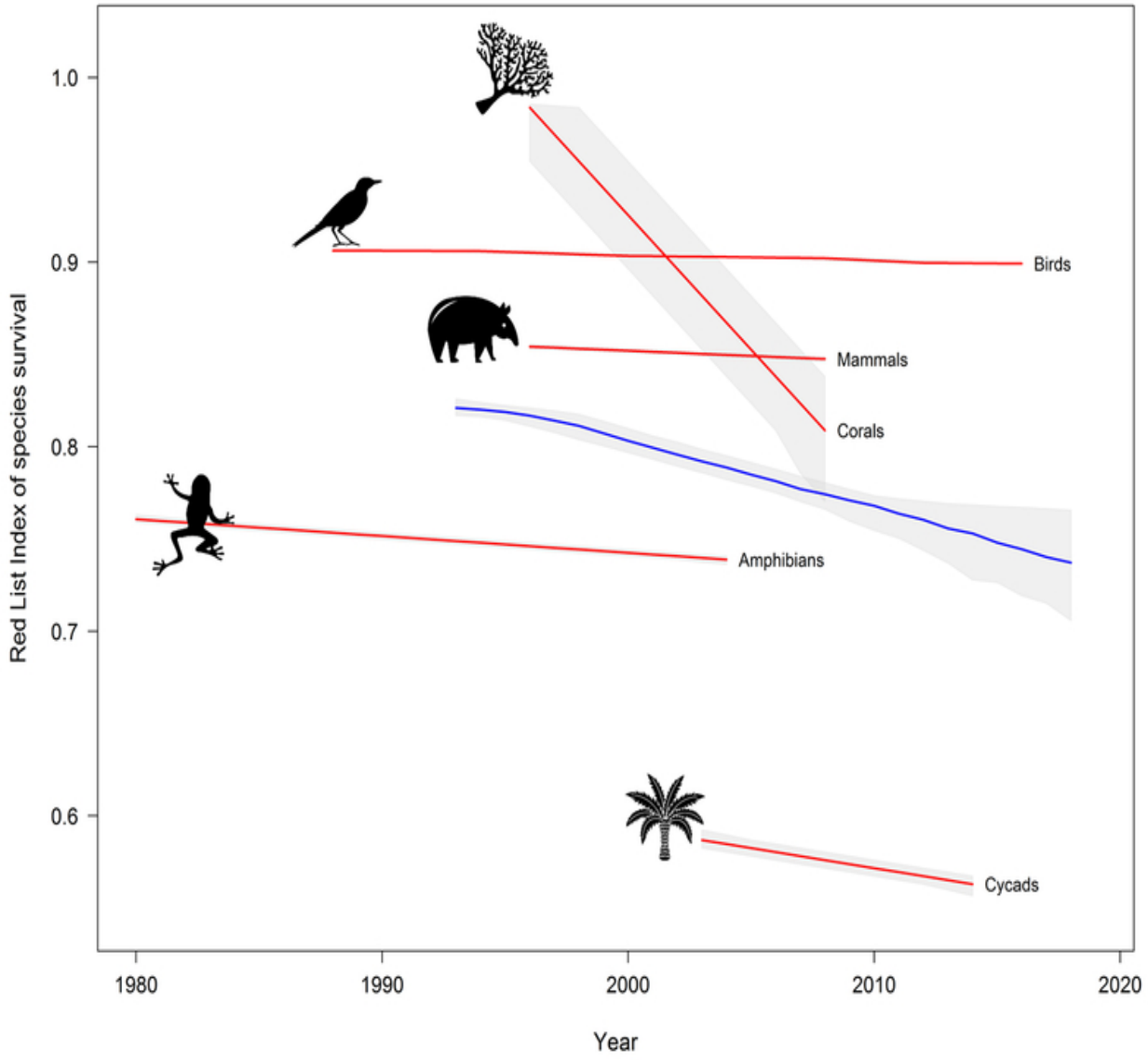
RED LIST

THE IUCN RED LIST OF THREATENED SPECIES™

Global threatened species diversity

Source: IUCN Red List of Threatened Species
RL Categories: Vulnerable(VU), Endangered (EN), Critically Endangered(CR)

The IUCN Red List Index



- Shows trends over time in projected extinction risk of sets of species (RLI of spp. survival)
- Can be calculated for any set of species that have been assessed at least twice
- Based on proportion of species in each RL category and proportion moving between categories owing to genuine status changes

  i.e. category changes resulting from revised taxonomy, improved knowledge or modified criteria are excluded

Targeted Conservation Works

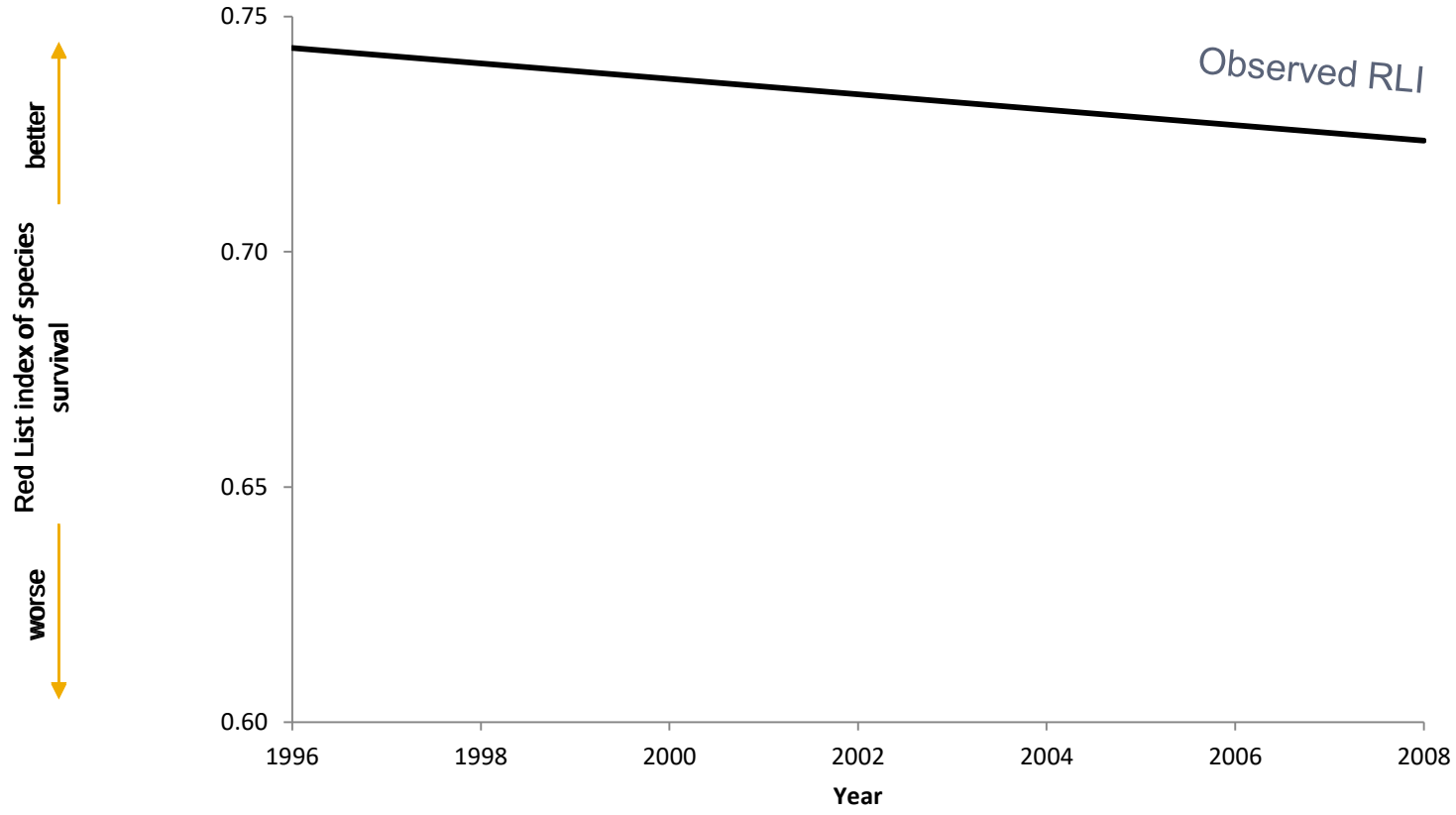
- 37 of the genuine improvements in status were mammals
- 5% of threatened mammals had increasing populations
- 16 bird species prevented from going extinct in the last 15 years due to conservation efforts
- Without conservation, the RLI for birds and mammals would be 20% worse

