National Aeronautics and Space Administration

Using UN Biodiversity Lab to Monitor the Pulse of the Planet

Amber McCullum, Juan Torres-Pérez, Lauren Weatherdon, Anne Virnig, Susana Rodríguez-Buriticá, Mihaela Dragon-Lebovics, Enrique Paniagua, Cornelia Mliler

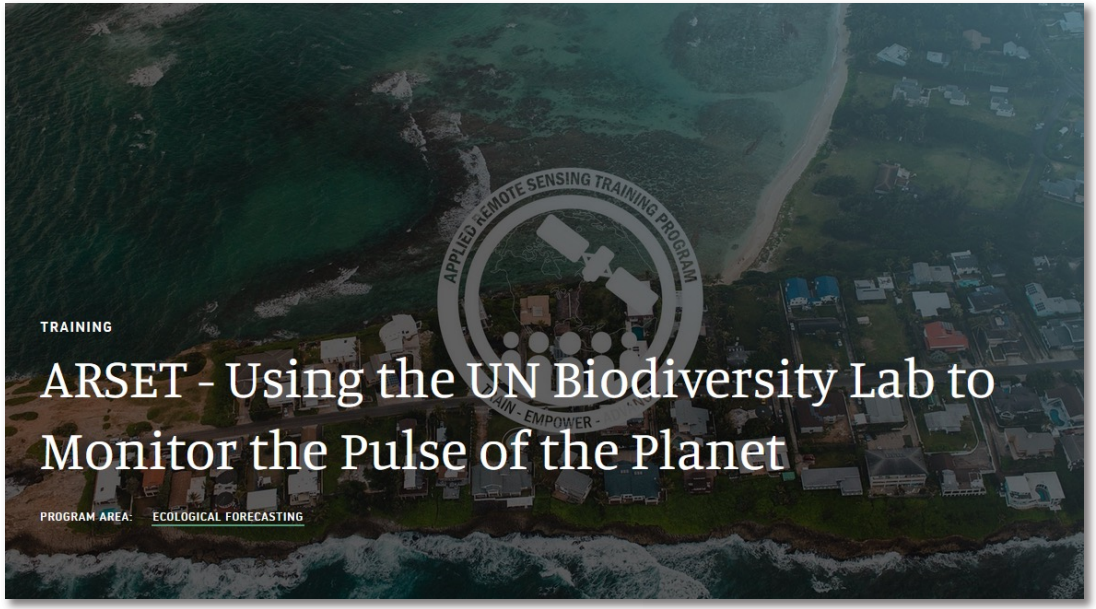
April 14, 2022

Course Structure

- **Three intermediate sessions**
  - Intermediate sessions will be held on **April 14, 21,** and **28**
  - For the intermediate sessions, there will be 3 sessions per day presenting the same material in:
    - English (9:00-10:30 EDT)
    - French (11:00-12:30 EDT)
    - Spanish (15:00-16:30 EDT)
- **Two advanced labs**
  - Advanced labs will be held on **April 27** and **May 4**
  - Please register for these separately via the course website
  - Offered in English with simultaneous interpretation to French and Spanish
  - The lab sessions will be limited to 150 participants

Course Materials and Q&A

- Webinar recordings, PowerPoint presentations, and the homework assignment can be found after each session at:
  - https://appliedsciences.nasa.gov/join-mission/training/english/arset-using-un-biodiversity-lab-monitor-pulse-planet
- Q&A: Following each lecture and/or by email:
  - amberjean.mccullum@nasa.gov
  - juan.l.torresperez@nasa.gov
  - anne.virnig@undp.org



Homework and Certificates

Intermediate Sessions

- **Homework:**
  - One homework assignment for the intermediate sessions submitted via Google Forms
    - Available on training website
- **Certificate of Completion**
  - Attend all three live intermediate webinars
  - Complete the homework assignment by **Thursday, May 12**
  - You will receive certificates approximately two months after completion of the course from: marines.martins@ssaihq.com

Advanced Sessions

- **Final Assignment for each Lab**
  - Submitted to UNDP after session
- **Certificate of Completion**
  - Attend the live webinar and submit the assignment
  - Details provided in each advanced lab session

Course Outline (Intermediate Sessions)

Part 1: Using UN Biodiversity Lab to Support Country-Led Action on Biodiversity and Sustainable Development

- NASA satellites and sensors
- Global policy context
- UNBL basic functionalities
- Country case studies

Part 2: Exploring the UN Biodiversity Lab Public Platform

- UNBL recap
- Data products and tools
- UNBL public platform functionalities

Part 3: Exploring UN Biodiversity Lab Secure Workspaces

- UNBL workspace functionalities
- Essential life support areas and future functionalities

Course Outline (Advanced Labs)

Advanced Lab 1: Mastering the UNBL Public Platform

- Deep dive on UNBL public platform functionalities
- Independent exercise on the use of public platform

Advanced Lab 2: Mastering UNBL Secure Workspaces

- Deep dive on UNBL secure workspace functionalities
  - Add users and assign privileges
  - Upload data layers
  - Calculate dynamics
- Independent exercise on the use of secure workspaces

Part 1 Agenda

- Introduction to remote sensing for biodiversity
- NASA satellites and sensors
- Global policy context
- What is the UN Biodiversity Lab?
- Mapping Essential Life Support Areas
- In-country case studies
- Q&A Session

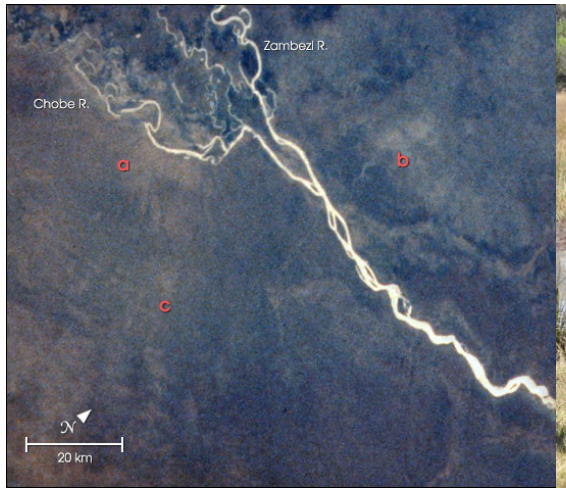
Poll: What country are you from?

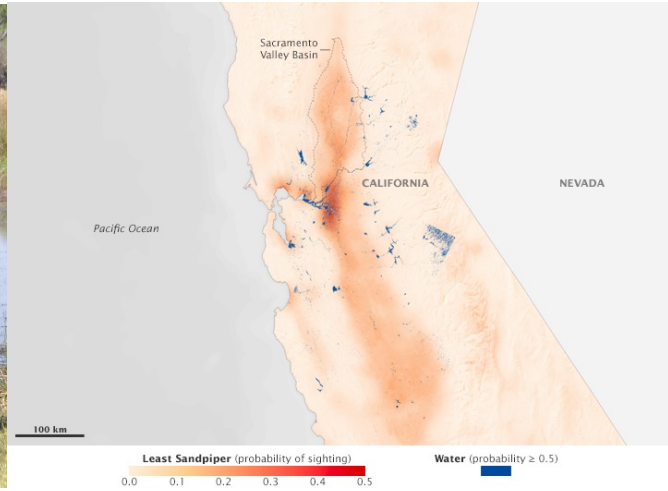
https://www.menti.com/3zfiiuzkxr

Remote Sensing for Biodiversity and Ecosystems

Remote Sensing and Biodiversity

- What is the **VALUE** of NASA Earth Observations for monitoring biodiversity?
  - Consistent measurements in space and time
  - Comparisons with ground observations
  - Used in remote locations where in-situ data are scarce
  - Provide a time series of data to identify changes in ecosystems



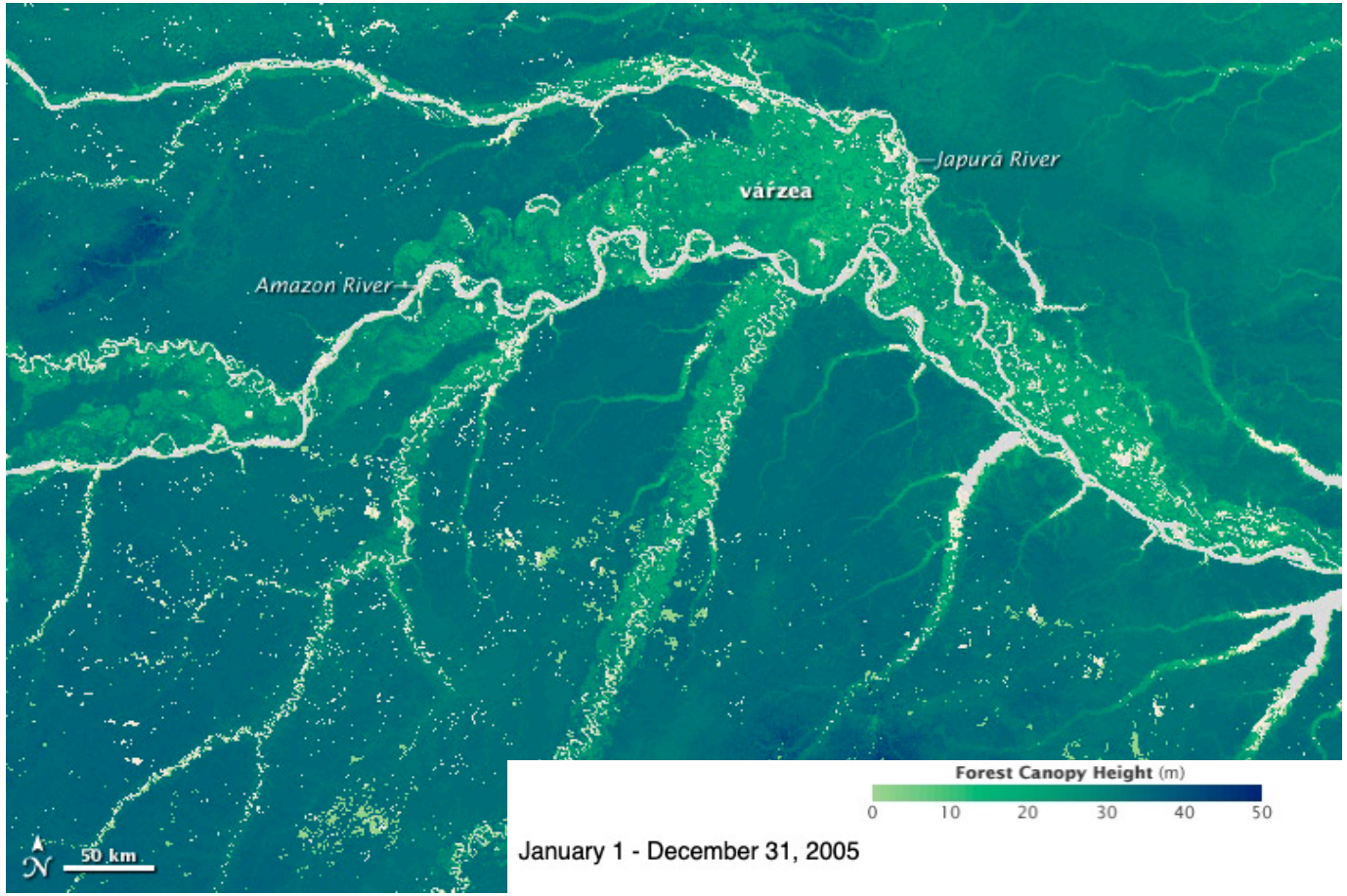


Elephant tracks in Botswana rom Landsat (left); Map of probability of sandpiper sightings in California (right).

Remote Sensing and Biodiversity

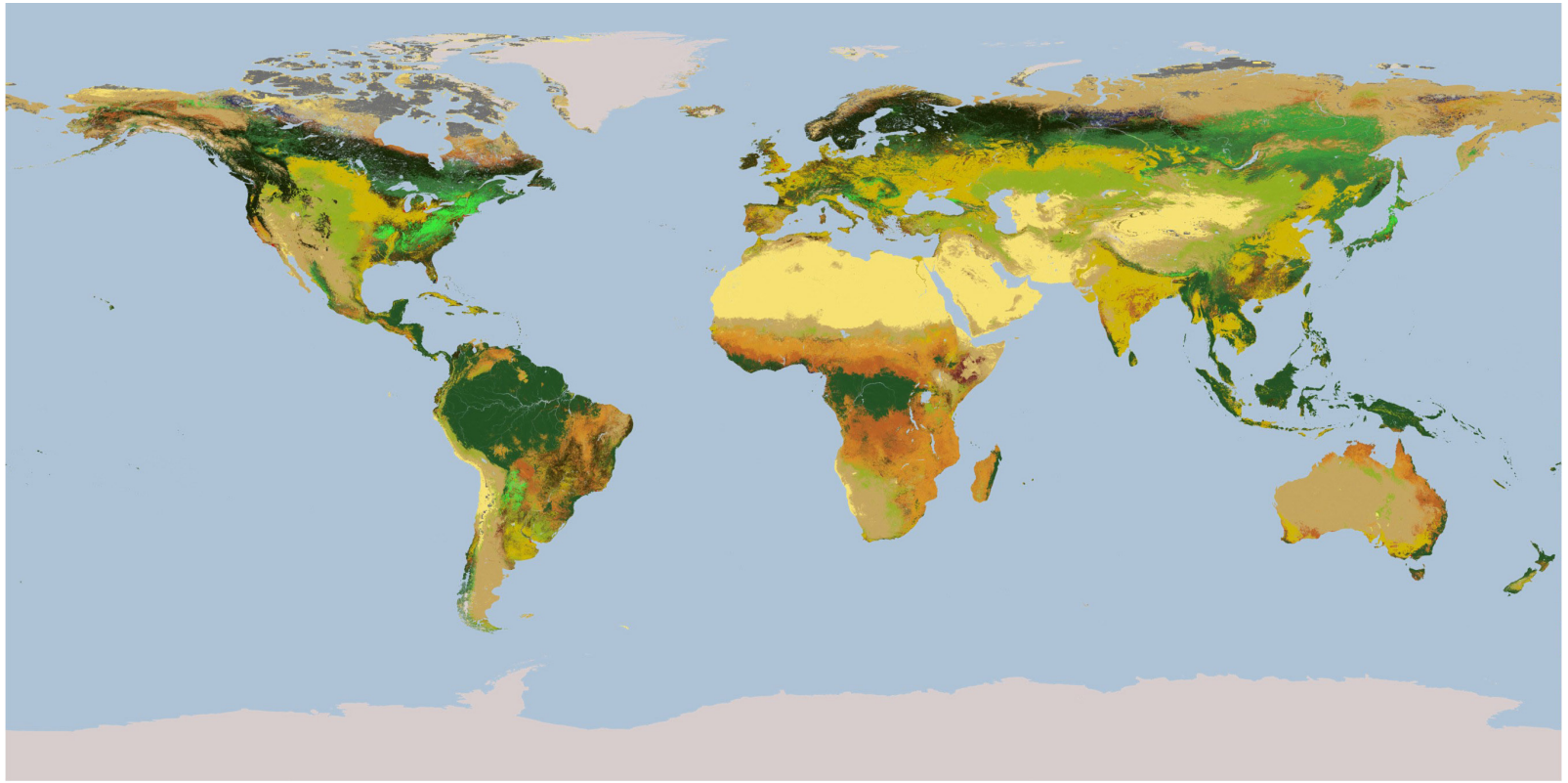
- What can we **EVALUATE** with NASA Earth Observations?
  - Ecosystem extent, structure, and change

- Physical environment (climate, topography)
- Land cover
- Fragmentation
- Degradation
- Vegetation productivity or health
- Forest canopy height



Forest Canopy Height (multiple sensors). Image Credit: NASA

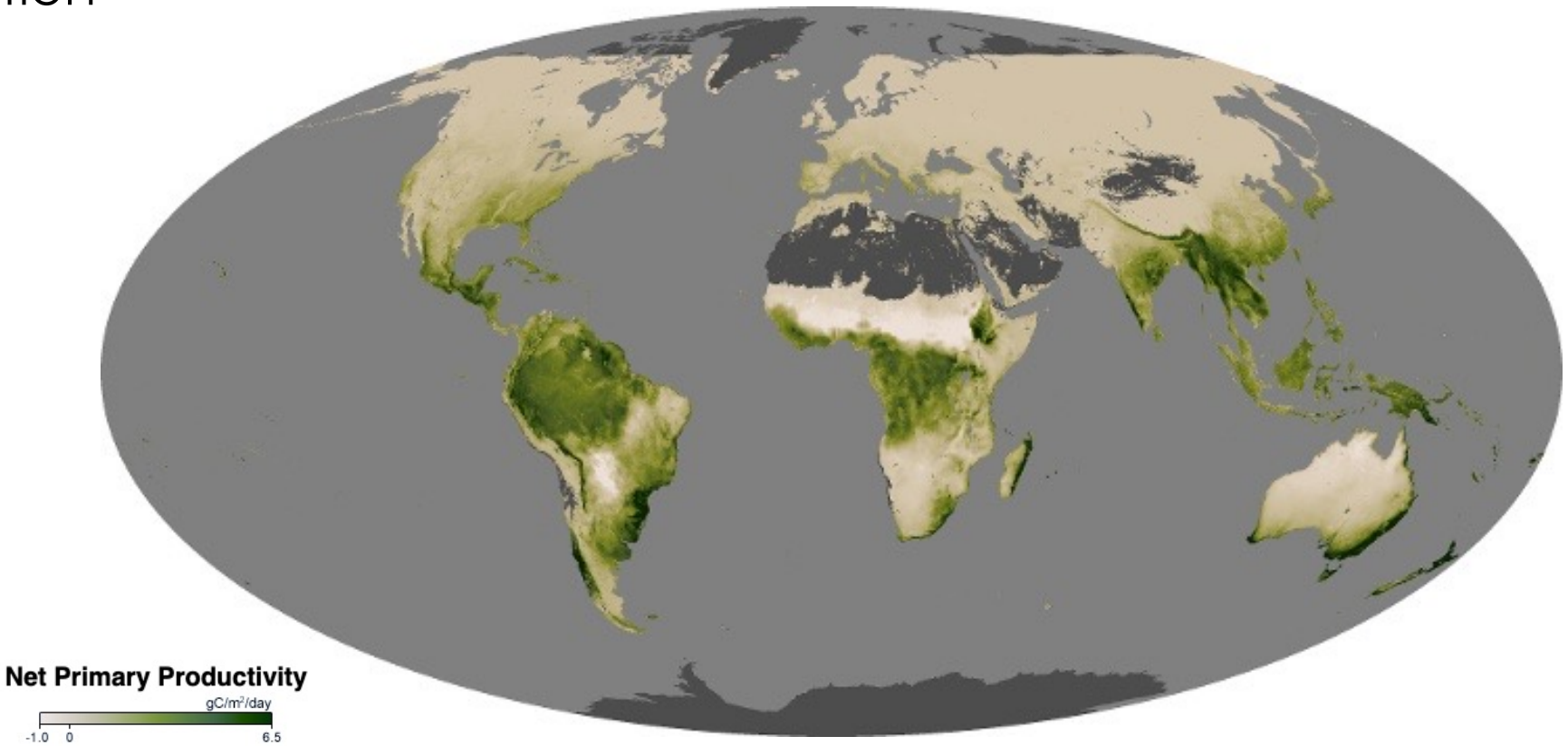
Ecosystem Structure and Composition



Landcover map from MODIS. Image Credit: NASA

Ecosystem Function

- Monitoring of the energy dynamics of an ecosystem
  - Net Primary Productivity (NPP)
  - Evapotranspiration
  - Albedo
  - Temperature



NPP via MODIS. Image Credit: NASA

Ecosystem Change

- Changes in land cover over time
  - Deforestation
  - Reforestation
  - Wildfires
  - Harvests/fallowed land
  - Urban growth

Landsat. Image Credit: NASA

Brazil forest changes:
- 2015: Deforestation
- 2017: Fire
- 2018: New Pasture

What are the limitations of Earth Observations?

- Difficult to obtain high spectral, spatial, and temporal resolution at the same time
  - Spatial vs. temporal resolution
    - More frequent data often means coarser spatial resolution
- Large amounts of data
  - Various formats, large file sizes
  - Difficult to process and analyze
    - Requires use of tools and knowledge of the data
- Data often available from multiple sources
- High spectral or spatial resolution data can be costly and largely unavailable globally

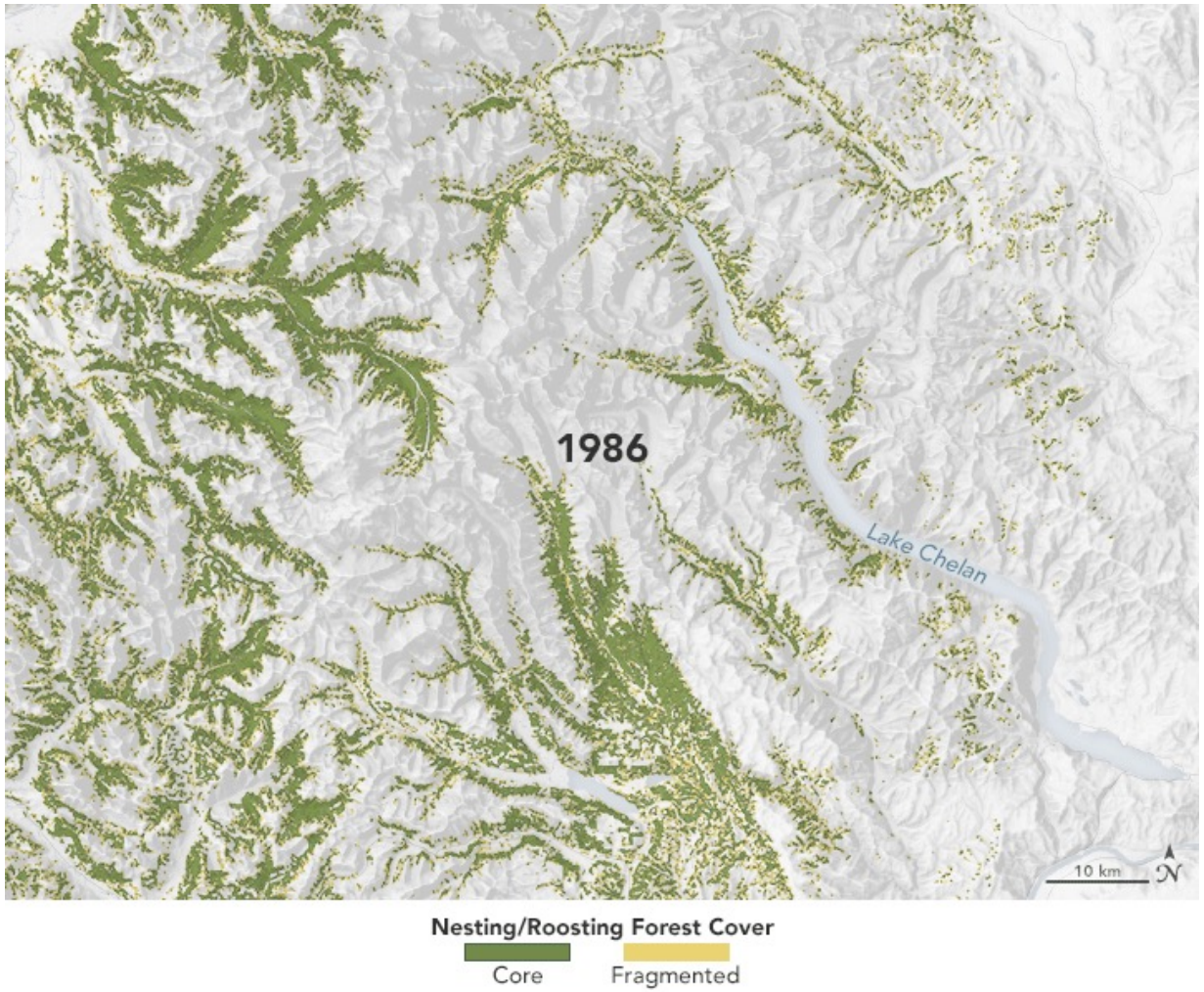
Satellites and Sensors for Creating Biodiversity and Ecosystem Data Layers

Landsat

- First Landsat launched in 1972
- Landsat 9 launched September 2021
- NASA created and launched
  - USGS maintains data
- Passive Sensor - Obtains values of reflectance from Earth's surface
- 30-meter pixels, 15-meter panchromatic band
- Image of the entire Earth every 16 days

Landsat

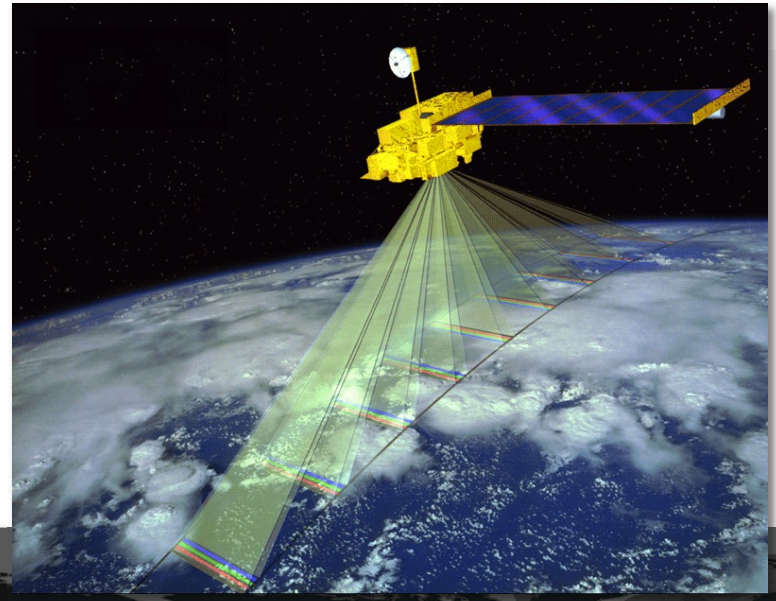
- **Landsat Pros/Cons**
  - Long Record (pro)
    - Time series analysis
  - Spatial Resolution (pro)
    - Higher than other sensors with more frequent measurements (e.g., MODIS)
  - Temporal Resolution (con)
    - May miss short-term changes/patterns



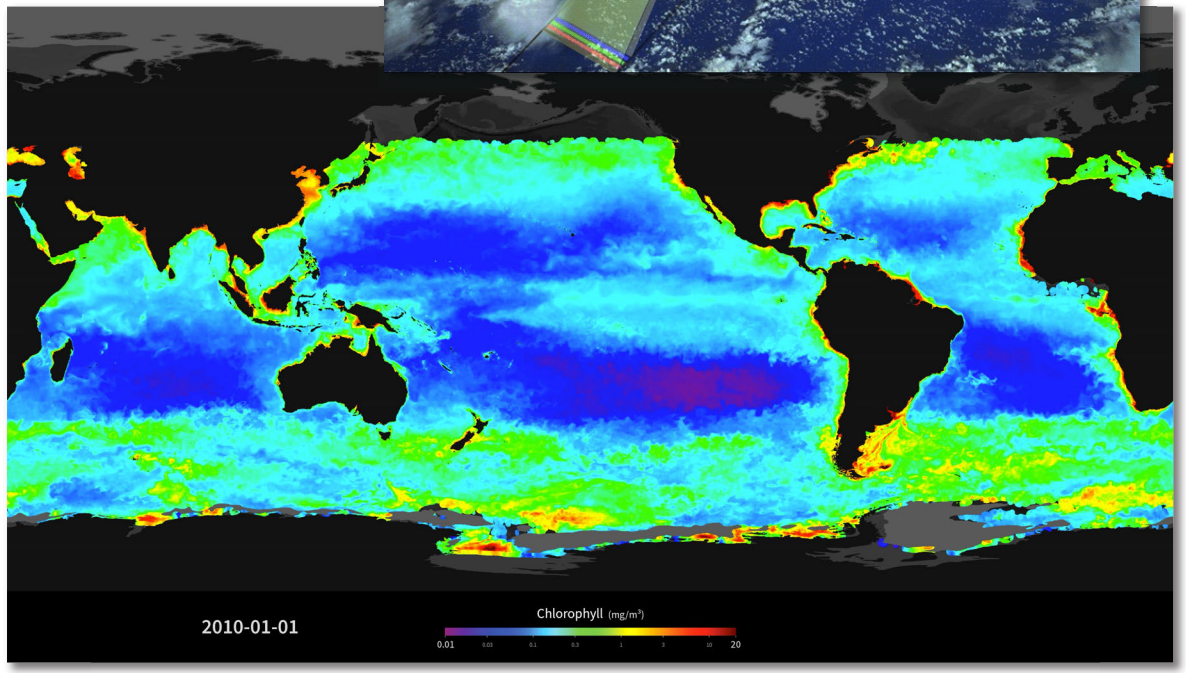
Changes in spotted owl habitat in eastern Washington using Landsat. Image Credit: NASA.

