



# Using UN Biodiversity Lab to Support National Conservation and Sustainable Development Priorities

Amber McCullum, Juan Torres-Pérez, Annie Virnig, Marion Marigo, Diego Ochoa, Christina Supples, Scott Atkinson, Rafael Monge, Susana Rodríguez-Buriticá, Dorine Jn Paul, Sendy Augustin Salomon, Guyguy Mangoni

March 24 – April 7, 2020



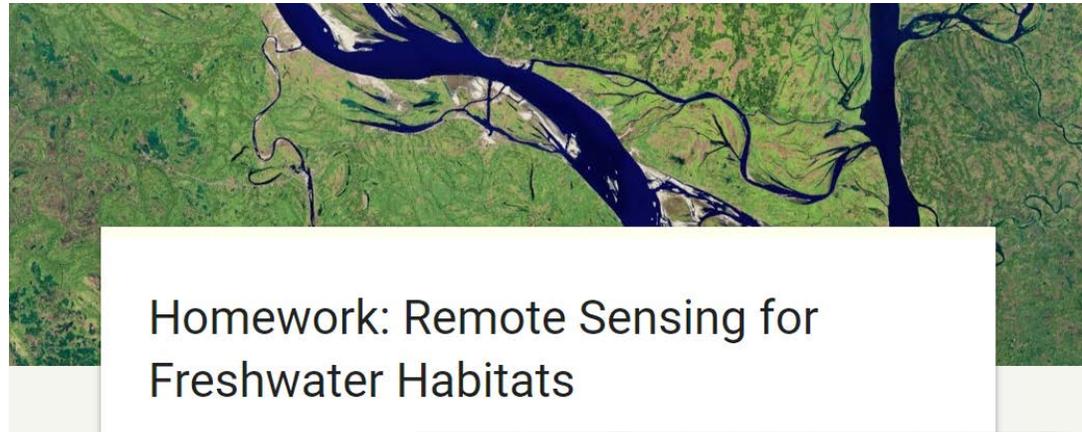
# Course Structure

- Three, 1.5-hour sessions on **March 24, 31, and April 7**
- There will be 3 sessions per day presenting the same material in
  - English (9:00-10:30 EST)
  - French (11:00-12:30 EST)
  - Spanish (14:00-15:30 EST)
  - **Please only sign up for and attend one session per day.**
- Webinar recordings, PowerPoint presentations, and the homework assignment can be found after each session at:
  - <https://arset.gsfc.nasa.gov/land/webinars/un-biodiversity-2020>
- Q&A: Following each lecture and/or by email
  - [amberjean.mccullum@nasa.gov](mailto:amberjean.mccullum@nasa.gov)
  - [juan.l.torresperez@nasa.gov](mailto:juan.l.torresperez@nasa.gov)



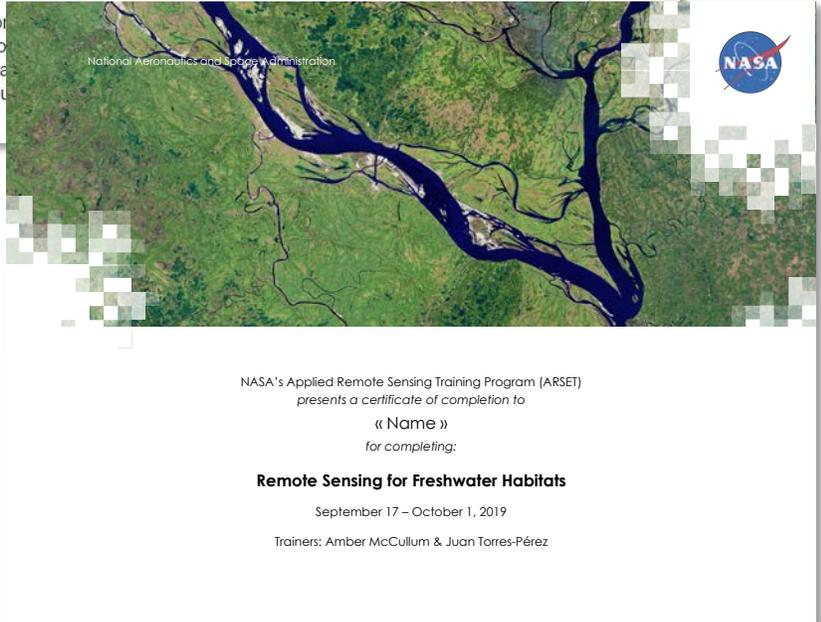
# Homework and Certificates

- **Homework:**
  - One homework assignment
  - Answers must be submitted via Google Forms
- **Certificate of Completion:**
  - Attend all three live webinars
  - Complete the homework assignment by **Tuesday, April 21** (access from ARSET website)
  - You will receive certificates approximately two months after completion of the course from: [marines.martins@ssaihq.com](mailto:marines.martins@ssaihq.com)



Homework: Remote Sensing for Freshwater Habitats

This homework includes questions from the webinar. Some questions refer to completing the steps. Thus, it may be necessary to complete the steps before submitting them here. You may submit this form at a later time.



NASA's Applied Remote Sensing Training Program (ARSET)  
presents a certificate of completion to  
« Name »  
for completing:  
**Remote Sensing for Freshwater Habitats**  
September 17 – October 1, 2019  
Trainers: Amber McCullum & Juan Torres-Pérez



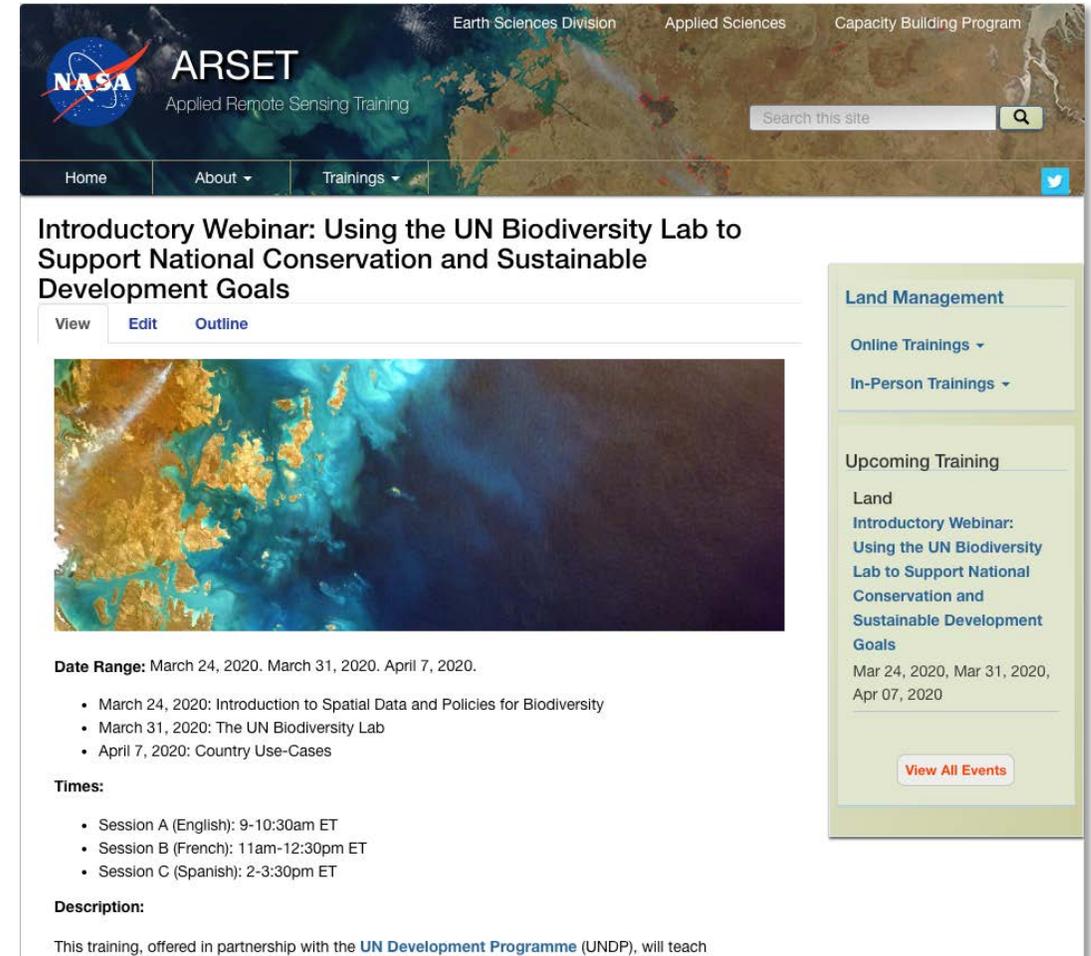
# Prerequisites and Course Materials

- **Prerequisites:**

- Please complete [Sessions 1 & 2A of Fundamentals of Remote Sensing](#) or have equivalent experience.

- **Course Materials:**

- <https://arset.gsfc.nasa.gov/land/webinars/un-biodiversity-2020>



The screenshot shows the ARSET (Applied Remote Sensing Training) website. The header includes the NASA logo, the ARSET title, and navigation links for Earth Sciences Division, Applied Sciences, and Capacity Building Program. A search bar is present in the top right. The main content area features a webinar titled "Introductory Webinar: Using the UN Biodiversity Lab to Support National Conservation and Sustainable Development Goals". Below the title are tabs for "View", "Edit", and "Outline". A satellite image of a coastal region is displayed. The "Date Range" is listed as March 24, 2020, March 31, 2020, and April 7, 2020. A list of sessions is provided: March 24, 2020: Introduction to Spatial Data and Policies for Biodiversity; March 31, 2020: The UN Biodiversity Lab; and April 7, 2020: Country Use-Cases. "Times" for each session are listed: Session A (English): 9-10:30am ET; Session B (French): 11am-12:30pm ET; and Session C (Spanish): 2-3:30pm ET. A "Description" section begins with "This training, offered in partnership with the UN Development Programme (UNDP), will teach". On the right side, there is a sidebar with "Land Management" and "Upcoming Training" sections, including a "View All Events" button.