Humpback Whale

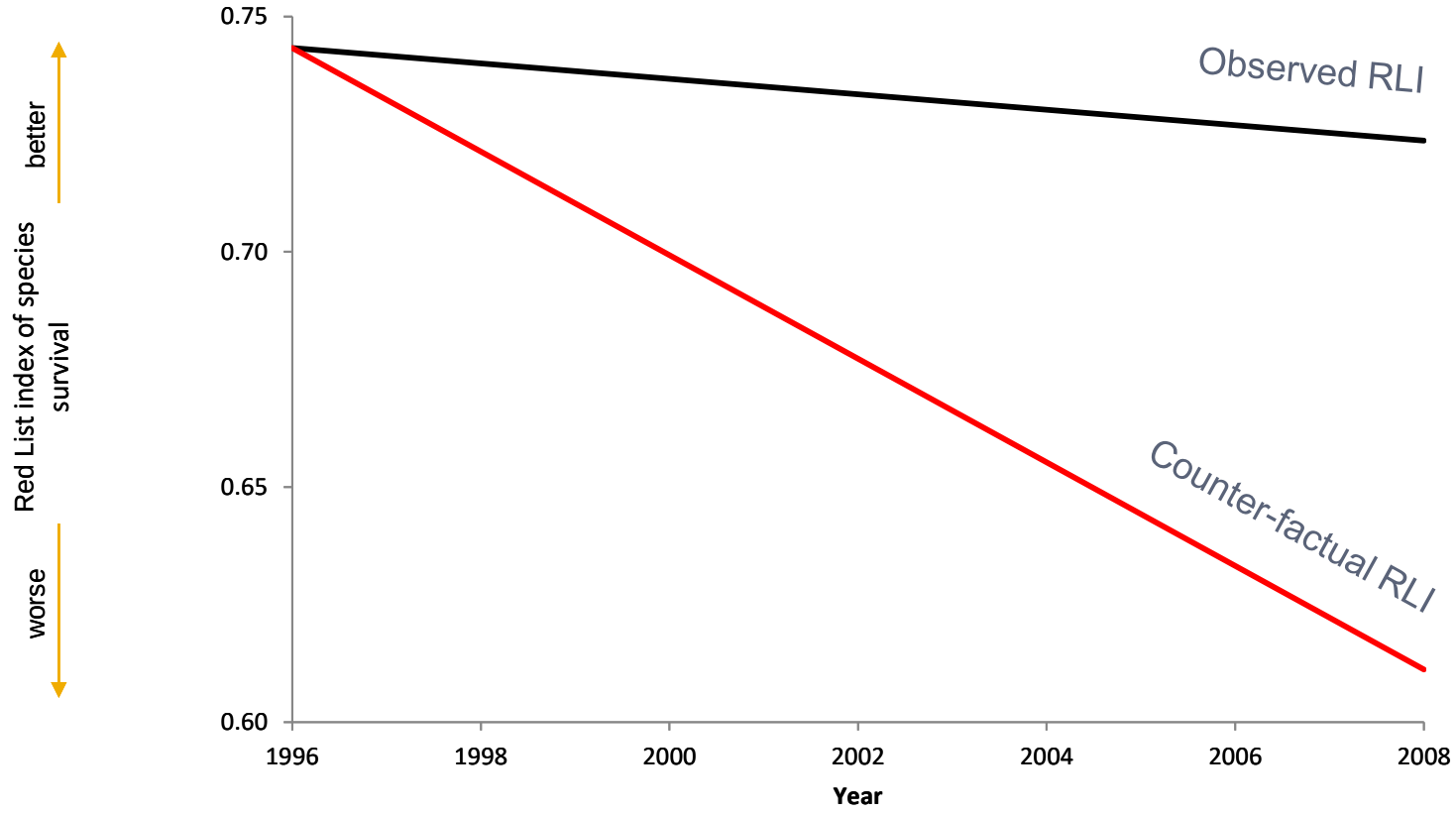
Black-footed Ferret

California Condor

Observed Red List Index for Ungulates, 1996-2008



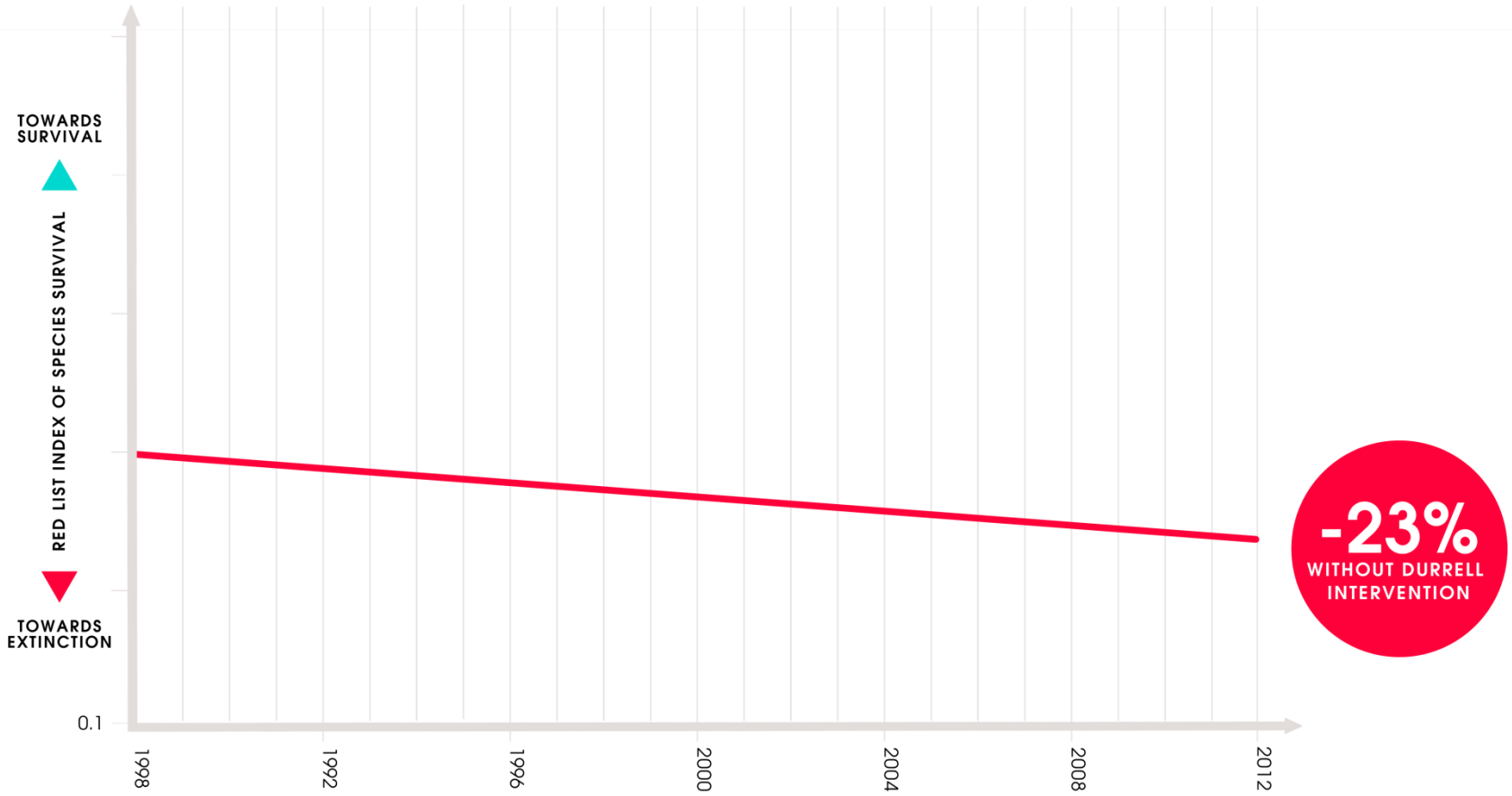
Red List Index for Ungulates, 1996-2008, in the absence of conservation



Impacts – Red List Index of species survival

durrell index

#10 | **The Red List Index of species survival:**
