National Aeronautics and Space Administration

Using UN Biodiversity Lab to Monitor the Pulse of the Planet

Amber McCullum, Juan Torres-Pérez, Annie Virnig, Lauren Weatherdon, Di Zhang

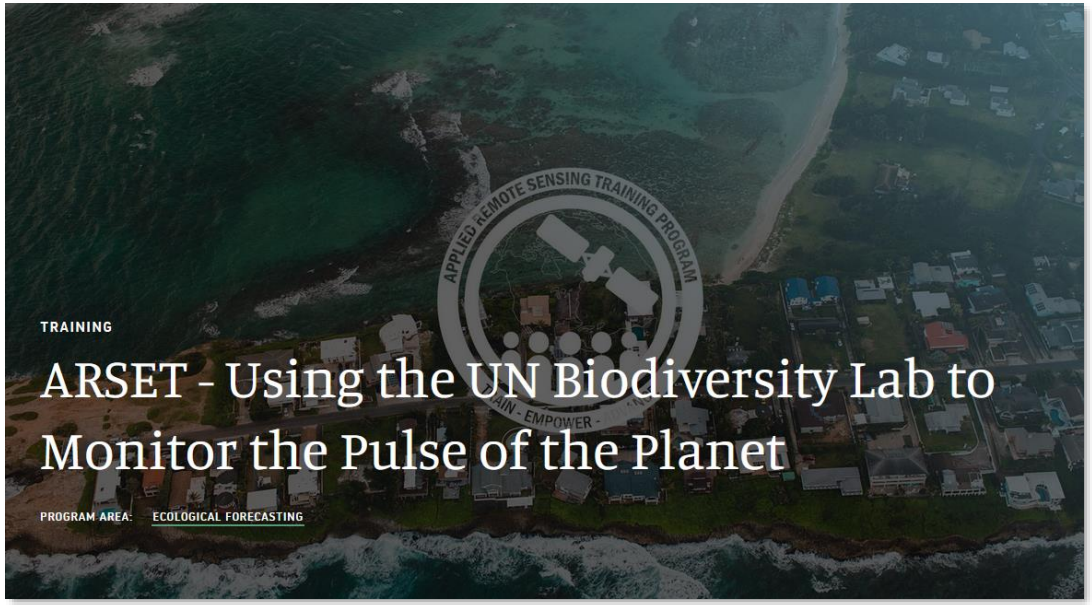
April 28, 2022

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 EST)
    - French (11:00-12:30 EST)
    - Spanish (15:00-16:30 EST)
- **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 webinars 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 3 Agenda

- Recap – What did we cover last time?
- UNBL Workspace Functionalities
- Essential Life Support Areas and Other Forthcoming Functionalities
- Q&A Session

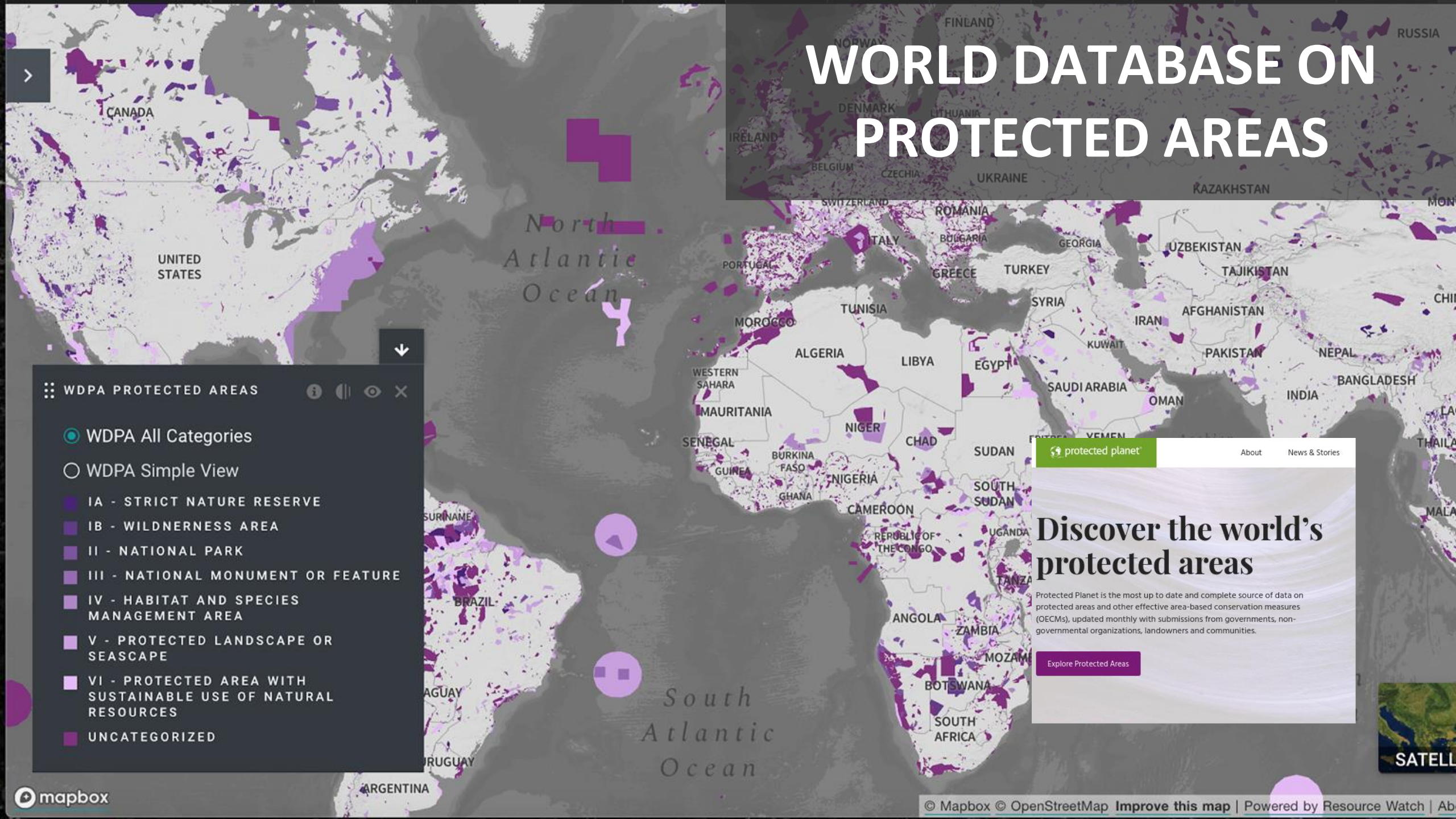
Image Credit: https://unbiodiversitylab.org/maps-of-hope/

Recap: What did we learn last session?