# Course Outline

## Session 1: Intro to Remote Sensing and Policies for Biodiversity

- NASA satellites and sensors
- Global policy context
- Introduction to UNDP's work on spatial data
- NASA-supported biodiversity projects

## Session 2: UN Biodiversity Lab: Introduction and Training

- Overview of UN Biodiversity Lab
- Data products and tools
- Demonstration of data access and analysis

## Session 3: How are Countries Using Spatial Data to Support Conservation of Nature?

- Overview of countries involved in UN Biodiversity Lab
- Country-specific examples for English, French, and Spanish



# Session 2 Agenda

- Introduction to UN Biodiversity Lab
- Getting Started with UN Biodiversity Lab
  - Register
  - Search
  - Visualize
- Overview of Analyses
- Exercise: Create a Map
- Question and Answer Session



Republic of Congo. Credit: [NASA](#)/JPL-Caltech/Sassan Saatchi





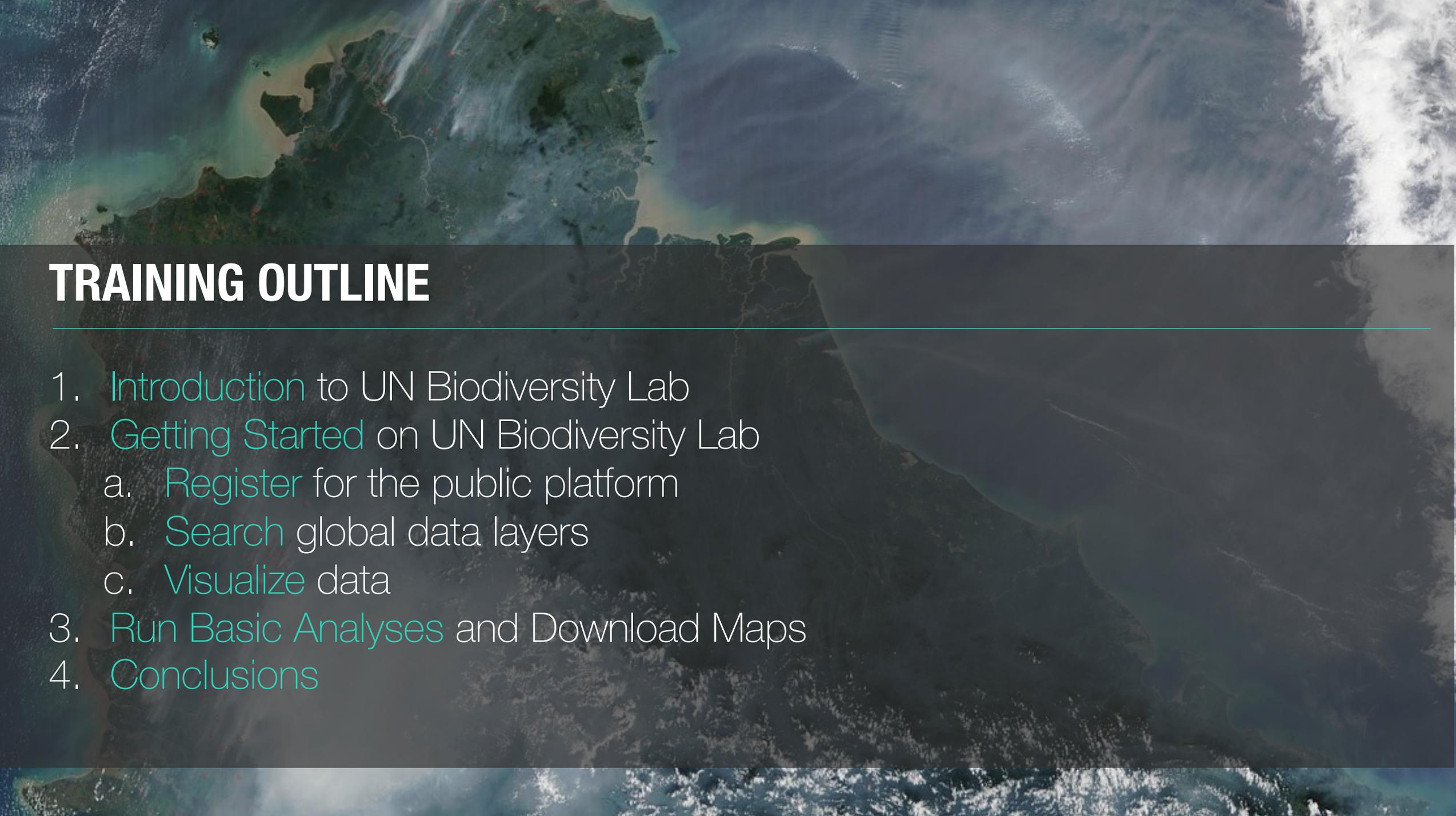
Guest Speakers:  
Annie Virnig and Scott Atkinson

A satellite view of Earth showing a coastline and ocean. The land is green and brown, and the ocean is blue. The image is rotated 90 degrees clockwise.

# TRAINING | UN BIODIVERSITY LAB

---

NASA ARSET Webinar Series  
31 March 2020



# TRAINING OUTLINE

---

1. [Introduction](#) to UN Biodiversity Lab
2. [Getting Started](#) on UN Biodiversity Lab
  - a. [Register](#) for the public platform
  - b. [Search](#) global data layers
  - c. [Visualize](#) data
3. [Run Basic Analyses](#) and Download Maps
4. [Conclusions](#)

An aerial photograph of a tropical coastline, showing lush green land, turquoise water, and white sandy beaches. A dark horizontal band is overlaid across the center of the image, containing the title text.

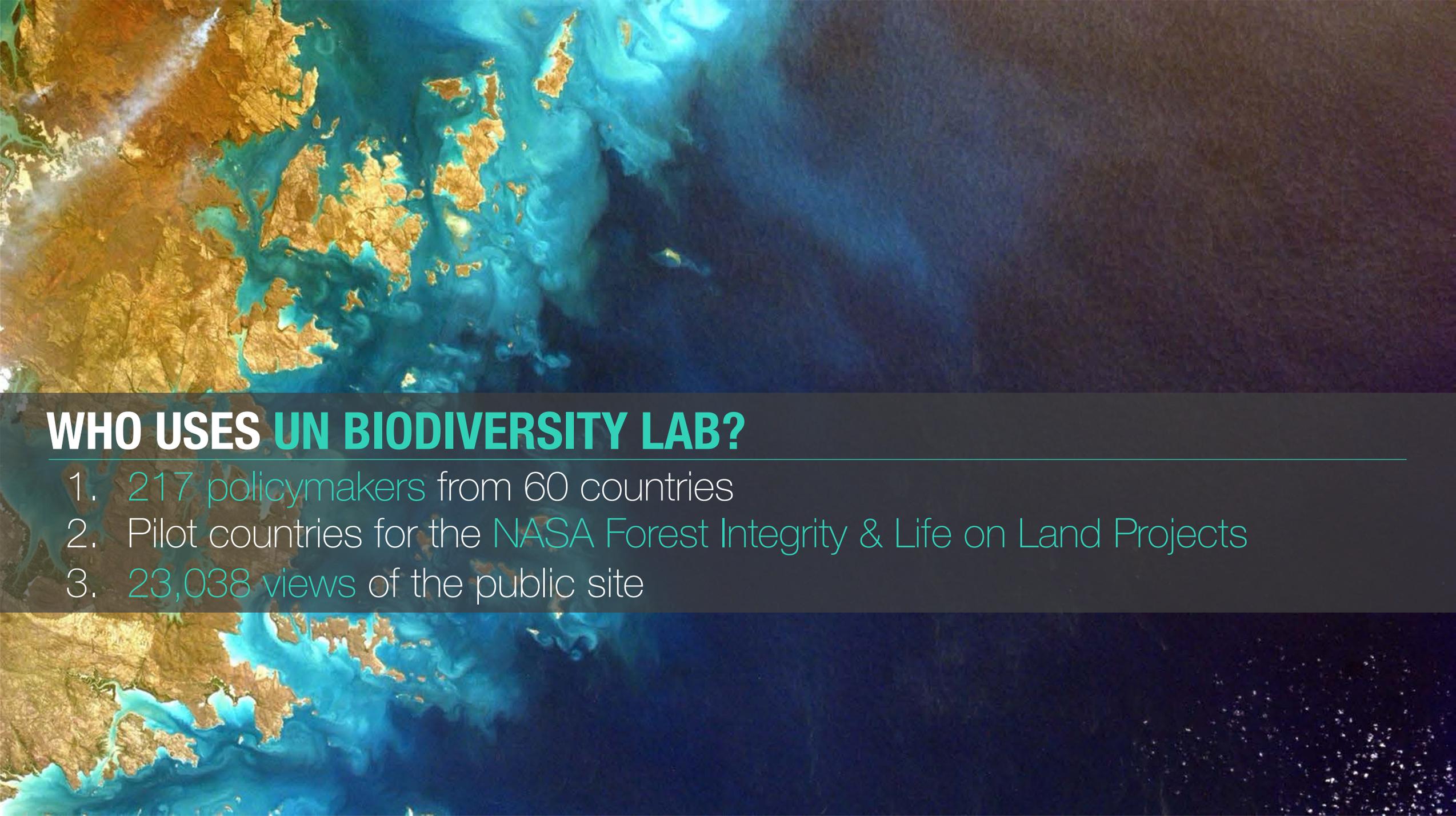
# **1. UN BIODIVERSITY LAB | INTRODUCTION**



## WHAT IS UN BIODIVERSITY LAB?

---

- Created to support policymakers in their **biodiversity commitments**
- Provides 137 governments with access to **FREE high-quality global spatial data layers & analytic tools**
- Does **NOT** require GIS expertise



## WHO USES UN BIODIVERSITY LAB?

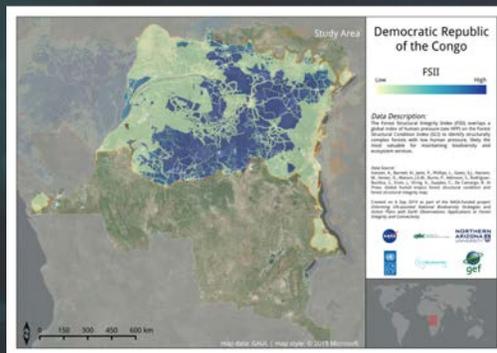
---

1. 217 policymakers from 60 countries
2. Pilot countries for the NASA Forest Integrity & Life on Land Projects
3. 23,038 views of the public site