What is the long-term impact of Durrell's conservation programmes on its target species' chances of survival?



Young et al. (2014). *Biological Conservation*

Impacts – Red List Index of species survival

durrell index

#10 | **The Red List Index of species survival:**
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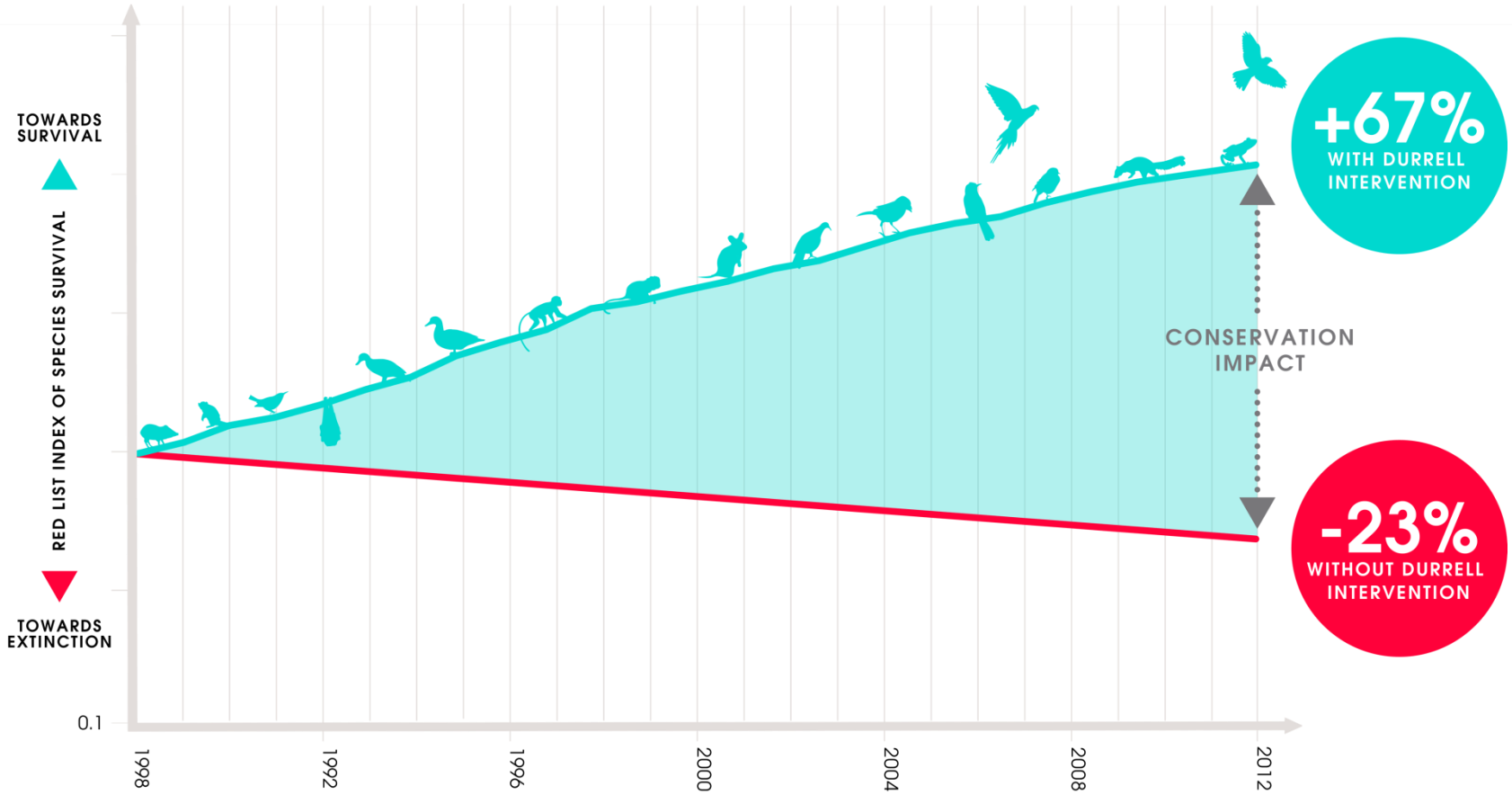