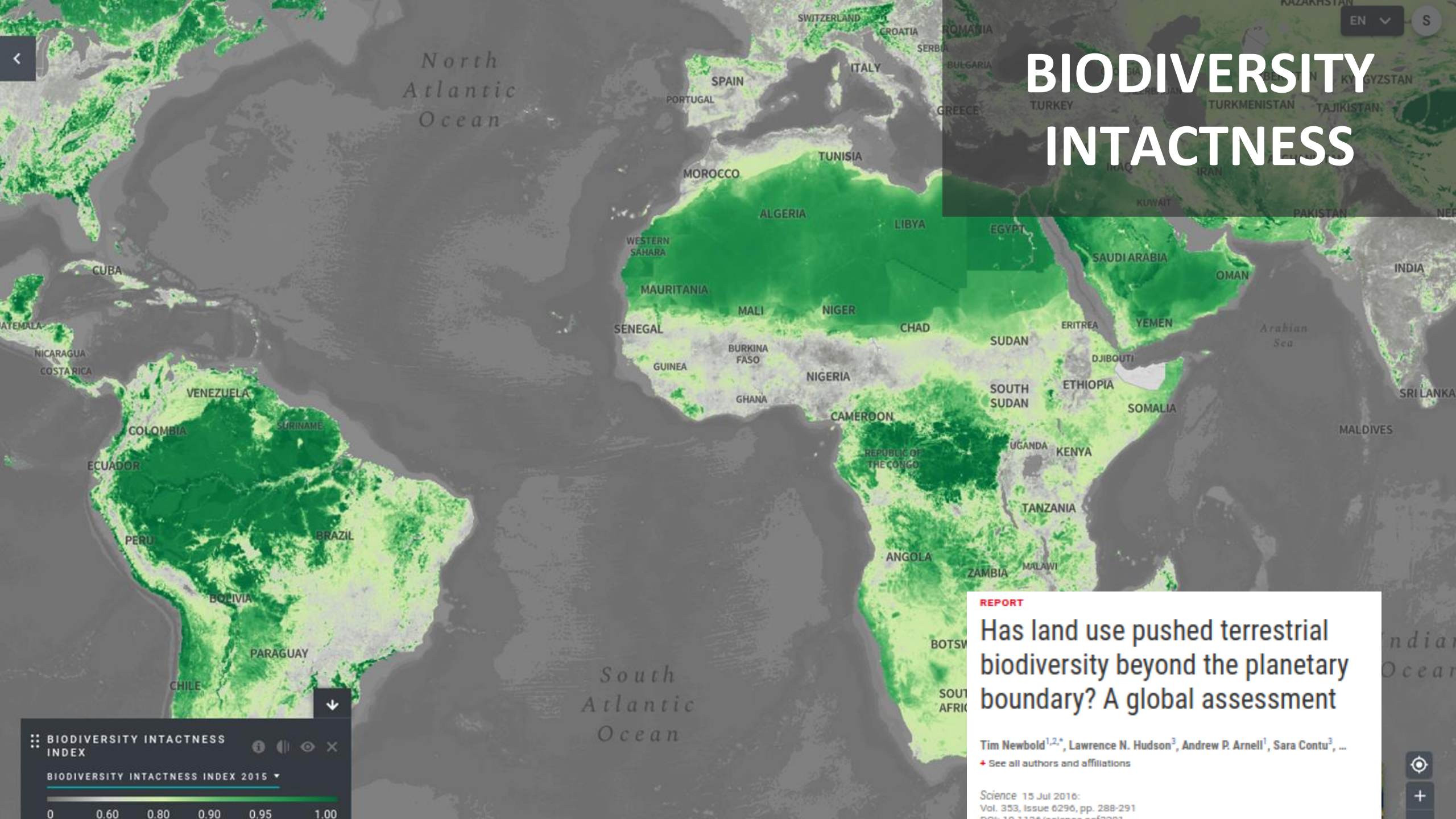
RECAP | UNBL PUBLIC PLATFORM

Anne Virnig, UNDP

WORLD DATABASE ON PROTECTED AREAS



BIODIVERSITY INTACTNESS



BIODIVERSITY INTACTNESS INDEX

BIODIVERSITY INTACTNESS INDEX 2015

0 0.60 0.80 0.90 0.95 1.00

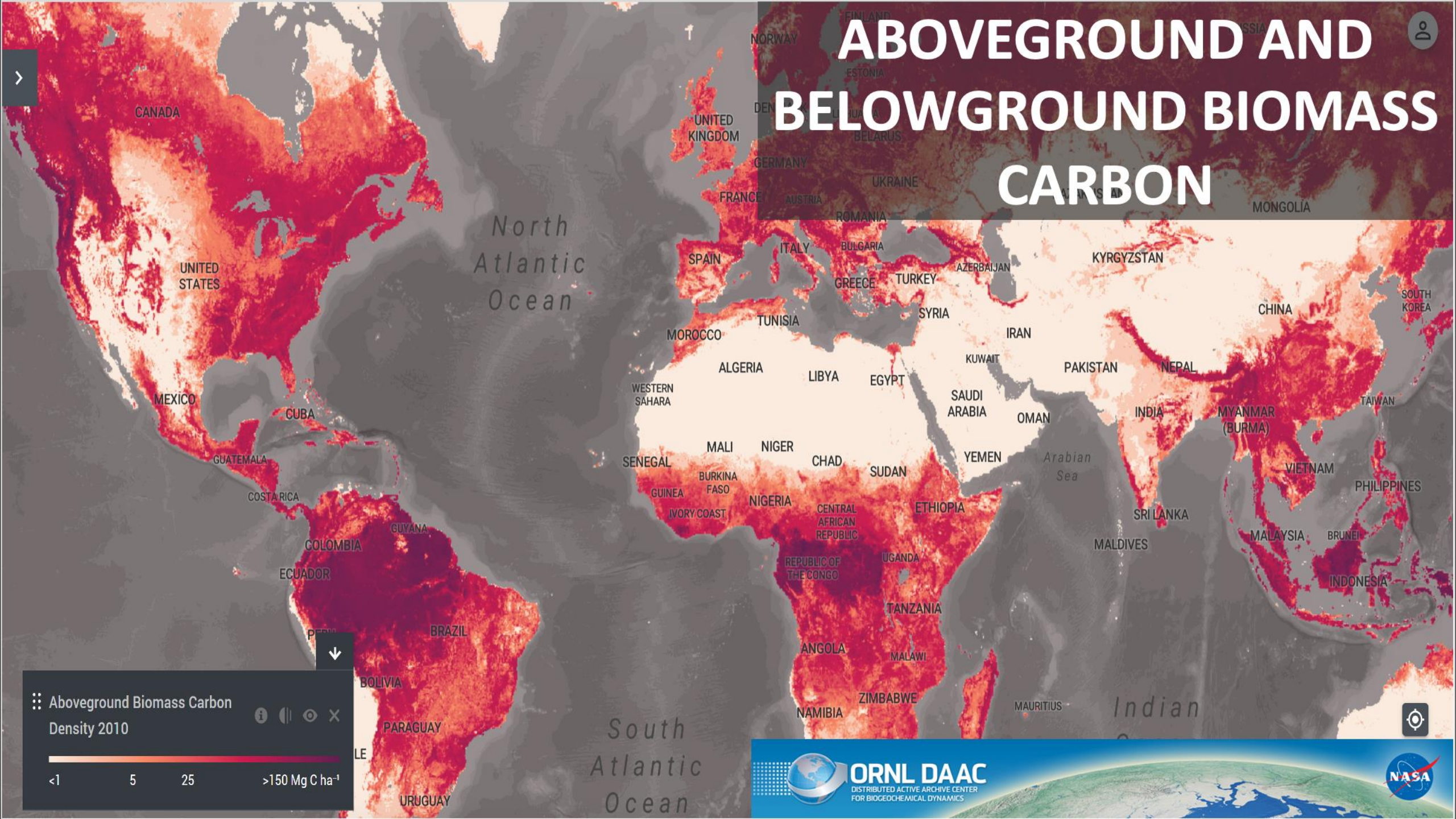
REPORT

Has land use pushed terrestrial biodiversity beyond the planetary boundary? A global assessment

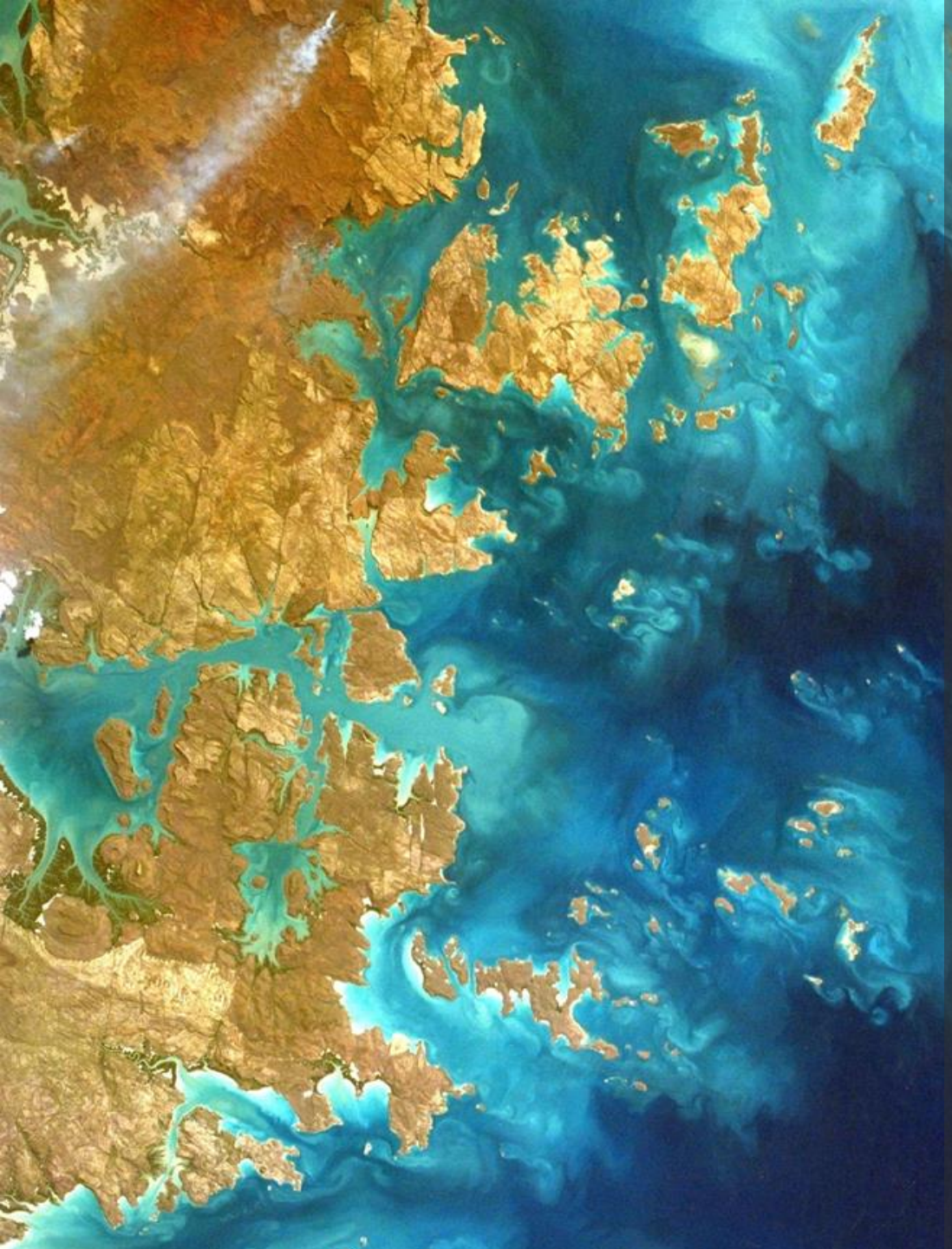
Tim Newbold[1,2,*], Lawrence N. Hudson[3], Andrew P. Arnell[1], Sara Contu[3], ...

+ See all authors and affiliations

Science 15 Jul 2016:
Vol. 353, Issue 6296, pp. 288-291


ABOVEGROUND AND BELOWGROUND BIOMASS CARBON
Aboveground Biomass Carbon Density 2010
<1
5
25
>150 Mg C ha-1
North Atlantic Ocean
South Atlantic Ocean
Arabian Sea
Indian
CANADA
UNITED STATES
MEXICO
CUBA
GUATEMALA
COSTA RICA
COLOMBIA
ECUADOR
GUYANA
BRAZIL
BOLIVIA
PARAGUAY
URUGUAY
NORWAY
UNITED KINGDOM
GERMANY
FRANCE
SPAIN
ITALY
BULGARIA
GREECE
TURKEY
UKRAINE
BELARUS
ROMANIA
AUSTRIA
MONGOLIA
KYRGYZSTAN
AZERBAIJAN
SYRIA
IRAN
CHINA
SOUTH KOREA
TUNISIA
MOROCCO
ALGERIA
LIBYA
EGYPT
WESTERN SAHARA
KUWAIT
PAKISTAN
NEPAL
SAUDI ARABIA
OMAN
INDIA
MYANMAR (BURMA)
TAIWAN
YEMEN
MALI
NIGER
CHAD
SUDAN
SENEGAL
BURKINA FASO
GUINEA
IVORY COAST
NIGERIA
CENTRAL AFRICAN REPUBLIC
ETHIOPIA
VIETNAM
PHILIPPINES
SRI LANKA
MALDIVES
MALAYSIA
BRUNEI
INDONESIA
REPUBLIC OF THE CONGO
UGANDA
TANZANIA
ANGOLA
MALAWI
ZIMBABWE
NAMIBIA
MAURITIUS
ORNL DAAC
DISTRIBUTED ACTIVE ARCHIVE CENTER FOR BIOGEOCHEMICAL DYNAMICS
NASA


CITY WATER MAP
City Water Map (CWP) - Watersheds
CITY WATER MAP - WATERSHEDS
CANADA
UNITED STATES
MEXICO
CUBA
GUATEMALA
COSTA RICA
COLOMBIA
ECUADOR
GUYANA
PERU
BRAZIL
BOLIVIA
PARAGUAY
URUGUAY
ARGENTINA
North Atlantic Ocean
South Atlantic Ocean
FINLAND
NORWAY
ESTONIA
UNITED KINGDOM
BELARUS
GERMANY
UKRAINE
FRANCE
AUSTRIA
KAZAKHSTAN
ROMANIA
SPAIN
ITALY
BULGARIA
GREECE
TURKEY
AZERBAIJAN
KYRGYZSTAN
SYRIA
TUNISIA
MOROCCO
IRAN
KUWAIT
ALGERIA
LIBYA
EGYPT
PAKISTAN
NEPAL
WESTERN SAHARA
SAUDI ARABIA
OMAN
INDIA
MALI
NIGER
CHAD
YEMEN
SENEGAL
BURKINA FASO
SUDAN
Arabian Sea
GUINEA
NIGERIA
ETHIOPIA
IVORY COAST
CENTRAL AFRICAN REPUBLIC
SRI LANKA
MALDIVES
REPUBLIC OF THE CONGO
UGANDA
TANZANIA
ANGOLA
MALAWI
ZIMBABWE
NAMIBIA
MAURITIUS
SOUTH AFRICA
Indian Ocean
mapbox
© Mapbox Improve this map | © Natural Earth Data © Mapbox © OpenStreetMap Improve this map | Powered by Impact Observa