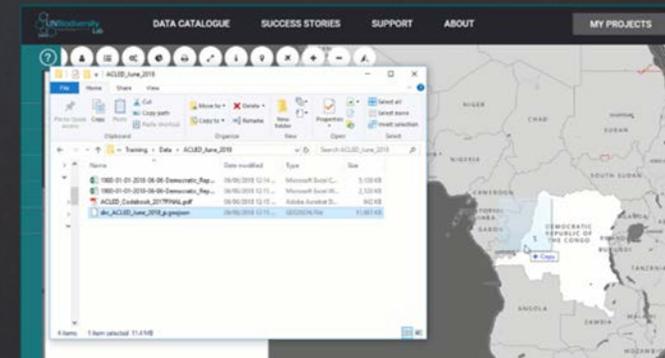
# UN BIODIVERSITY LAB | FIVE KEY FEATURES



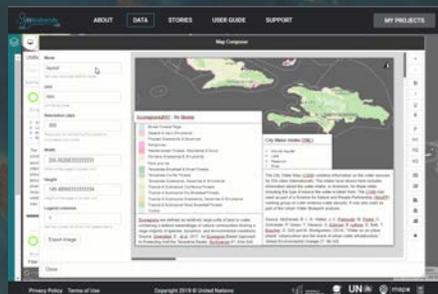
1. Access >100 global data layers



2. Visualize NASA project data



3. Conduct analyses



4. Create maps



5. View story maps of conservation success

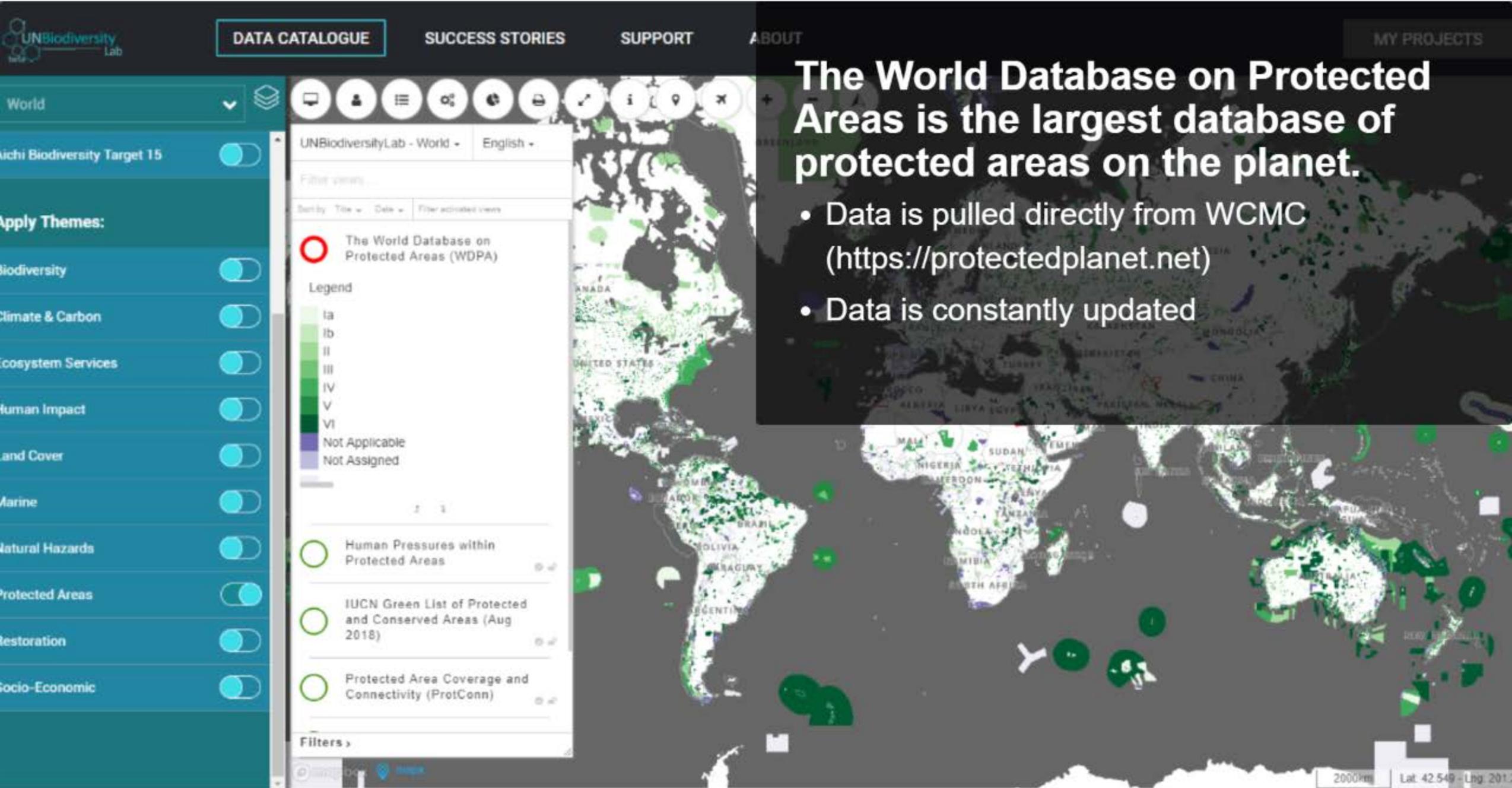


**ACCESS >100 GLOBAL DATA LAYERS**

A wide-angle landscape photograph showing a valley with a winding river in the foreground. The valley floor is covered in green grass and some low-lying shrubs. In the background, there are several layers of rolling hills and mountains, with the most prominent one being a large, rounded peak in the center. The sky is a clear, pale blue. A semi-transparent dark grey horizontal band is overlaid across the middle of the image, containing the title text.

# Snapshot of Protected Area Estate Data

Photo Credit: Equator Prize Winner Guassa-Menz Community Conservation



# The World Database on Protected Areas is the largest database of protected areas on the planet.

- Data is pulled directly from WCMC (<https://protectedplanet.net>)
- Data is constantly updated

Log In My Account | Contact Us

**SHARE** **REPORT**

# One-third of global protected land is under intense human pressure

Kendall R. Jones<sup>1,2\*</sup>, Oscar Venter<sup>3</sup>, Richard A. Fuller<sup>2\*</sup>, James R. Allan<sup>1,2</sup>, Sean L. Maxwell<sup>1,2</sup>, Pablo Jose Negro<sup>1,2</sup>, James...

\* See all authors and affiliations

Species 10 May 2019  
Vol. 369, Issue 6500, pp. 738-751  
DOI: 10.1126/science.1269555

**Article**   Figures & Data   Info & Metrics   eLetters   PDF

You are currently viewing the abstract. [View Full Text](#)

**Human pressure and Protected Areas: Visualization of the percentage of a Protected Area under intense human pressure.**

# Protected areas in the world's ecoregions: How well connected are they?



Santiago Saura\*, Lucy Bastin, Luca Battistella, Andrea Mandrici, Grégoire Dubois

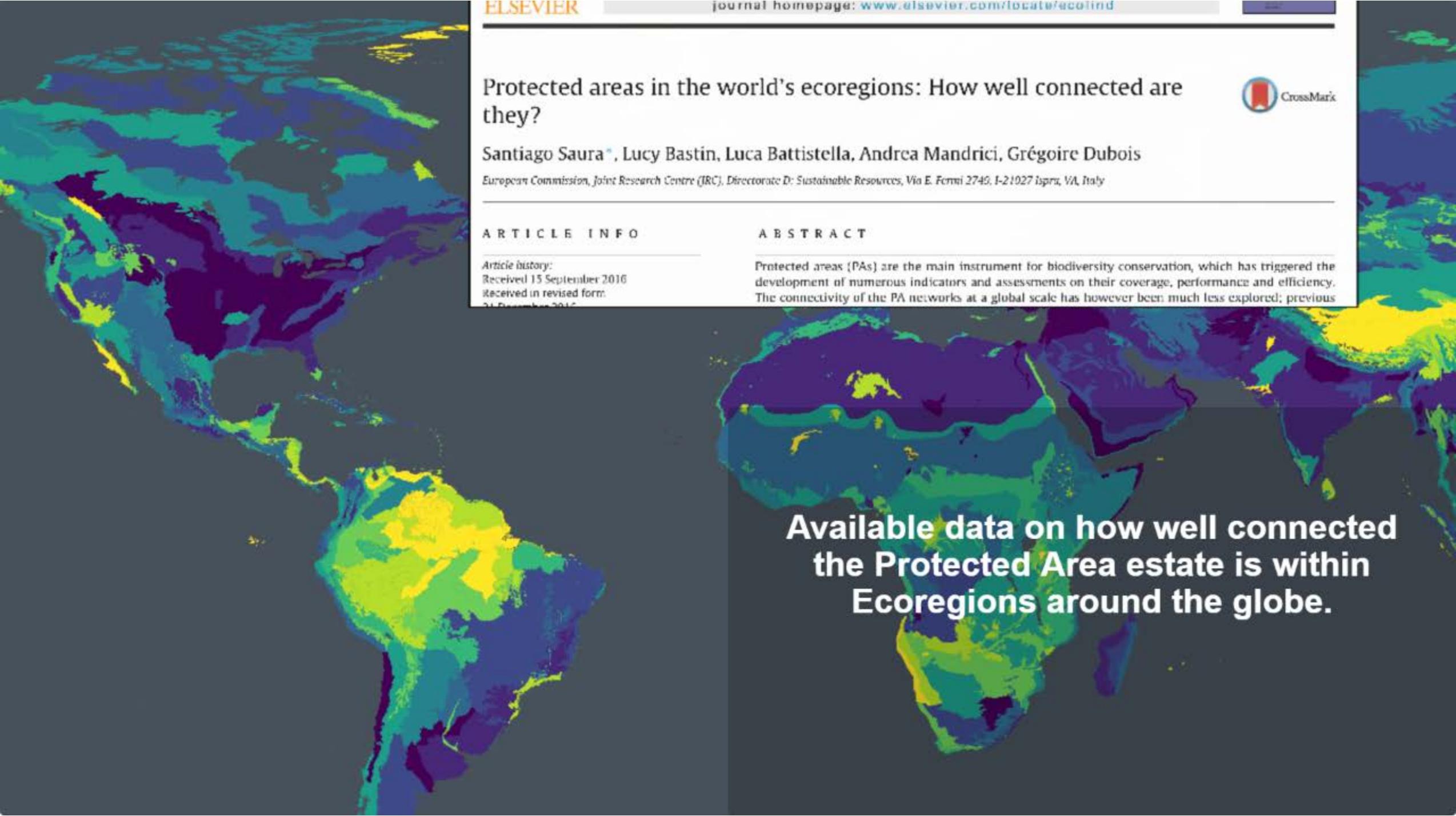
European Commission, Joint Research Centre (JRC), Directorate D: Sustainable Resources, Via E. Fermi 2749, I-21027 Ispra, VA, Italy

## ARTICLE INFO

Article history:  
Received 15 September 2016  
Received in revised form  
21 December 2016

## ABSTRACT

Protected areas (PAs) are the main instrument for biodiversity conservation, which has triggered the development of numerous indicators and assessments on their coverage, performance and efficiency. The connectivity of the PA networks at a global scale has however been much less explored; previous

A world map where different ecoregions are color-coded in shades of blue, green, and yellow. The map shows the distribution of these regions across all continents, with higher concentrations of yellow and green in North America, Europe, and parts of Asia and Africa. The text is overlaid on the map, specifically over the African continent.

**Available data on how well connected the Protected Area estate is within Ecoregions around the globe.**

A top-down view of a sea turtle swimming in clear, turquoise water. The turtle's dark brown, patterned shell is the central focus, with its head and front flippers visible. The water is bright and clear, showing some light refraction and shadows on the seabed below.