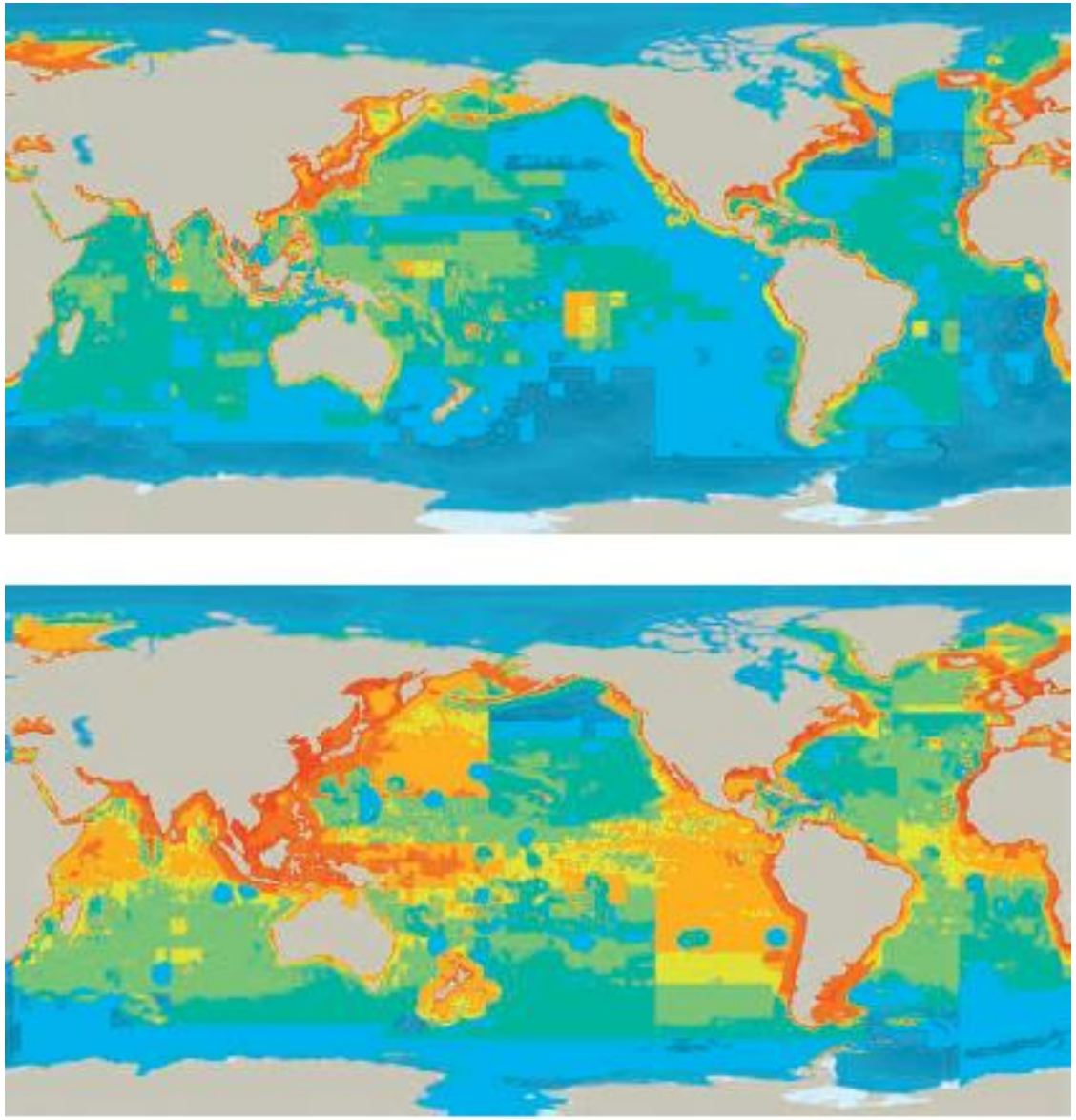
Young et al. (2014). *Biological Conservation*

However, there are some problems that we can't easily fix

- Over-harvesting
- Dams and river fragmentation
- Novel wildlife diseases
- Impacts of climate change
- Acidification, including in the oceans
- Disruptions to migration

Growth in fishing pressure, 1950-2000

(WWF Living Planet Report, 2018)



Amphibian Extinctions

The disease chytridiomycosis has devastated the populations of hundreds of amphibian species since 1970, especially in Australia and the Americas

The Coral Reef Crisis: scientific justification for critical CO_2 threshold levels of < 350ppm

One-Third of Reef-Building Corals Face Elevated Extinction Risk from Climate Change and Local Impacts

Kent E. Carpenter,[1]* Muhamma
Andrew Bruckner,[6] Angel Chiri
Graham J. Edgar,[11,12] Alasdair
Bert W. Hoeksema,[16] Gregor H

ion concentrations and the ability of corals to build skeletons (*4*). Local threats include human disturbances such as increased coastal development, sedimentation resulting from poor land-use and watershed management, sewage discharges, nutrient loading and eutrophication from agrochemicals, coral mining, and overfishing (*1*, *2*, *5*–*9*). Local anthropogenic impacts reduce the resil-
rals to withstand global threats, re-
global deterioration of reef structure
of these ecosystems to sustain their

ELSEVIER

MARINE POLLUTION BULLETIN

Viewpoint

The coral reef cris

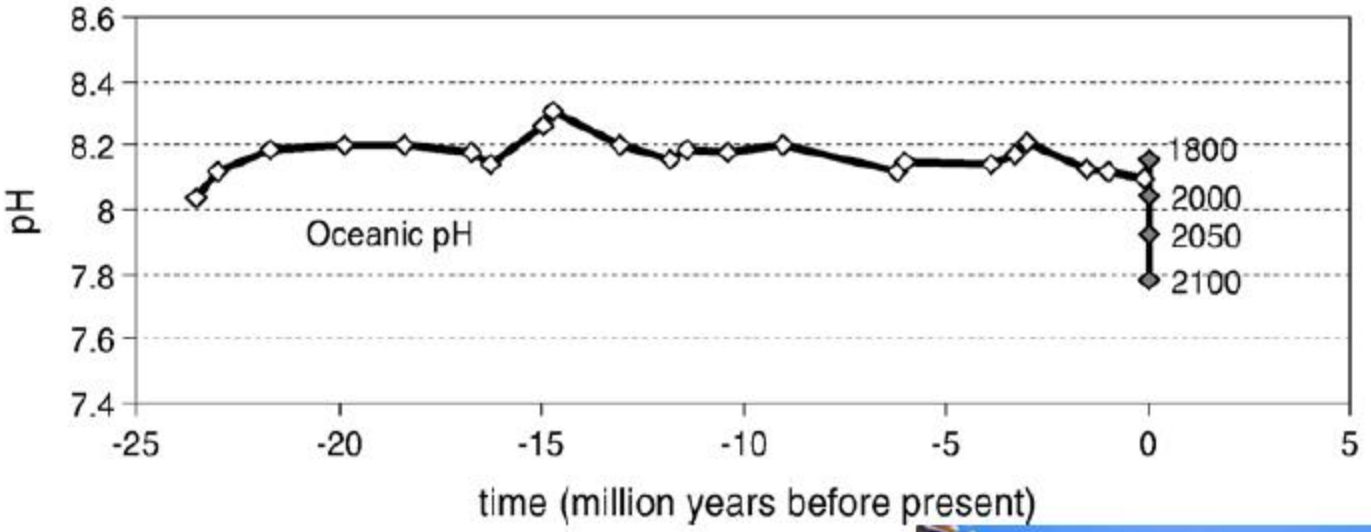
J.E.N. Veron [a,*], O. Hoeg
arce-Kelly [f,1],
C.R.C. Sheppard [g], M. Spalding
, M.G. Stanford-Smith
, A.D. Rogers