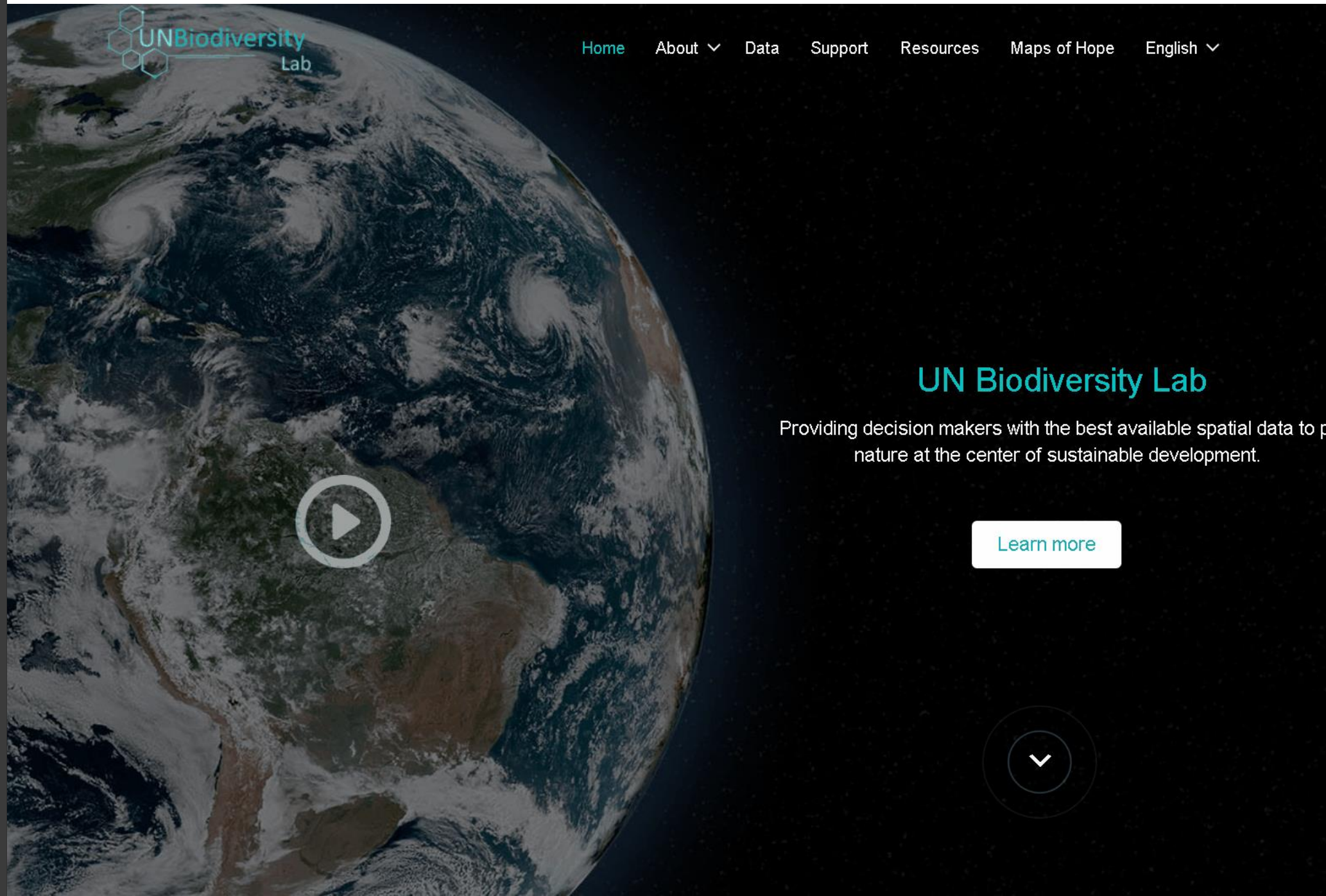
ACCESS OUR FULL DATA LIST

www.unbiodiversitylab.org/data-list

WHAT ARE UNBL COLLECTIONS?

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

EXPLORE UNBL COLLECTIONS



UNBL PUBLIC PLATFORM TRAINING

1. Register & login
2. Search & visualize global datasets
3. Calculate dynamic metrics for your country
4. Share views, create maps & download data

UNBL Workspaces Training

TRAINING | UNBL WORKSPACES

Di Zhang, UNDP

TRAINING OVERVIEW

1. Introduction to UNBL workspaces
2. How to apply for a UNBL workspace
3. Access & basic info for your workspace
4. User management
5. Upload data – places & data layers

INTRODUCTION TO UNBL WORKSPACES

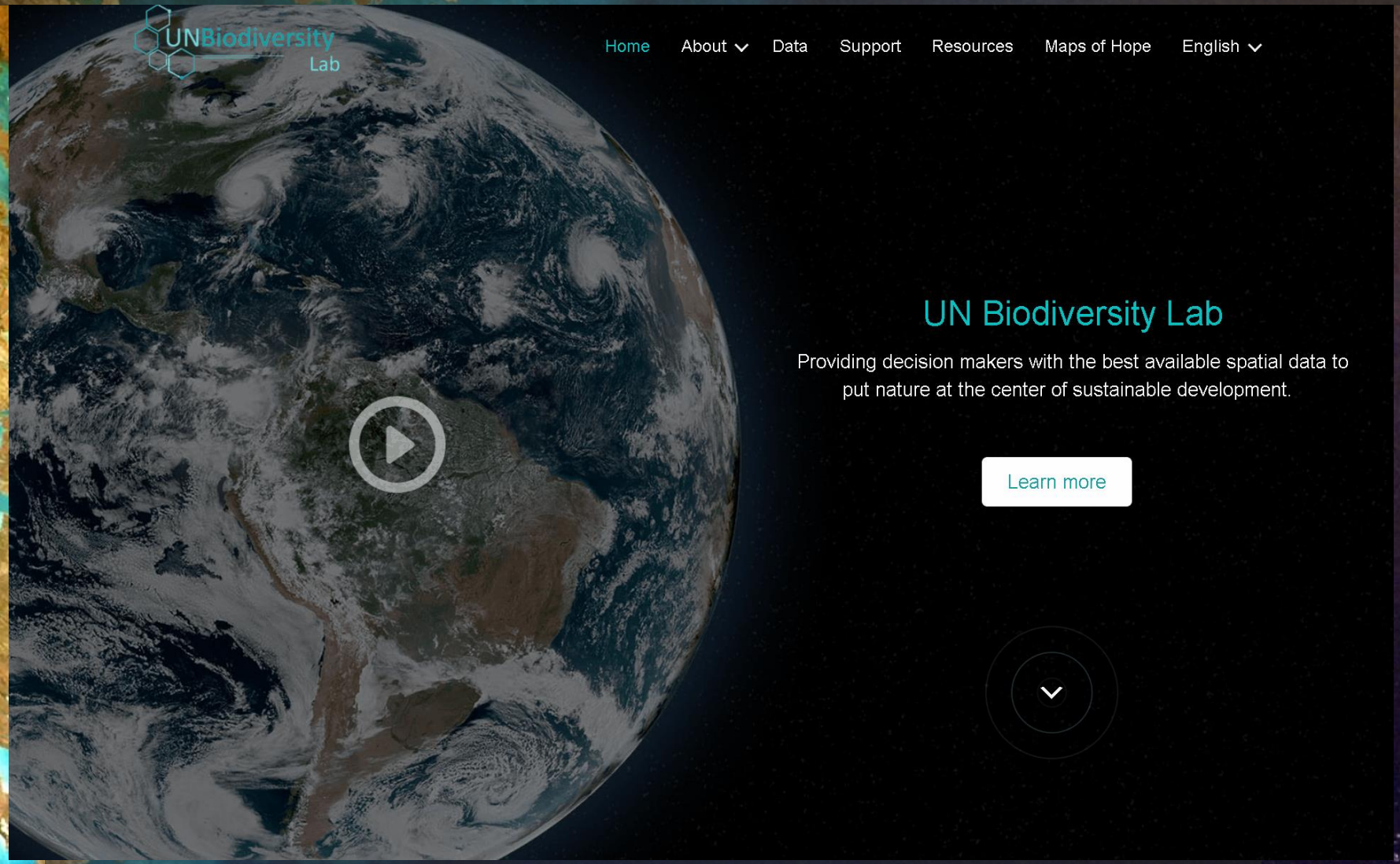
WHAT IS A UNBL WORKSPACE?

- Secure UN-hosted space for collaboration
- Available for governments, UN agencies, NGOs, Indigenous peoples organizations, and research institutions
- Limit access to a discrete set of users
- Upload your national/regional/local data layers
- Upload your areas of interest
- Calculate dynamic metrics

UNBL WORKSPACE | HOW TO APPLY?

View Animated GIFS (Slides 24-50)