# Snapshot of Biodiversity Data

# Terrestrial Ecosystems of the World

BioScience

American Institute  
of Biological Sciences

Issues More Content ▾ Submit ▾ Purchase Alerts About ▾

All BioScience



Advanced  
Search



## An Ecoregion-Based Approach to Protecting Half the Terrestrial Realm

Eric Dinerstein, David Olson, Anup Joshi, Carly Wynne, Neil D. Burgess,  
Eric Wikramanayake, Nathan Hahn, Suzanne Palminteri, Prashant Hedao, Reed Noss, ...  
[Show more](#)



View Metrics

Arctic Ocean

Arctic Ocean



ELSEVIER

# Global Ecology and Conservation

Volume 21, March 2020, e00860

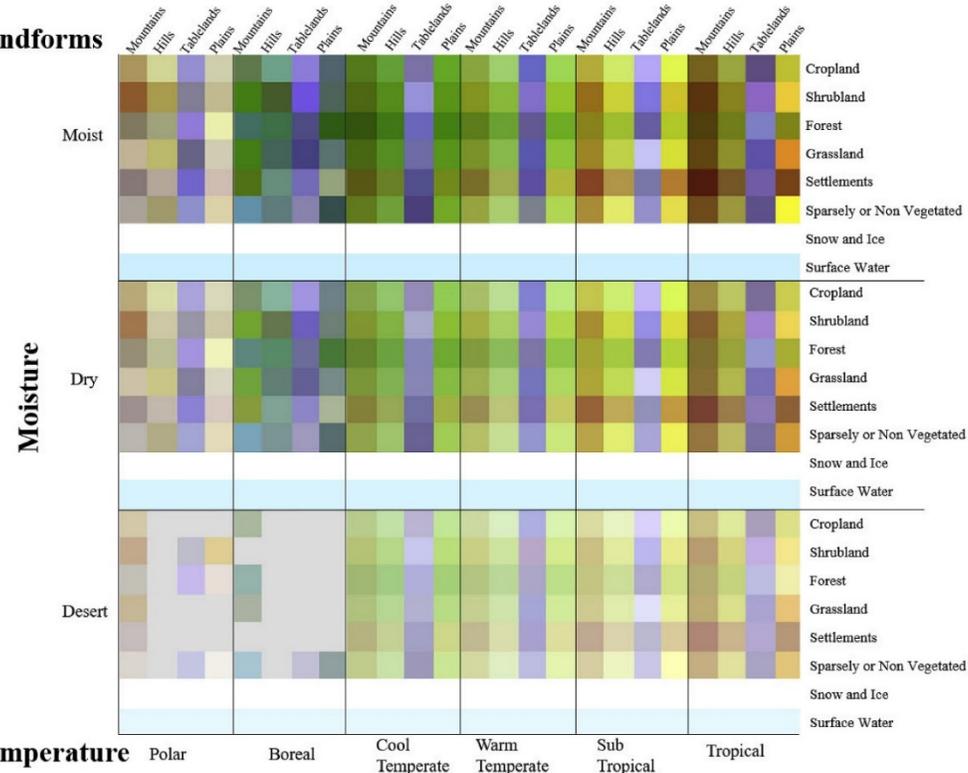


Original Research Article

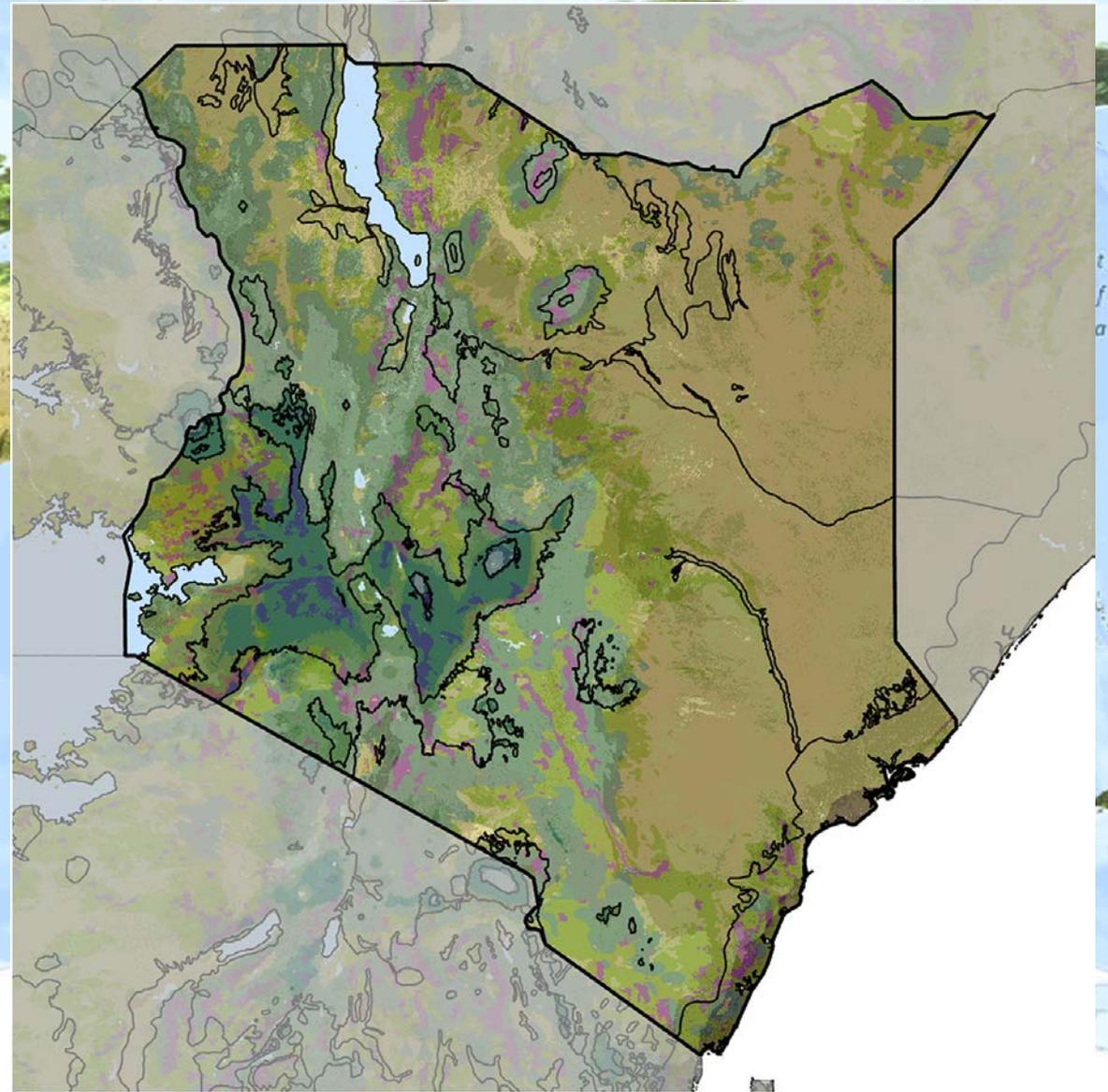
## An assessment of the representation of ecosystems in global protected areas using new maps of World Climate Regions and World Ecosystems

Roger Sayre <sup>a</sup>, Deniz Karagulle <sup>b</sup>, Charlie Frye <sup>c</sup>, Timothy Boucher <sup>c</sup>, Nicholas H. Wolff <sup>d</sup>, Sean Breyer <sup>b</sup>, Dawn Wright <sup>b</sup>, Madeline Martin <sup>a</sup>, Kevin Butler <sup>b</sup>, Keith Van Graafeiland <sup>e</sup>, Jerry Touval <sup>e</sup>, Leonardo Sotomayor <sup>f</sup>, Jennifer McGowan <sup>e</sup>, Edward T. Game <sup>e</sup>, Hugh Possingham <sup>g</sup>

### Landforms



Vegetation





Guiding  
Conservation  
for 50 Years

The IUCN Red List of Threatened Species™

2018-1

[::About](#) [::Initiatives](#) [::News](#) [::Photos](#) [::Partners](#) [::Sponsors](#) [::Resources](#)

Enter Red List search term(s)



[OTHER SEARCH OPTIONS](#)

[Discover more](#)

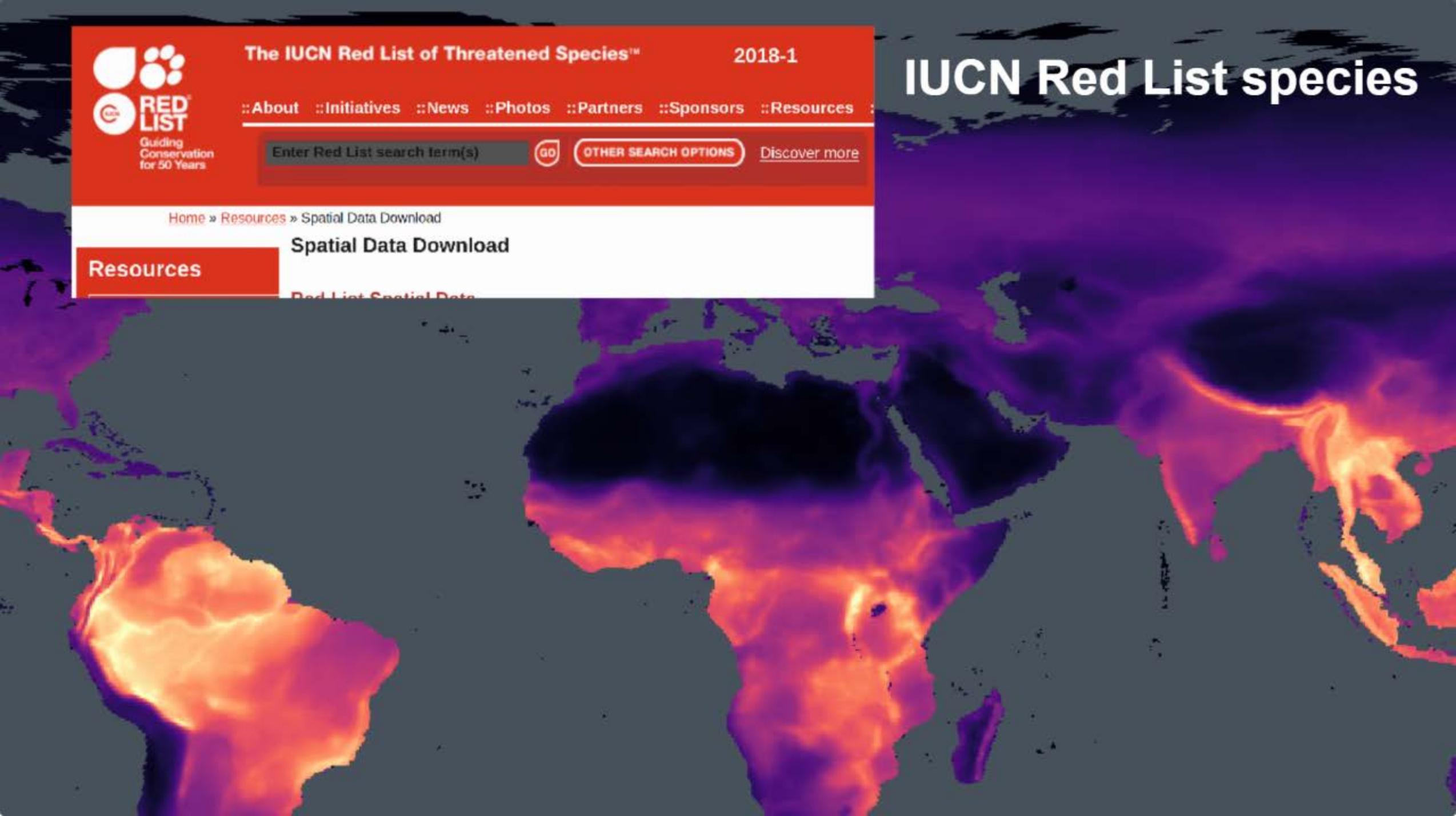
[Home](#) » [Resources](#) » [Spatial Data Download](#)