Ringed Seals and climate change

- A high Arctic species. Highly dependent on ice
- Ice loss is causing pups to become prematurely separated from their mothers and disrupting other important habits
- Highlight the impacts of melting Arctic ice

Ocean acidification

Challenge to marine biodiversity and ability of oceans to function as sink of CO_2

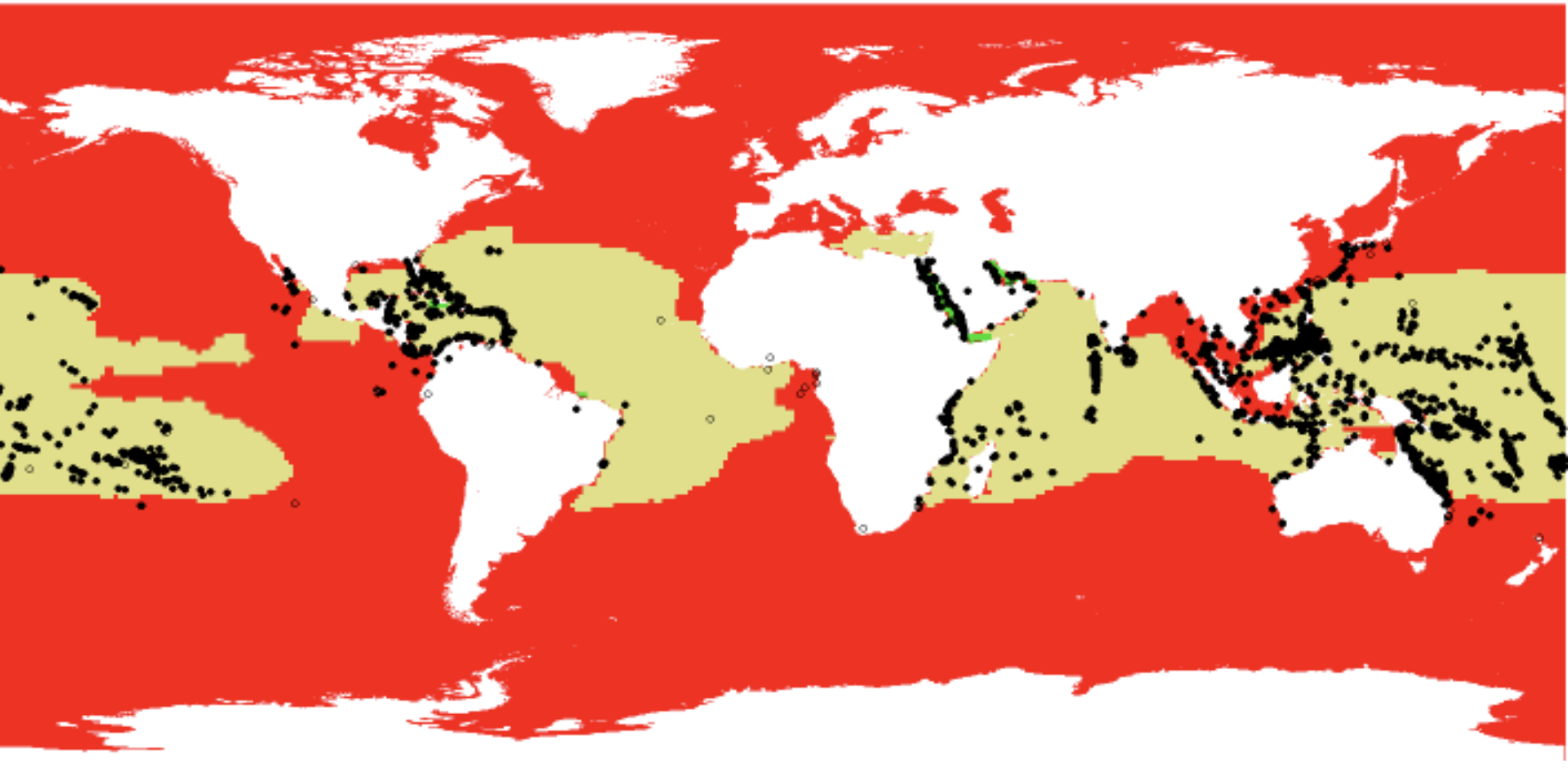


Turley et al 2006

- Southern Ocean and Arctic ocean projected to become corrosive to aragonite by 2030-2060