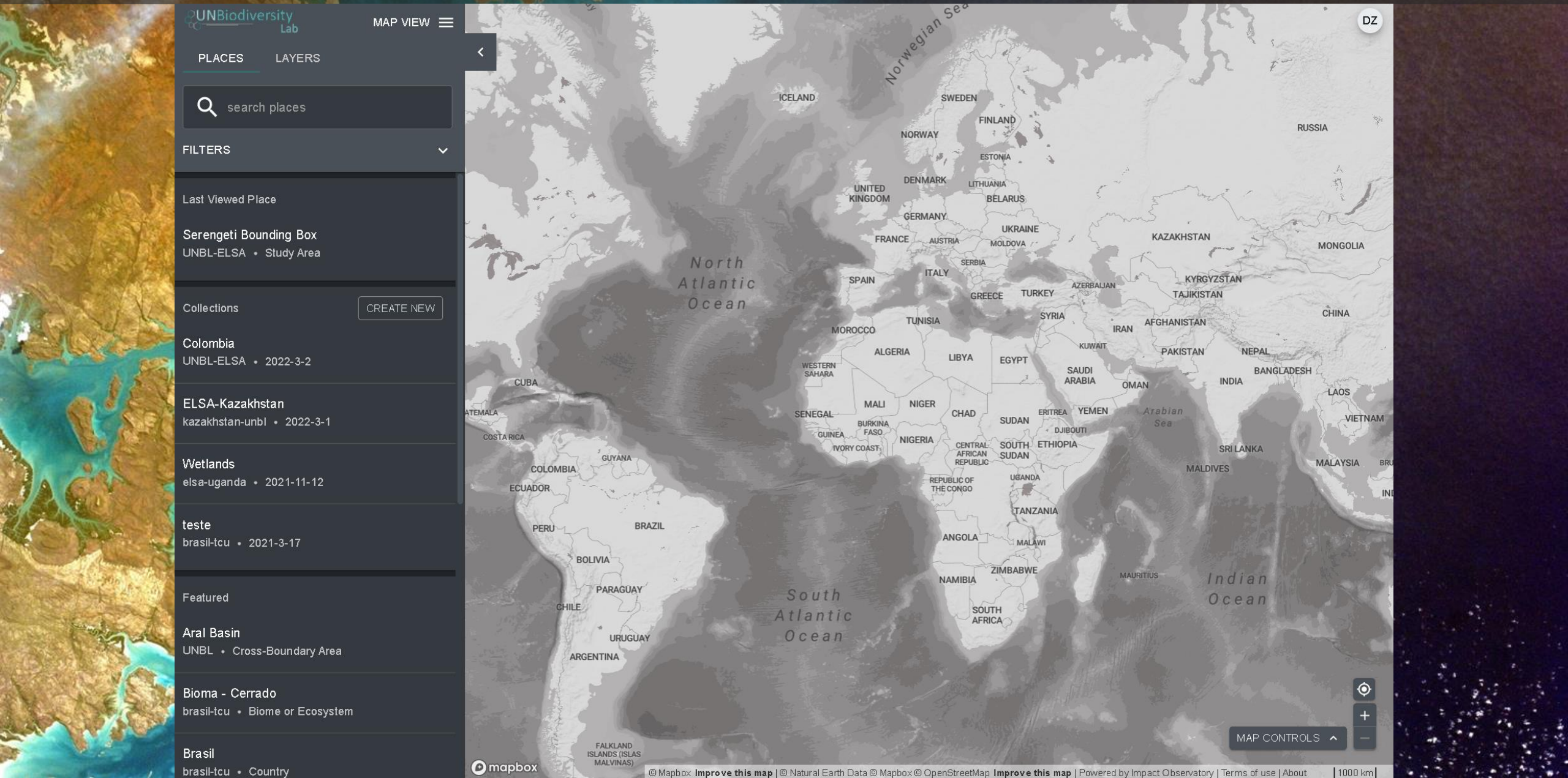
REQUEST A UNBL WORKSPACE



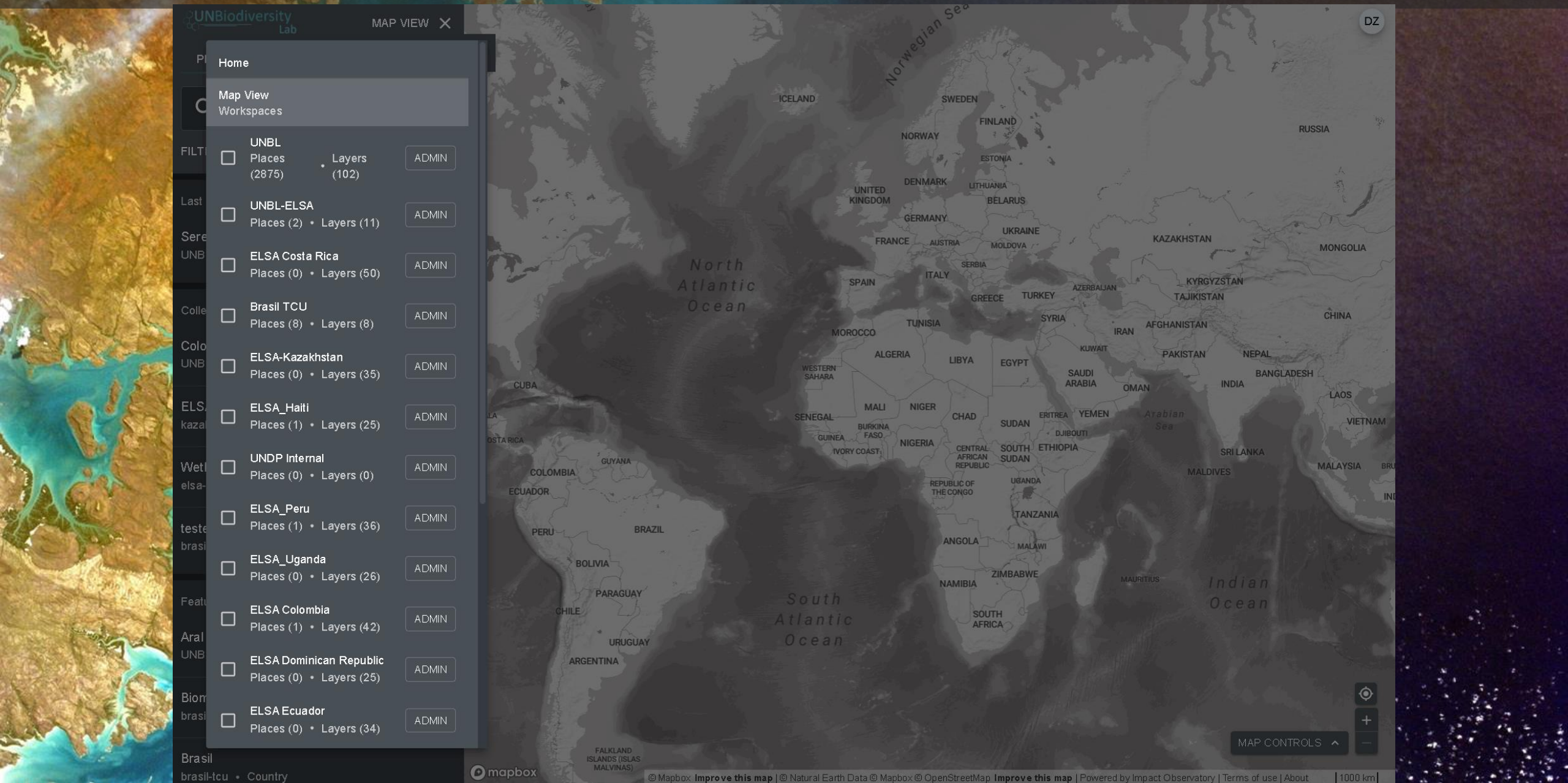
- Request private workspace by visiting: https://unbiodiversitylab.org/unbl-workspaces/