## Spatial Data Download

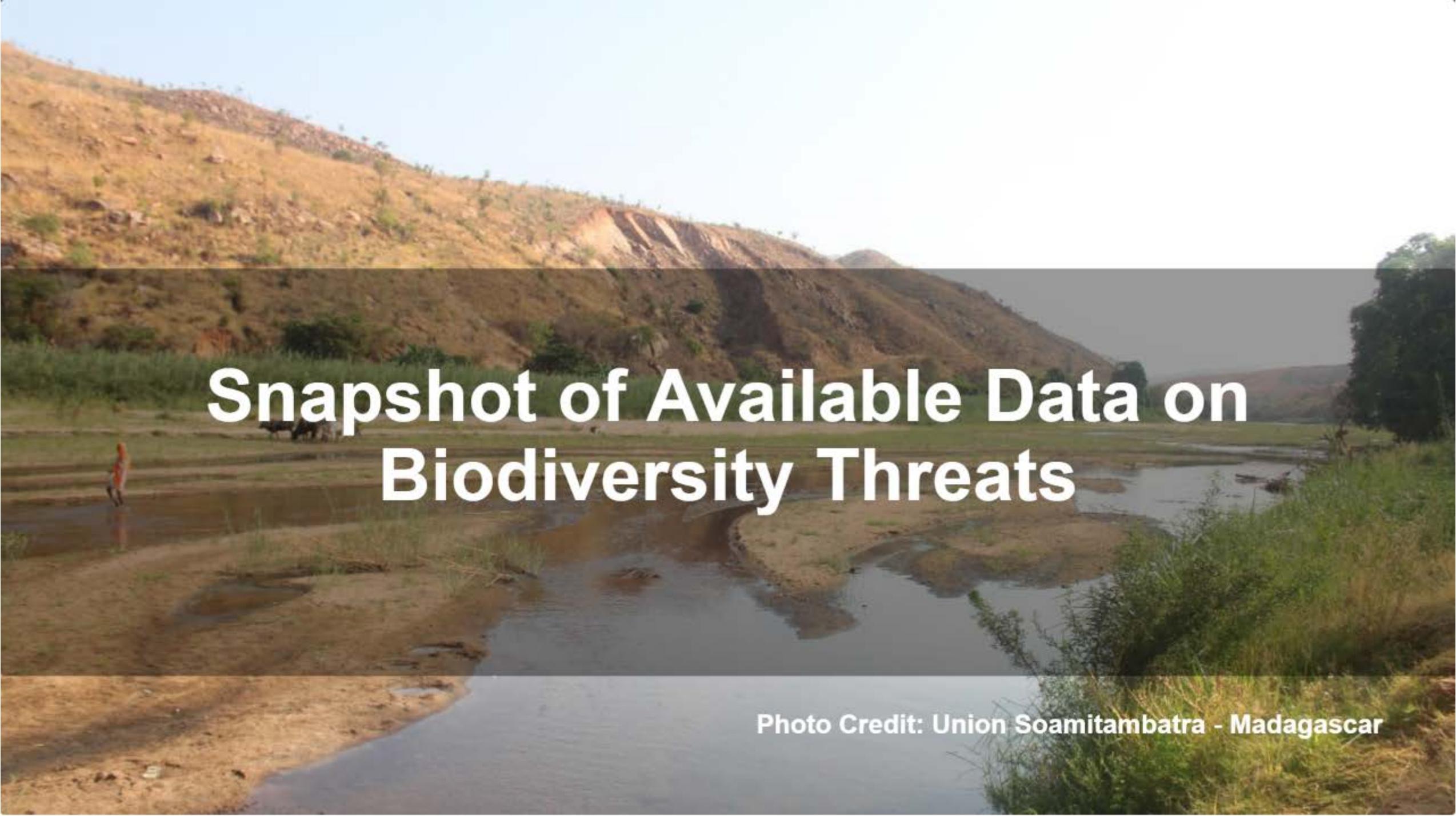
Resources

[Red List Spatial Data](#)

# IUCN Red List species



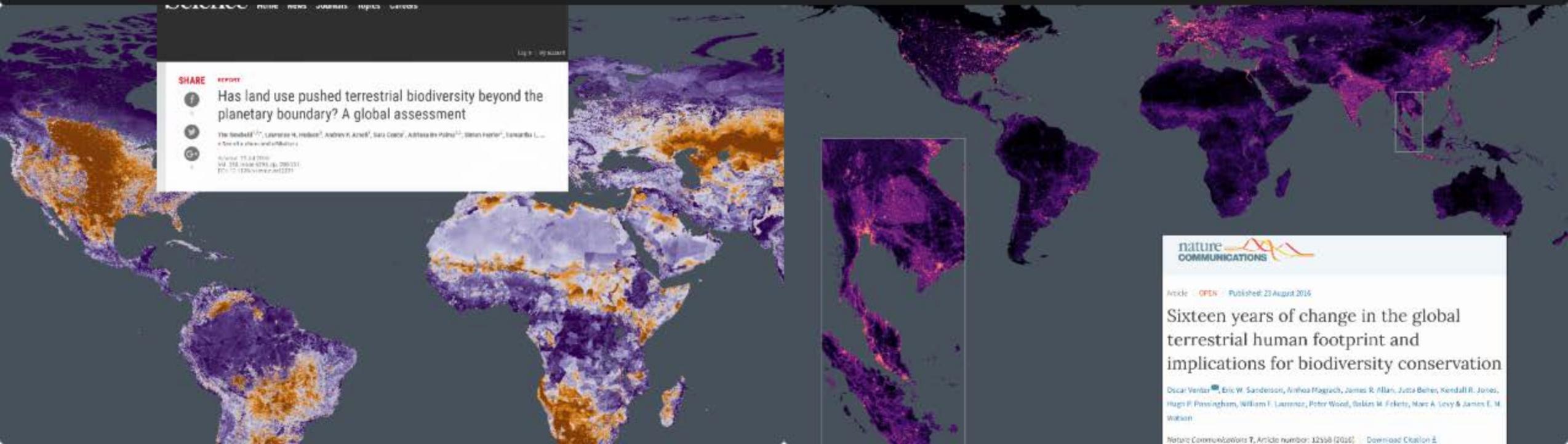




# Snapshot of Available Data on Biodiversity Threats

Photo Credit: Union Soamitambatra - Madagascar

# Data on Biodiversity Intactness Index and Human Impact



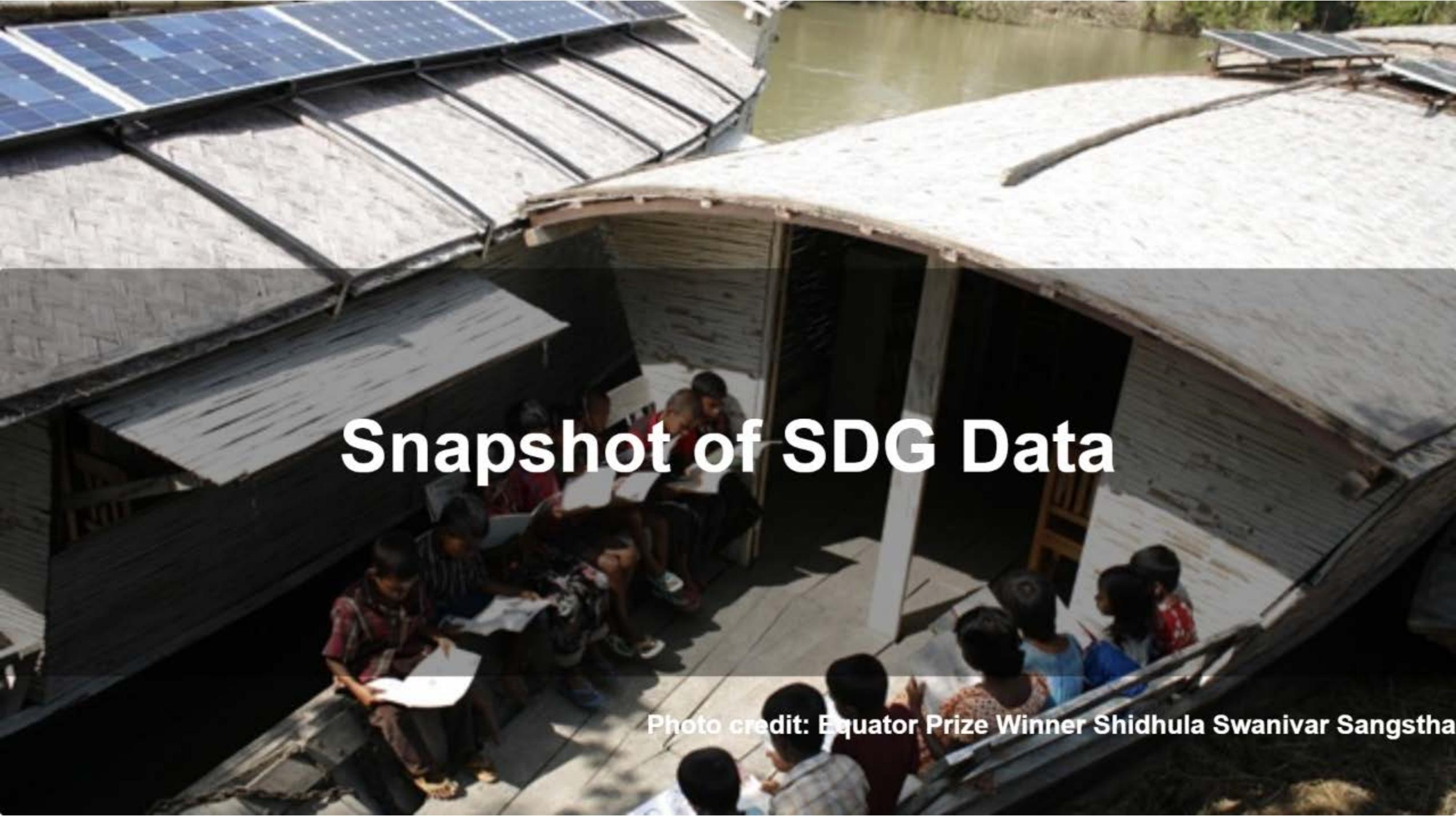
Article [OPEN](#) | Published: 14 July 2015

## Spatial and temporal changes in cumulative human impacts on the world's ocean

Benjamin S. Halpern , Melanie Frazier, John Potapenko, Kenneth S. Casey, Kellee Koenig, Catherine Longo, Julia Stewart Lowndes, R. Cotton Rockwood, Elizabeth R. Selig, Kimberly A. Selkoe & Shaun Walbridge

*Nature Communications* **6**, Article number: 7615 (2015) | [Download Citation](#) 

**Available data on the cumulative change of human impacts include shipping pollution, runoff plumes, and other related data**