Predicted Future (~2065) Surface Ocean Aragonite Saturation State

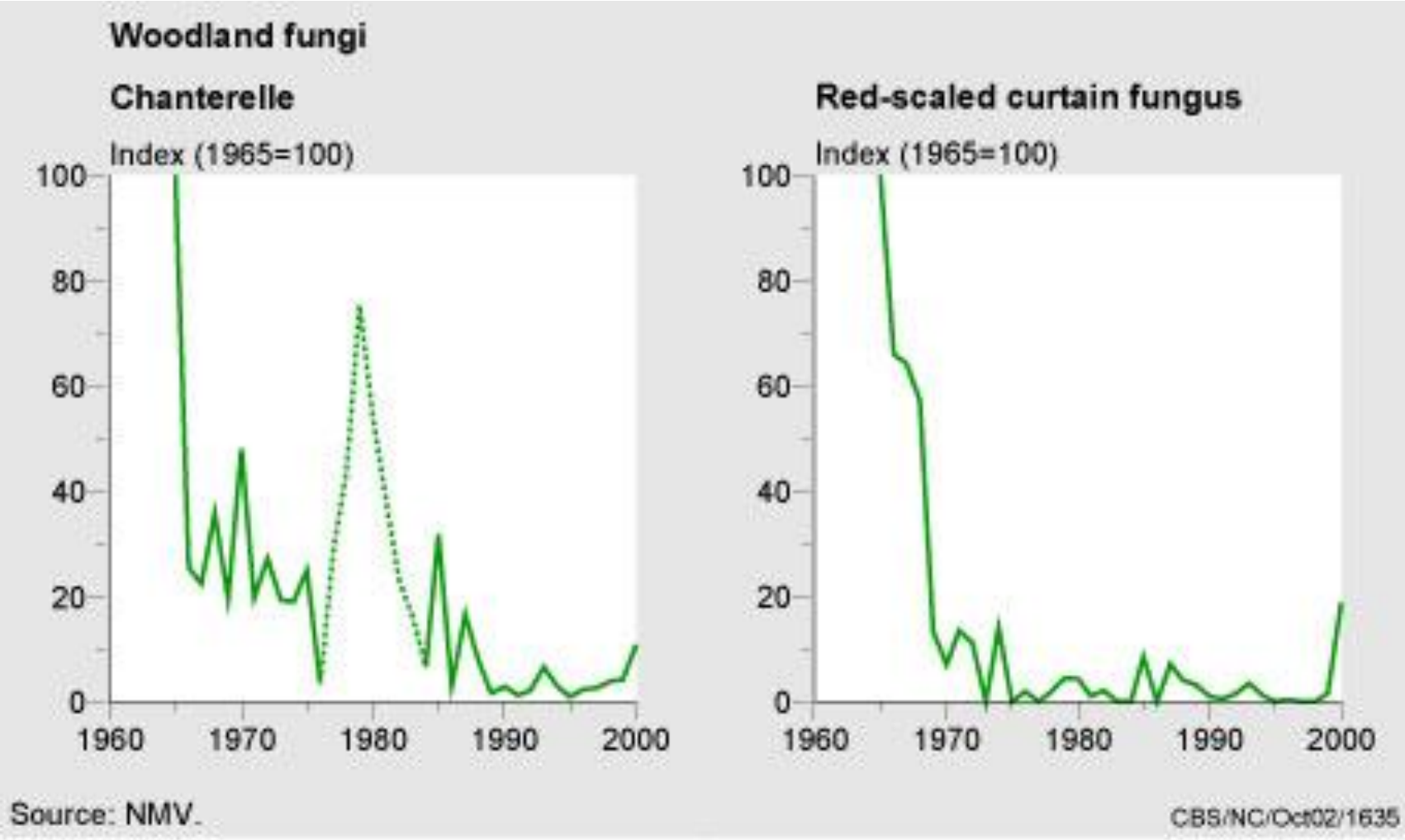
References: 5, 7



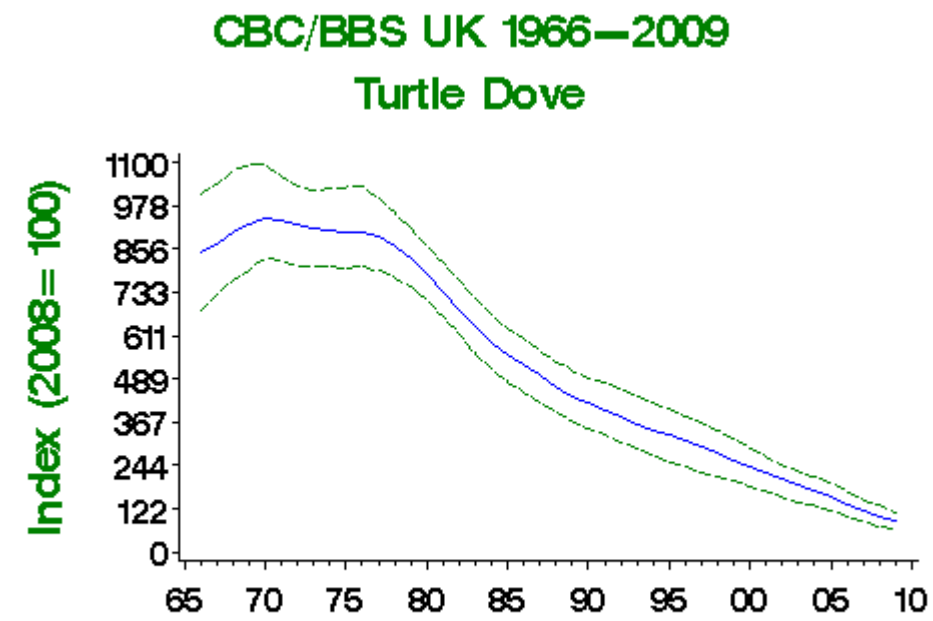
Clownfish and climate change

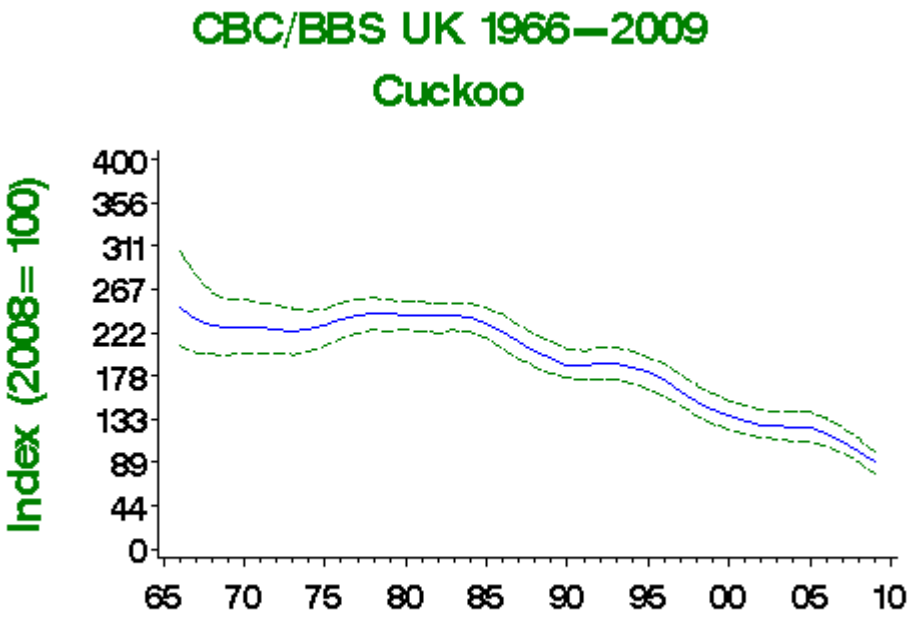
- Tropical and subtropical fish, associated with sea-anemones, mainly on coral reefs.
- Ocean acidification and rising temperatures causes clownfish to lose habitat and their ability to find their sea-anemone ‘home’.
- Highlight the impacts of coral reef degradation due to climate change.

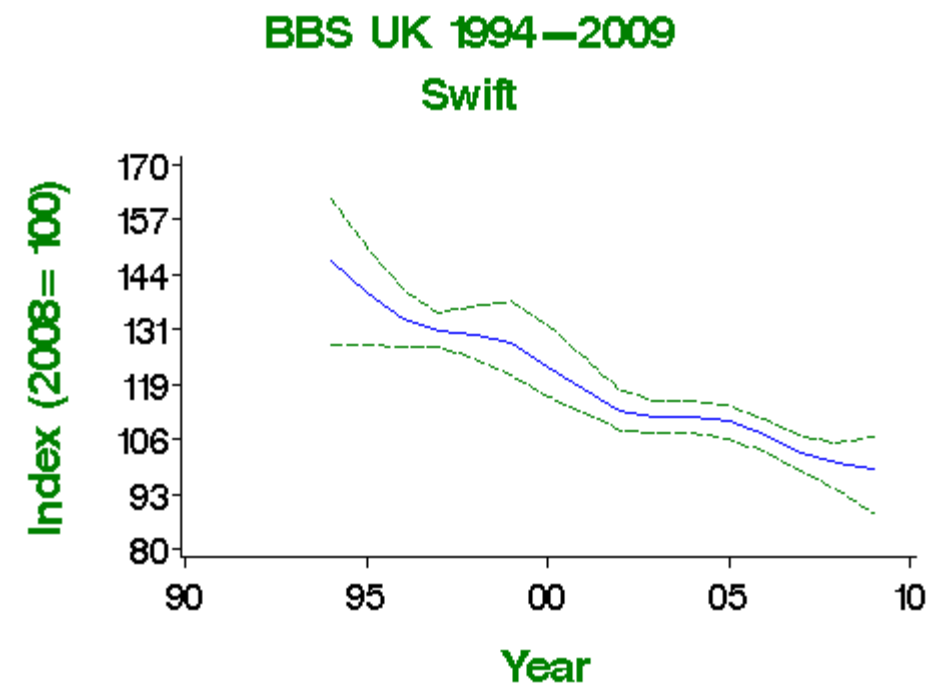
Acidification of forests and effects on fungi