UNBL WORKSPACE | ACCESS & ADMIN

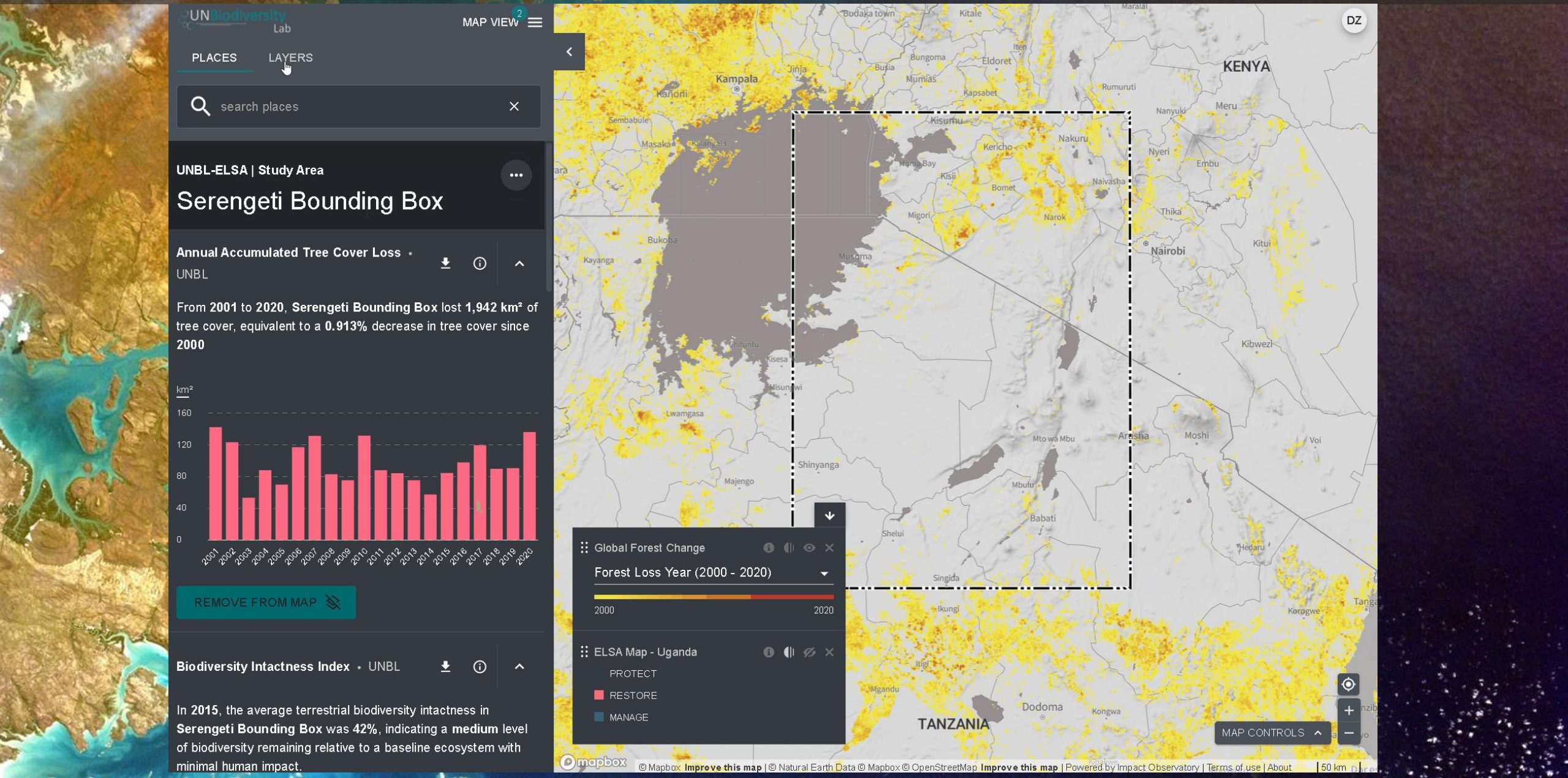
ACCESS YOUR UNBL WORKSPACE



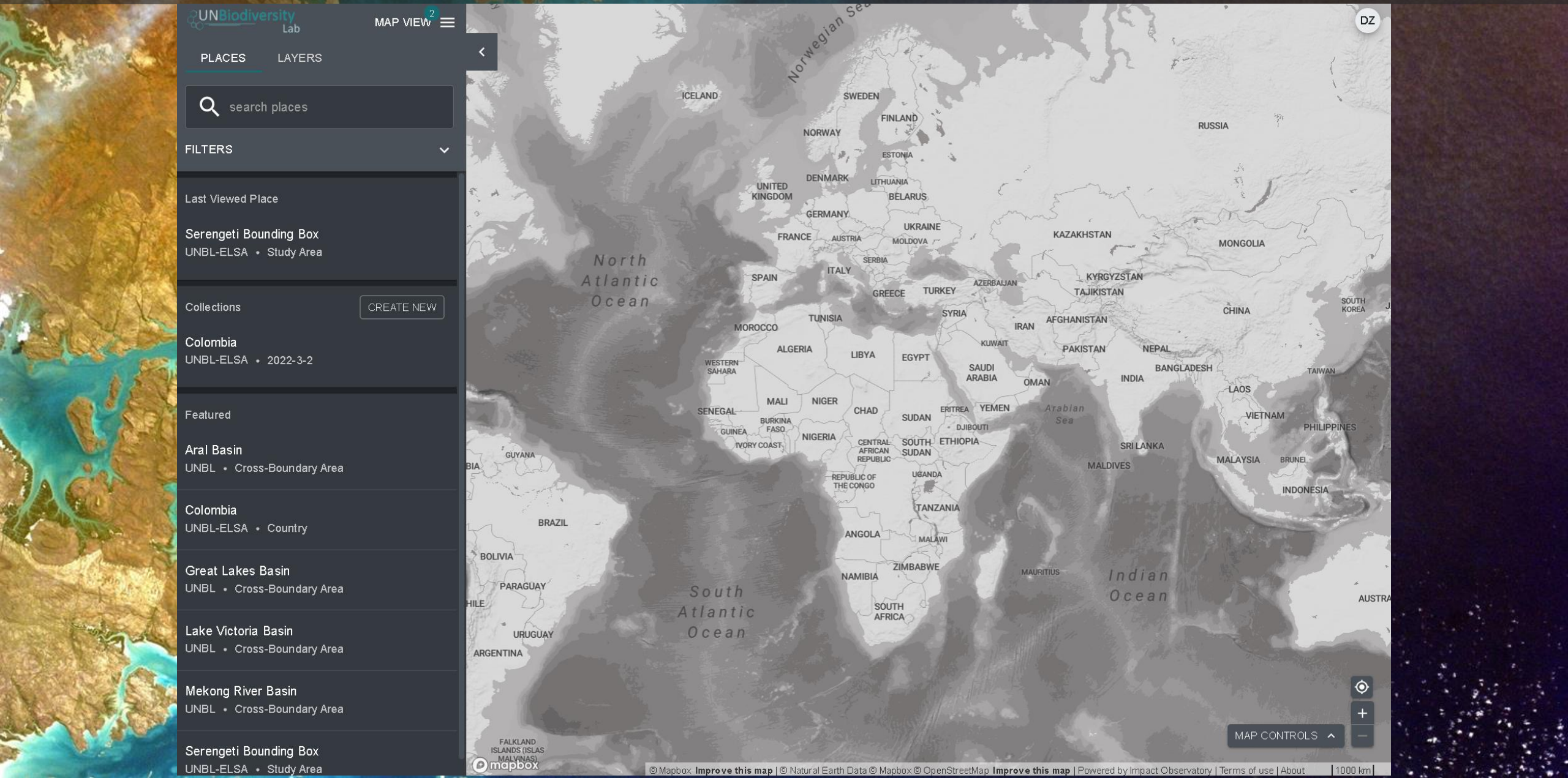
VIEW DATA IN YOUR UNBL WORKSPACE (1)



VIEW DATA IN YOUR UNBL WORKSPACE (2)



ACCESS YOUR ADMIN PAGE



NAVIGATE IN YOUR ADMIN PAGE

UNBiodiversity Lab

UNBL-ELSA

Home

UNBL-ELSA

Key: UNBL-ELSA

Workspace places: 2

Workspace layers: 28

Workspace widgets: 1

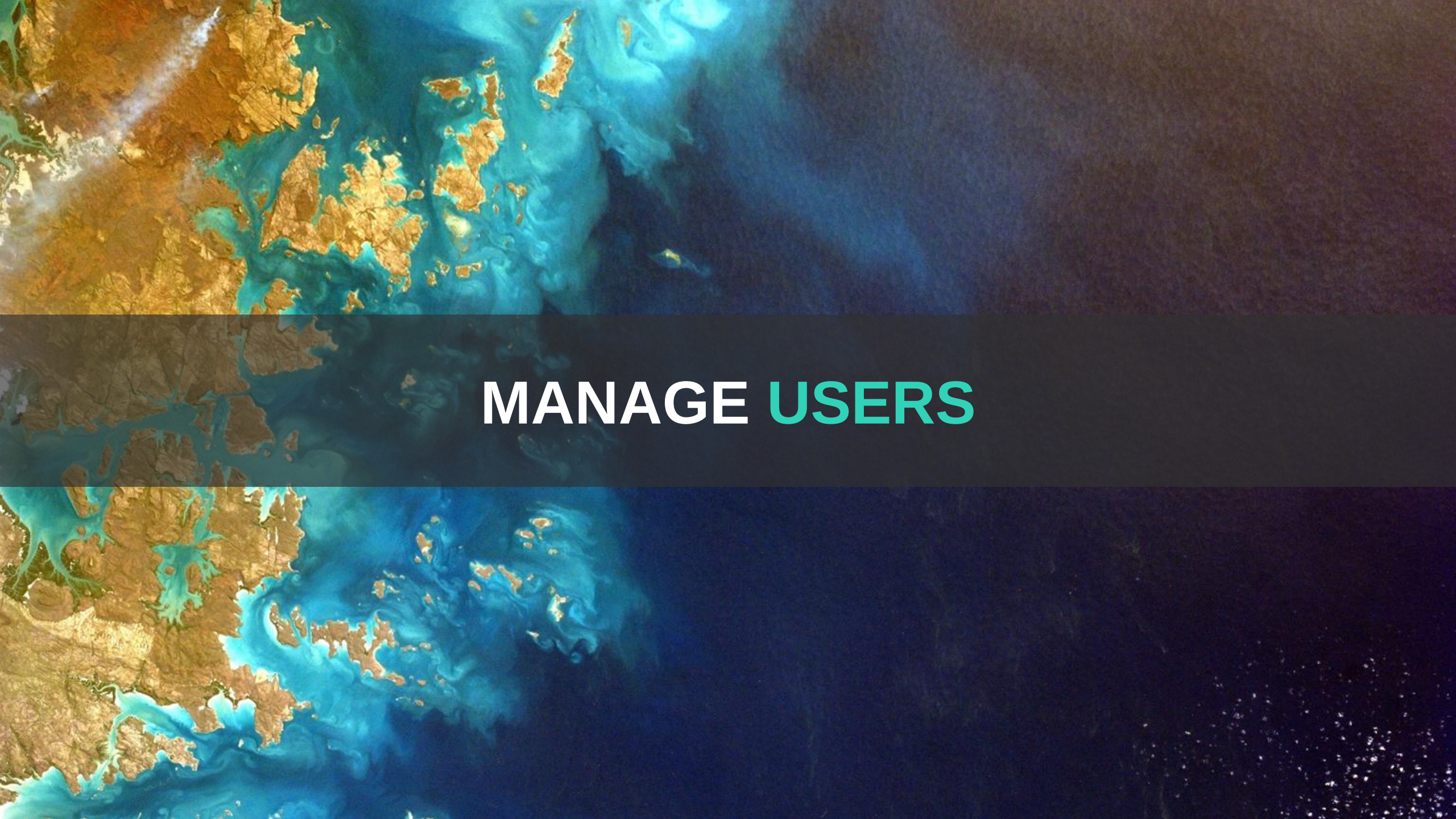
Workspace dashboards: 1

DZ

Home

Welcome To The UNBL-ELSA Admin!

Search and edit sections related to your workspace

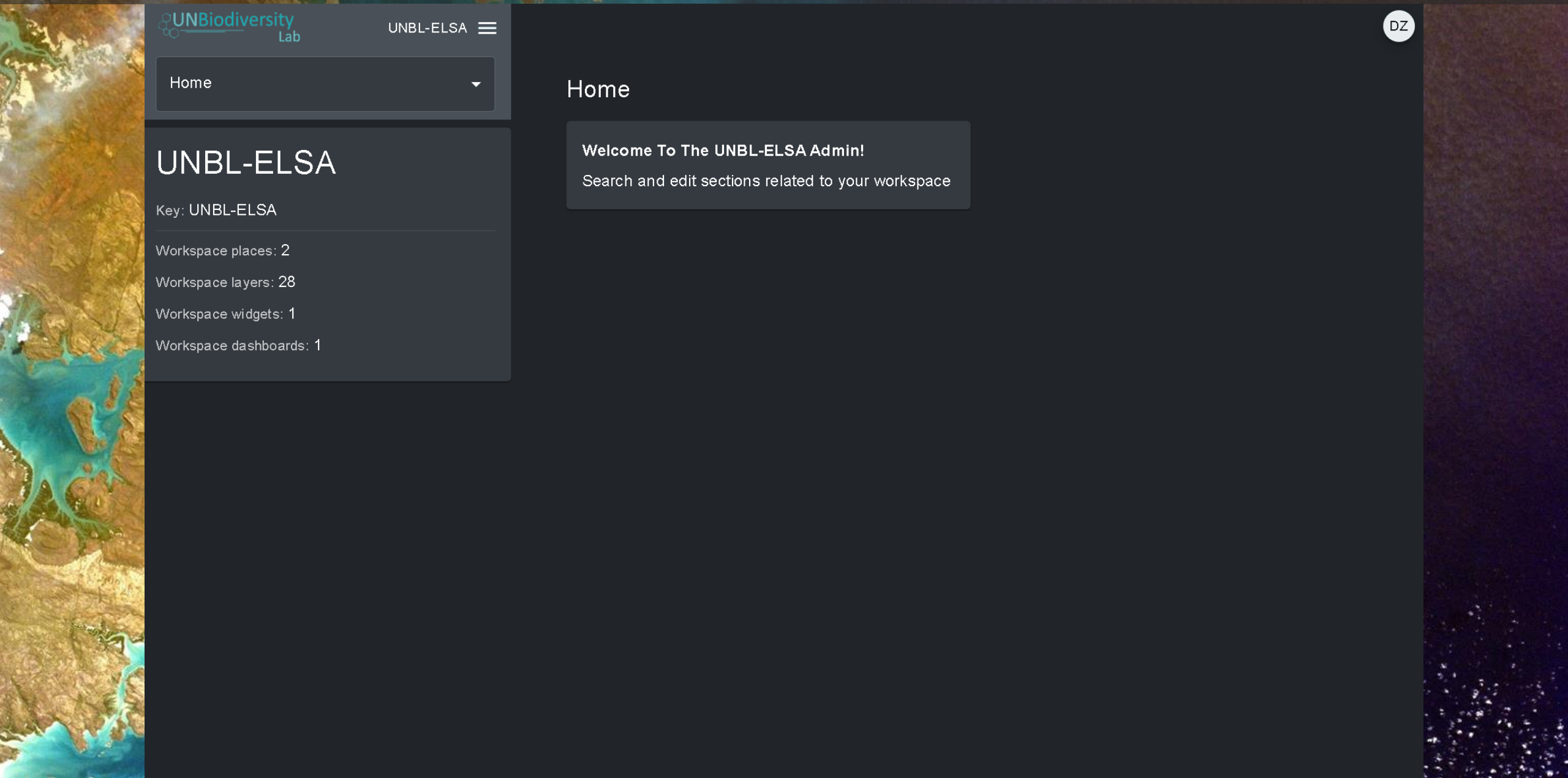


MANAGE USERS

USER ROLES IN YOUR UNBL WORKSPACE

- Viewer view: Can view all workspace data. Viewers do not have access to the admin tool.
- Editor: Upload/delete workspace data via the admin tool and view all workspace assets on the map view.
- Admin: Add and assign roles to editors/viewers, upload/delete workspace data, and view all workspace data.
- Owner: Change workspace name, assign roles to admins/editors/viewers, upload/delete workspace data, and view all workspace data.