MODIS

- **Moderate Resolution Imaging Spectroradiometer (MODIS)**
  - Onboard the Terra and Aqua satellites
  - Spatial Resolution:
    - 250m, 500m, 1km
  - Temporal Resolution:
    - Daily, 8-day, 16-day, monthly, quarterly, yearly
    - 2000–Present
  - Spectral Coverage:
    - 36 bands (major bands include red, blue, near infrared, mid-infrared)
      - Bands 1-2: 250m
      - Bands 3-7: 500m
      - Bands 8-36: 1000m

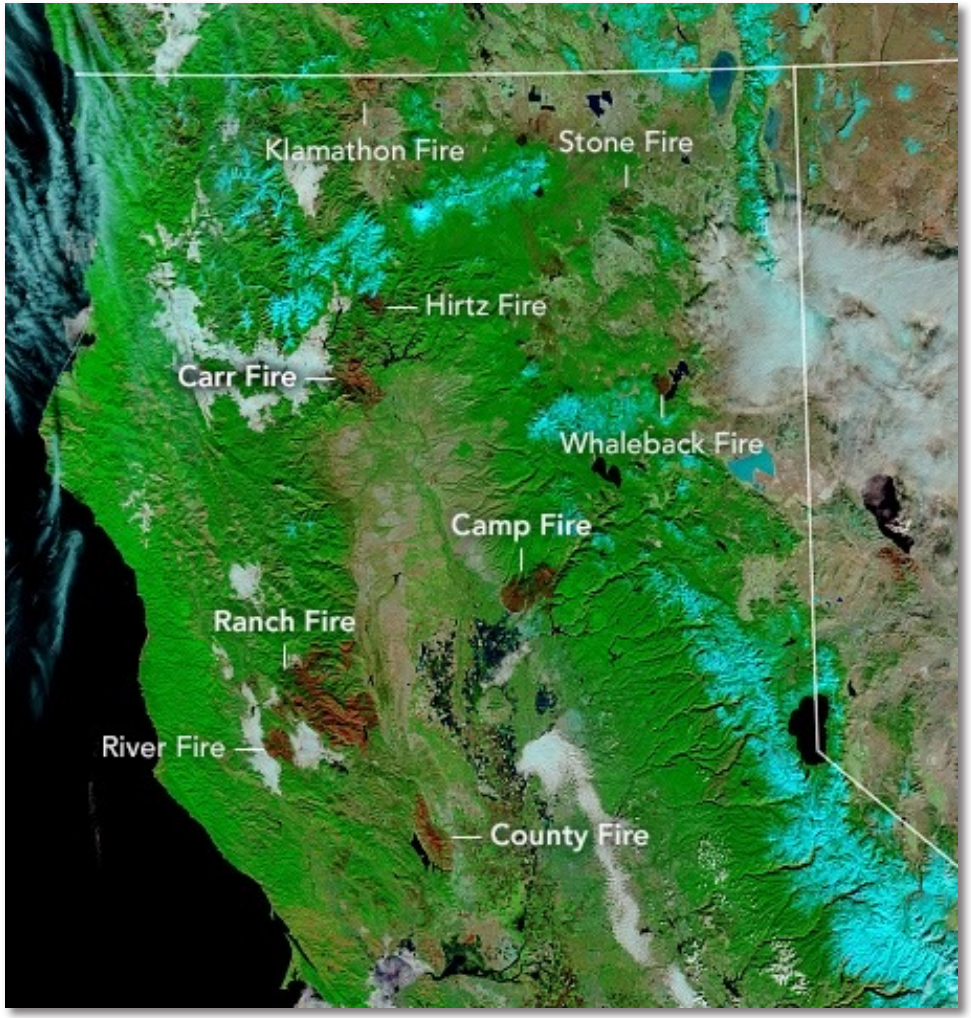


Artistic rendering of Terra (right); MODIS Ocean Bioproductivity (below). Image Credit: NASA



MODIS

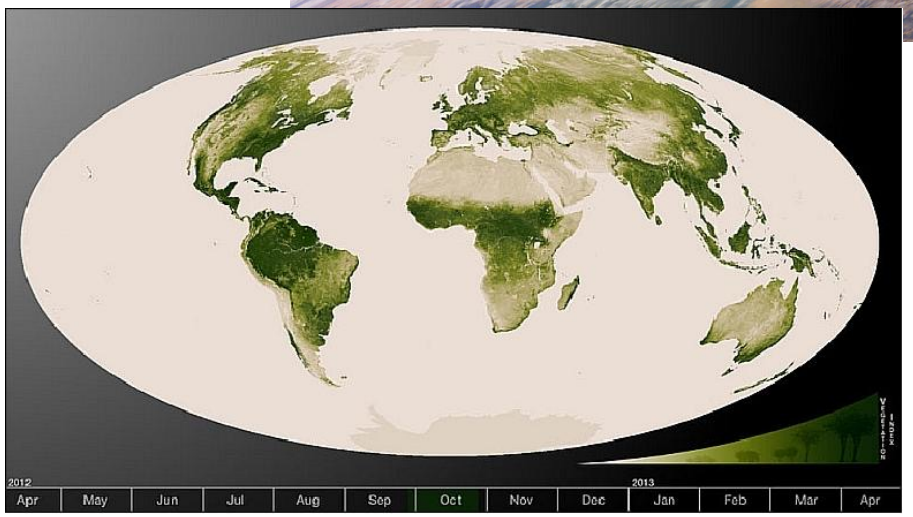
- **MODIS Pros/Cons**
  - Temporal Resolution (pro)
    - Daily measurements
  - Record Length (pro)
    - Shorter than Landsat, but still adequate
  - VIIRS Transition (pro)
    - Similar measurements to VIIRS, which will enable the continuation of the daily measurements
  - Spatial Resolution (con)
    - Coarse



MODIS image of record-setting fire activity in 2018 fits with a longer trend of larger and more frequent California fires since 2000. Image Credit: NASA

Visible Infrared Imaging Radiometer Suite (VIIRS)

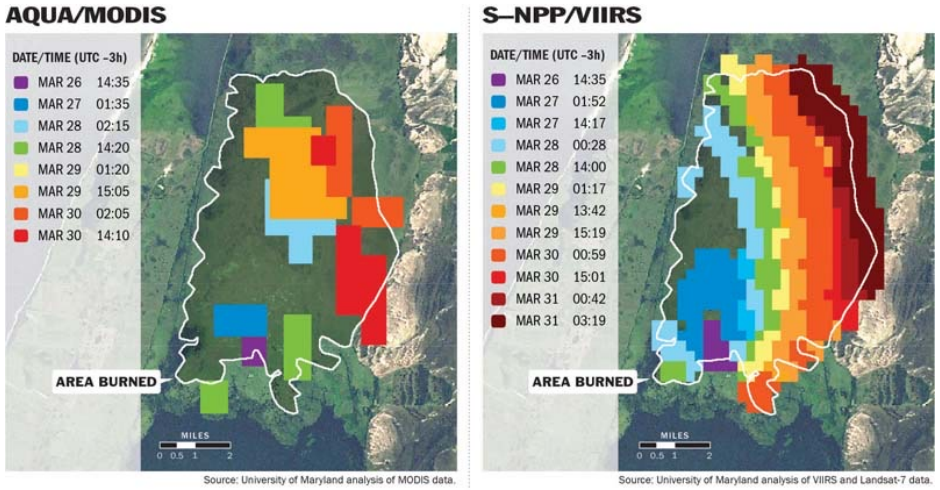
- A sensor onboard the Suomi National Polar-Orbiting Partnership (NPP)
- Data available globally from January 2012 to present
- Revisit Time: 1 day
- Spatial Resolution: 375m and 750m
- Similar to MODIS (with some differences)
- Visible, near-infrared channels (reflectance)
- Shortwave and longwave infrared (brightness temperature)
- Products:
  - Surface reflectance
  - Vegetation indices
  - Thermal anomalies



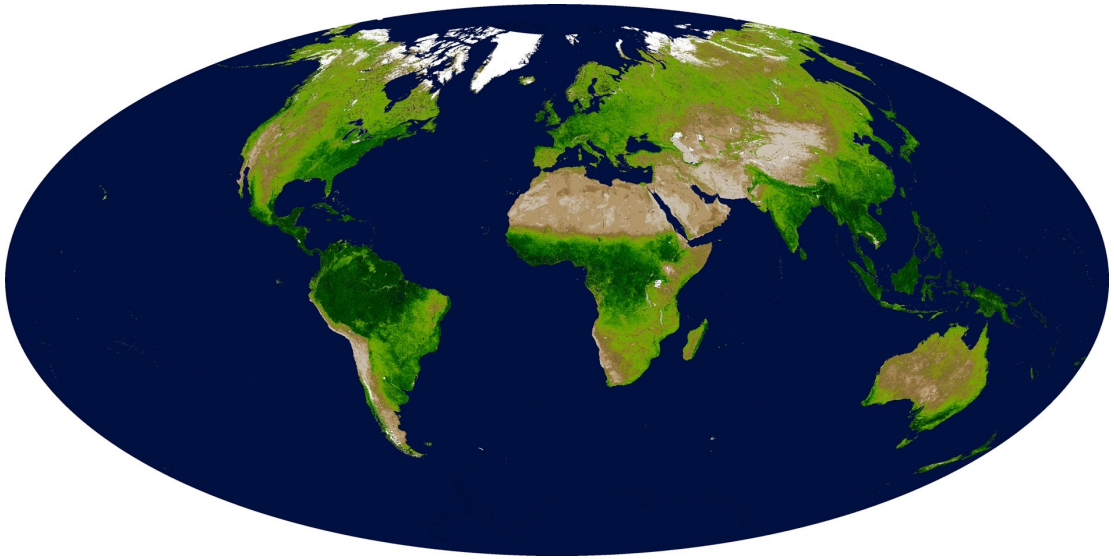
Suomi NPP satellite (above); Global vegetation map (left). Image Credit: NASA/NOAA)

MODIS to VIIRS Transition

- Improved spatial resolution -
  - From 500 m and 1,000 m to 375 m and 750 m
- Spectral coverage slightly smaller -
  - From 0.412 – 14 microns to .412 to 12 microns
- Fewer bands
  - From 36 to 22
- Higher orbit - absolute full global coverage in one day
- Comparable radiometric and spectral quality -
  - 12-bit data
  - Similar on-board calibrators

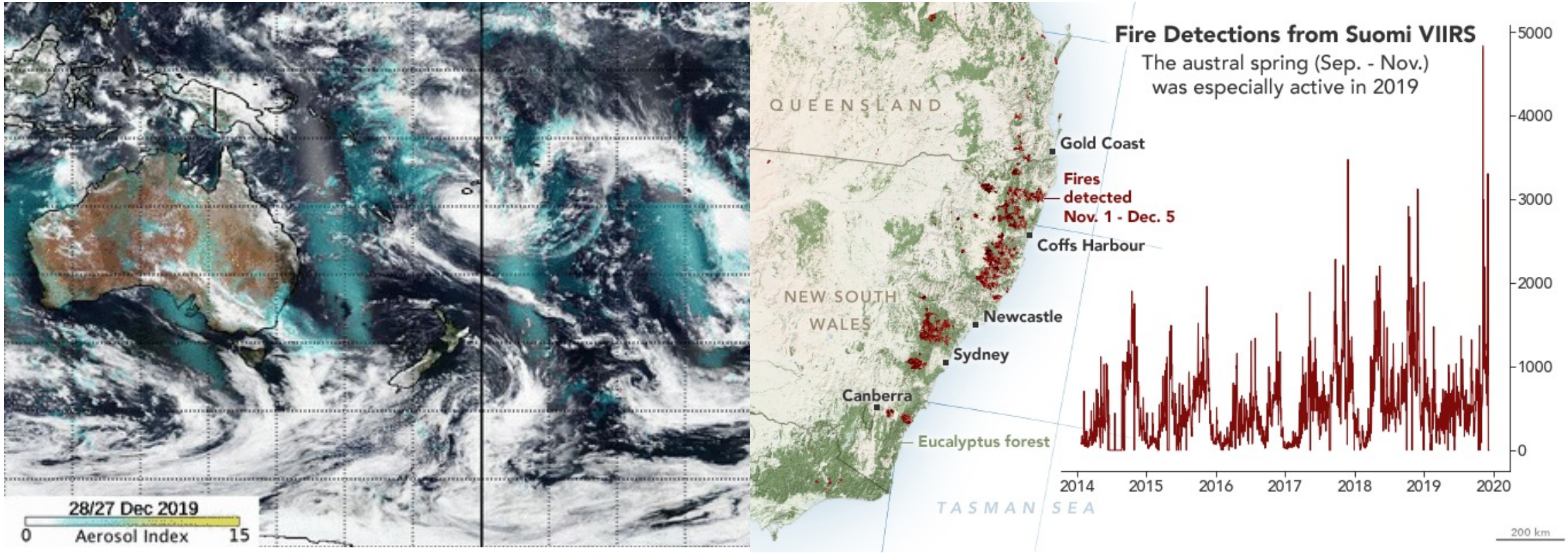


MODIS vs. VIIRS burned area from Brazil in 2013 (above), Image Credit: University of Maryland;



EVI from MODIS (left), Image Credit: NASA

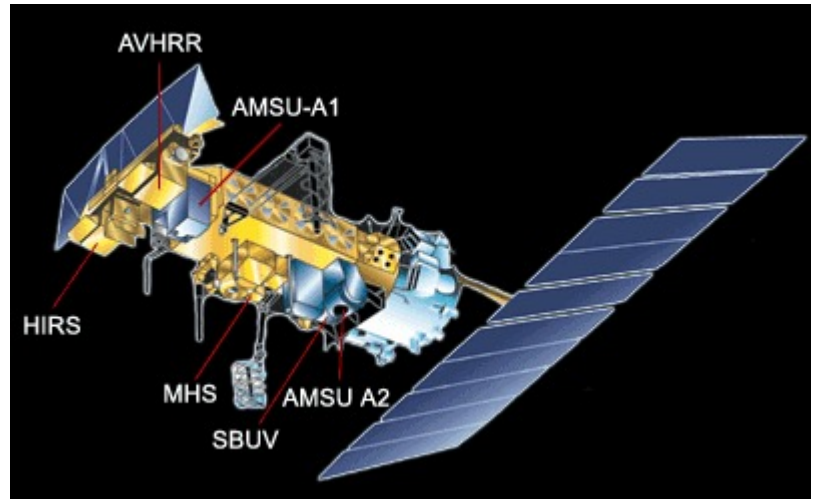
VIIRS



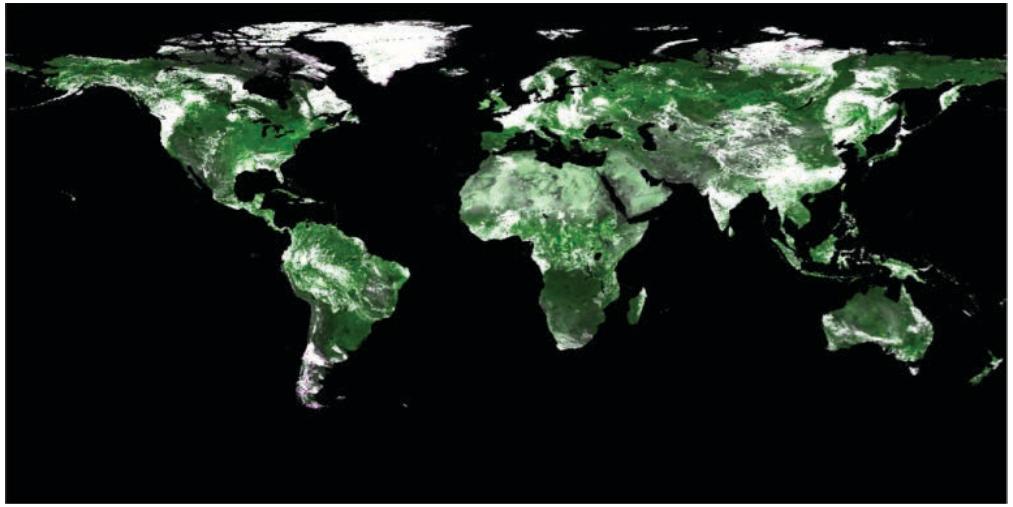
VIIRS and OMPS-NM instruments track the movement of aerosols from recent Australian fires (left); VIIRS detects active fire locations along eastern Australia (right). Image Credit: NASA

Advanced Very High-Resolution Radiometer (AVHRR)

- Produced and operated by the National Oceanic and Atmospheric Administration (NOAA)
- Onboard many NOAA Polar Orbiting Environmental Satellites (POES)
  - Data available from 1978 to present
- Spatial Resolution: 1 km
- Temporal Resolution: Global coverage available twice daily (morning and afternoon)
- Spectral Resolution: 4-6 bands, multispectral, visible, near-infrared, and thermal bands
- Land cover and vegetation index products available



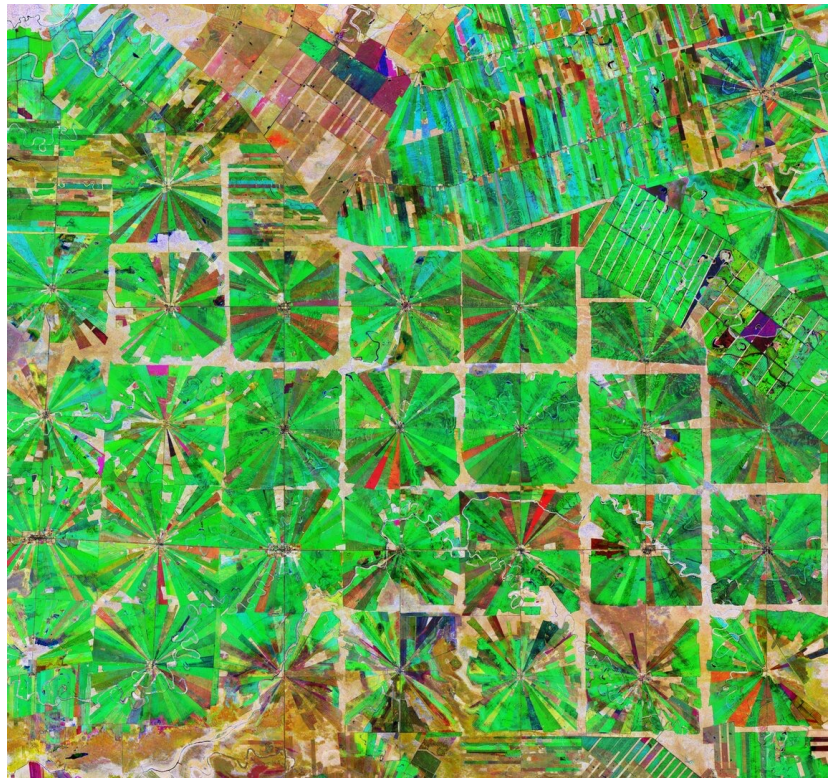
NOAA's N instrument, with the AVHRR sensor included. Image Credit: NOAA



Surface reflectance from AVHRR (global, 1km). Image Credit: NOAA

ESA Satellites and Sensors for Biodiversity

- **Sentinel-2**
  - 13 spectral bands
  - Spatial Resolution:
    - Red, Green, Blue (RGB) at 10 meters
    - Near-infrared and Shortwave infrared at 20 and 60 meters
  - Revisit Time: ~5 days
  - Often combined with Landsat for continuity
    - Harmonized Sentinel-2 and Landsat surface reflectance products available
- **SPOT (multiple satellites)**
  - National Centre for Space Studies (*CNES*), French government space agency
  - 4 multispectral bands
  - 6-meter spatial resolution
  - Revisit Time: ~2-3 days



Composite Sentinel-2 image of forests converted to farmland in Brazil 2019. Image Credit: ESA

Satellite-derived Elevation Datasets

- **Advanced Land Observing Satellite (ALOS)**
  - Japanese Space Agency (JAXA)
  - Elevation data via Global Digital Surface Model (DSM)
  - 5m

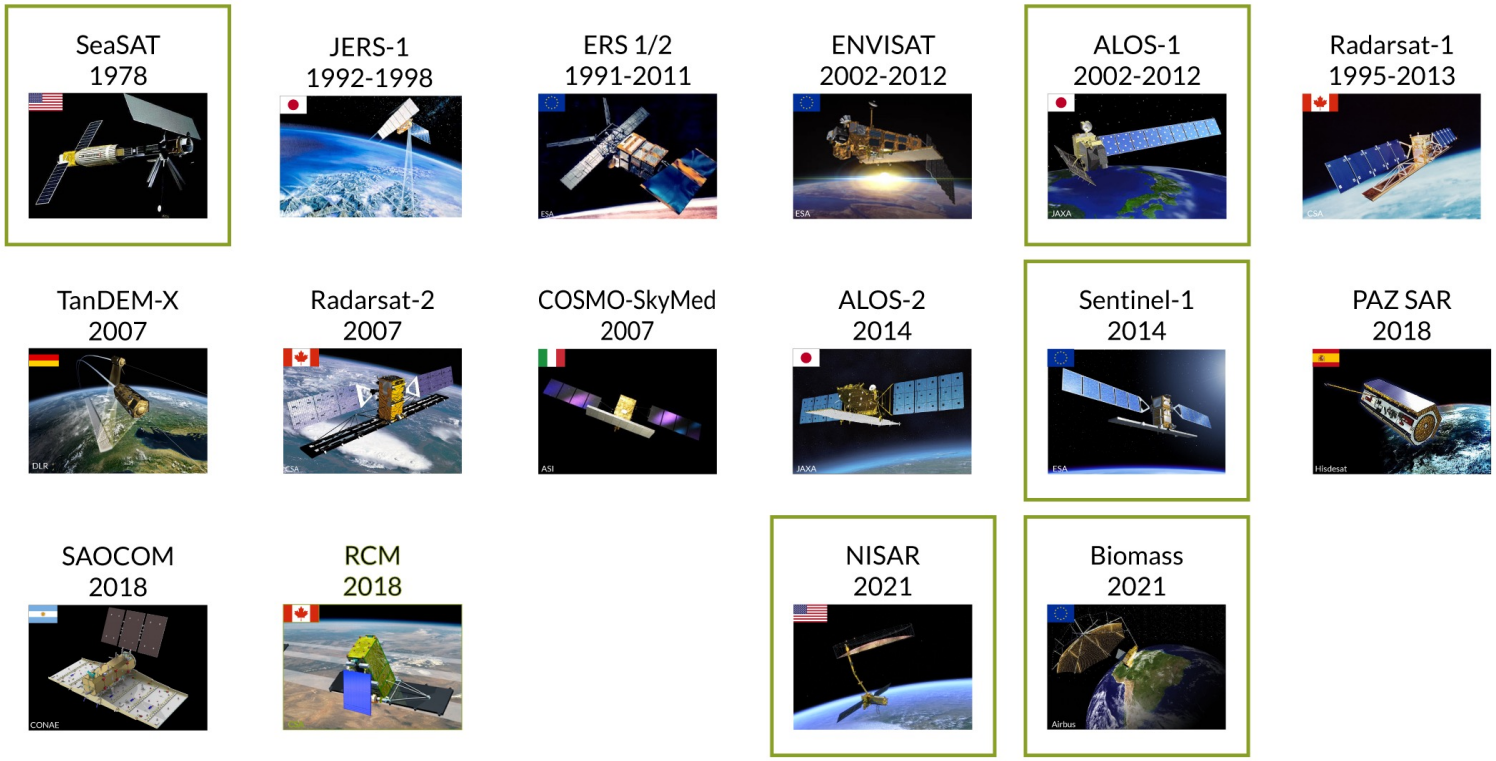
- **Shuttle Radar Topography Mission (SRTM):**
  - Flown onboard the Endeavor in 2000
  - Elevation data (90m and 30m)
  - Often combined with ASTER or Landsat data