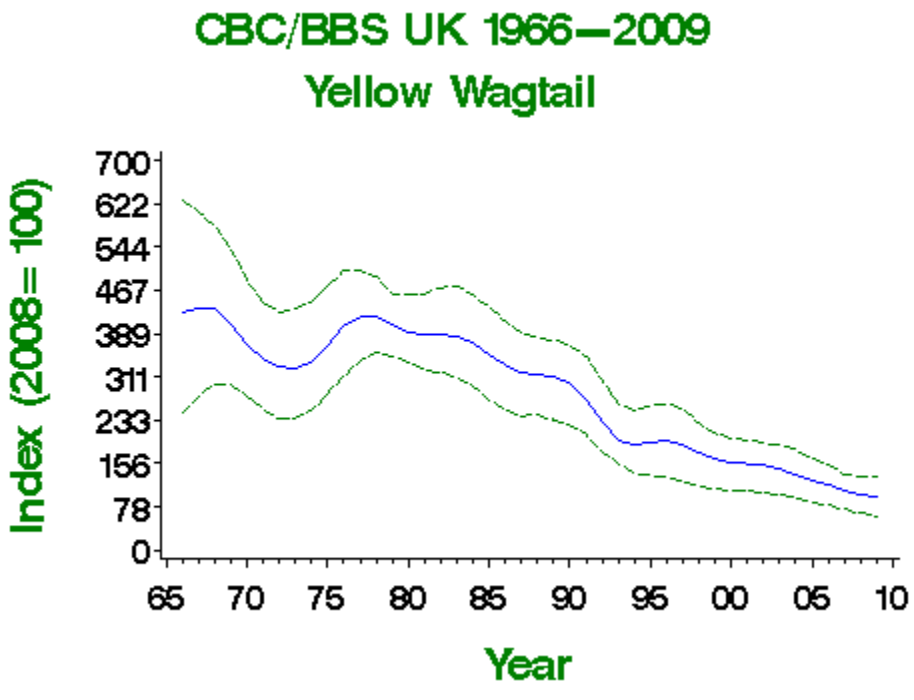


Migratory bird declines









Local bird trends in SW England

Willow Warbler – large decrease

Cetti’s Warbler – large increase

What about biodiversity and the Perfect Storm?

Global Food Security

Beddington says:

“The challenge for global agriculture is to grow more food on not much more land, using less water, fertiliser and pesticides than we have historically done.”

This doesn’t look like business as usual,

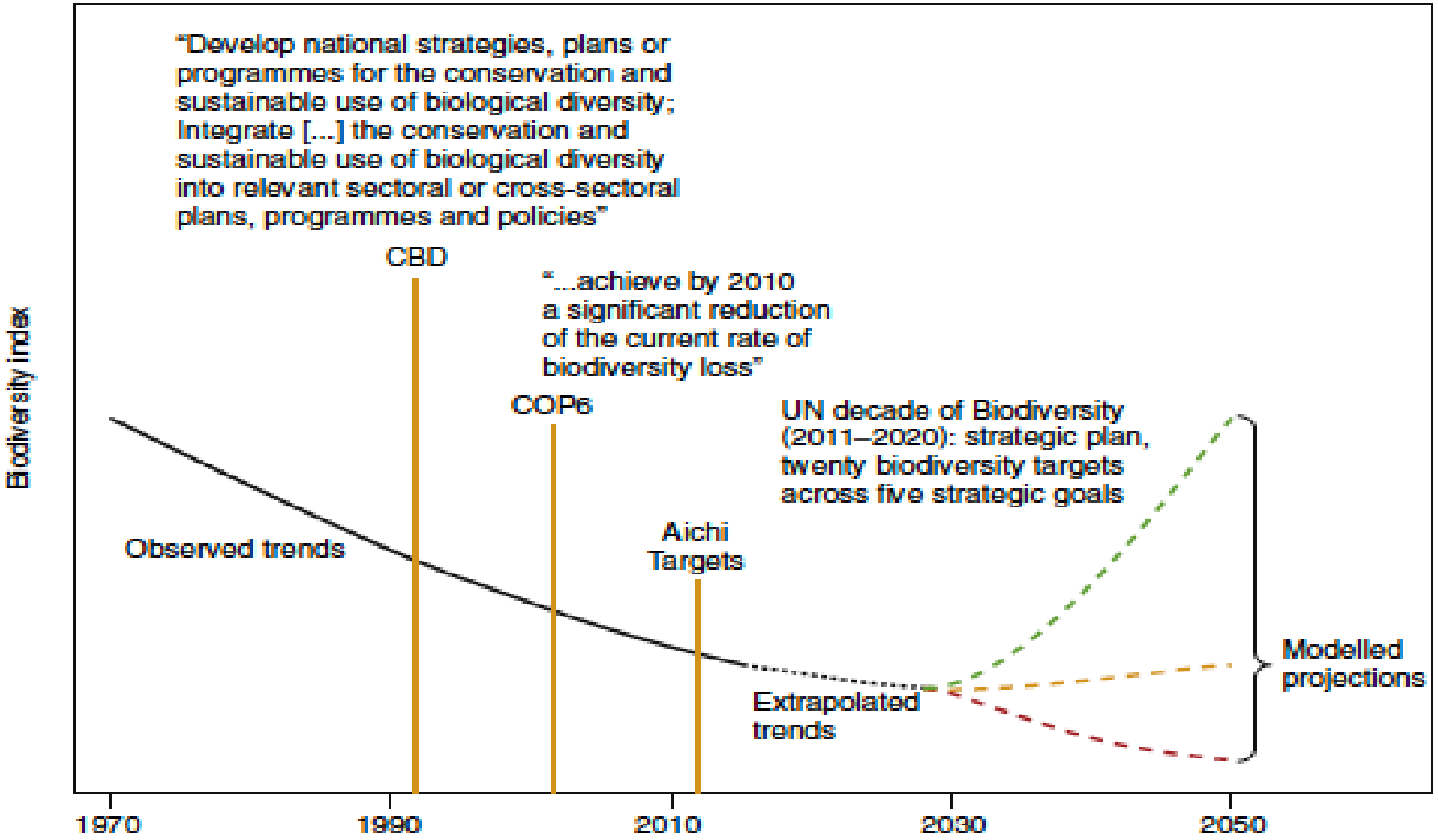
Six necessary & desirable Transformations

1. An energy revolution – Facilitating a global energy transformation (>80 % reduction in CO2 emissions by 2050)
2. An urban planet - Achieving sustainable urban living
3. Future food - a food system transformation to achieve +70% production by 2050 through Sustainable Intensification
4. The rising billion - Adapting to the population transition and preparing for a world of 9 billion people
5. Protect, restore & sustain - A biodiversity Management Transformation
6. Strengthen global governance - A private and public Governance transformation

Aiming higher to bend the curve of biodiversity loss

The development of the post-2020 strategic plan for the Convention on Biological Diversity provides a vital window of opportunity to set out an ambitious plan of action to restore global biodiversity. The components of such a plan, including its goal, targets and some metrics, already exist and provide a roadmap to 2050.