ADD USERS TO YOUR UNBL WORKSPACE



UPLOAD DATA | PLACES

TYPES OF DATA

Places/Areas of Interest

- Polygons delineating an area of interest, such as a country boundary, a sub-national administrative areas, or other user defined locations (vector data)

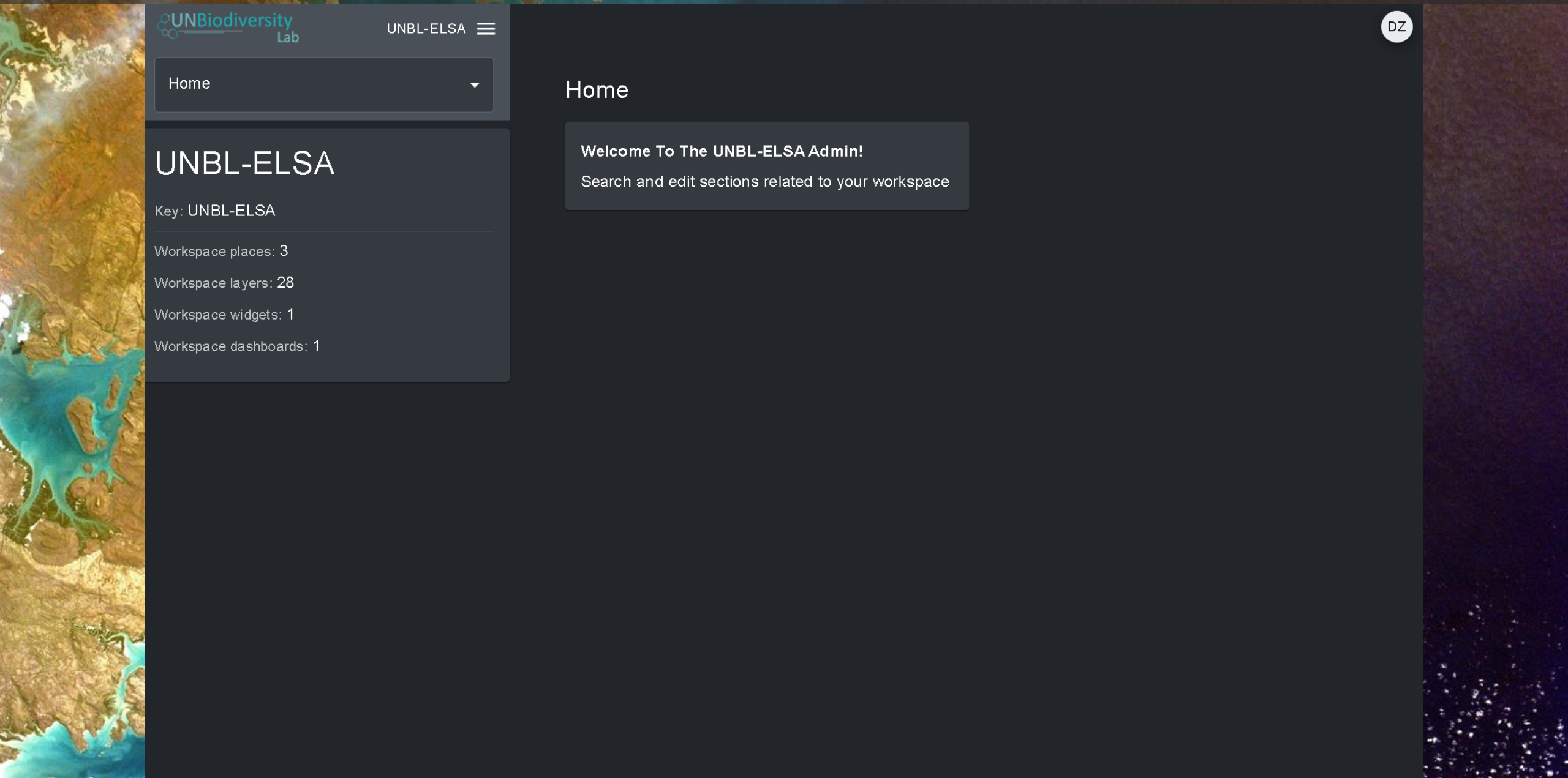
Data Layers

- Raster data, such as aboveground biomass carbon, or species richness data
- Vector data, such as Ecoregions polygons, or the World Database on Protected Areas (WDPA)

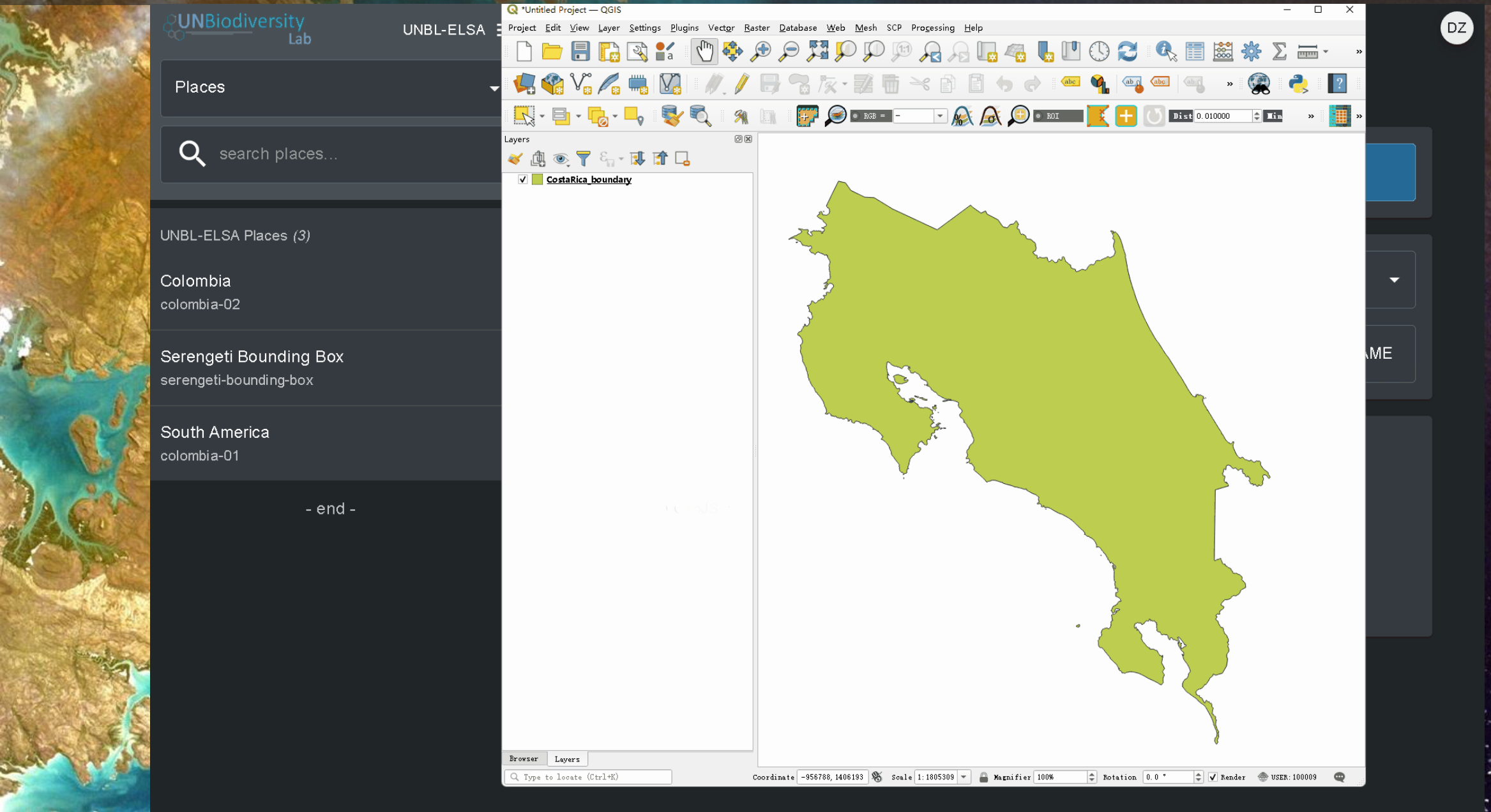
WHY ADD PLACES TO YOUR UNBL WORKSPACE?

- Upload shape for a subnational, national, or transboundary area of interest.
- Utilize all functionalities of UNBL for this place:
  - Calculate dynamic metrics
  - Clip & download any raster layer to the range of this place for use in a desktop GIS software