# Snapshot of SDG Data

Photo credit: Equator Prize Winner Shidhula Swanivar Sangstha

Letters | Published: 10 January 2016

## A global map of travel time to cities to assess inequalities in accessibility in 2015

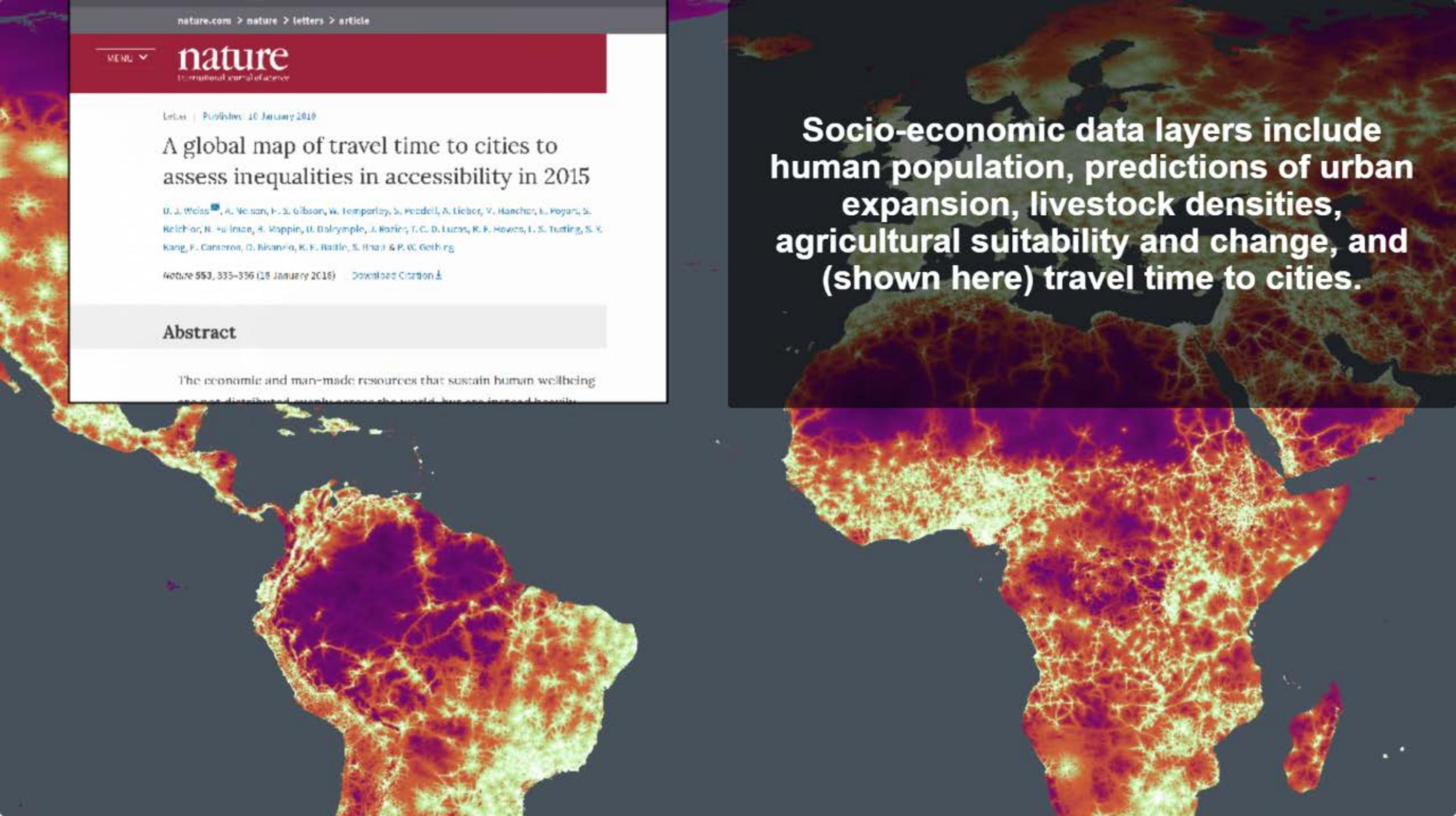
D. J. Weiss<sup>1</sup>, A. Nelson<sup>1</sup>, F. S. Gibson<sup>1</sup>, W. Temporalay<sup>2</sup>, S. Pezdell<sup>1</sup>, A. Lieber<sup>1</sup>, V. Haasler<sup>1</sup>, L. Poyari<sup>3</sup>, S. Reichert<sup>4</sup>, N. Hulme<sup>5</sup>, A. Mappin<sup>6</sup>, U. Dalrymple<sup>7</sup>, J. Borrie<sup>8</sup>, T. C. D. Lucas<sup>9</sup>, R. K. Howes<sup>10</sup>, I. S. Tuttle<sup>11</sup>, S. Y. Kang<sup>12</sup>, F. Cameron<sup>13</sup>, O. Kisanuki<sup>14</sup>, K. F. Bastin<sup>15</sup>, S. Hnat<sup>16</sup> & P. W. Gething

*Nature* **553**, 335–336 (10 January 2016) | [Download Citation](#)

### Abstract

The economic and man-made resources that sustain human wellbeing are unevenly distributed across the world, but are unevenly distributed

**Socio-economic data layers include human population, predictions of urban expansion, livestock densities, agricultural suitability and change, and (shown here) travel time to cities.**





Forest growing stock volume of the northern hemisphere:  
Spatially explicit estimates for 2010 derived from Envisat  
ASAR

Maurizio Sar

Ronald J. H

r, Martin Th

## Global Change Biology

Primary Research Article

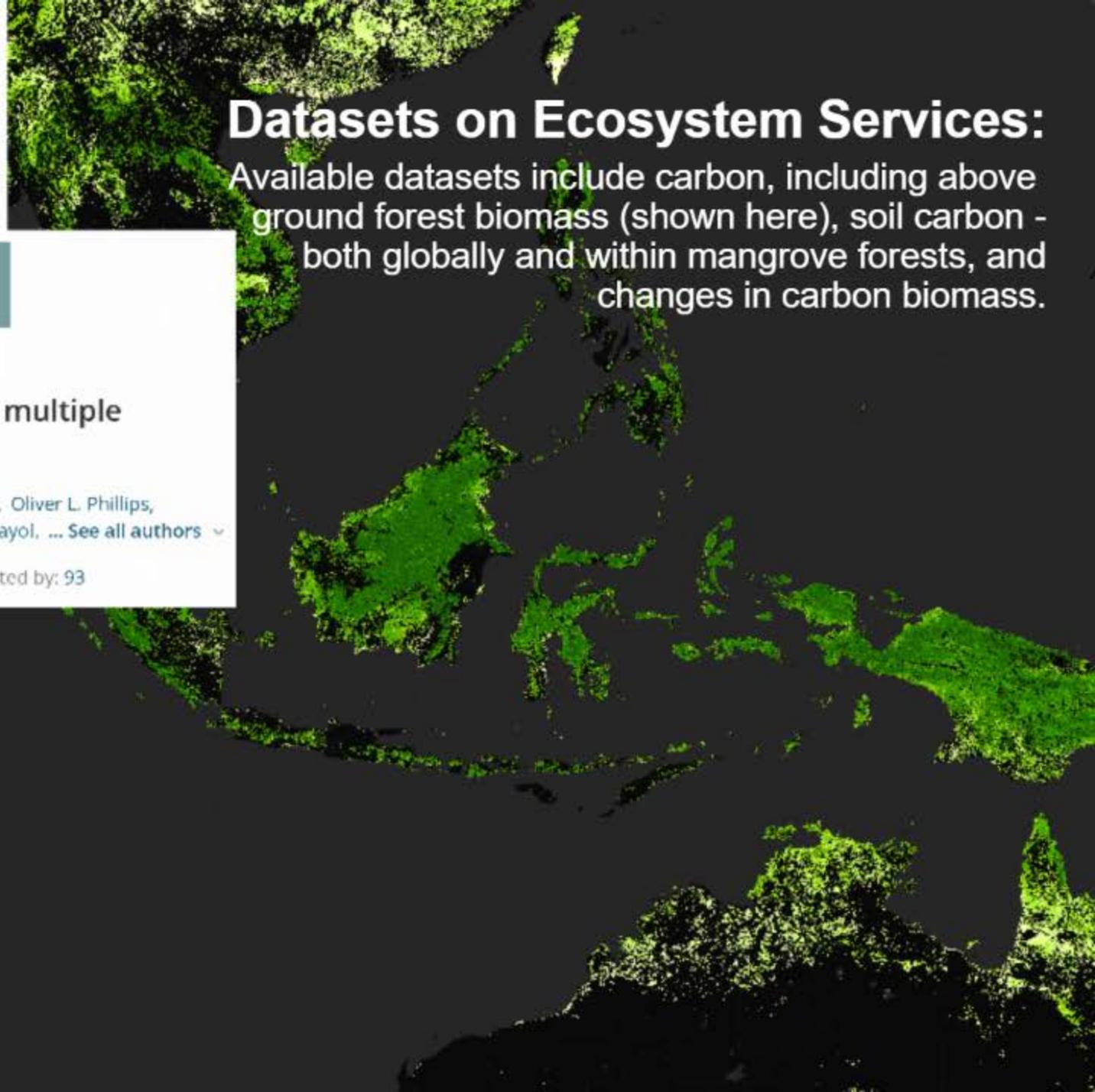
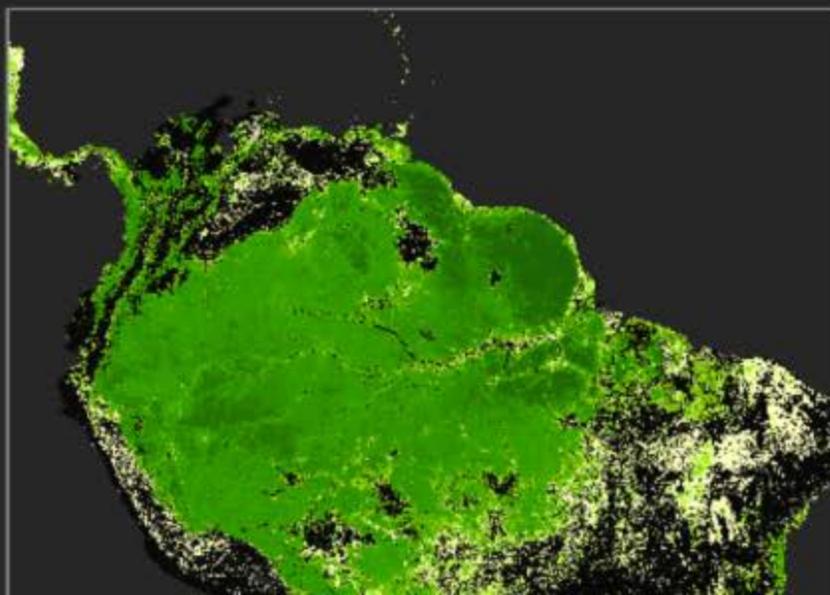
### An integrated pan-tropical biomass map using multiple reference datasets

Valerio Avitabile , Martin Herold, Gerard B. M. Heuvelink, Simon L. Lewis, Oliver L. Phillips,  
Gregory P. Asner, John Armston, Peter S. Ashton, Lindsay Banin, Nicolas Bayol. ... [See all authors](#) 