Landsat data to texture-map the surface created using the SRTM elevation data. Image Credit: NASA

Synthetic Aperture Radar (SAR) Data

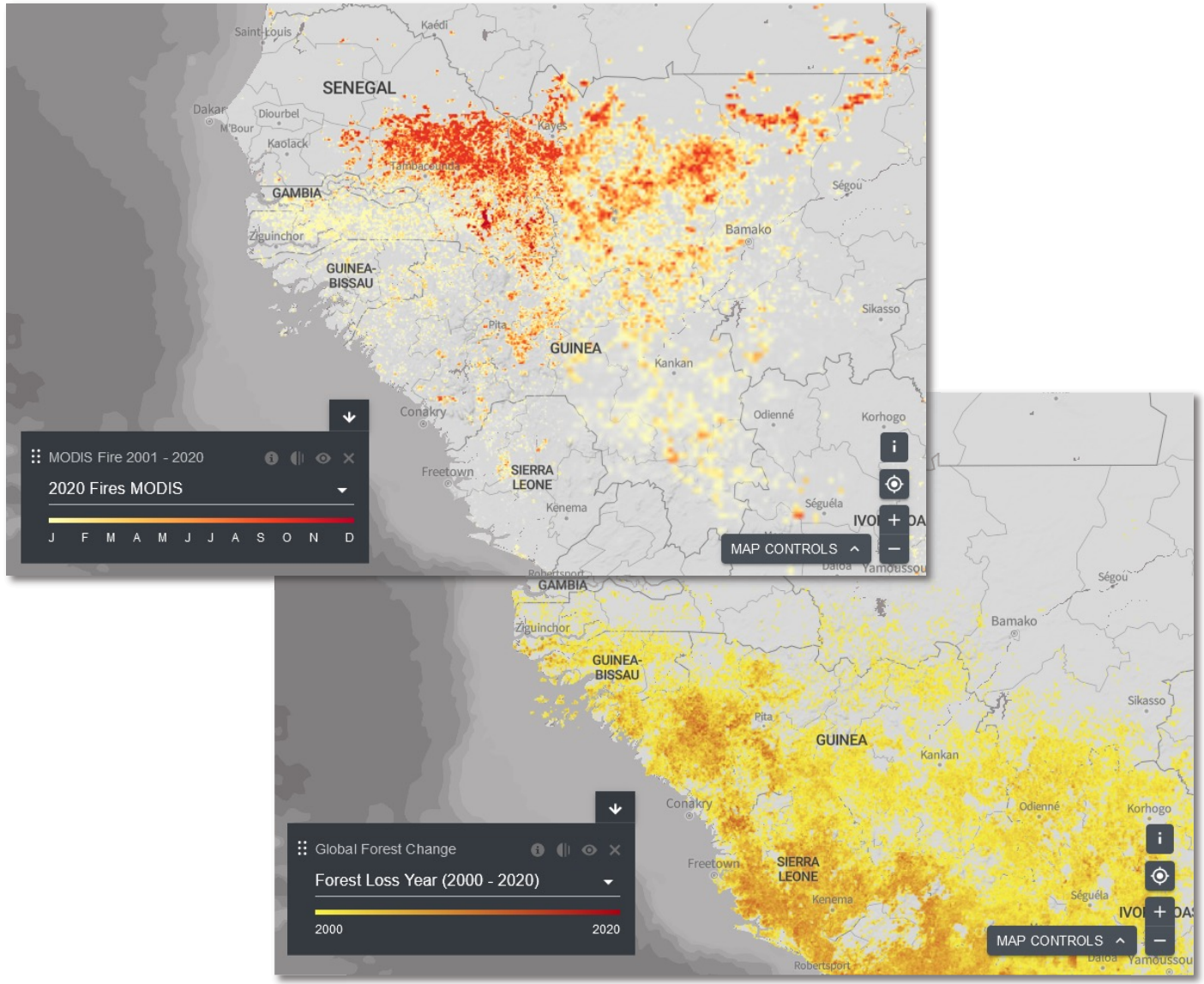
Mapping and Monitoring

- Forests
- Wetlands
- Biomass
- Disturbances
- Wildfire
- Selective Logging
- Deforestation
- Reforestation



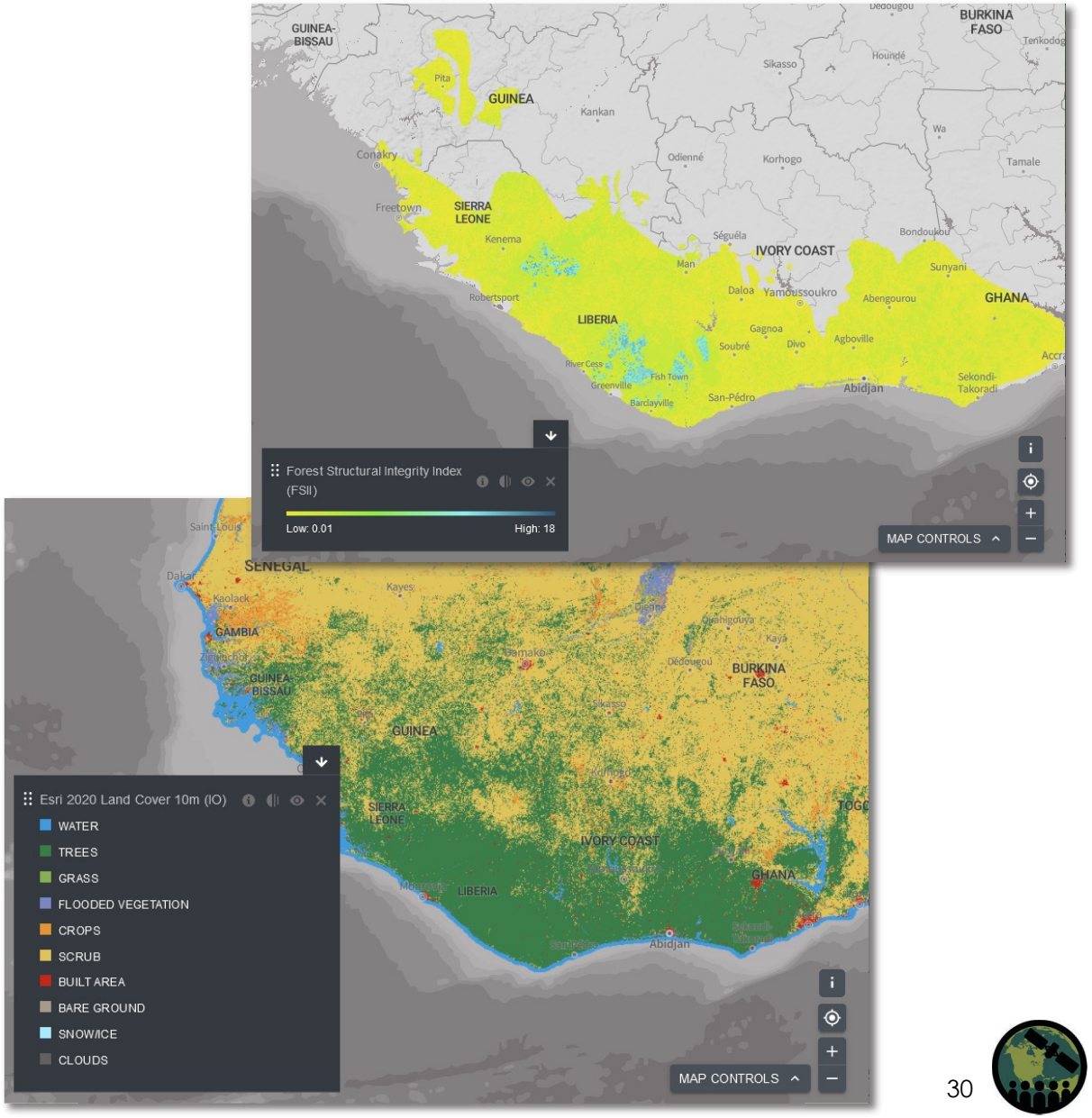
Satellite-Derived Datasets on UNBL

- MODIS Fires 2000 - 2020
  - Yearly burned area maps
- Normalized Difference Vegetation Index
  - MODIS
- Gross Primary Production
  - MODIS
- Yearly Nighttime Lights 2014 - 2020
  - VIIRS
- Global Forest Change
  - Landsat 7 data used to identify percent tree cover

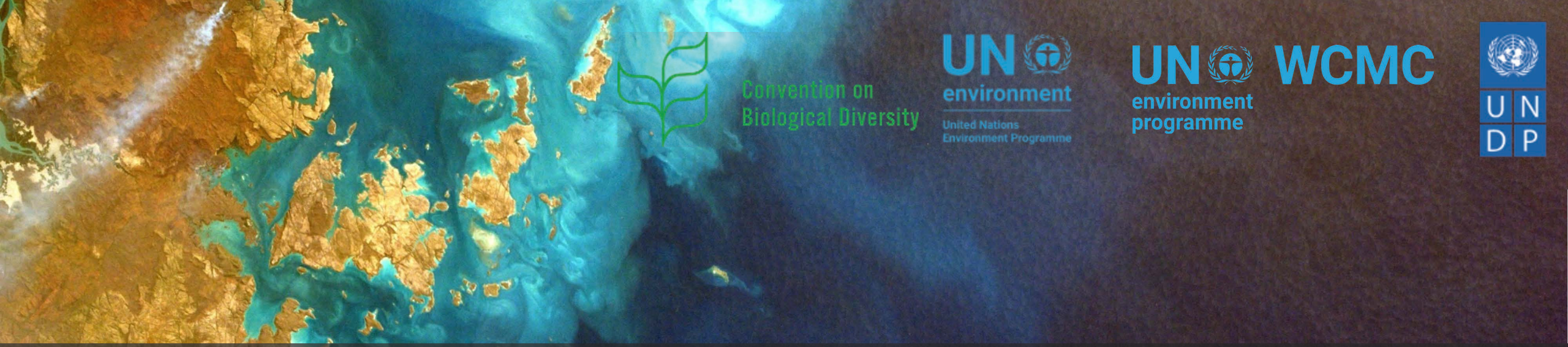


Satellite-Derived Datasets on UNBL

- Forest Structural Integrity Index
  - Lidar canopy heights derived from spaceborne Geoscience Laser Altimetry System (GLAS) and airborne LiDAR data
  - Percent tree cover and forest change from Landsat and MODIS
  - Quickbird imagery for crown information
- Aboveground Biomass Carbon Density 2010
  - Normalized Difference Vegetation Index from AVHRR and MODIS
- ESRI 2020 Global Landcover 10m
  - Sentinel-2
- Global Digital Surface Model
  - Elevation data from ALOS



Global Policy Framework for Biodiversity and Sustainable Development



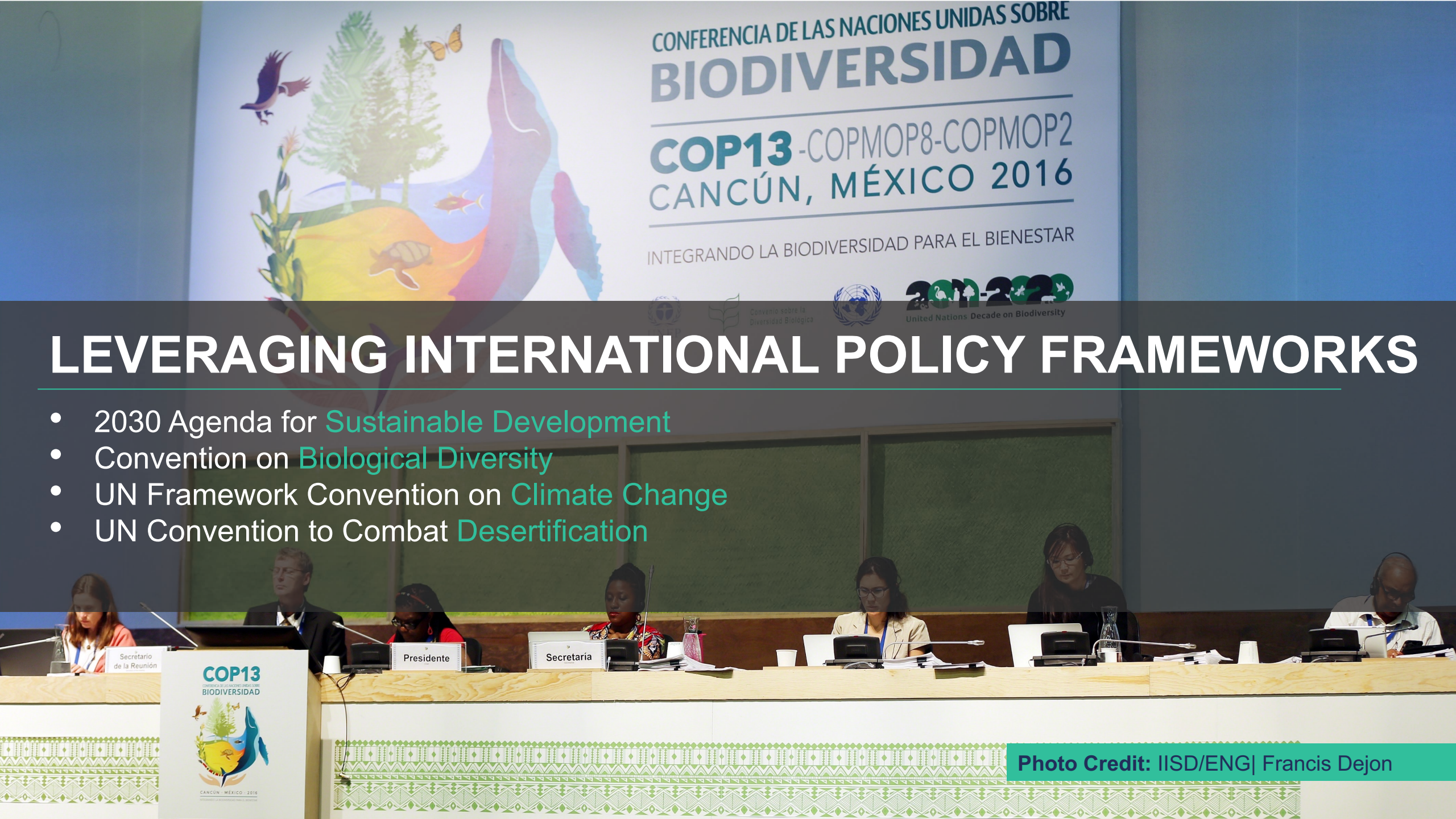
GLOBAL POLICY FRAMEWORKS FOR BIODIVERSITY AND SUSTAINABLE DEVELOPMENT

Lauren Weatherdon, UNEP-WCMC

WE ARE WITNESSING AN UNRAVELING OF THE PLANET

- IPCC report shows that we must act in the next decade to avoid catastrophic impacts of climate change
- IPBES report shows 1 million species at risk of extinction
- Unsustainable land use accounts for ¼ of greenhouse gas emissions

Photo Credit: Equator Prize Winner Komunitas Adat Muara Tae



LEVERAGING INTERNATIONAL POLICY FRAMEWORKS

- 2030 Agenda for Sustainable Development
- Convention on Biological Diversity
- UN Framework Convention on Climate Change
- UN Convention to Combat Desertification

Photo Credit: IISD/ENG| Francis Dejon

ACTIONS FOR NATURE TO ACHIEVE THE SUSTAINABLE DEVELOPMENT GOALS

- Protect and conserve biodiversity, restore ecosystems
- Tackle key drivers of biodiversity loss
- Protect and enhance nature's contributions to people
- Close the finance gap
- Fundamentally reform our relationship with nature
- Engage all of society and harness all available synergies

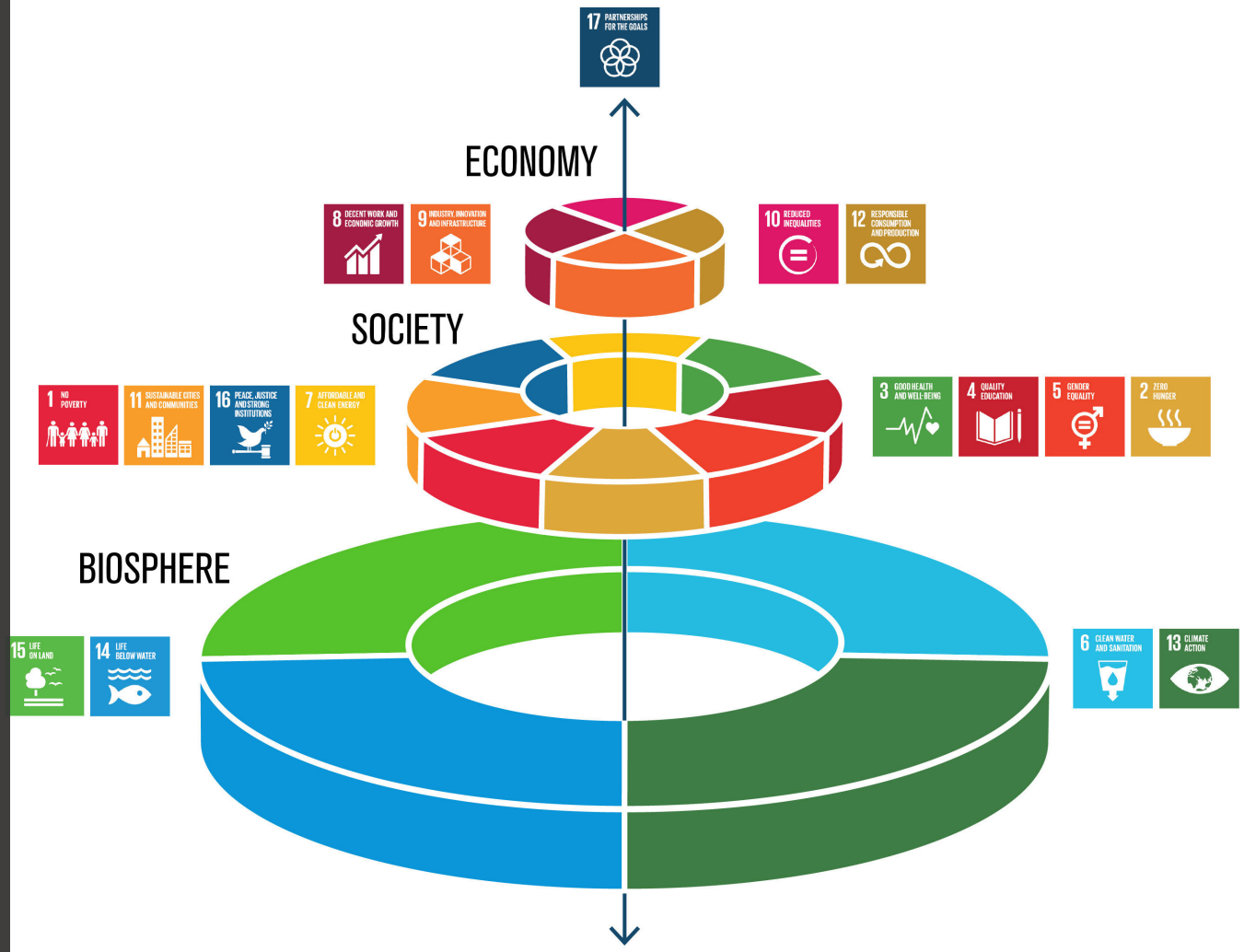


Image Credit: J. Rockström and P. Sukhdev, 2016 | Stockholm Resilience Centre

IDENTIFYING SYNERGIES ACROSS NATIONAL PLANS

- 2030 Agenda for Sustainable Development
  - National Development Plan; national SDG indicators
- Convention on Biological Diversity
  - National Biodiversity Strategies and Action Plans (NBSAPs)
- UN Framework Convention on Climate Change
  - Nationally Determined Contributions (NDCs)
  - Reducing emissions from deforestation and forest degradation (REDD+)
- UN Convention to Combat Desertification
  - Land Degradation Neutrality Targets (LDN)

Photo Credit: Equator Prize Winner Tulele Peisa

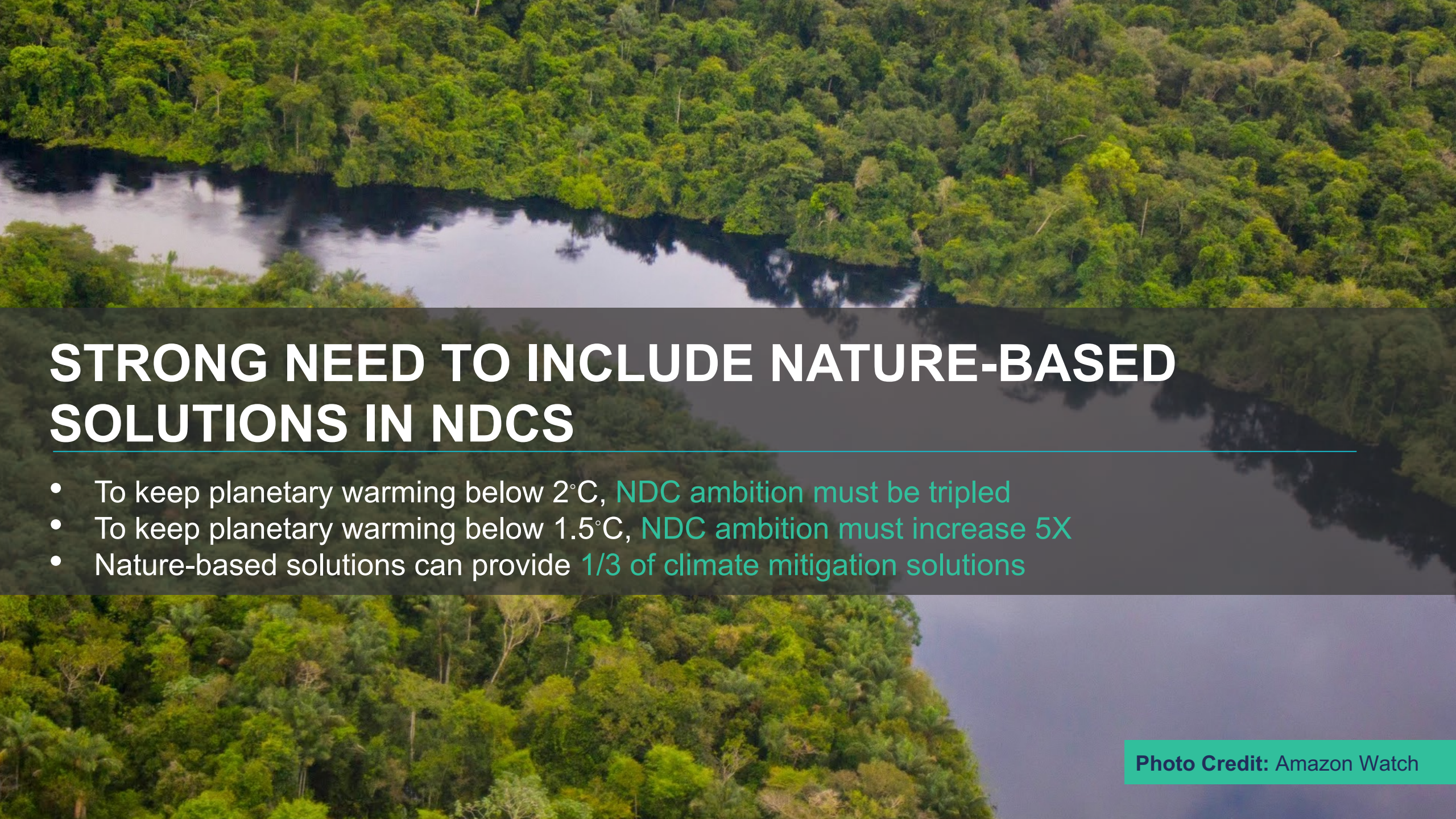
TROPICAL FORESTS ARE A KEY ECOSYSTEM AT THE NATURE-CLIMATE NEXUS

- Tropical forest loss accounts for more than 90% of global deforestation
- Globally, this is equal to the total GHG emissions of the European Union
- Investments comprise less than 1.5 percent—only US$3.2 billion—of the US$256 billion committed by multilaterals & developed country donors

Photo Credit: J. Equator Prize Winner Riba Agroforestry Research Center

WHAT ARE NATURE-BASED SOLUTIONS?

- Protection, restoration, and sustainable use of forests, grasslands, and wetlands
- Emphasized as critical by the IPCC Special Report on Land (2019)
- Often already included in NBSAPs & REDD+ plans
- Often promoted by indigenous peoples and local communities



STRONG NEED TO INCLUDE NATURE-BASED SOLUTIONS IN NDCS

- To keep planetary warming below 2°C, NDC ambition must be tripled
- To keep planetary warming below 1.5°C, NDC ambition must increase 5X
- Nature-based solutions can provide 1/3 of climate mitigation solutions

Photo Credit: Amazon Watch

A COMMON APPROACH FOR THE UN

"Making peace with nature is the defining task of the 21st century. It must be the top, top priority for everyone, everywhere. In this context, the recovery from the pandemic is an opportunity." - UN Secretary-General António Guterres

- UN system has committed to mainstreaming biodiversity through better coordinated efforts to:
  - connect and build on strategies and programmes and facilitate implementation of the post-2020 global biodiversity framework in alignment with the objectives of the 2030 Agenda and Paris Agreement.
  - address sustainable development-related risks and opportunities by taking on board the connections between nature, society, and the economy.