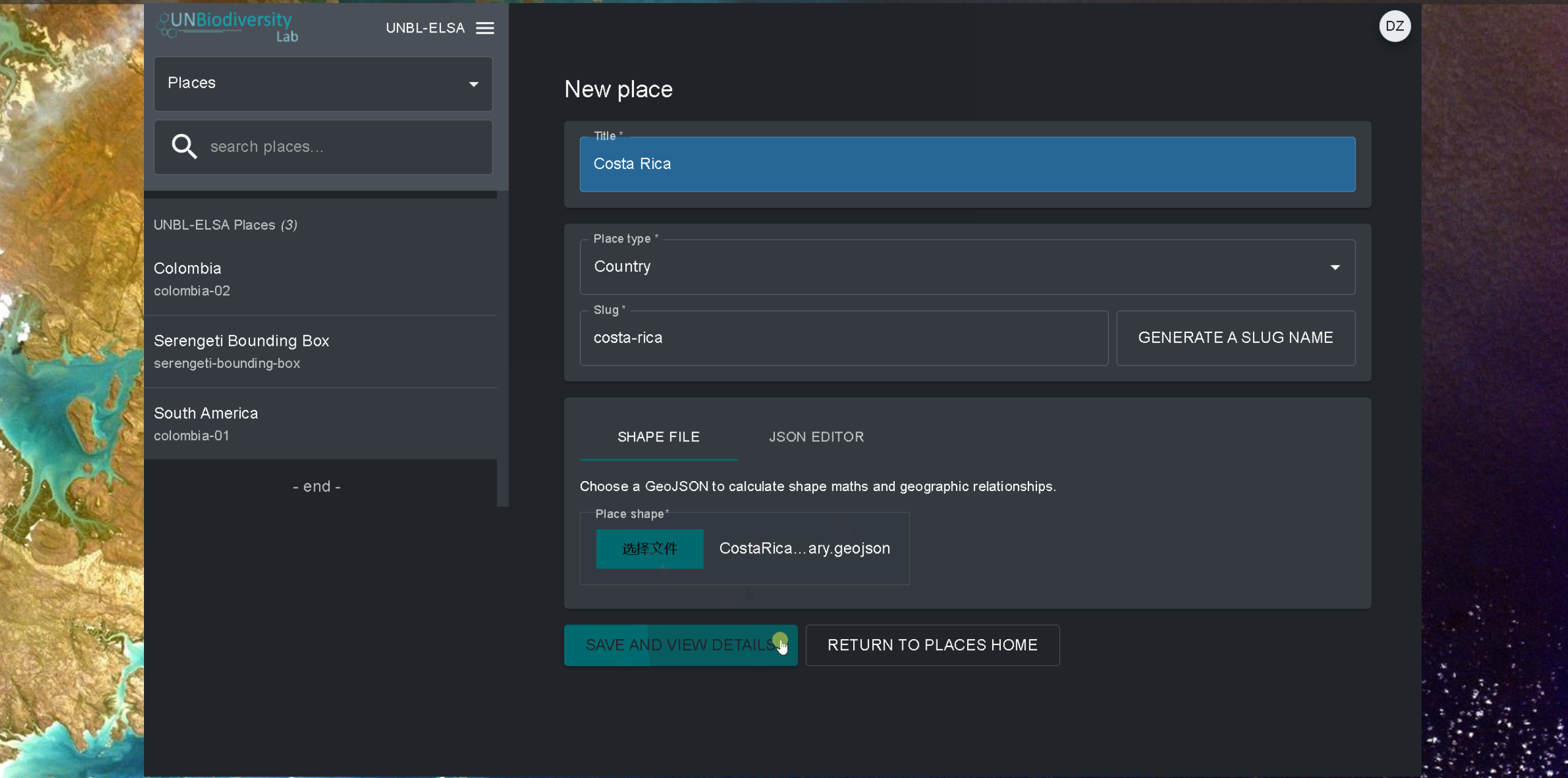
ADD PLACES TO YOUR UNBL WORKSPACE (1)



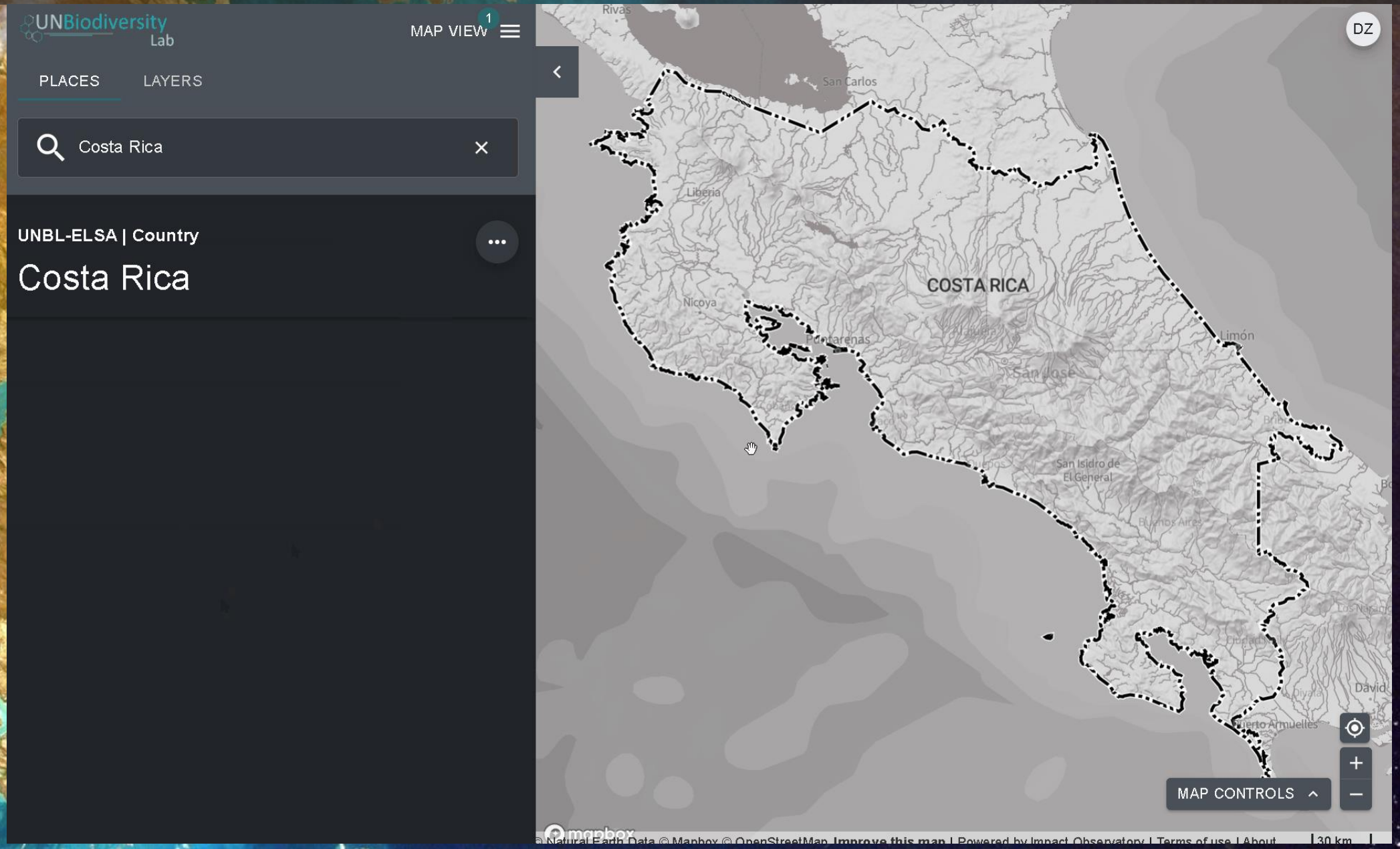
ADD PLACES TO YOUR UNBL WORKSPACE (2)



ADD PLACES TO YOUR UNBL WORKSPACE (3)



ADD PLACES TO YOUR UNBL WORKSPACE (4)

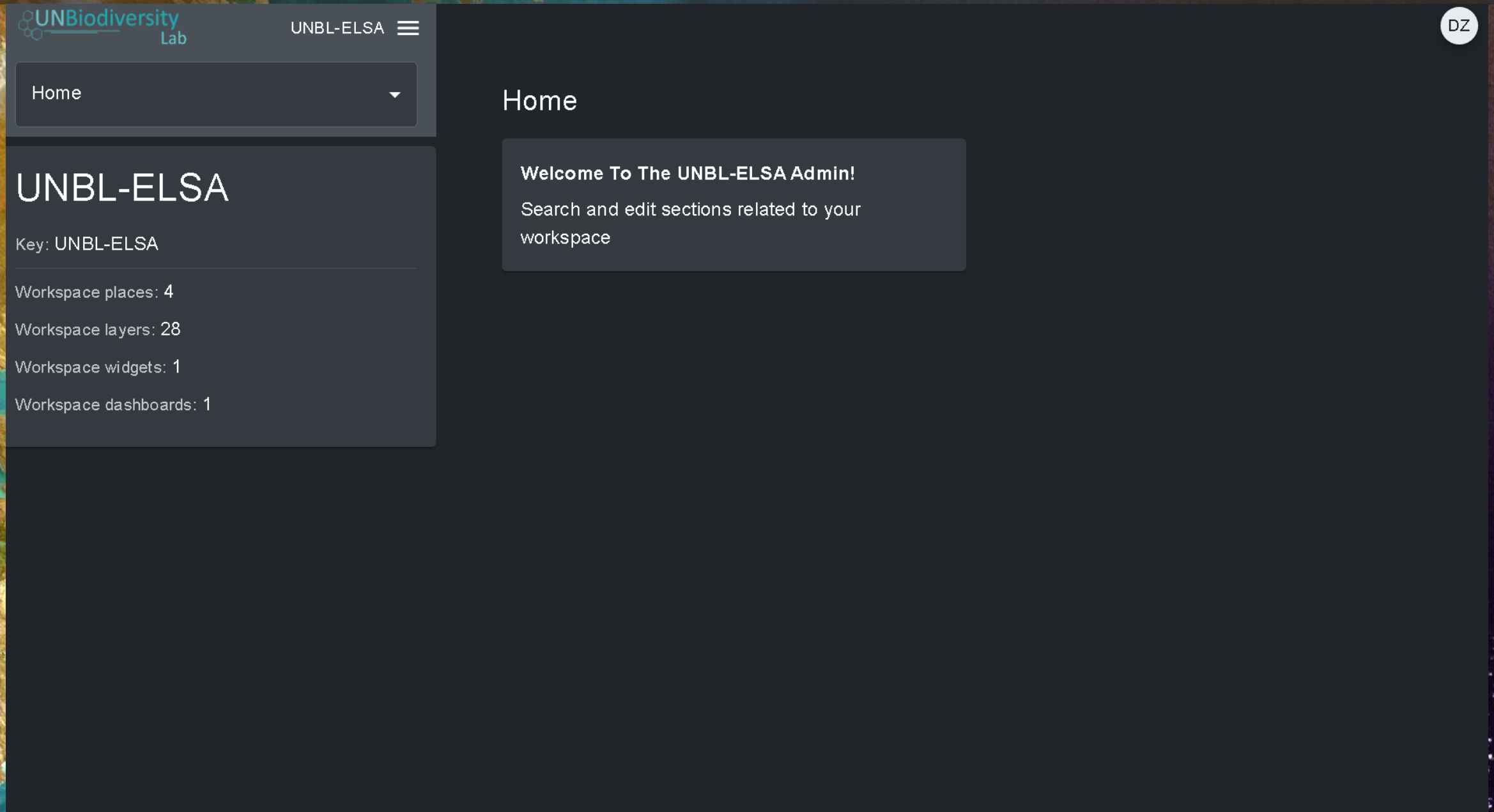


UPLOAD DATA | LAYERS

WHY ADD LAYERS TO YOUR UNBL WORKSPACE?

- Give all your team members the ability to view your data without them needing any prior GIS experience.
- Link to your existing raster and vector layers stored in Google Earth Engine (GEE), Carto, Planetary Computer, Esri (coming soon), and several other cloud locations.
- Upload your data directly into the UNBL GIS data repository on Azure and have them available in your UNBL workspace.
- UNBL security ensures that the layers will only be visible to members of your workspace.