First published: 25 October 2015 | <https://doi.org/10.1111/gcb.13139> | Cited by: 93

## Datasets on Ecosystem Services:

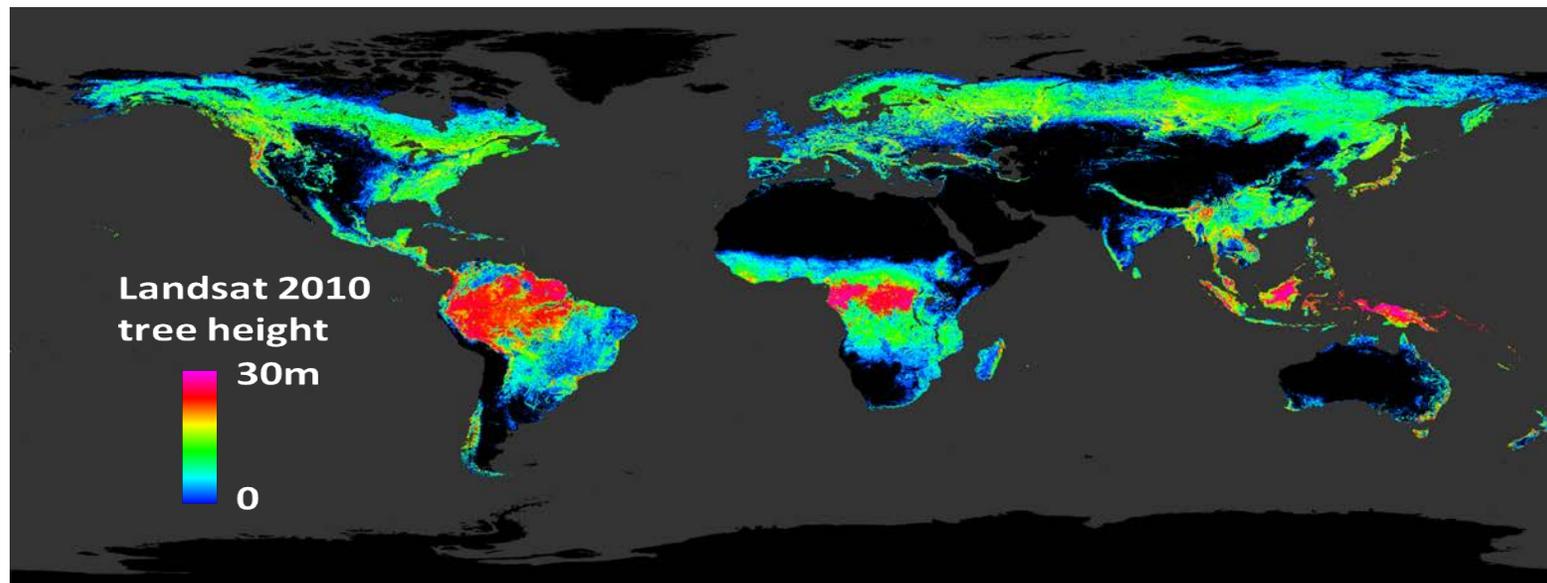
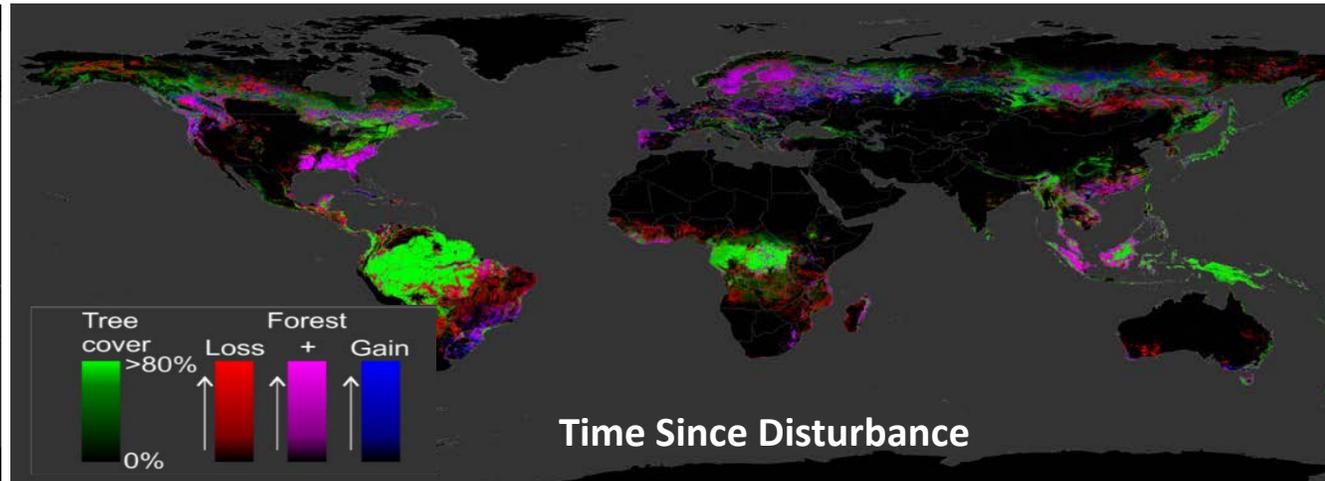
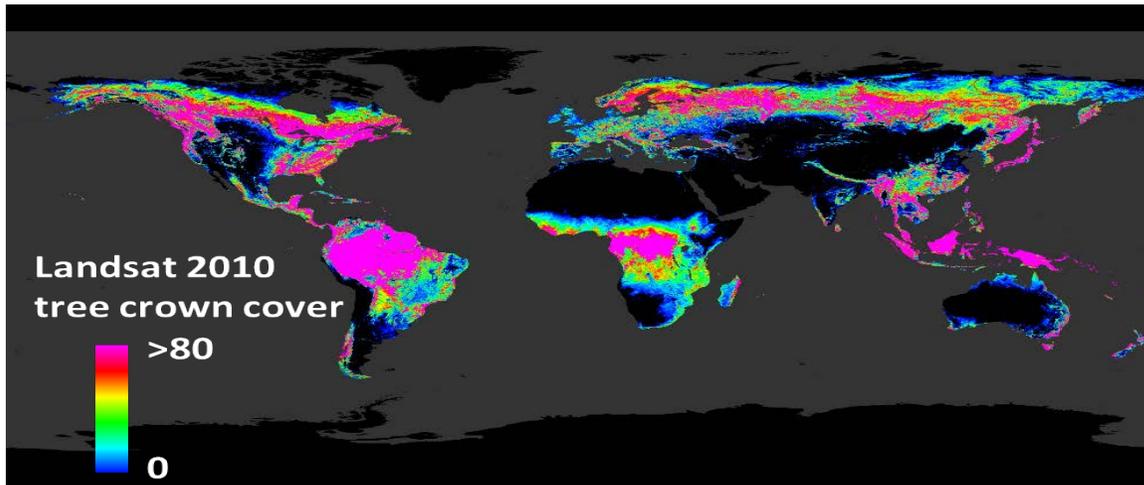
Available datasets include carbon, including above-ground forest biomass (shown here), soil carbon - both globally and within mangrove forests, and changes in carbon biomass.



An aerial photograph of a lush, green tropical rainforest. A dark, winding river flows through the center of the forest, reflecting the surrounding trees. The forest is dense and vibrant, with various shades of green. A semi-transparent dark grey banner is overlaid across the middle of the image, containing the main text.

**PRIORITY ACCESS TO NASA FOREST INTEGRITY  
PROJECT DATA**

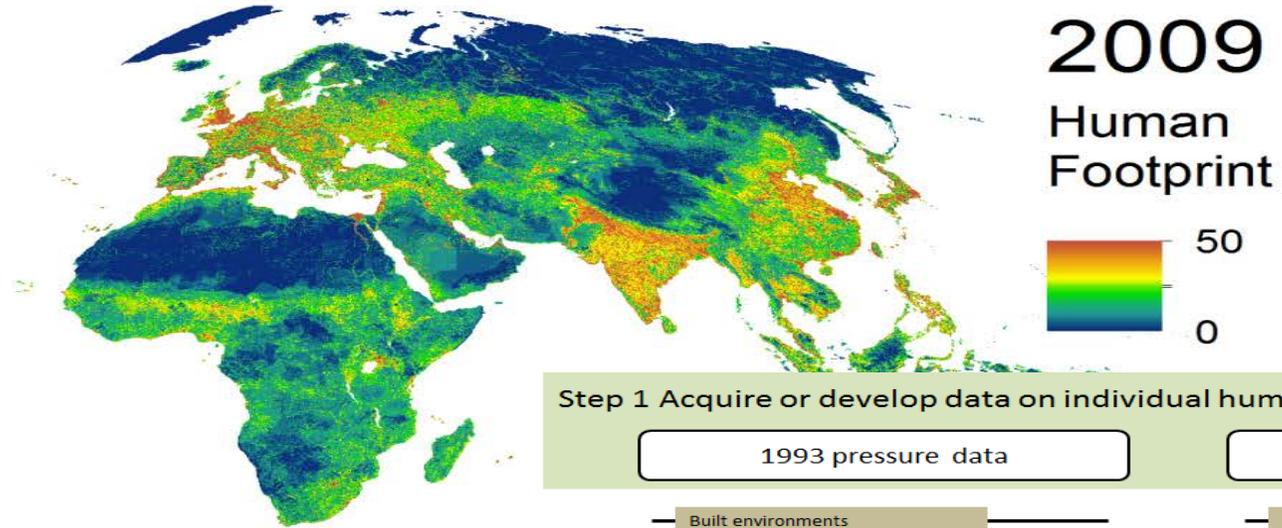
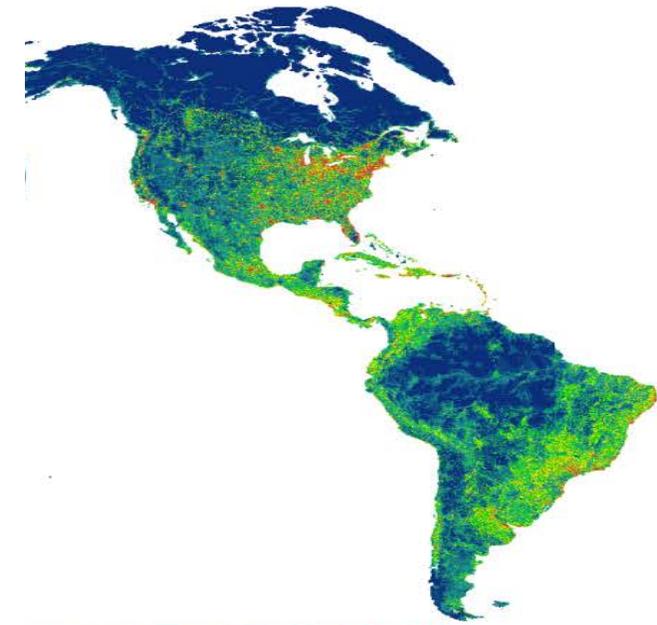
# 1. FOREST CONDITION



- Data Produced
- Canopy cover 2000, 2010
  - Time Since Disturbance 2000-2017
  - Canopy height 1986, 2001, 2016 (expected)