UN COMMON APPROACH TO BIODIVERSITY:
3 IMPACT AREAS AND 15 OBJECTIVES

SPATIAL DATA CAN PLAY A POWERFUL ROLE FOR NATURE AND CLIMATE

- Identify WHERE & HOW to take action on nature for biodiversity, climate, and sustainable development
- Support monitoring & transparency for the CBD, UNFCCC, and nature-based Sustainable Development Goals

ABILITY OF POLICYMAKERS TO ACCESS & USE SPATIAL DATA IS VARIABLE

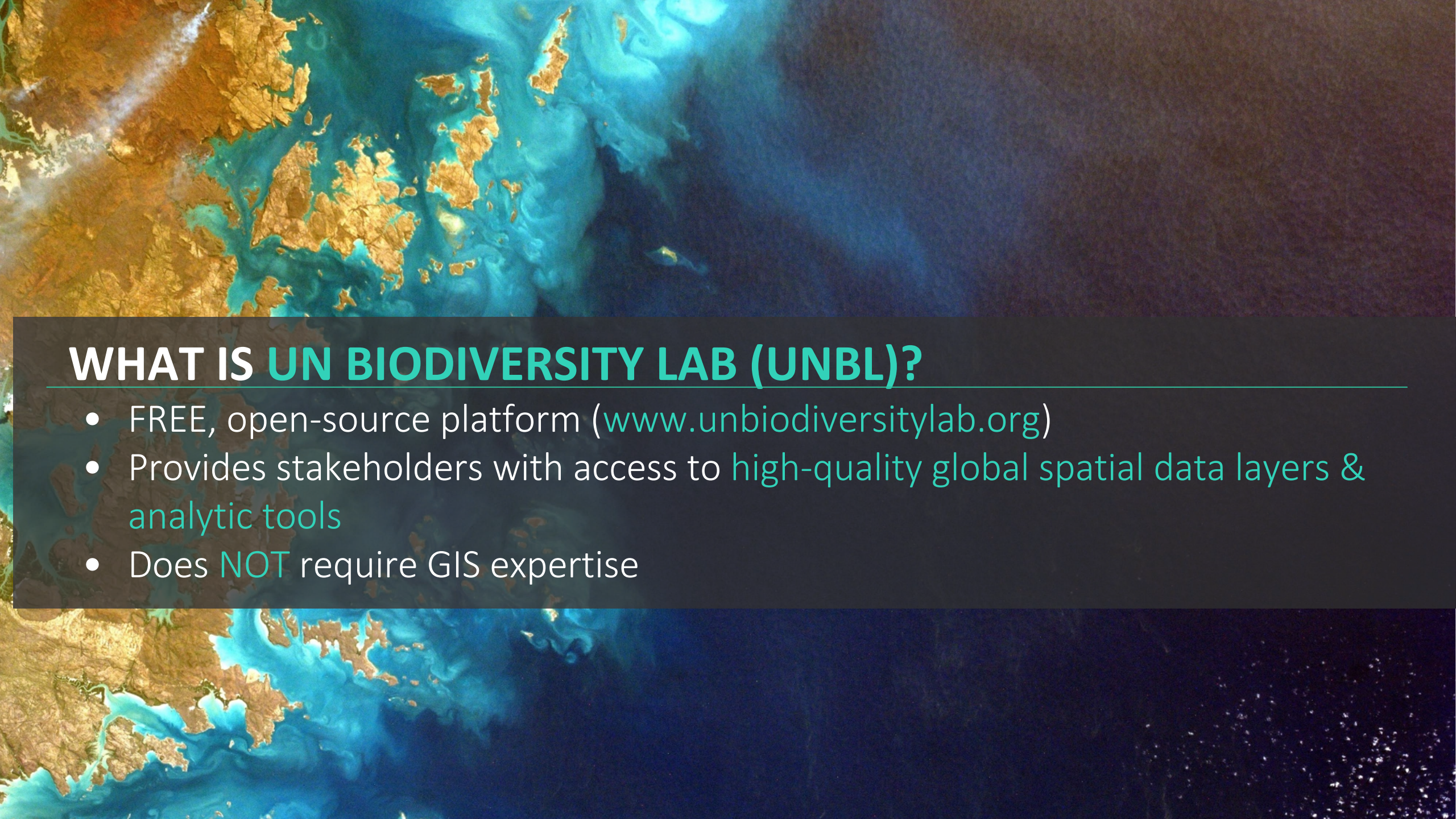
- National Biodiversity Plans & Fifth National Reports show lack of spatial data:
  - 4 maps per National Biodiversity Plan, 5 per 5NR
  - 1 out of every 3 5NRs had no actionable maps (identifying areas for protection/restoration)
  - <4% focused on ecosystem services

Photo: IISD/ENB | Francis Dejon

Introduction to UN Biodiversity Lab

INTRODUCTION TO UN BIODIVERSITY LAB

Anne Virnig, UNDP



WHAT IS UN BIODIVERSITY LAB (UNBL)?

- FREE, open-source platform (www.unbiodiversitylab.org)
- Provides stakeholders with access to high-quality global spatial data layers & analytic tools
- Does NOT require GIS expertise

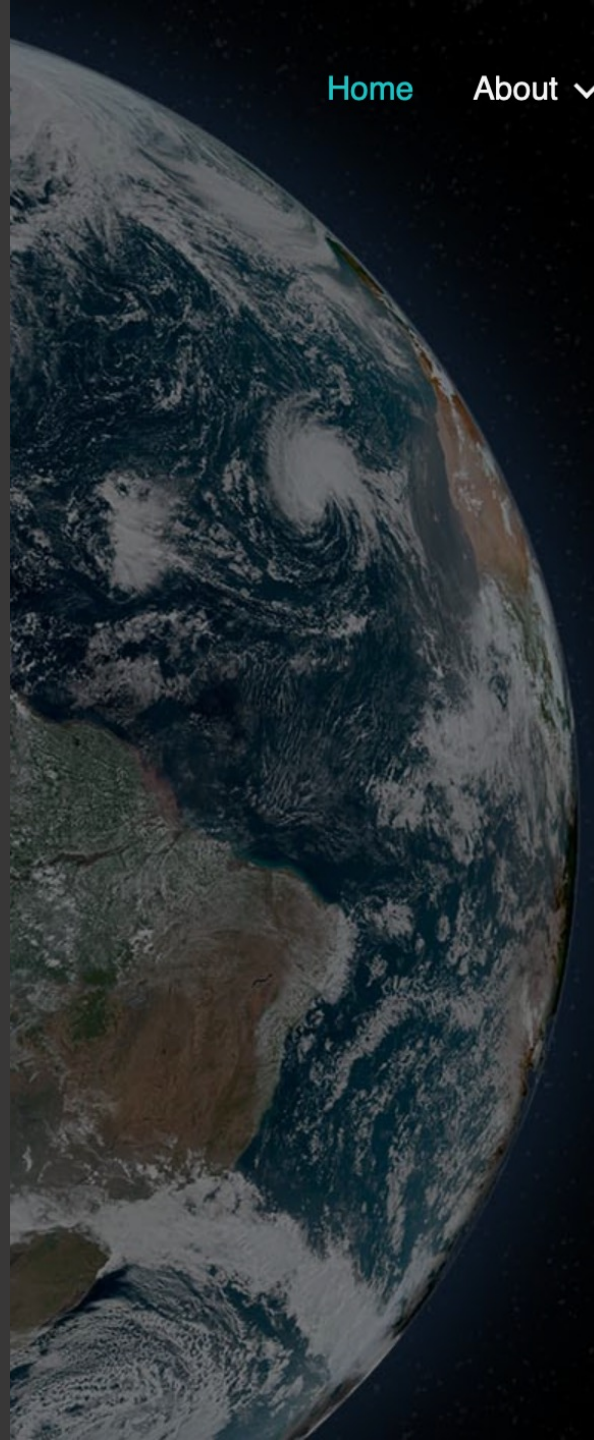
A TRUSTED PLATFORM FOR COMMITMENTS TO THE CBD

- Initially created in 2018
- Led to a 2X increase in the number of maps between the 5NR and 6NR
- UNBL 2.0: planning, implementation, and monitoring for the post-2020 global biodiversity framework

Photo | IISD Francis Dejon

INTRODUCING

UNBL 2.0...
Trailer



Home About Data Support Resources Maps of Hope English

UN Biodiversity Lab

Providing decision makers with the best available spatial data to put nature at the center of sustainable development.

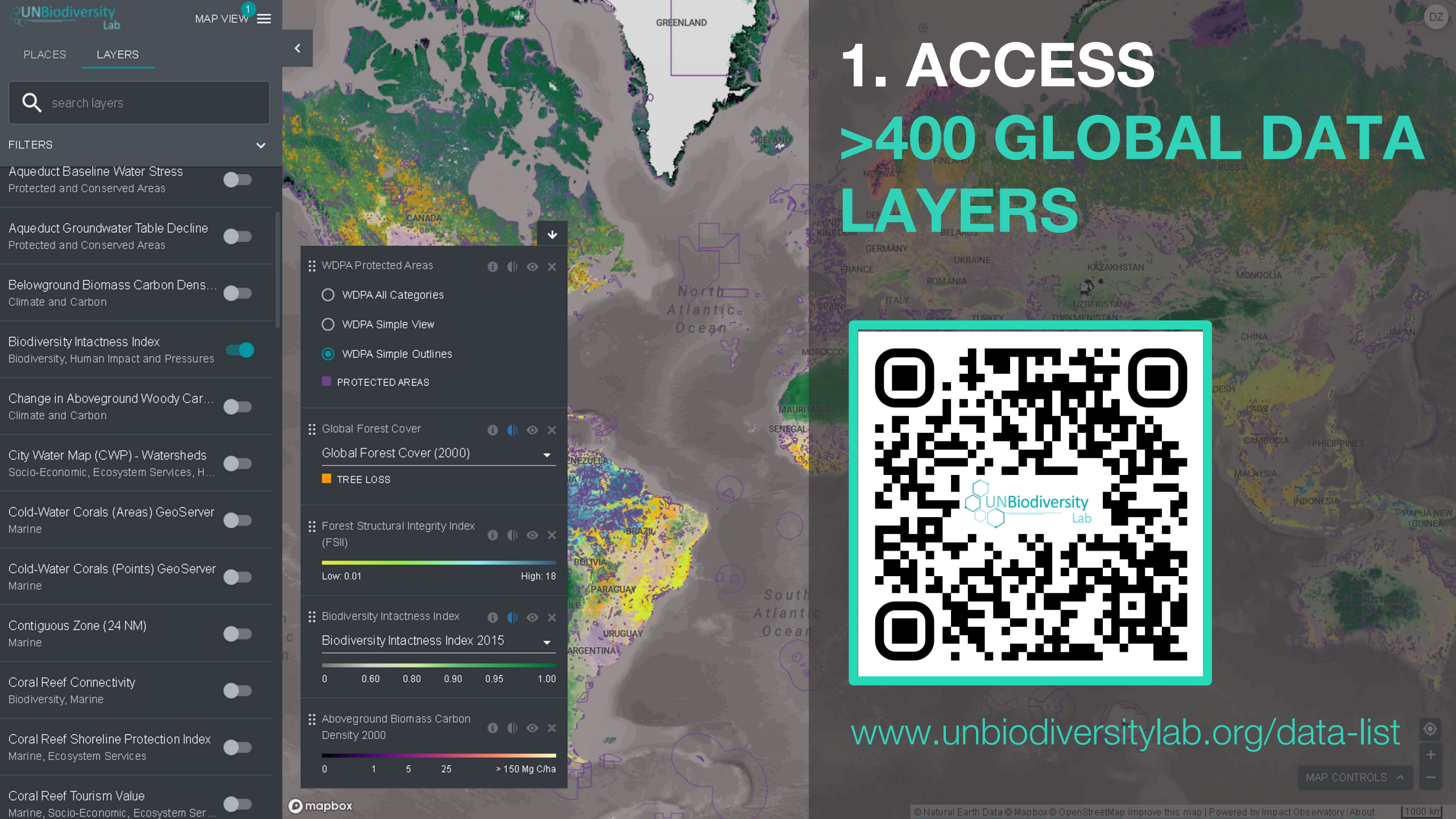
Learn more

OVERALL | WHAT'S NEW?

- Enhanced usability & modern web app design
- Fully available in English, French, Portuguese, Russian, and Spanish
- API to enable seamless integration with other solutions

CORE FEATURES | WHAT'S NEW?

1. Data catalogue now offering over 400 layers *(Updated)*
2. Data collections to generate insight for action *(New)*
3. Analytics to calculate key metrics for any country *(New)*
4. Secure workspaces available to ANY not-for-profit actors *(Expanded)*
5. Create maps for your country *(Updated)*
6. Map Essential Life Support Areas (Coming in 2022!) *(New)*



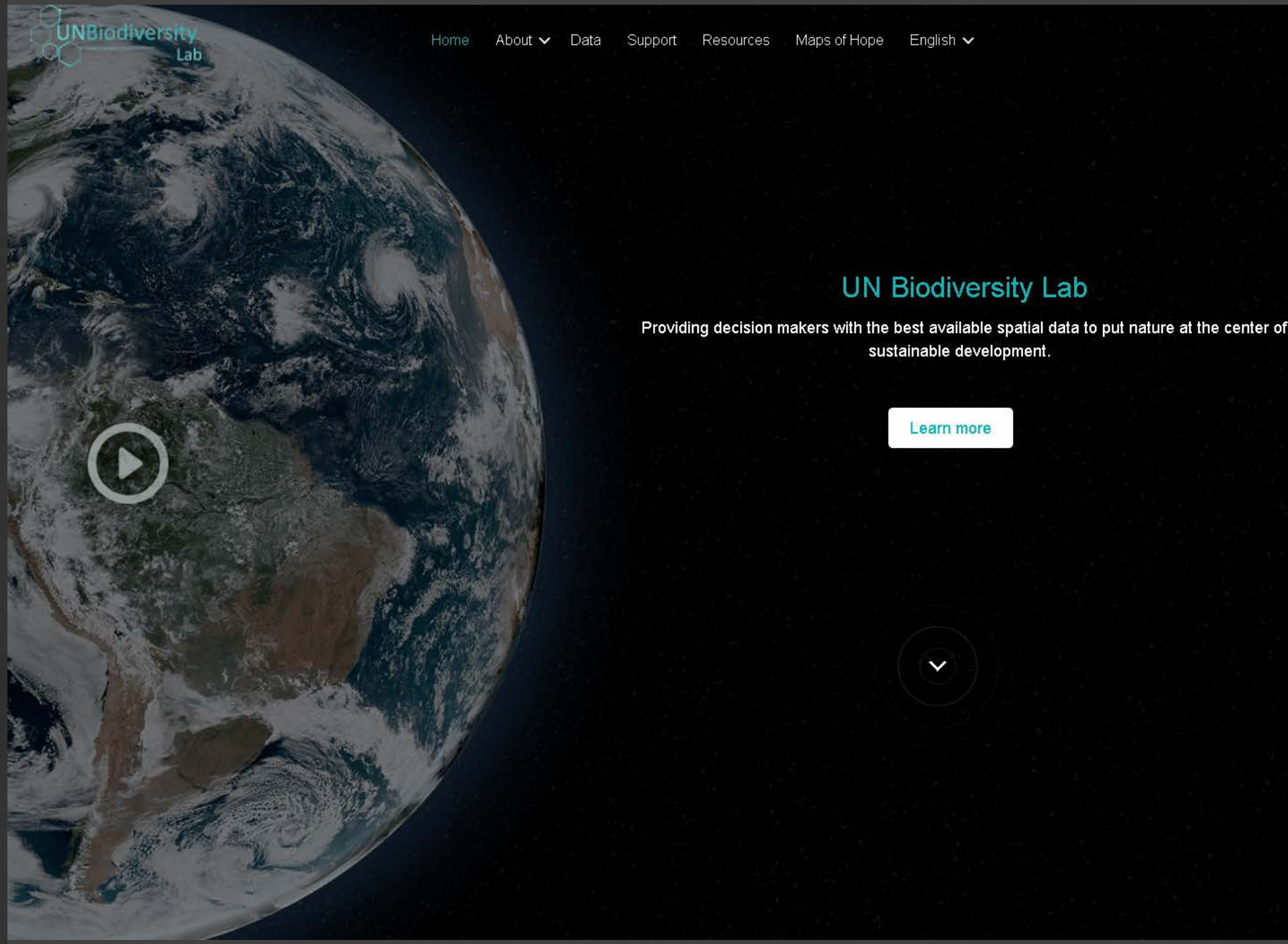
1. ACCESS >400 GLOBAL DATA LAYERS

UNBiodiversity Lab

www.unbiodiversitylab.org/data-list

2. EXPLORE UNBL COLLECTIONS

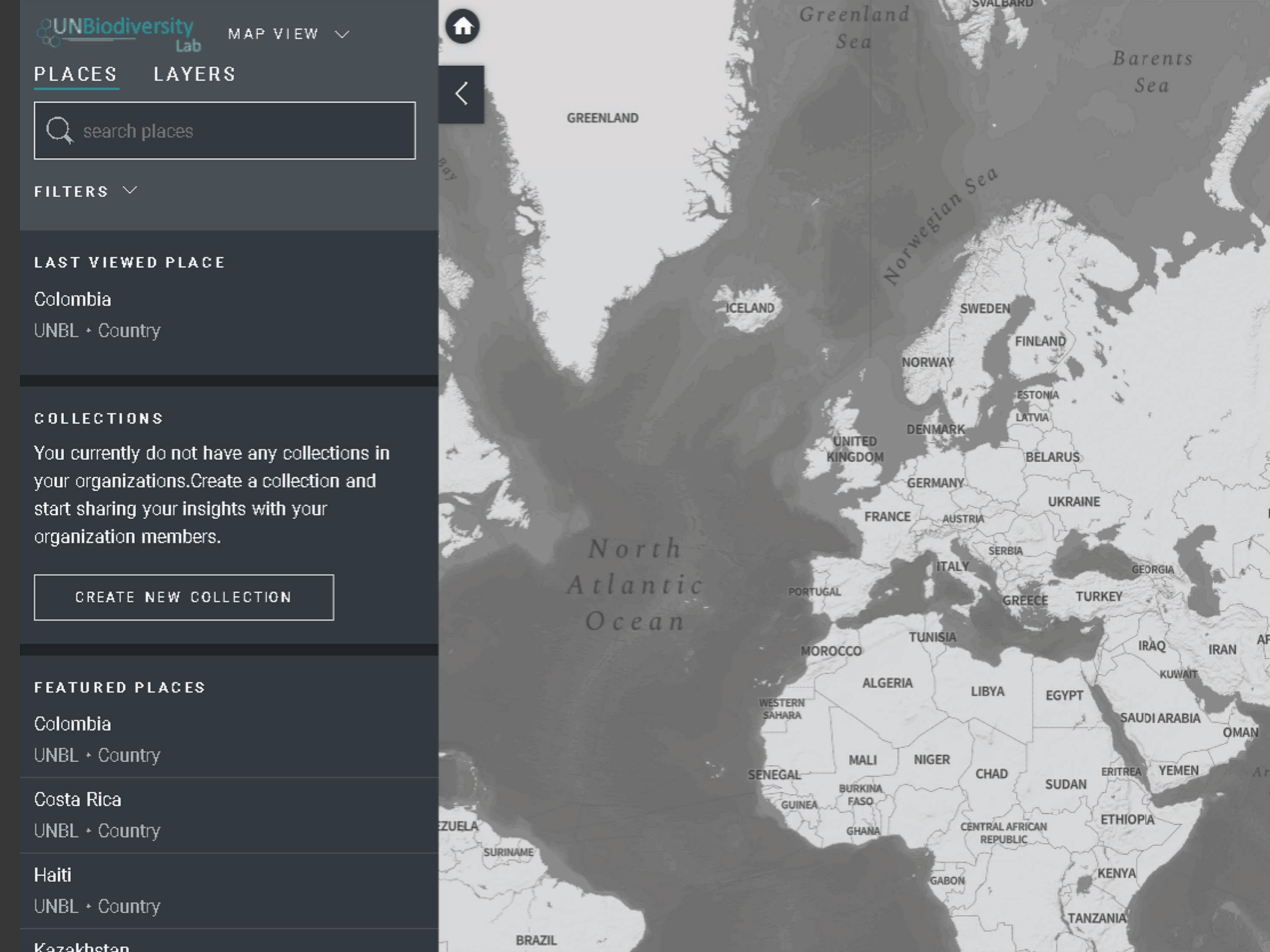
https://youtu.be/Wo3-f_3cr-4



UNBL COLLECTIONS

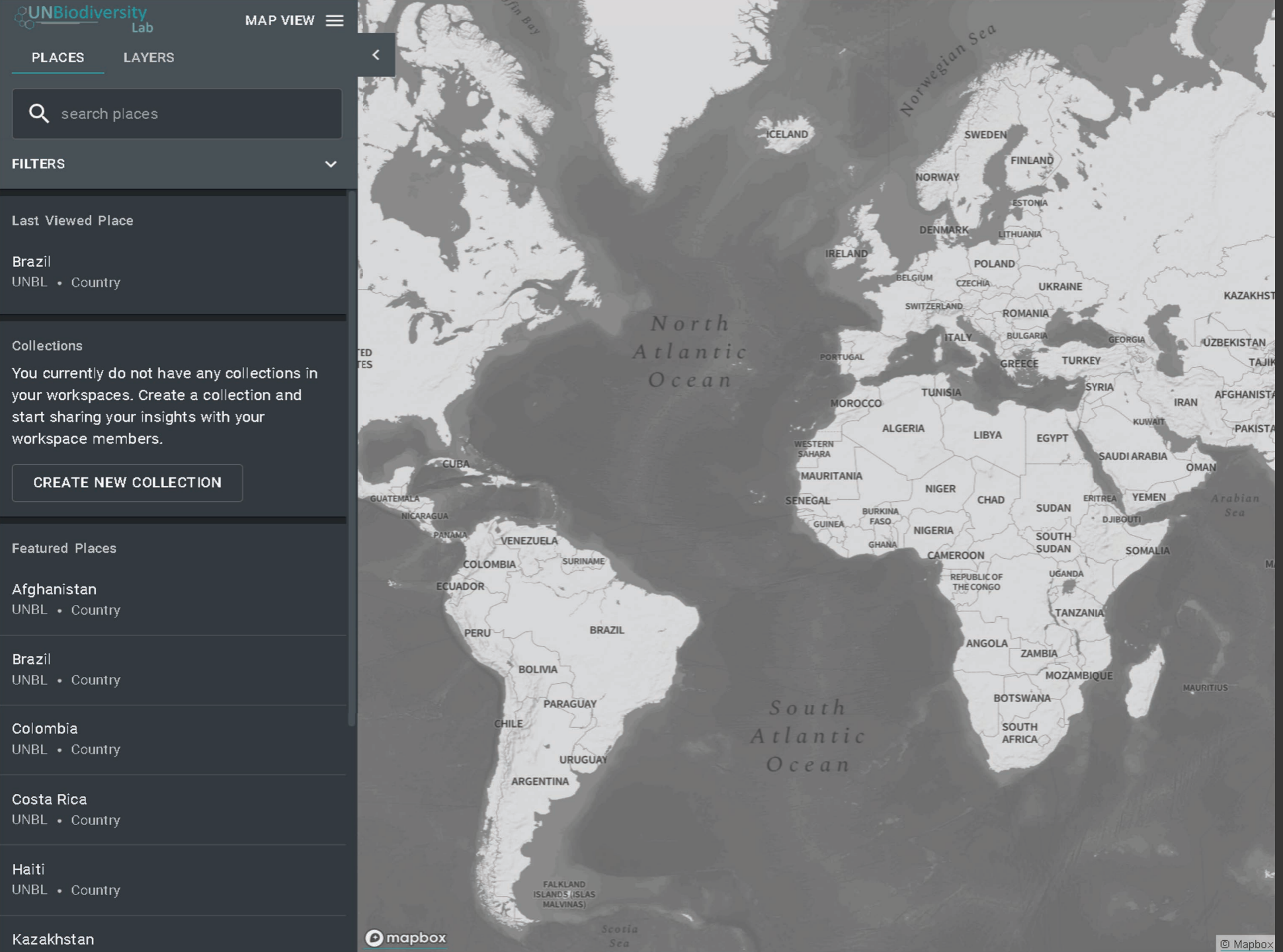
- Protected areas
- Nature-based solutions for climate change
- Post-2020 global biodiversity framework (coming soon!)
- Restoration (coming soon!)