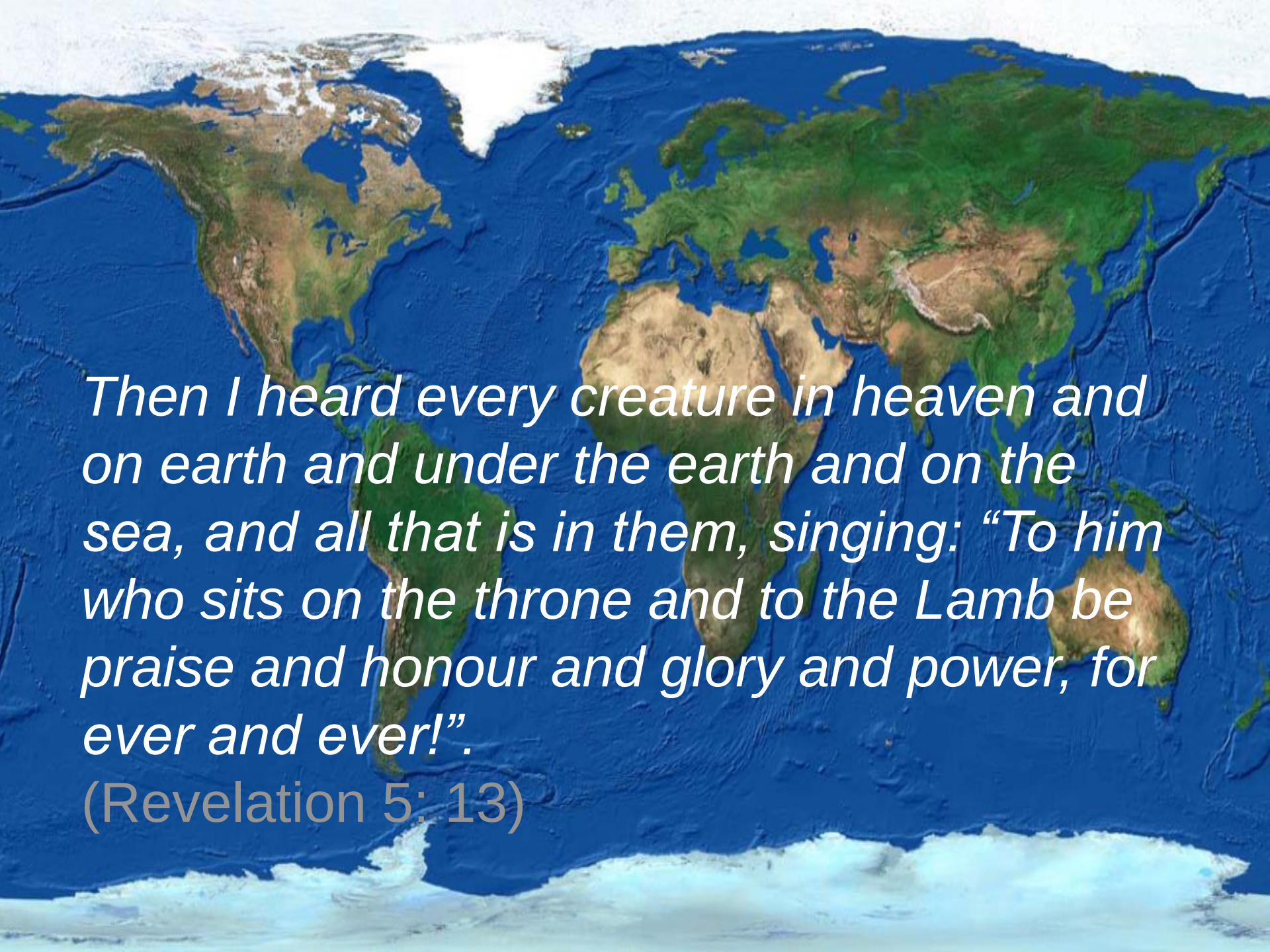
Georgina M. Mace, Mike Barrett, Neil D. Burgess, Sarah E. Cornell, Robin Freeman, Monique Grooten and Andy Purvis



Actions to Save Nature	Essential Targets to be Reached
Space for nature and people	• More protected areas, better managed, in the right places • Keeping large areas of wilderness intact • Ensuring that infrastructure is designed with nature in mind • Making agriculture nature-friendly and efficient
Water for nature and people	• Maintaining and restoring connectivity and water-flow in rivers • Ensuring that infrastructure, especially dams and impoundments, are designed with nature in mind • Making agriculture less demanding of water and agro-chemicals • Enforcing strict controls on the release of all pollutants into the aquatic environment
Legal & sustainable use of nature	• Making all use of wild species sustainable, including marine and freshwater fisheries • Ensuring adherence to national and international rules on the use and trade of species
Emergency action for nature	• Implementing emergency action to save species on the brink of extinction • Developing and implementing solutions for climate change and ocean acidification impacts on species and ecosystems, especially coral reefs • Removing invasive species that threaten species and ecosystems and preventing release of potential new invasives • Developing and implementing solutions to combat wildlife disease, especially emerging diseases with no currently available cure in the wild
Humans for nature	• Implementing ambitious, radically new policies, so the decline of nature stops and recovery starts • Revolutionising agriculture so it feeds more people on less land, and is less dominated by livestock • Implementing already agreed commitments to reduce greenhouse gas emissions and combat climate change • Enforcing strict controls on the release of all pollutants into the environment • Ensuring that all infrastructure is designed with nature in mind at the outset

A Global Mitigation Hierarchy for Nature Conservation

WILLIAM N. S. ARLIDGE, JOSEPH W. BULL, PRUE F. E. ADDISON, MICHAEL J. BURGASS, DIMAS GIANUCA, TAYLOR M. GORHAM, CÉLINE JACOB, NICOLE SHUMWAY, SAMUEL P. SINCLAIR, JAMES E. M. WATSON, CHRIS WILCOX, AND E. J. MILNER-GULLAND



Then I heard every creature in heaven and on earth and under the earth and on the sea, and all that is in them, singing: “To him who sits on the throne and to the Lamb be praise and honour and glory and power, for ever and ever!”.
(Revelation 5: 13)


Thank you