M. Hansen et al. multiple

# 2. UPDATED HUMAN FOOTPRINT



2009  
Human  
Footprint

50  
0

Step 1 Acquire or develop data on individual human pressures

1993 pressure data

2009 pressure data

Built environments

Population density

Electric infrastructure

Crop lands

Pasture lands

Railways

Major roadways

Navigable waterways

Built environments

Population density

Electric infrastructure

Crop lands

Pasture lands

Railways

Major roadways

Navigable waterways

Step 2 Assign relative pressure scores to individual pressures

1993 pressures

2009 pressures

Step 3 Overlay individual pressures to create Human Footprint maps

1993 Human Footprint

2009 Human Footprint

## Data Produced

- HFP 2000, 2013
- National HFP maps

Venter et al. 2016

# 3. FOREST STRUCTURAL CONDITION INDEX (SCI)

Loss Year	Forest height (m)										
	Canopy cover (%)	0-5	>5-15			>15-20			>20		
		<25	Canopy cover (%)			Canopy cover (%)			Canopy cover (%)		
			25-75	>75-95	>95	25-75	>75-95	>95	25-75	>75-95	>95
2013-2017	1	1	1	1	1	1	1	1	1	1	1
2001-2012	1	1	2	3	4	5	6	7	8	9	10
value. <=2000	1	1	10	11	12	13	14	15	16	17	18

Low SCI: Areas that are low stature or recently disturbed

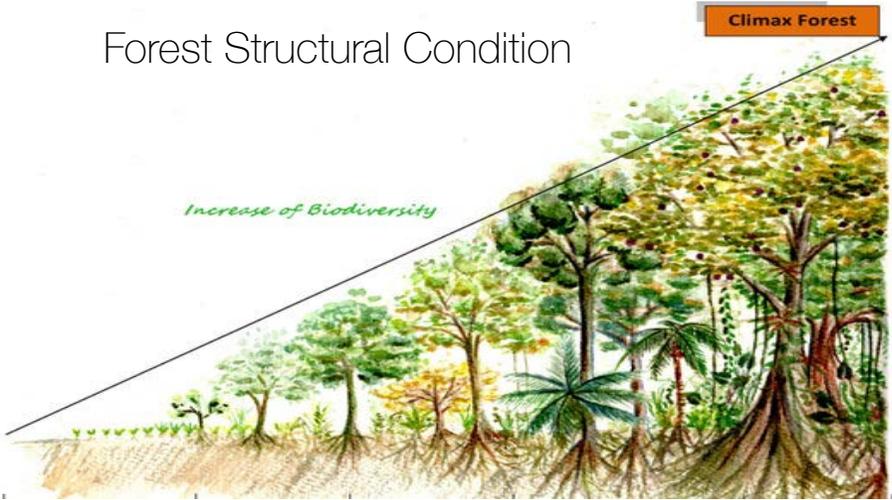


High SCI: Cells with high stature and cover and not recently disturbed

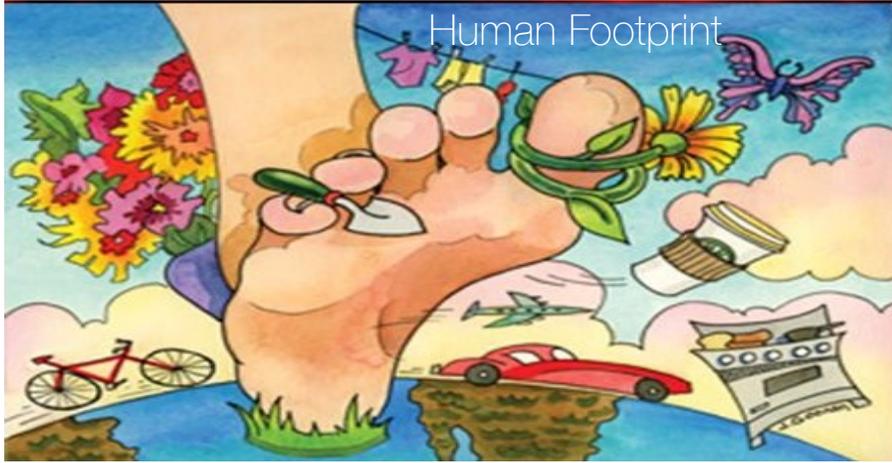


# 4. FOREST INTEGRITY INDEX (FSII)

Forest Structural Condition



+



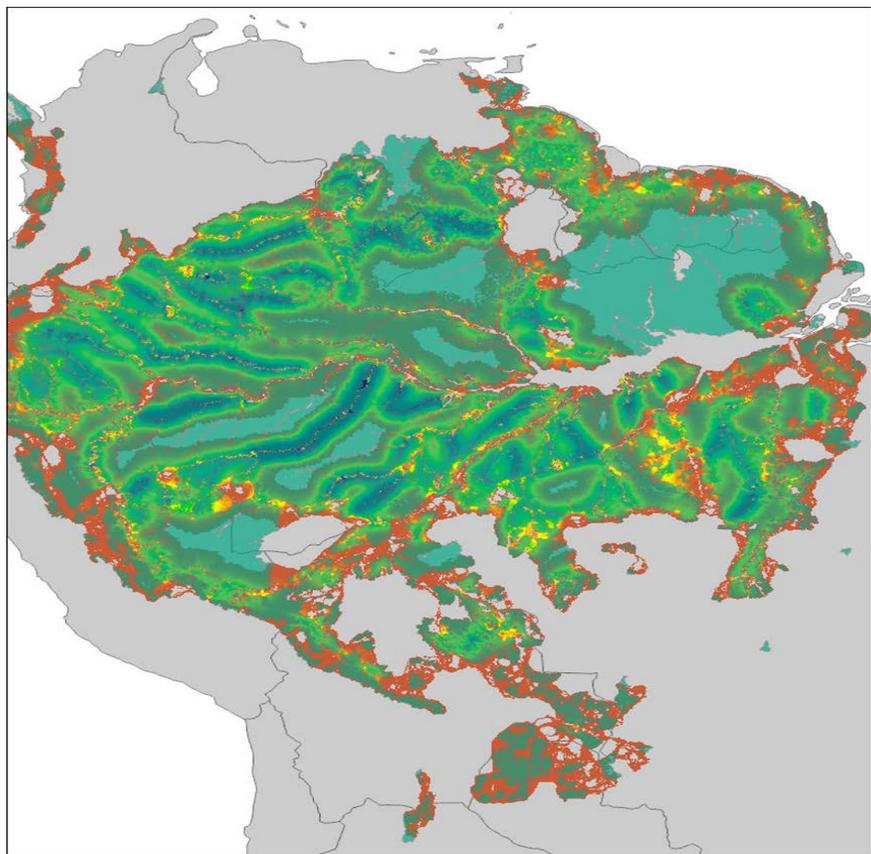
=

Forest structural condition	Canopy cover (%), Loss year Canopy height
Forest integrity	Canopy cover (%), Loss year Canopy height Human footprint

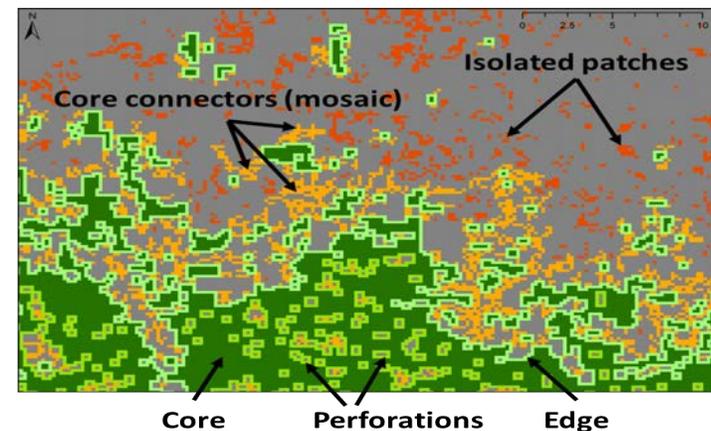


Forest Integrity

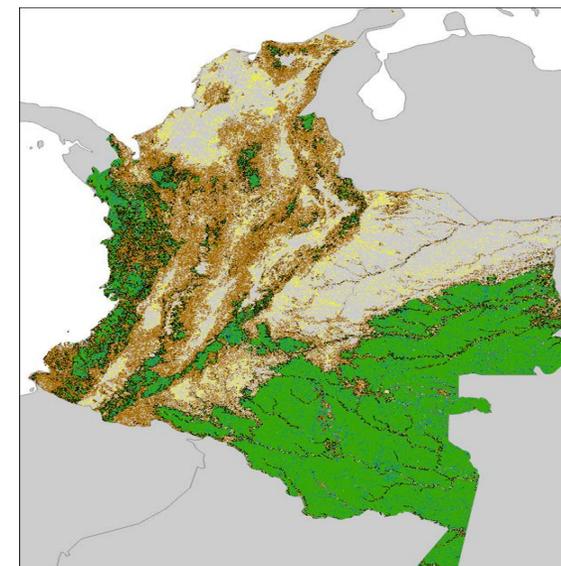
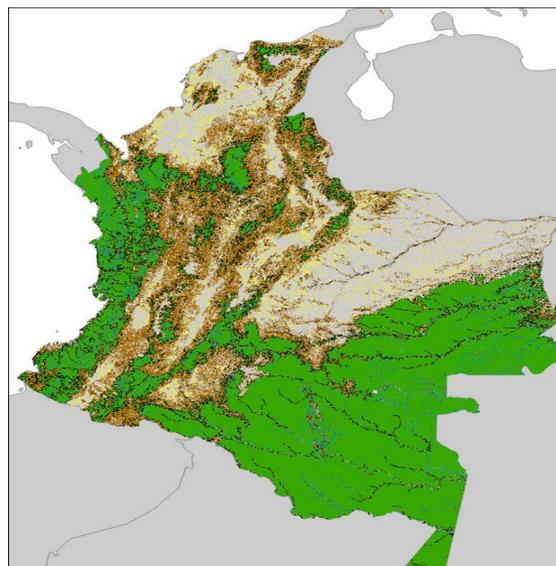
# 5. FOREST CONNECTIVITY & FRAGMENTATION



Morphological Spatial Pattern Analysis



Vogt, P. and Riitters, K., 2017. GuidosToolbox: universal digital image object analysis. *European Journal of Remote Sensing*, 50(1), pp.352-361.



# 6. IMPACTS OF FOREST INTEGRITY ON KEY SPECIES

Goal: To evaluate biodiversity responses (richness, population trends, endangerment trends) to HFP, connectivity and forest integrity.

Biodiversity data:

- Predicts – diversity metrics at local sites (all taxa)
- IUCN range maps – coarse grain range maps (vertebrates)
- Living Planet Index: 14,152 populations of 3,706 species



e.g. Venter et al. 2009

An aerial photograph of a tropical coastline, showing a mix of green land, blue water, and white sand beaches. A dark horizontal band is overlaid across the center of the image, containing the text.

## **2. GETTING STARTED | UN BIODIVERSITY LAB**