3. CALCULATE DYNAMIC METRICS



METRICS AVAILABLE FOR YOUR COUNTRY

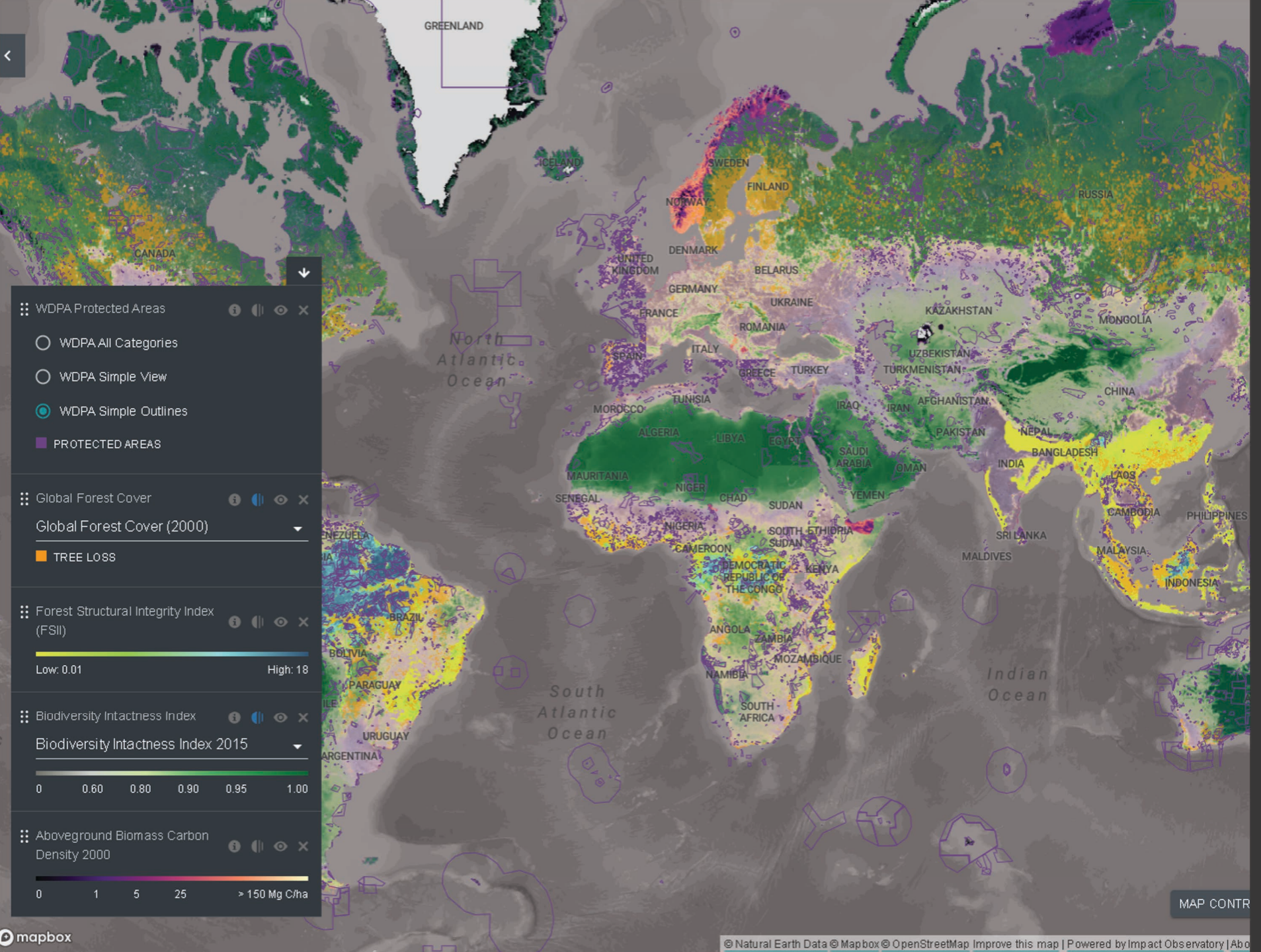
1. Tree cover loss (2001-2018)
2. Biodiversity intactness index (2015)
3. Enhanced vegetation index (2000-2019)
4. Global land cover (2015)
5. Monthly fire activity (2018)
6. Protected areas (2019)
7. Terrestrial carbon density (2010)
8. Terrestrial human footprint (1993 & 2009)



4. CREATE A UNBL WORKSPACE

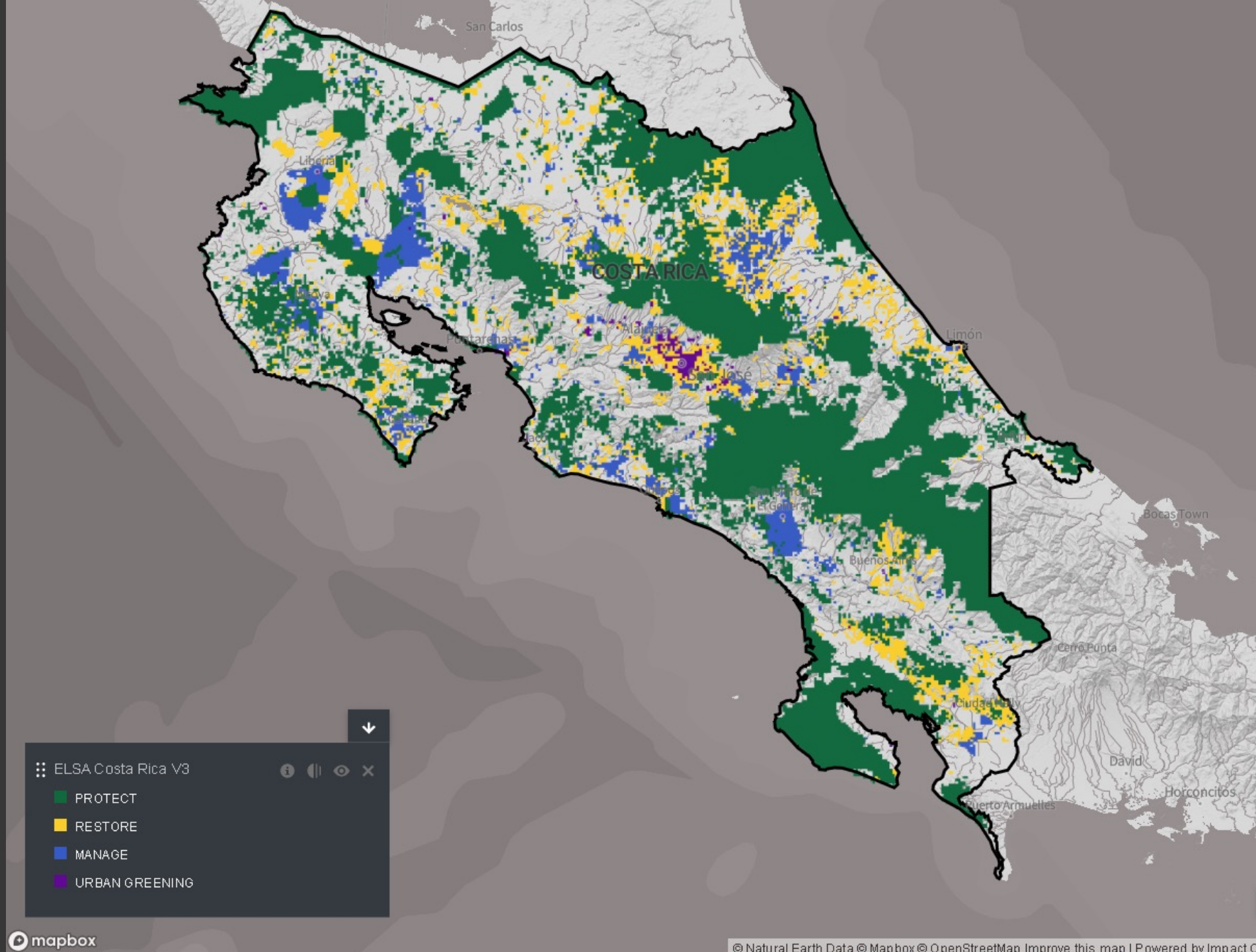
UNBL WORKSPACE FUNCTIONALITIES

- Secure, password-protected space for collaboration
- Limit access to a discrete set of users
- Upload your national or subnational data layers
- Create areas of interest
- Calculate dynamic metrics
- Available for governments, UN agencies, NGOs, Indigenous Peoples organizations, and research institutions



5. CREATE YOUR OWN MAPS

6. MAP YOUR ESSENTIAL LIFE SUPPORT AREAS (*Coming 2022!*)



POLL | WHAT FEATURE OF UNBL IS MOST RELEVANT FOR YOUR WORK?

https://www.menti.com/vjdjhtwsq9

3 EASY STEPS TO GET INVOLVED

1. Sign up for our mailing list! → Drop your email into the chat
2. Register today → www.unbiodiversitylab.org, click on data tab
3. Create a UNBL workspace → Email di.zhang@undp.org

Convention on Biological Diversity

UN environment
United Nations Environment Programme

UN environment programme WCMC

UNDP

gef

Impact Observatory

Microsoft

NASA

UNICC

PERMANENT MISSION OF DENMARK TO THE UN IN NEW YORK
Ministry of Foreign Affairs of Denmark

Flanders
State of the Art

gef

GORDON AND BETTY
MOORE
FOUNDATION

one earth

Microsoft

Sida

SVENSKA
POSTKOD
STIFTELSEN

Data providers

The UNBL data providers offer an essential service by generating, updating, and sharing their data as a digital public good.

BirdLife INTERNATIONAL | Partnership for nature and people

CBCS Centre for Biodiversity & Conservation Science

CIFOR

CENTER FOR MACROECOLOGY, EVOLUTION AND CLIMATE
UNIVERSITY OF COPENHAGEN

Introduction to UNBL Use Cases: ELSA Video

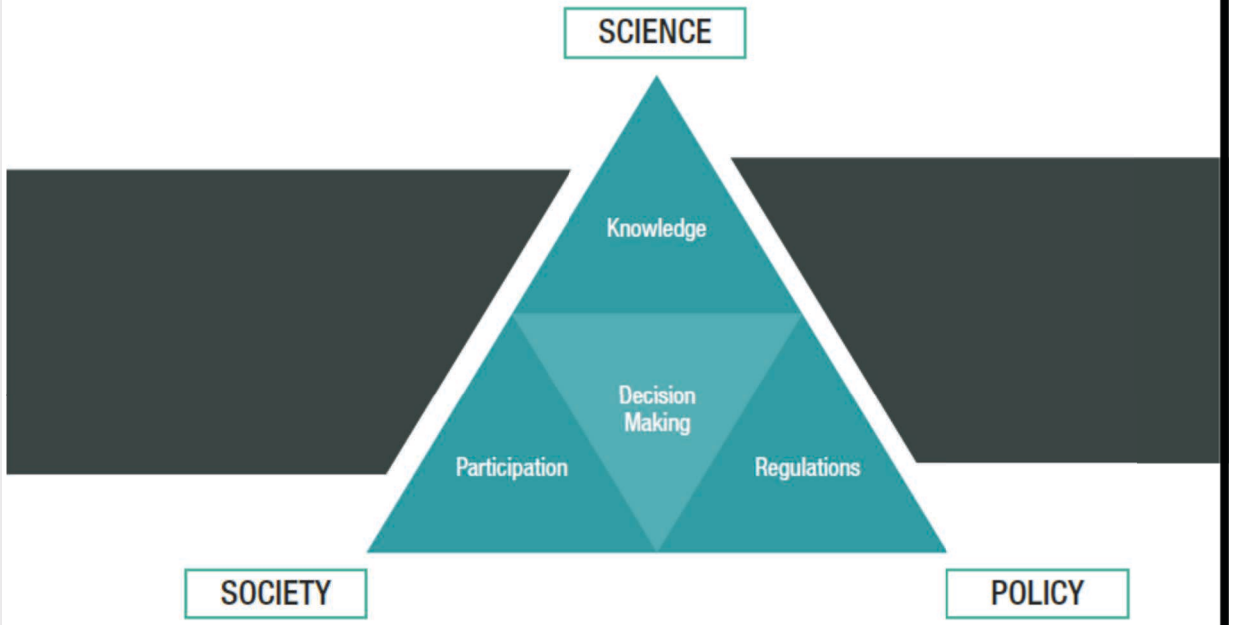
UNBL Case 1: Colombia

Using UNBL to Monitor Biodiversity in COLOMBIA

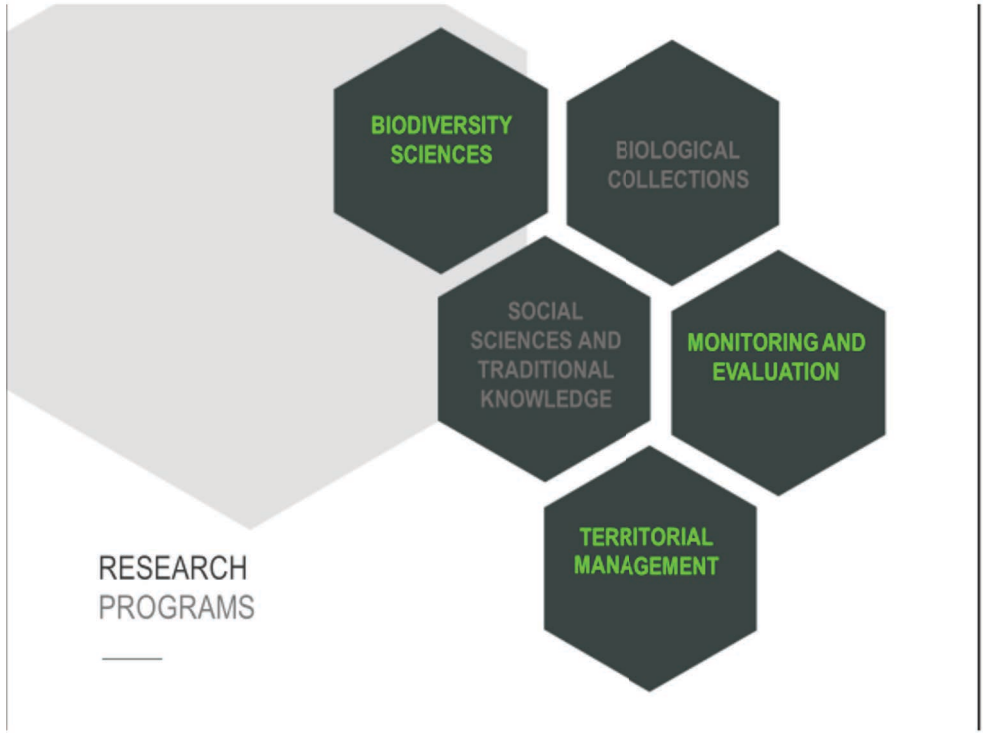
Susana Rodriguez-Buriticá
Main Researcher Analysis and Modeling
Biological Resources Research Institute Alexander von Humboldt

April 14, 2022

ALEXANDER VON HUMBOLDT INSTITUTE



Research Institute supporting Environmental Ministry
Part of the National Environmental Information System
Interface between Science-Policy-Society



Spatial data is used and required in all departments at Humboldt, but especially in three:

1. **Biological Sciences:** Strategic ecosystems like paramos, wetlands, and dry tropical forests
2. **Territorial Management:** Guidelines for local land management strategies
3. **Biodiversity Monitoring and Evaluation**: Nationwide biodiversity information (status, trends, gaps, warnings)

Examples of UNBL Uses

1

- BioTablero: Global vs. National Data for Biodiversity Indicators

2

- Systematic Planning

3

- Forest Integrity Variables

Examples of UNBL Uses

1

- BioTablero: Global vs. National Data for Biodiversity Indicators

2

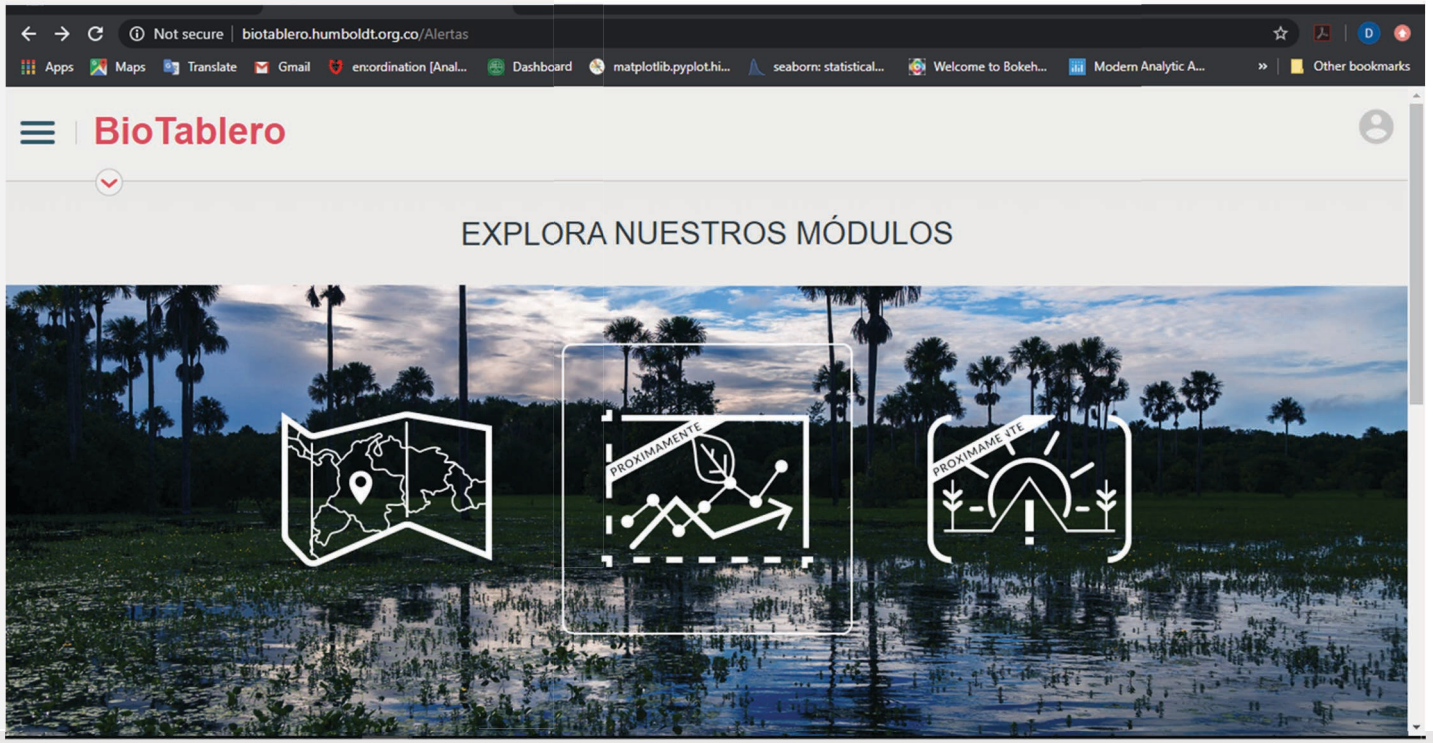
- Systematic Planning

3

- Forest Integrity Variables

3. BIOTABLERO
DECISION SUPPORT SYSTEM FOR COLOMBIA

biotablero.humboldt.org.co



Examples of UNBL Uses

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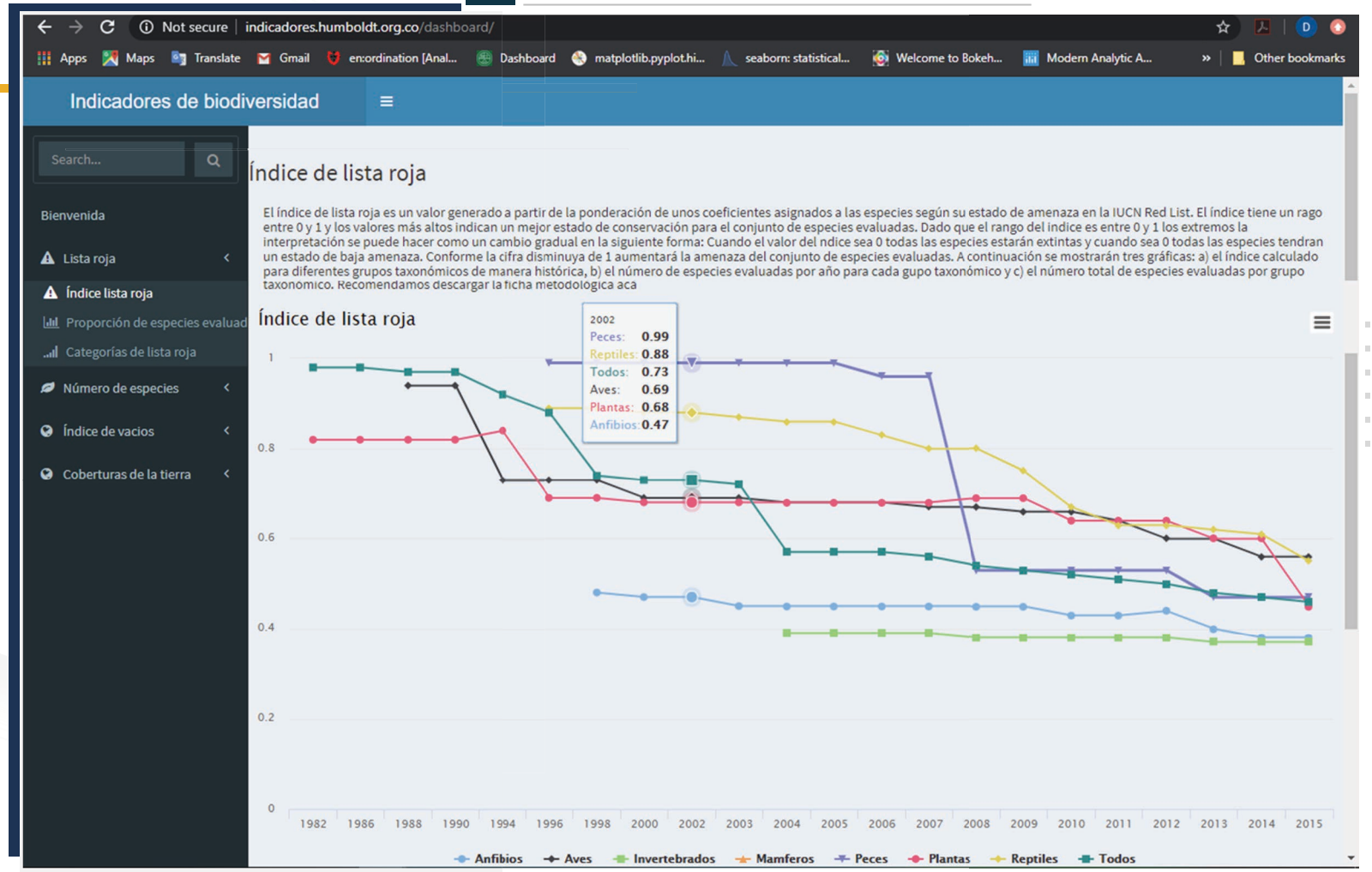


Examples of UNBL Uses

1

- BioTablero: Global vs. National Data for Biodiversity Indicators

2

- Systematic Planning

3

- Forest Integrity Variables

1. Review Biodiversity Indicators that have global information in accord with CBD suggestions (63 indicators were evaluated)
2. What do they respond to (SDG, Aichi, EBV)?
3. How useful is the information to Colombia?

Biodiversity Indicators Partnership (BIP)= 5 data layers

Digital Observatory for Protected Areas (DOPA)= 7 layers

UN Biodiversity Lab = 16 layers

Examples of UNBL Uses

1

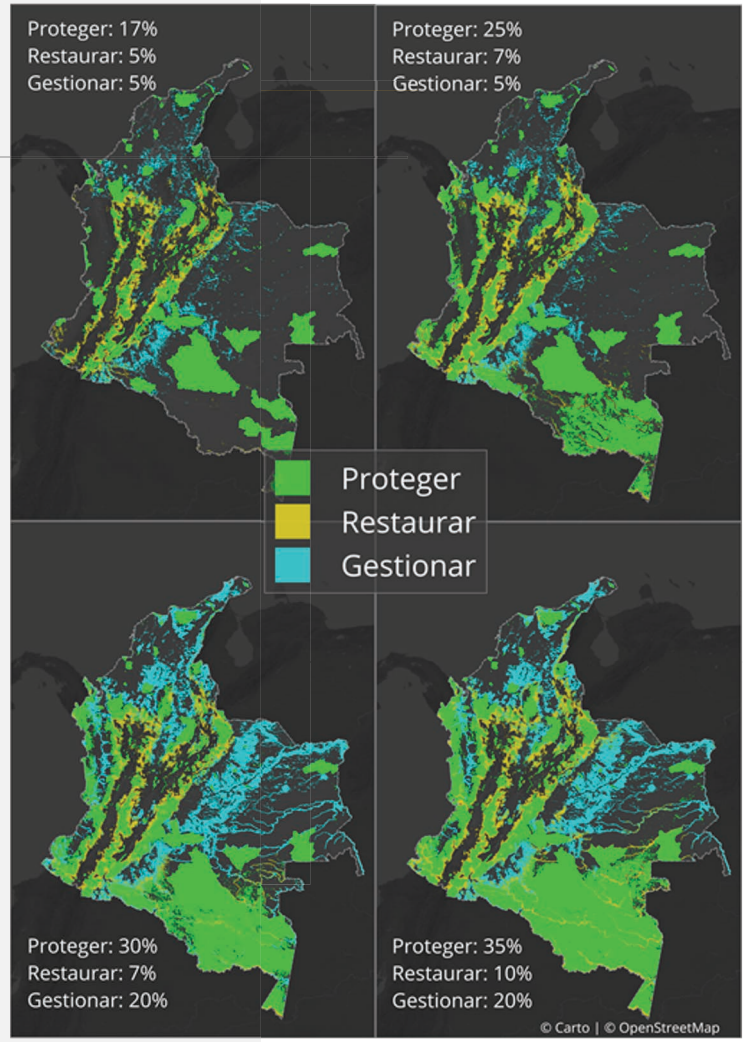
- BioTablero: Global vs. National Data for Biodiversity Indicators

2

- Systematic Planning: ELSA and Conservation Planning

3

- Forest Integrity Variables



Examples of UNBL Uses

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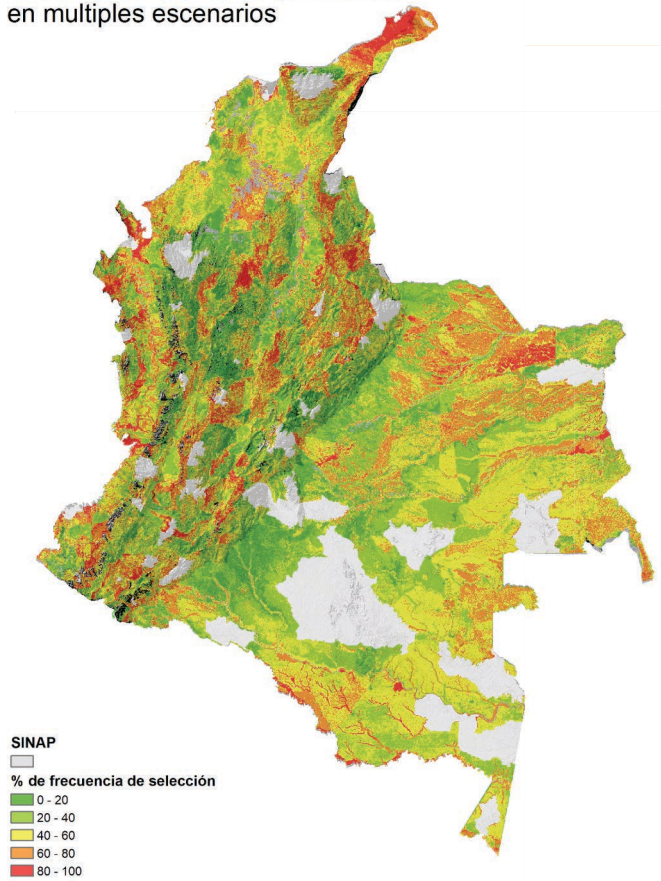
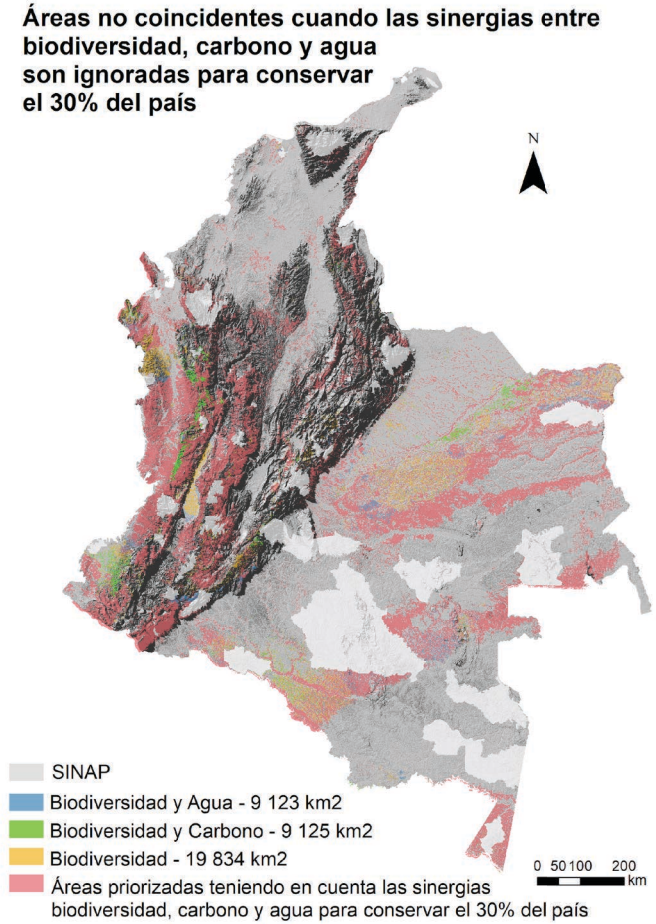




Examples of UNBL Uses

1

- BioTablero: Global vs. National Data for Biodiversity Indicators

2

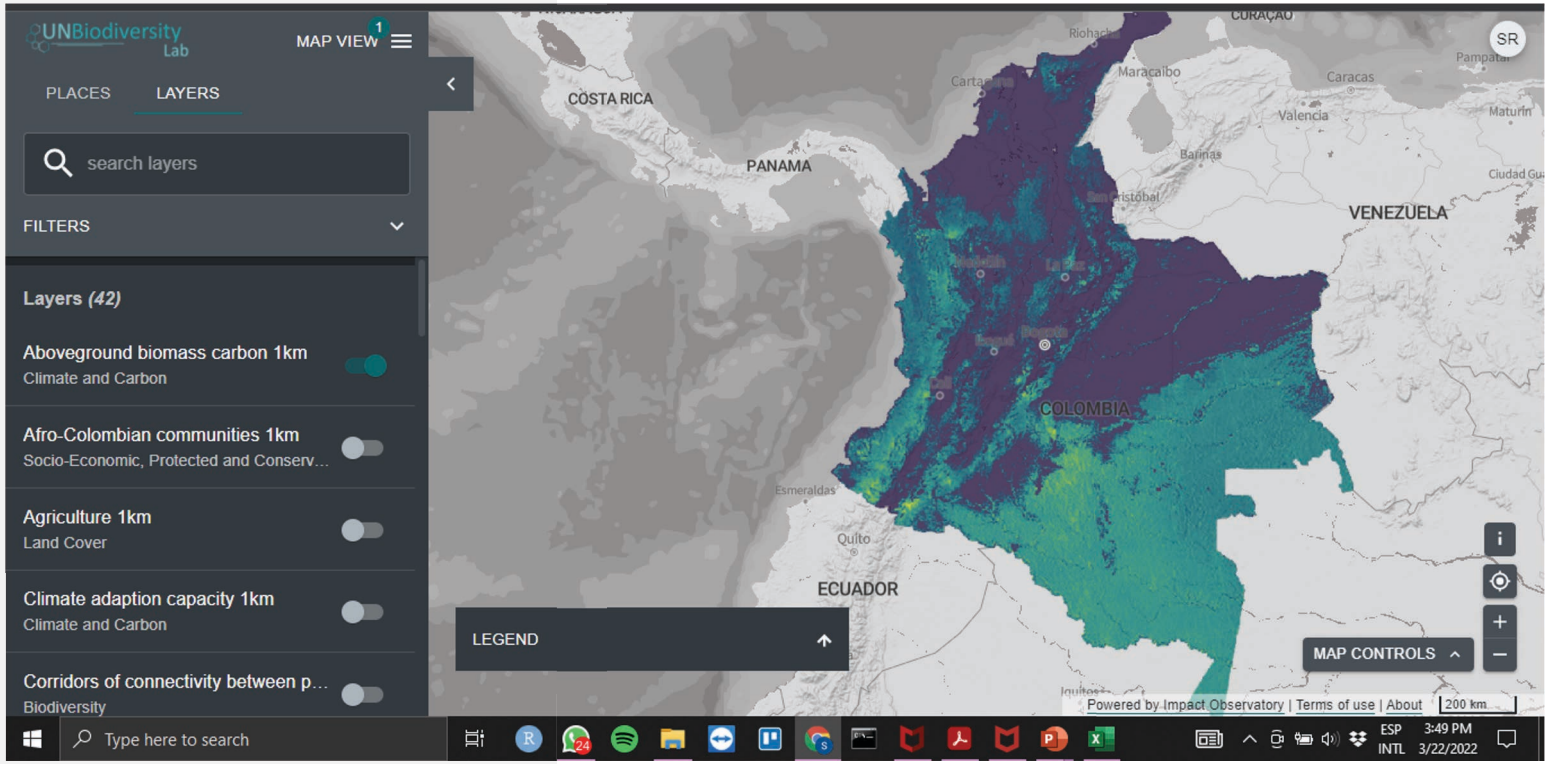
- Systematic Planning: ELSA and Conservation Planning

3

- Forest Integrity Variables

-Forest Structural Condition Index (SCI -Hansen et al. 2019)

-Aboveground Biomass Carbon (Spawn et al. 2020).



Examples of UNBL Uses

1

- BioTablero: Global vs. National Data for Biodiversity Indicators

2

- Systematic Planning

3

- Forest Integrity Variables

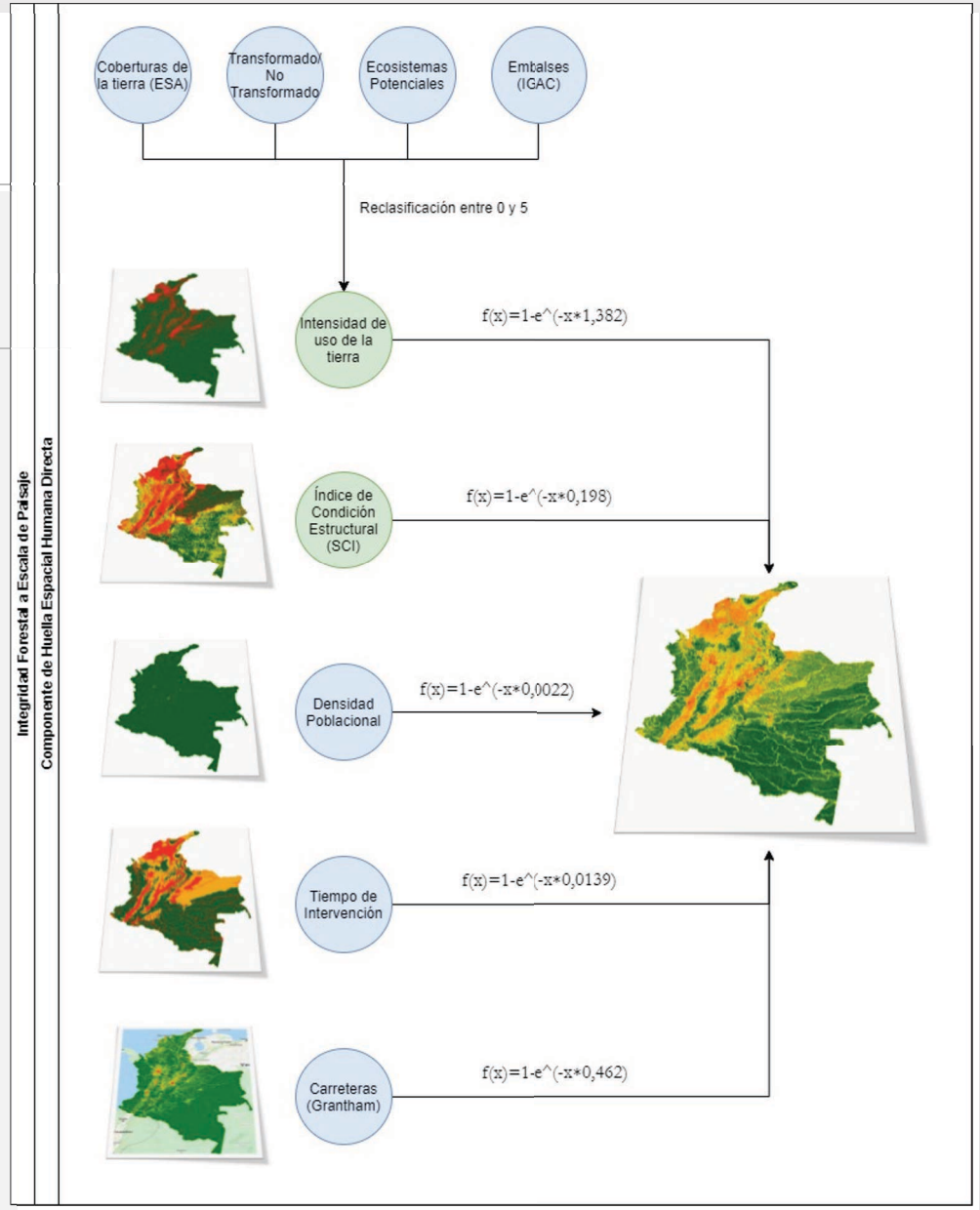
Forest Landscape Integrity Index (Grantham et al. 2020)

Current Forest Status +

Measured Pressures +

Inferred Pressures +

Connectivity Loss



Examples of UNBL Uses

1

- BioTablero: Global vs. National Data for Biodiversity Indicators

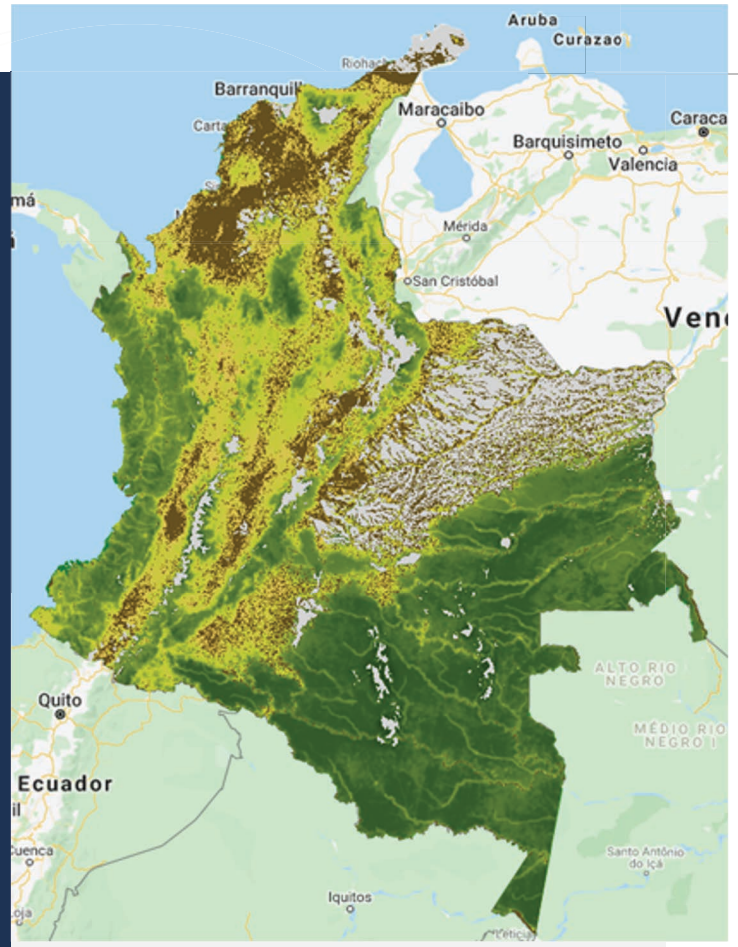
2

- Systematic Planning

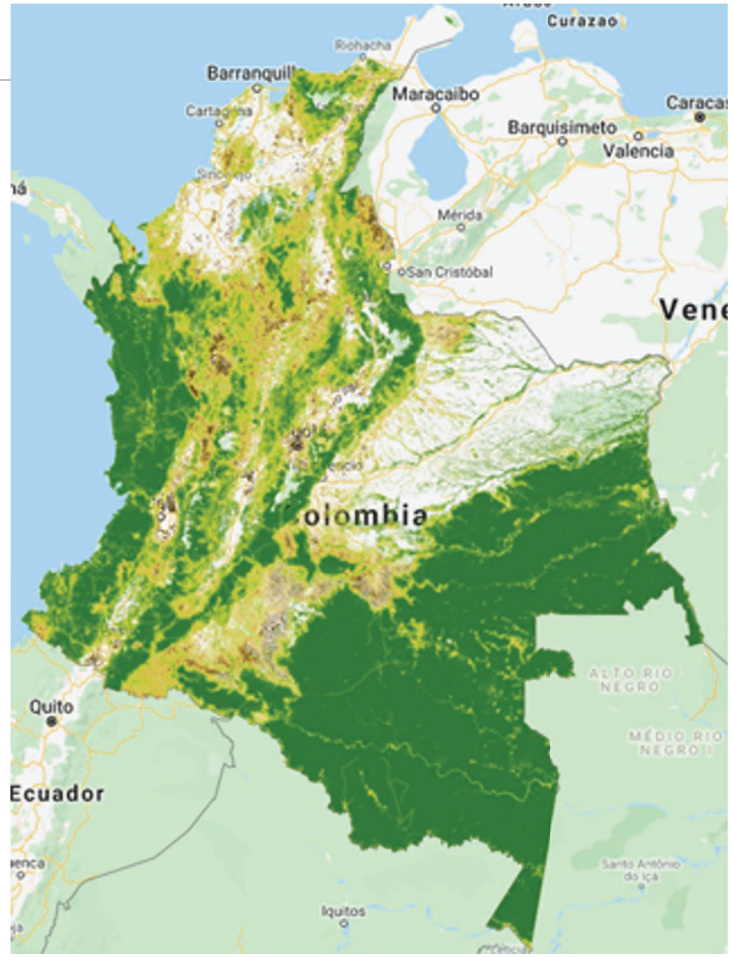
3

- Forest Integrity Variables

National Product



Global Product



Structural Condition Index (Hansen et al 2019) for Forest Status and Global Forest Layers (Hansen et al 2013) for Connectivity Measures

BIO DIVERSIDAD
REPORTE DE ESTADO Y TENDENCIAS DE LA BIODIVERSIDAD CONTINENTAL DE COLOMBIA

IMPACTS

1) Convenient repository to explore global data
   a) It reduces search time of data, sources, and methods
   b) It allows fast comparison among layers with similar theme
2) Facilitates communication and transparency for the ELSA project while migration to national repositories is organized

http://reporte.humboldt.org.co/biodiversidad/

Thanks

thanks.....

UNBL Case 2: IUCN ECARO

IUCN

Nature based Solutions

The nature of progress

ADAPT: Nature-Based Solutions for Resilient Societies in the Western Balkans

14 April 2022, UN Biodiversity Lab

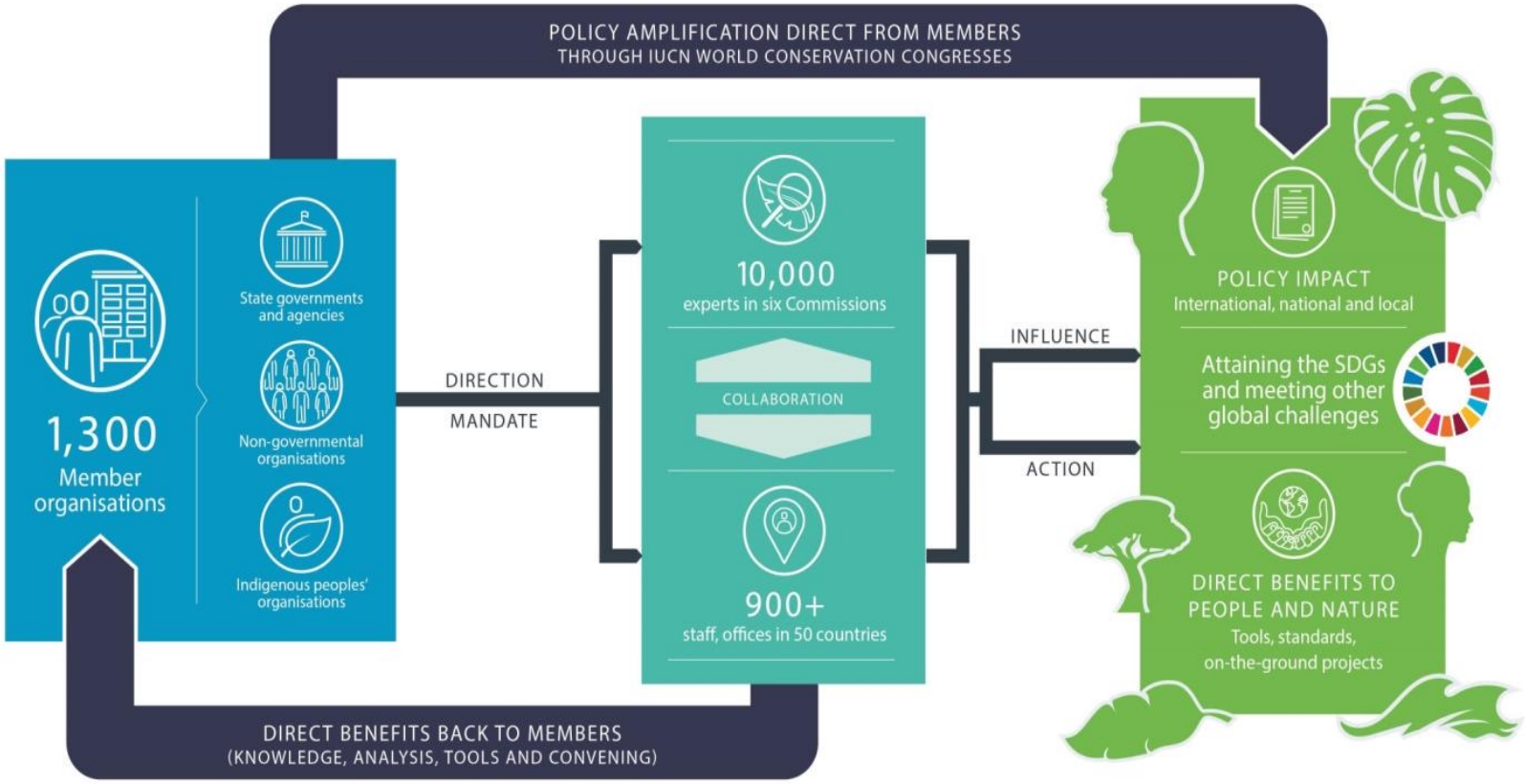
Mihaela Dragan-Lebovics, Nature-Based Solutions Project Officer, IUCN ECARO

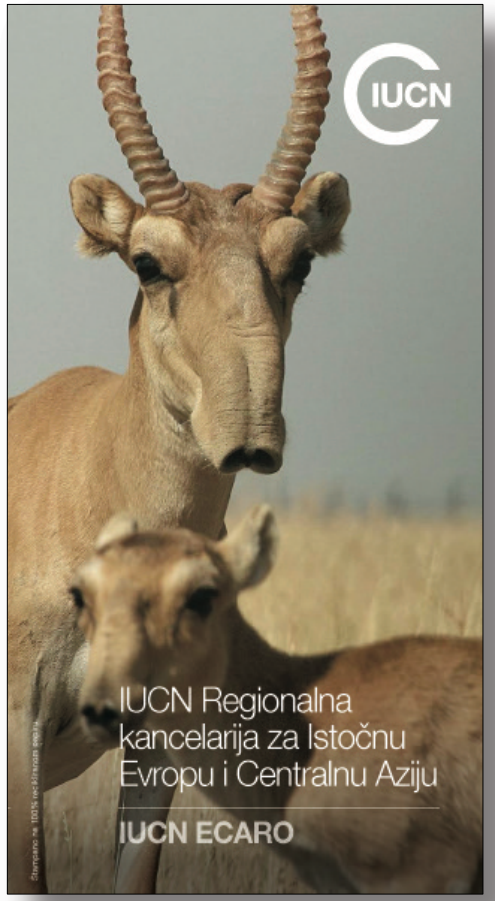
IUCN at a Glance

Nature based Solutions

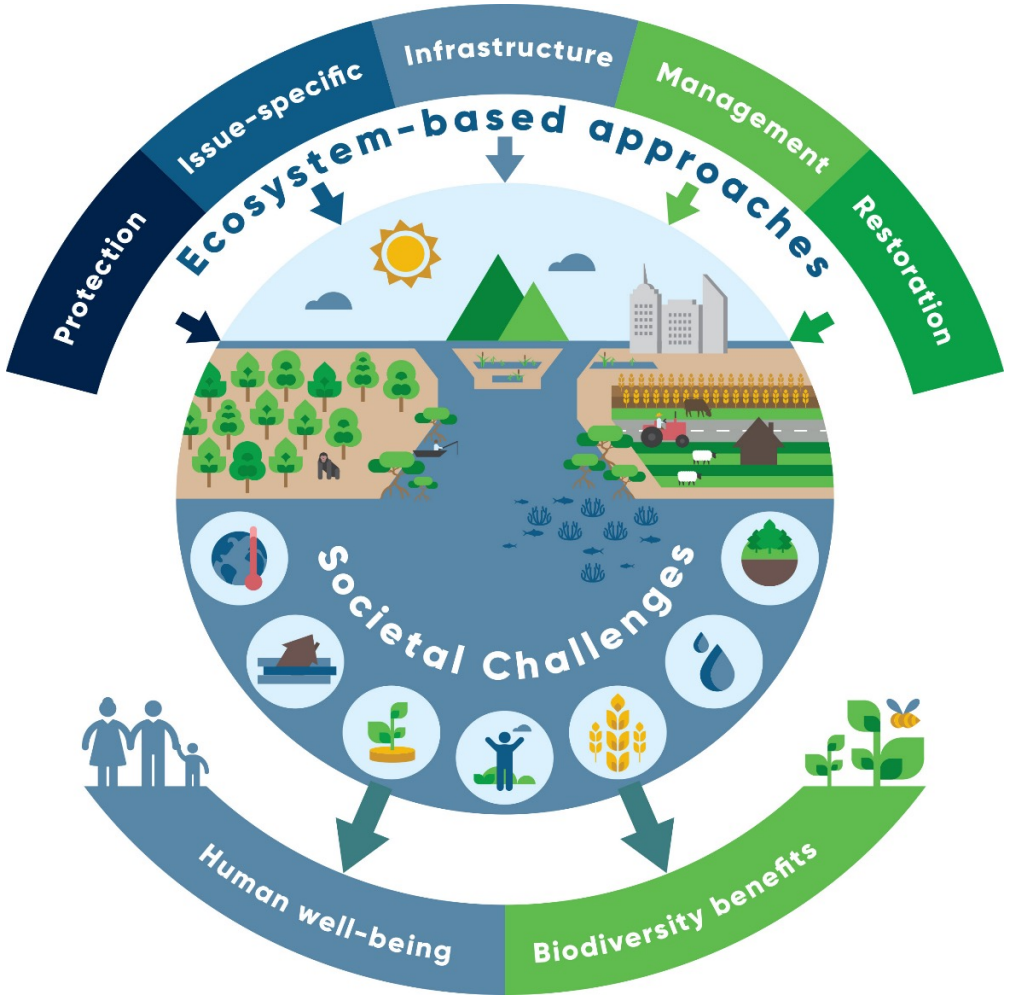
The nature of progress

UNITED FOR LIFE AND LIVELIHOODS





What are Nature-based Solutions?



IUCN defines nature-based solutions as: “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges (e.g., climate change, food and water security or natural disasters) effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”

- WCC 2016, Resolution 069

A Global Framework to Scale Up NbS

- The IUCN Global Standard for NbS was launched in June 2020 and is translated in 6 languages, including English, French, Spanish, Albanian, Serbian, Macedonian, Chinese, and Japanese.
- A facilitative standard for design, verification, and NbS scale up
- 8 criteria and 28 indicators
- Based on knowledge co-creation: conservation science, social science, traditional knowledge;
- 'Crowd-sourced' drafts through two rounds of open consultation, 800+ people across 100 countries, 1,000s of comments, each comment and response tracked;
- Developed to be compatible with the ISEAL Alliance Code of Good Practice – revised every four years.

ADAPT in Figures

Funded by the Sida, the Swedish International Development Agency

Contract Value

EUR 2.48 million

Project Lifetime:

3.8 years

Geographical Scope: Western Balkans Region

Funded by Sida

The project is funded by Sida and is implemented by IUCN ECARO

Contract Value

Total contract value

EUR 2.48 million

Project Lifetime

The project started in November 2019 and will end in June 2023.

Geographical Scope

Western Balkans: Serbia, Albania, Bosnia and Herzegovina, North Macedonia, Kosovo, and Montenegro

ADAPT Intervention Cycle

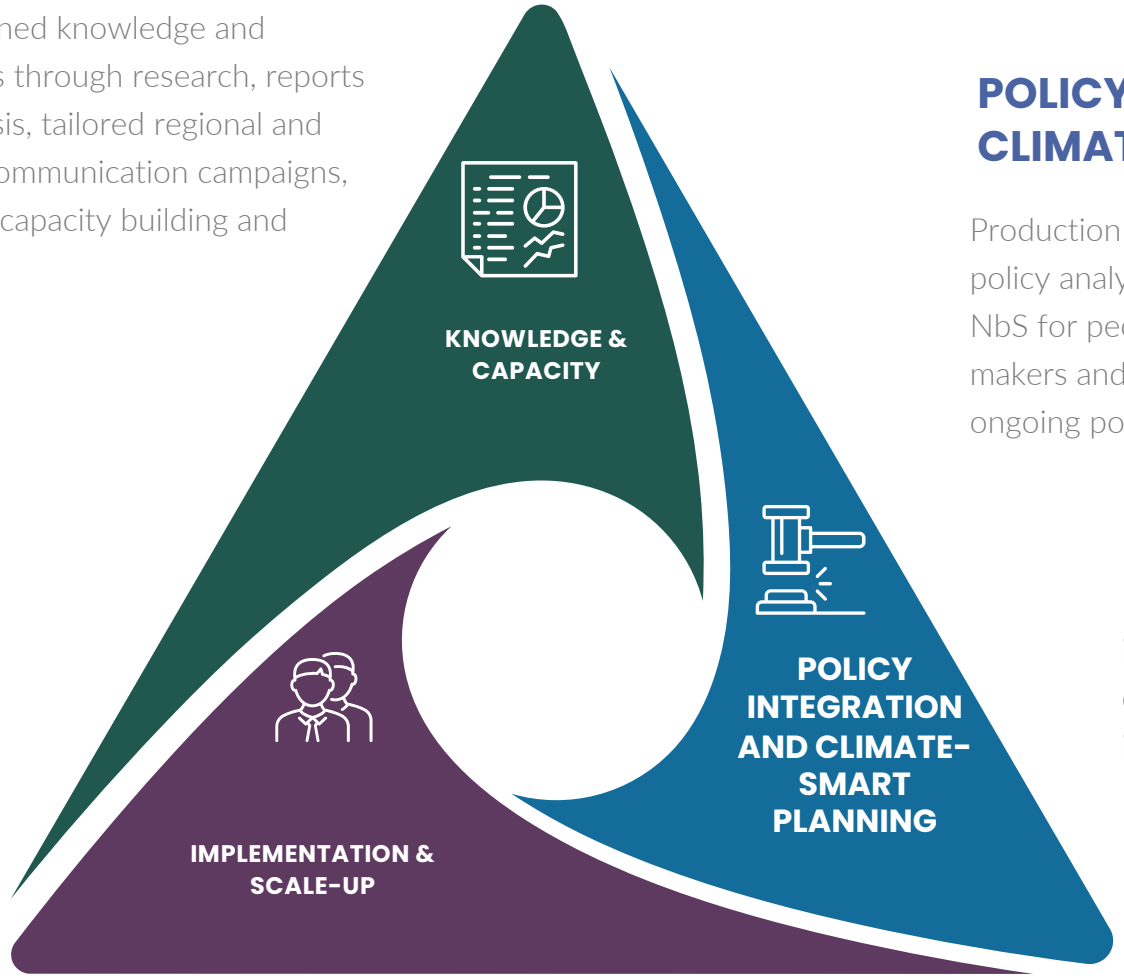
3 Major Components

ADAPT
NATURE-BASED SOLUTIONS FOR RESILIENT SOCIETIES IN THE WESTERN BALKANS

IUCN

KNOWLEDGE AND CAPACITY

Strengthened knowledge and awareness through research, reports and analysis, tailored regional and national communication campaigns, as well as capacity building and training.



POLICY INTEGRATION AND CLIMATE-SMART PLANNING

Production of the regional comparative policy analysis. Explaining the benefits of NbS for people and nature to policy makers and mainstreaming NbS into ongoing policy processes.

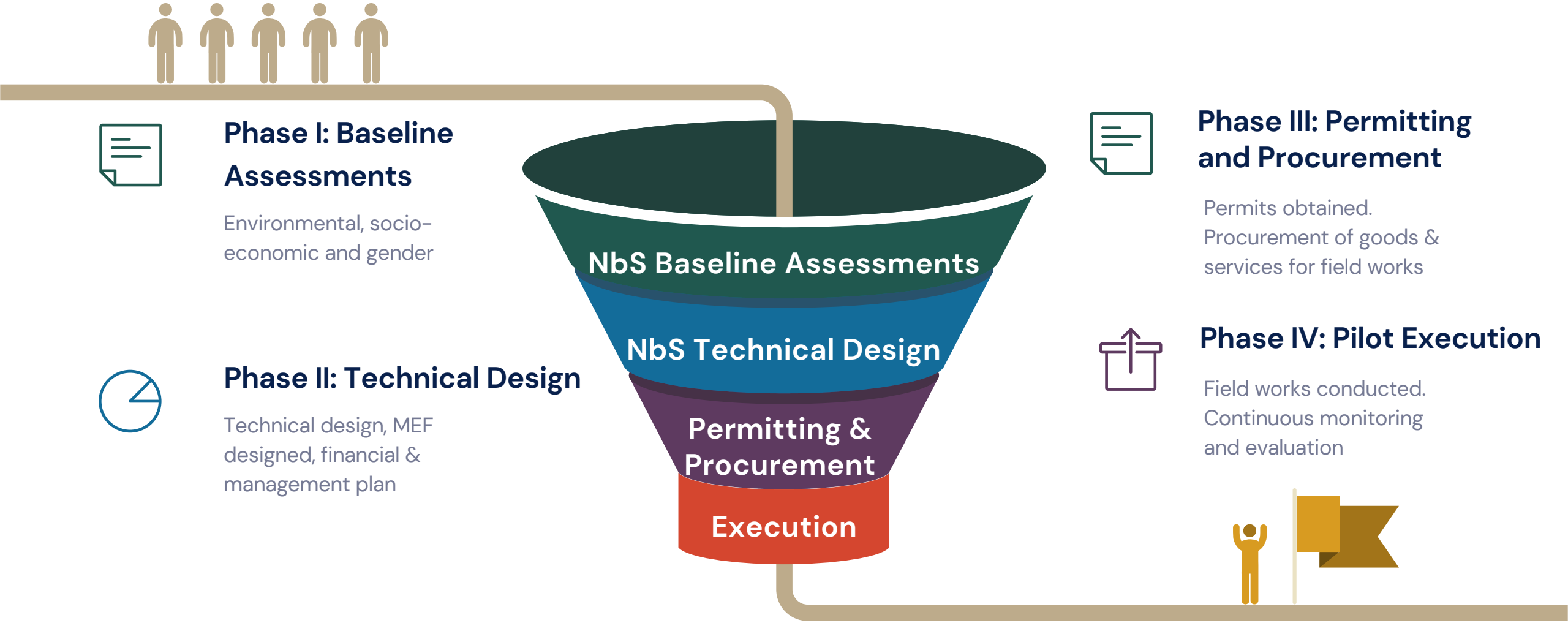
IMPLEMENTATION AND SCALE-UP

Identification of pilot areas for NbS field interventions in Serbia and Albania, identification of pilot areas and site preparation for future field interventions in Bosnia and Herzegovina, Montenegro, North Macedonia, and Kosovo.

Sida
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

Nature-based Solutions Field Interventions

Pilot Site Stages



Phase I: Baseline Assessments

Environmental, socio-economic and gender

Phase II: Technical Design

Technical design, MEF designed, financial & management plan

Phase III: Permitting and Procurement

Permits obtained.
Procurement of goods & services for field works

Phase IV: Pilot Execution

Field works conducted.
Continuous monitoring and evaluation

Phase I: Restoration Opportunities

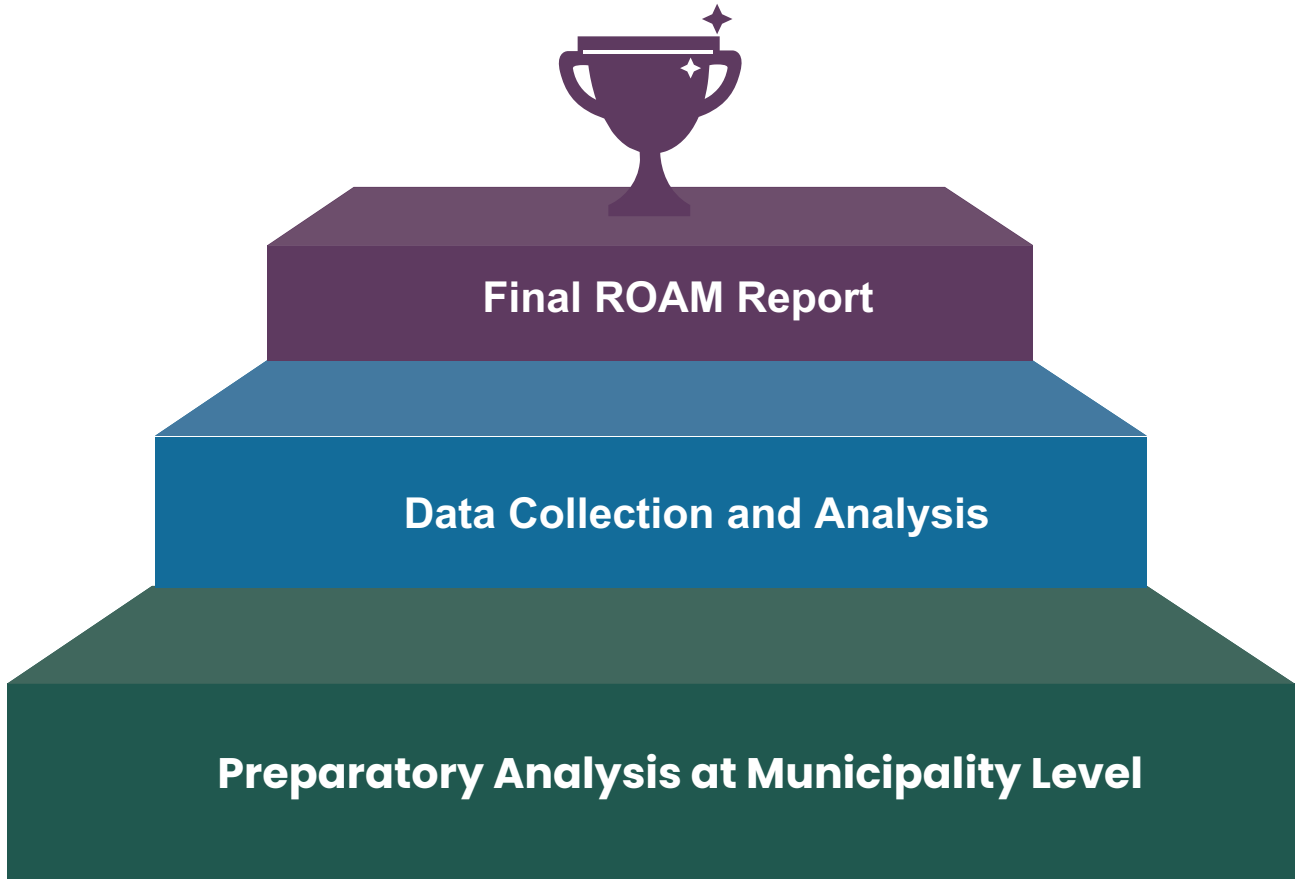
Assessment Report

Forest Landscape Restoration (FLR)

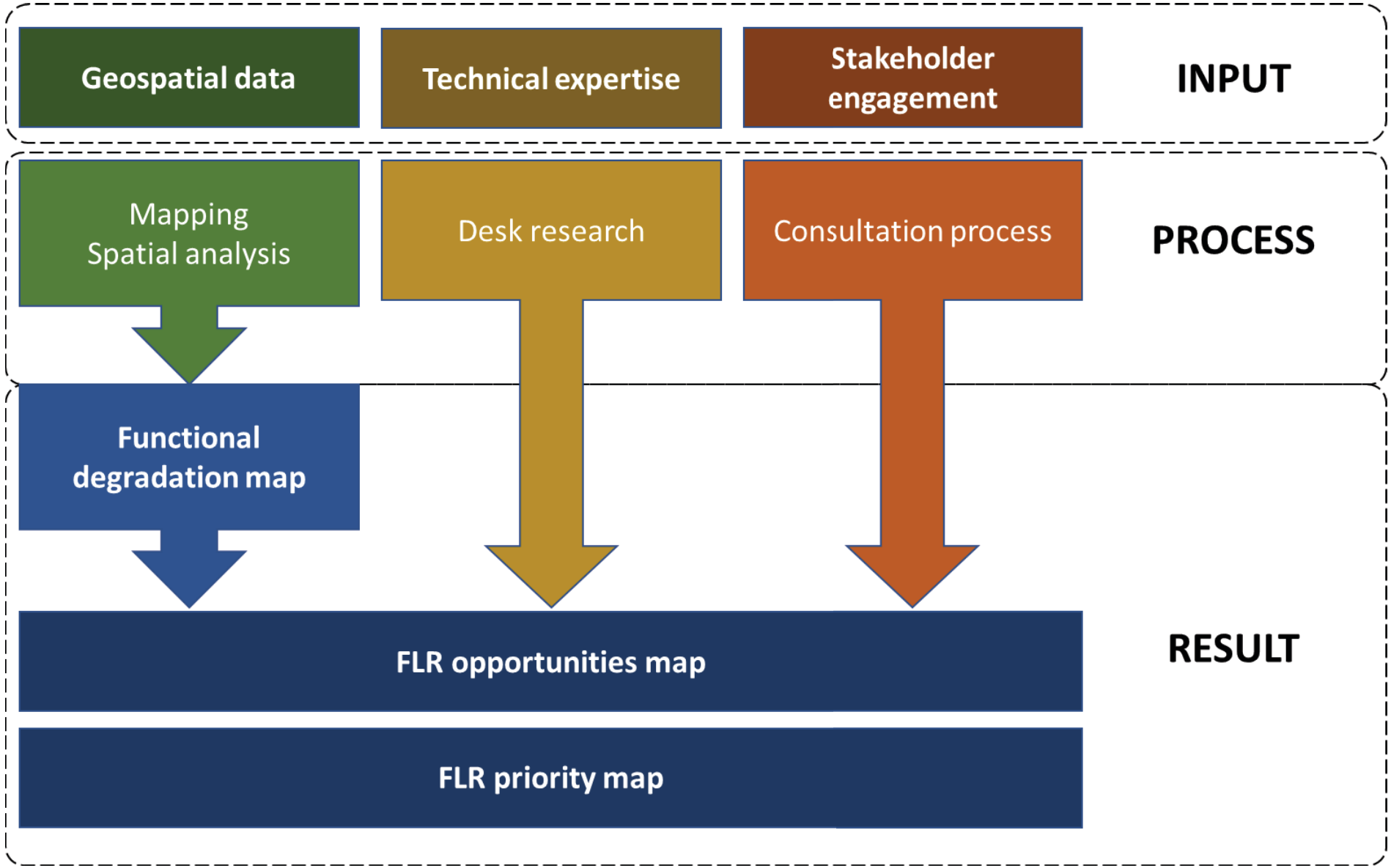
Economic Cost-Benefit Analysis
Gender and Inclusive Governance
Climate Change Policy Analysis

Analytical workshops and consultations performed
Restoration Opportunities and Priority Maps developed
Refined list of Forest Landscape Restoration interventions

Inception workshop and report
Stakeholder Consultations → Theory of Change
Stakeholder Analysis and scoping
Preliminary list of NbS and FLR

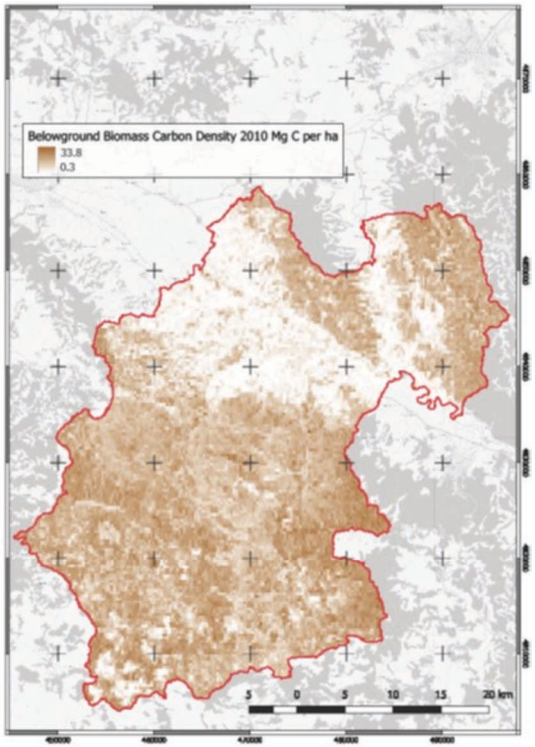


Multi-Criteria Spatial Analysis of FLR

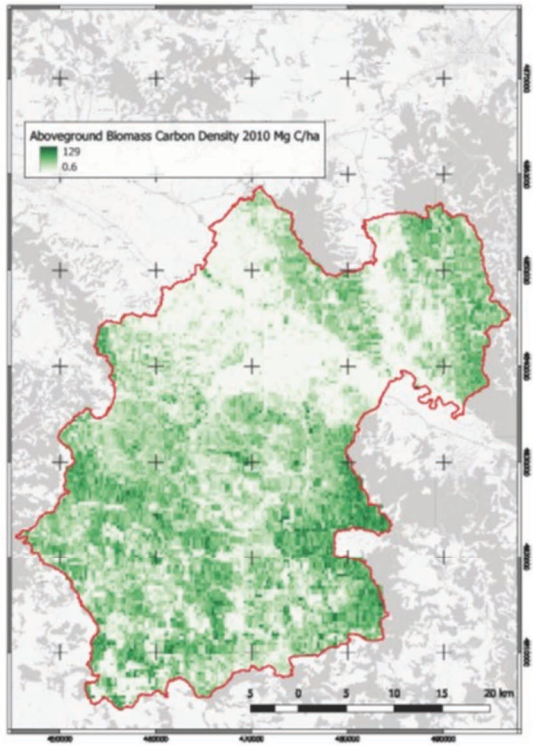


Sida
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

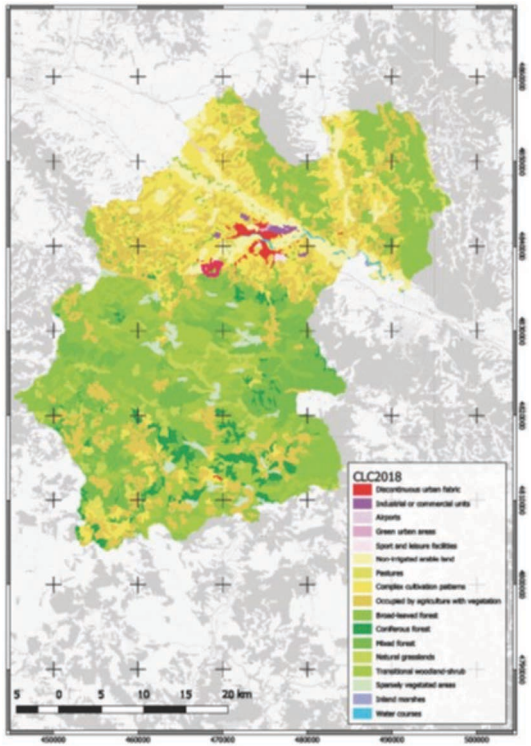
UN Biodiversity Lab Data Used by the ADAPT Project



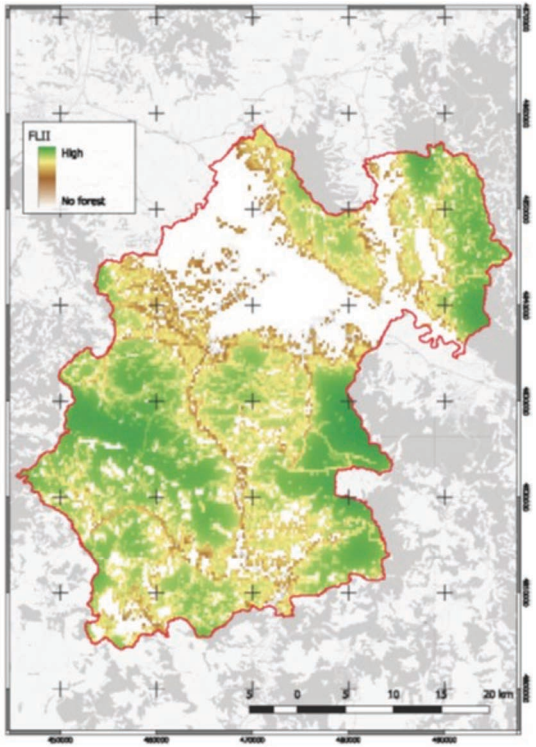
Above-Ground Carbon Mg/ha



Below-Ground Carbon Mg/ha



Corine Land Cover 2018

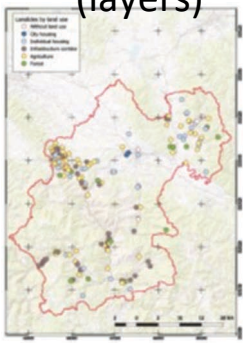


Forest Landscape Integrity Index

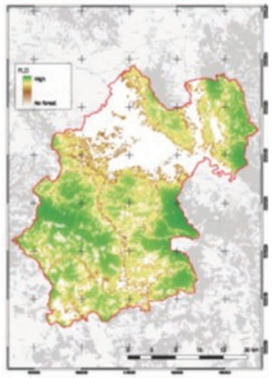
Road to Developing NbS Scenarios, based on Local, National and Global Data

ADAPT
NATURE-BASED SOLUTIONS FOR RESILIENT SOCIETIES IN THE WESTERN BALKANS

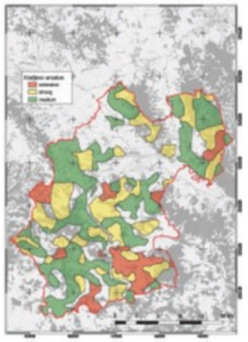
Elementary Data (layers)



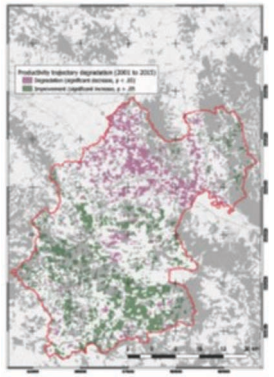
Landslides



FLII
Forest Landscape Integrity Index
(EU Biodiversity lab)

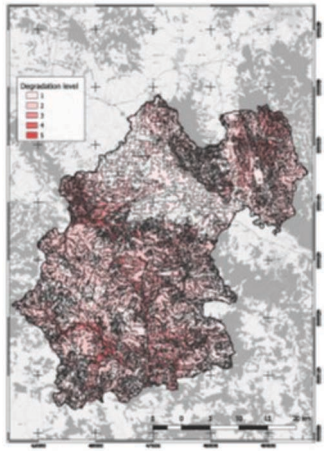


Erosion Map

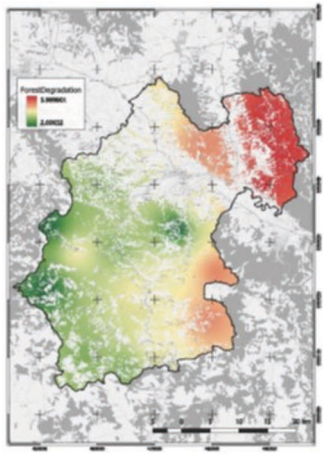


Productivity Trajectory Degradation
(trends.earth)

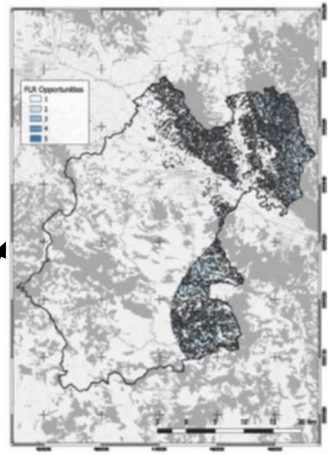
Slopes > 12°
(Copernicus 25m DEM)



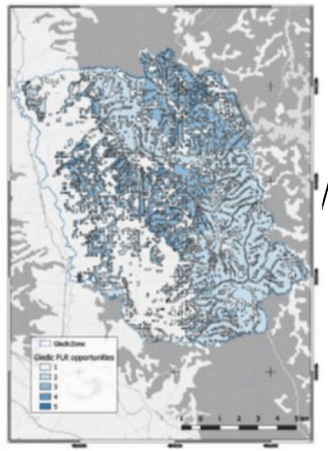
Land Degradation



Forest Degradation



FLR Opportunities
Kraljevo



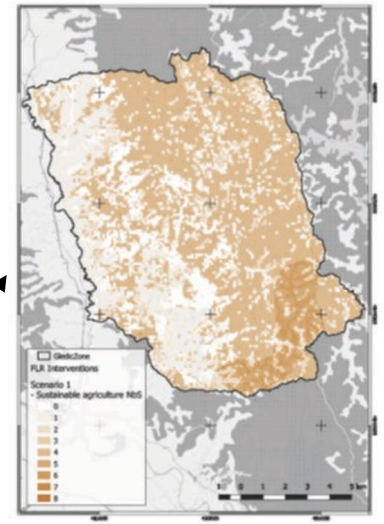
FLR Opportunities
Gledić

NbS Intervention

Cultivation of MEPs

Silvo-Pastoral Measures

Bio-Engineering Measures



	A	B	C
1	Intensity	Area	
2	0	1326.102	
3	1	1751.724	
4	2	1004.556	
5	3	724.798	
6	4	5653.555	
7	5	2477.42	
8	6	255.637	
9	7	2.523	
10	8	0	
11			

Sida
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

Impact Analysis

Impacts Derived from Using UNBL Data in the ADAPT Project

DATA USED

Above-Ground Carbon Mg/ha

Below-Ground Carbon Mg/ha

Forest Landscape Integrity Index

IMPACTS

On CBA analysis, functional degradation map, restoration opportunity map and priority map

KEY STEPS TO BRIDGE GAP IN DATA AVAILABILITY

A

Biomass carbon maps and spatial calculations were used by the socio-economic expert for performing a CBA analysis, defining a BAU scenario and the NbS intervention scenarios.

Carbon sequestration was an important indicator in the scenarios mentioned that allowed to calculated the CO2 avoided by deploying NbS.

B

Forest Landscape Intactness Index was one of the initial layers used for overlapping as basis for visualising the degradation map. Other data used: flood and landslide risk, slopes, erosion.

UNBL Case 3: Costa Rica

Mapping ELSAs for Climate Adaptation

Enrique Paniagua
UNDP & MINAE

Cornelia Miller
PRIAS Lab

COSTA RICA GOBIERNO DEL BICENTENARIO 2018 - 2022

MINAE Ministerio de Ambiente y Energía

SIMOCUTE

CeNAT

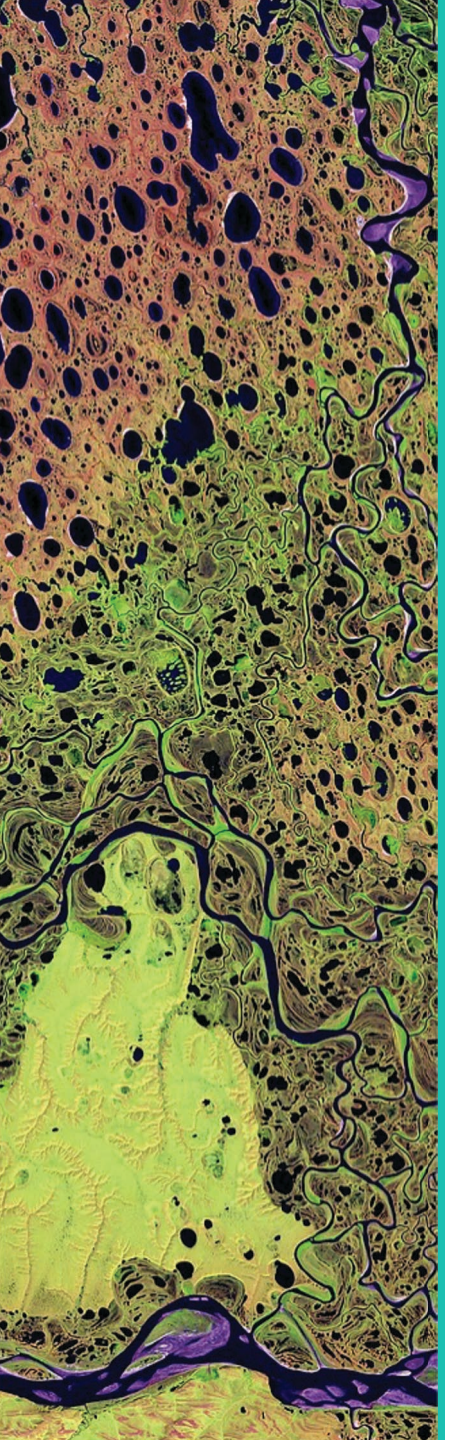
UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

GORDON AND BETTY MOORE FOUNDATION

Impact Observatory

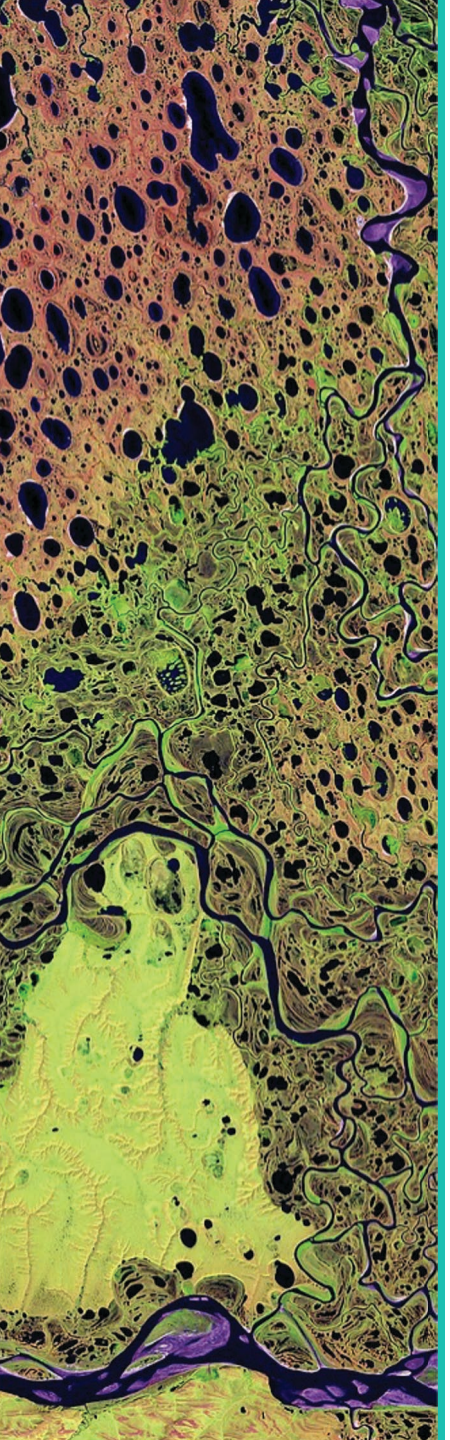
gef

PNUD



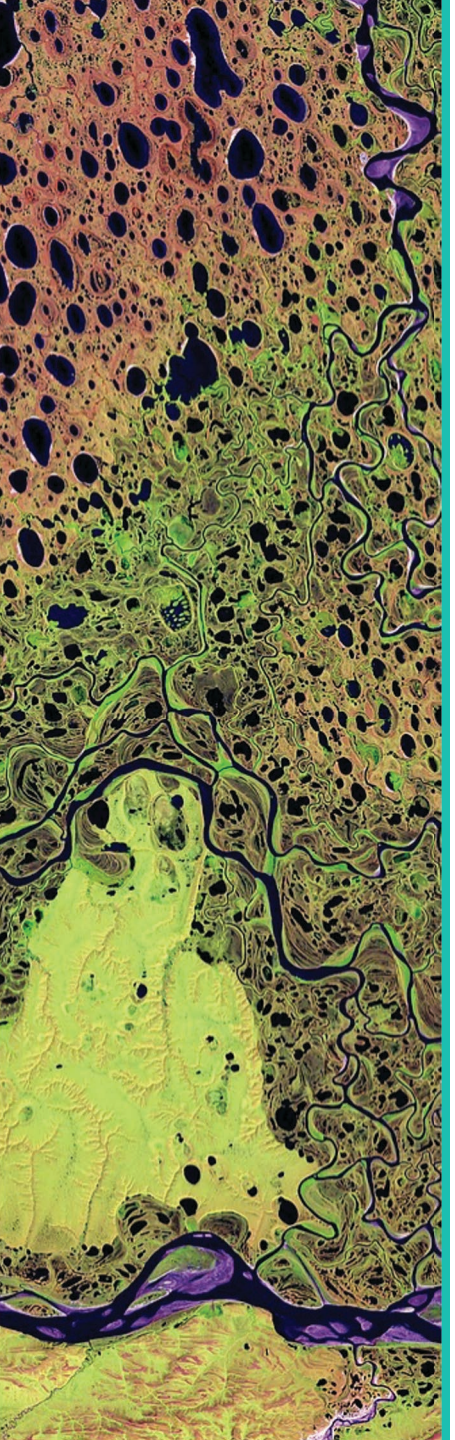
What is the ELSA project?

- UNDP project since 2019. MINAE and PRIAS as national partners.
- ELSAs: Essential Life Support Areas.
- Areas that, if conserved, restored, or sustainably managed, can offer benefits related to food security, water security, climate change, etc.
- Mapping ELSAs to promote science-based policies and decision-making.
- Take nature out of the “conservation silo”.



Why ELSA for climate adaptation?

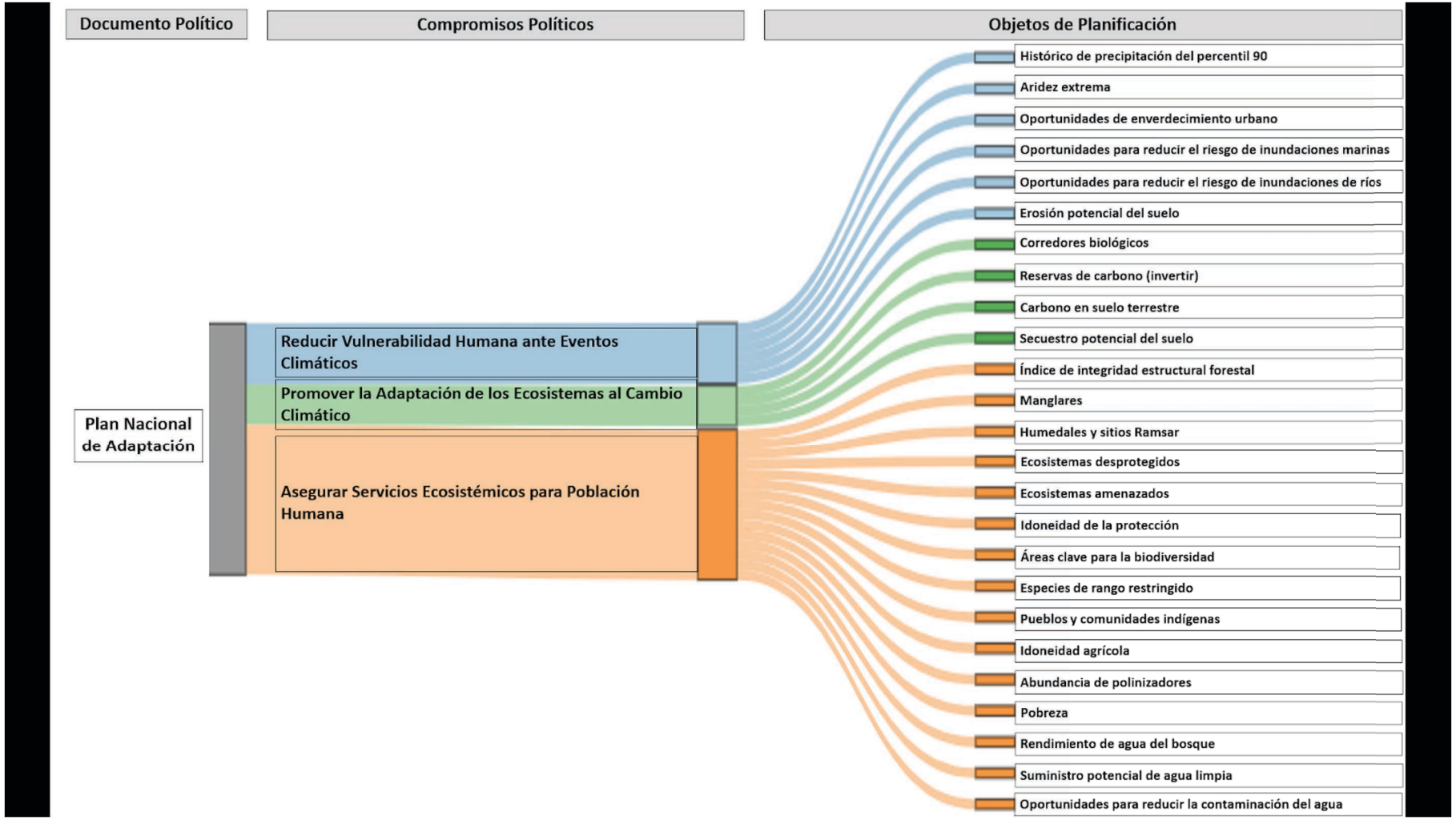
- Central America is one of the most vulnerable regions to the impacts of climate change.
- By 2025, reconstruction due to climate impacts could represent 2.5% of Costa Rica's GDP (CGR, 2017).
- Nature-based Solutions can help in increasing resilience.
- National Policy on Climate Change Adaptation: Solutions based Nature as a key line of action.
- National Climate Adaptation Plan.



Main Steps

- Identify national priorities
- Collect related data sources
- Combine the data layers with the policy priorities
- Produce ELSA maps

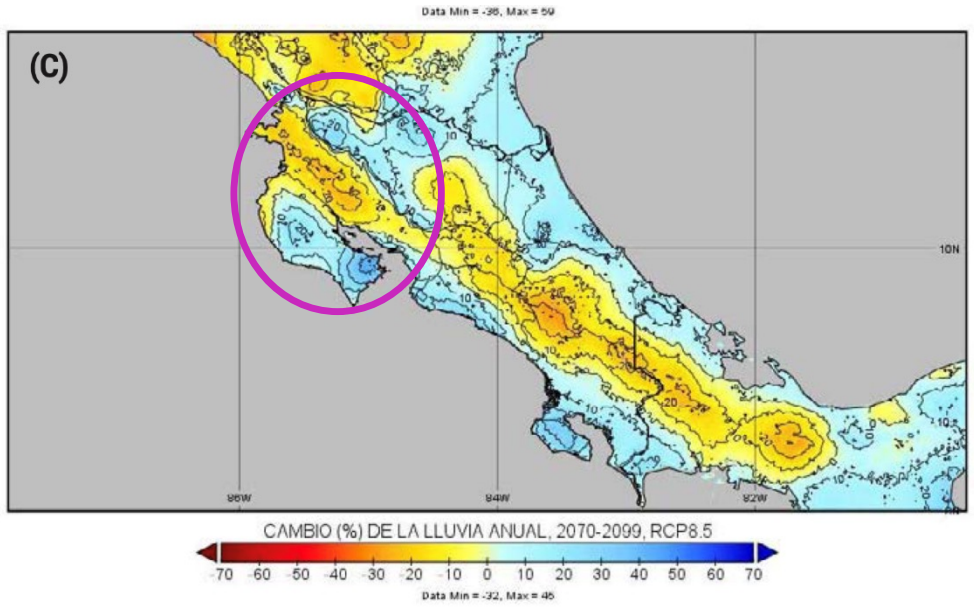
Policy Priorities & Data Layers



Medium Temperature and Precipitation Scenarios in RCP8.5

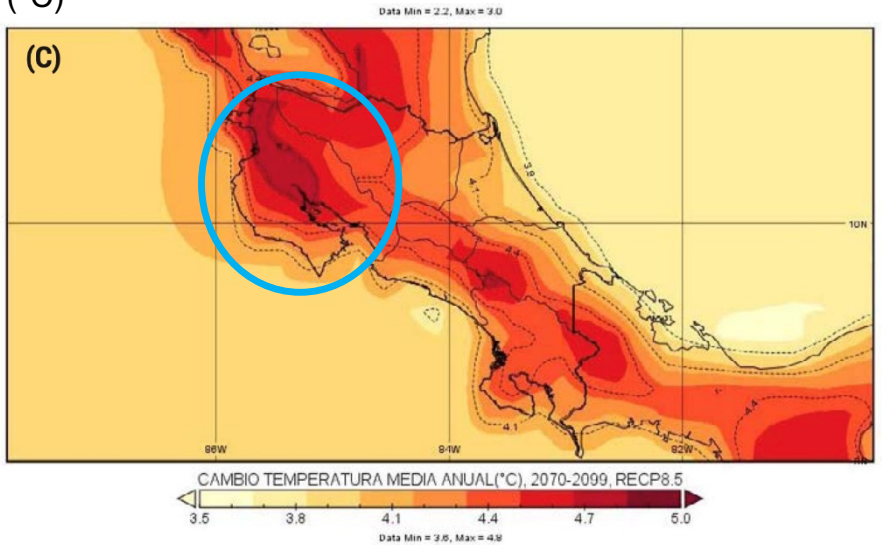
By using Earth observations, what nature-based actions can be taken to adapt to climate change?

Figure 1
Long-term projection (2070-2099) of the change in mean annual rainfall with respect to climatology (1970-2000) of WCv2.



Proyecciones de Cambio Climático regionalizadas para Costa Rica (Escenarios RCP-2.6 y RCP-8.5),IMN / Luis Fernando Alvarado Gamboa, 2021, http://cglobal.imn.ac.cr/, http://cglobal.imn.ac.cr/index.php/publications/proyecciones-de-cambio-climatico-regionalizadas-para-costa-rica-escenarios-rcp-2-6-y-rcp-8-5/

Figure 2
Change long-term time horizons (2070-2099) using the RCP8.5 emissions scenario of mean annual temperature (°C)



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Guanacaste

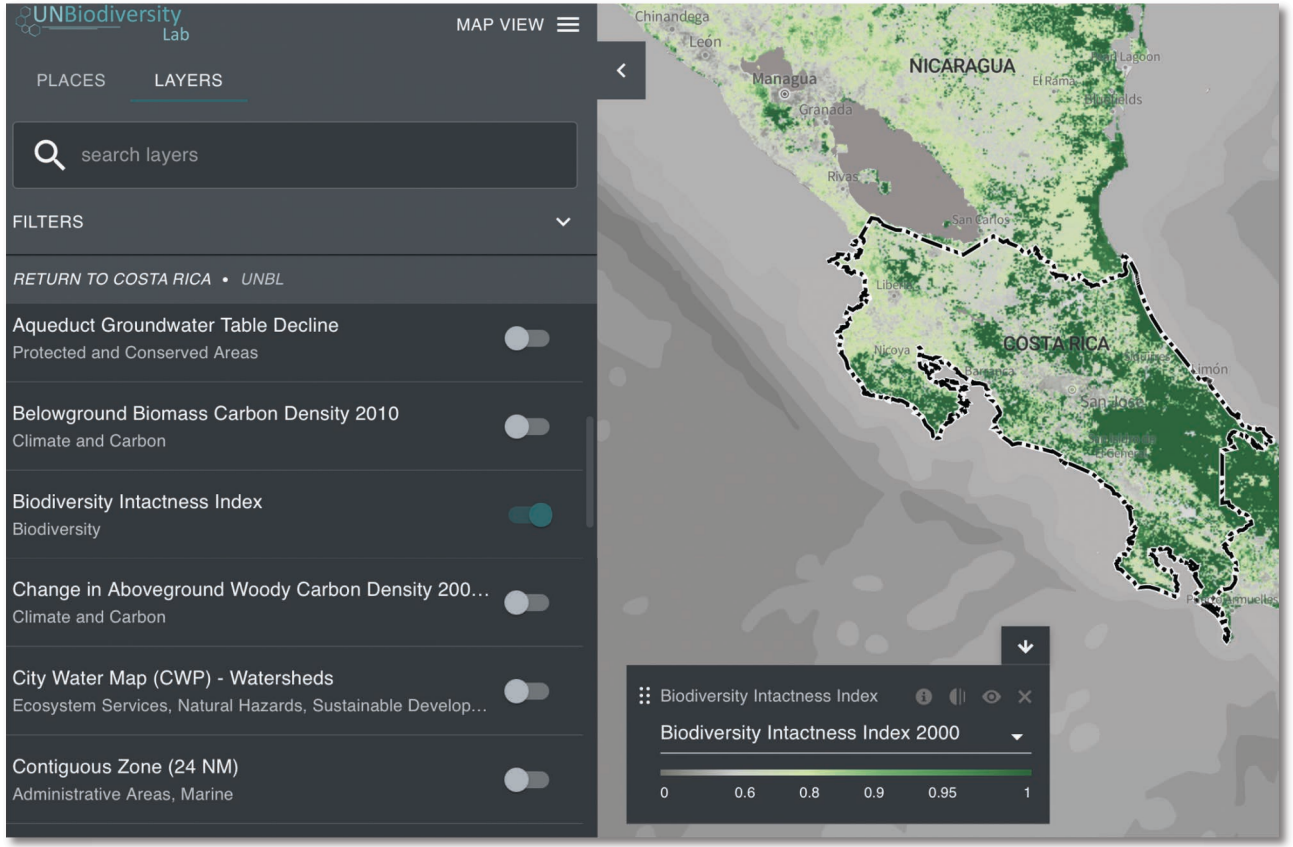
- Tourist atraction.
- 1,470 km2 of protected areas, a World Heritage Site (1999).
- Blue zone, P. Nicoya.
- Costa Rican folklore.
- Food security, livestock, and grains.

ELSA Map – Layers

Data used for this project:

- International layers

- National layers



Two Groups

Features

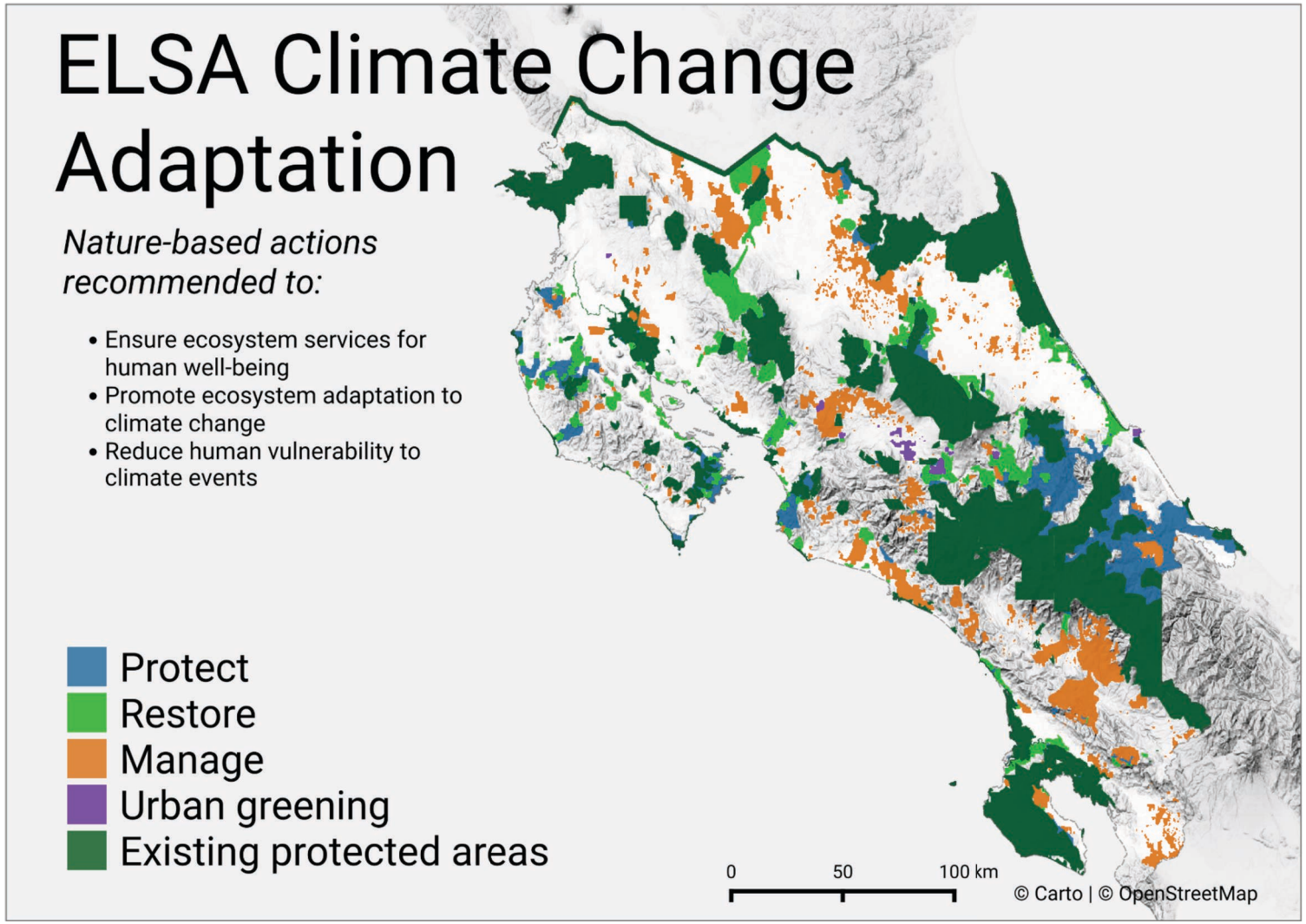
- Reduce human vulnerability to climate events
- Promote ecosystems adaptation to climate change
- Secure ecosystem services for human population

Zones

- Actions to execute
- Blocking options

CONARE CeNAT PRIAS

ELSA - Climate Adaptation



Impact – From Science to Policy

National Climate Adaptation Plan: 6 concrete targets explicitly mention ELSA Adaptation results. 3 of them involve ecosystem restoration actions.

ELSA Adaptation results to be considered for the implementation of:

- National Strategy for Landscape Restoration (MAG-MINAE)
- Payment for Environmental Services Programme
- National Wetland Programme
- Costa Rica Forever Programme

Thank You!

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Convention on Biological Diversity

UN environment
United Nations Environment Programme

UN environment programme WCMC

UNBiodiversity Lab


APPLIED REMOTE SENSING TRAINING PROGRAM
TRAIN - EMPOWER - ADVANCE

Thank You!