ADD LAYERS TO YOUR UNBL WORKSPACE (1)



ADD LAYERS TO YOUR UNBL WORKSPACE (2)

UNBL - NASA ARSET Trainings design

File Edit View Insert Format Tools Add-ons Help Last edit was seconds ago

Share

Layer config: (copy/paste the following:)


```
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    "assetId": "users/zdi/hfp2013_merisINT",
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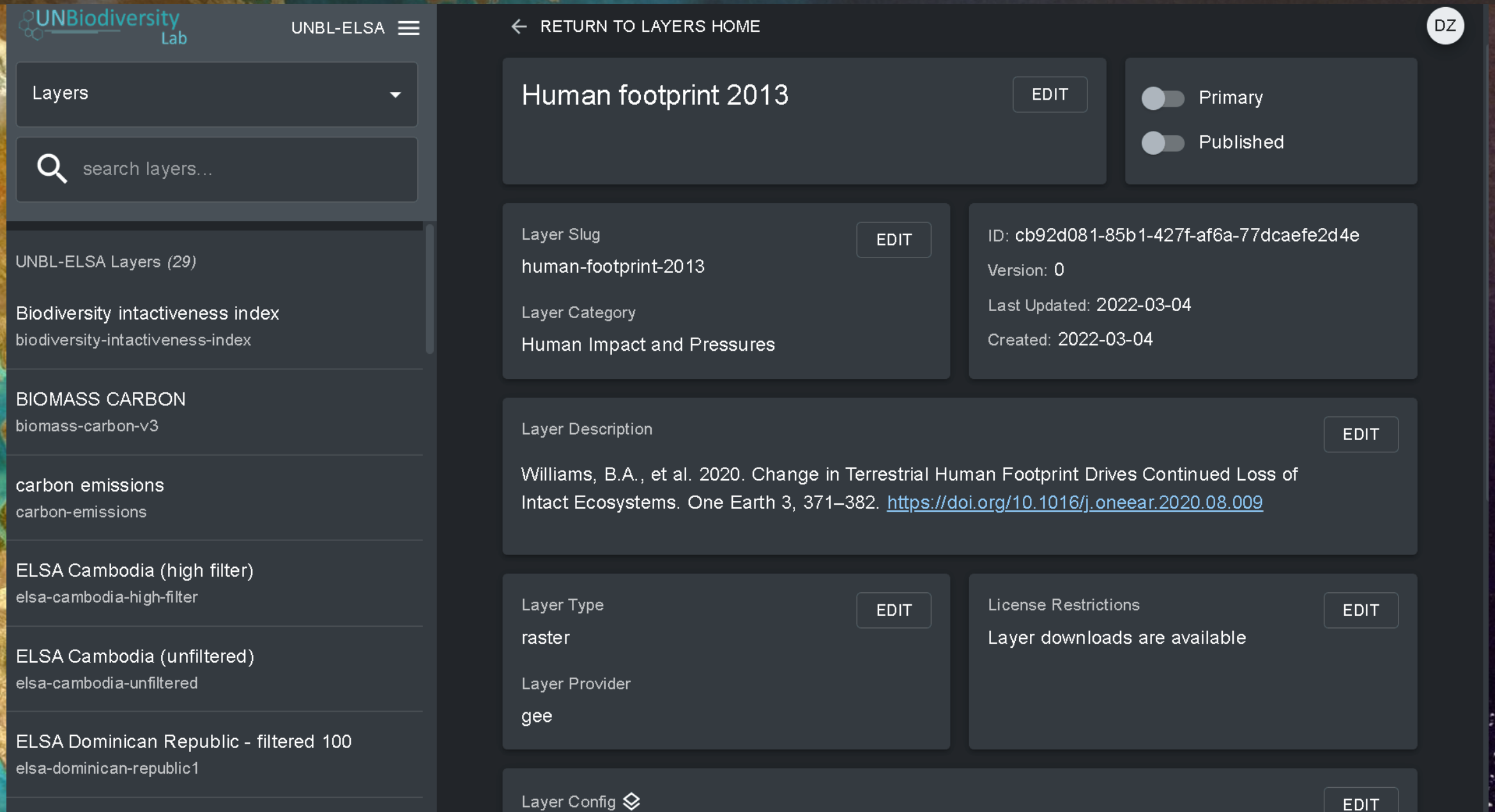
ADD LAYERS TO YOUR UNBL WORKSPACE (3)



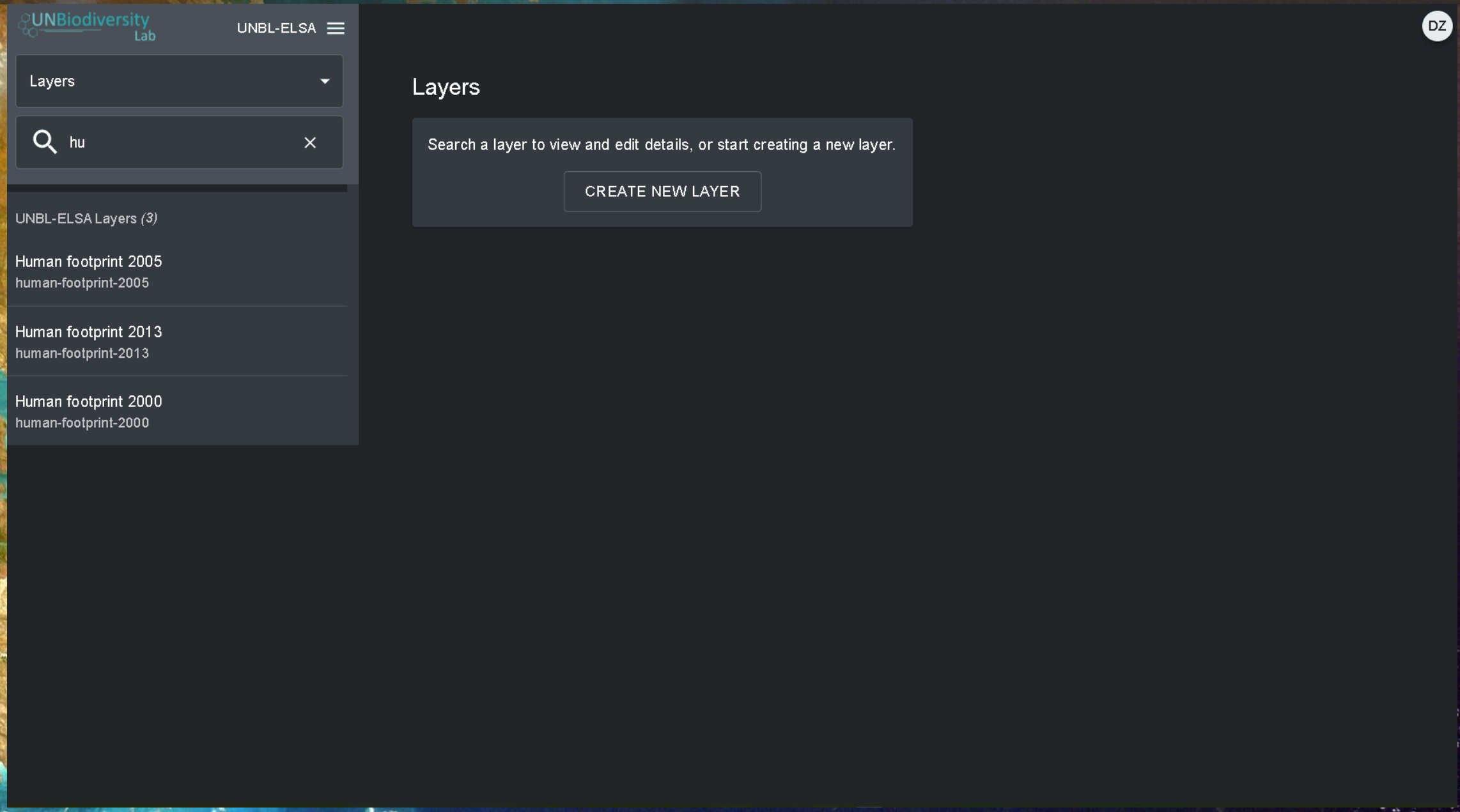
EDIT CONFIG FOR YOUR LAYERS FROM GEE

- GEE Asset ID
- Layer Styling
  - ColorMap type: use "*ramp*" for continuous data (e.g., population data). Use the "*interval*" for categorical data (e.g., land cover categories).
  - Set color, quantity, opacity
- Legend Styling
  - Set value/name, color.
  - Legend types: use "*gradient*" for ramp styled continuous data, use "*basic*" for interval styled categorical data.
- Update the layer ID in the tiles URL.

UPLOAD DATA | GROUP LAYERS

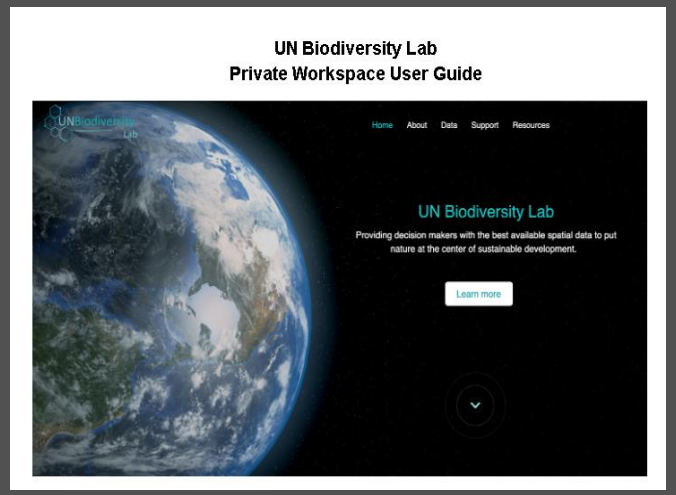
WHAT ARE GROUP LAYERS

ADD GROUP LAYERS TO YOUR WORKSPACE



CONCLUSIONS

UNBL WORKSPACE GUIDANCE MATERIALS



UNBL Workspace
Technical Guidance

- https://unbiodiversitylab.org/unbl-workspaces-en/
- https://unbiodiversitylab.org/unbl-workspaces-sp/
- https://unbiodiversitylab.org/unbl-workspaces-fr/
- https://unbiodiversitylab.org/unbl-workspaces-pt/
- https://unbiodiversitylab.org/unbl-workspaces-ru/

Also available in French, Portuguese, Russian, and Spanish!

A Look Ahead: UN Biodiversity Lab

A LOOK AHEAD | UN BIODIVERSITY LAB

Anne Virnig, UNDP
Lauren Weatherdon, UNEP-WCMC

THE VISION

Spatial Data as a Key Integrator

Spatial data can:

- Create a biodiversity baseline
- Unify competing national priorities into a single scientifically-grounded framework
- Identify cross-cutting solutions to planning problems

Draft Target 1, post-2020 framework of the Convention on Biological Diversity. Ensure that all land and sea areas globally are under integrated biodiversity-inclusive spatial planning addressing land- and sea-use change, retaining existing intact and wilderness areas.

Photo Credit: Giancarlo Pucci | UNDP Costa Rica

Giancarlo Pucci / UNDP Costa Rica


What if countries had a way to precisely locate where protecting, managing, and restoring nature could have the greatest impact?


Our vision is a world where government agencies develop comprehensive spatial plans to achieve multiple goals that include conserving nature, sustaining its benefits to people, and mitigating our climate crisis.

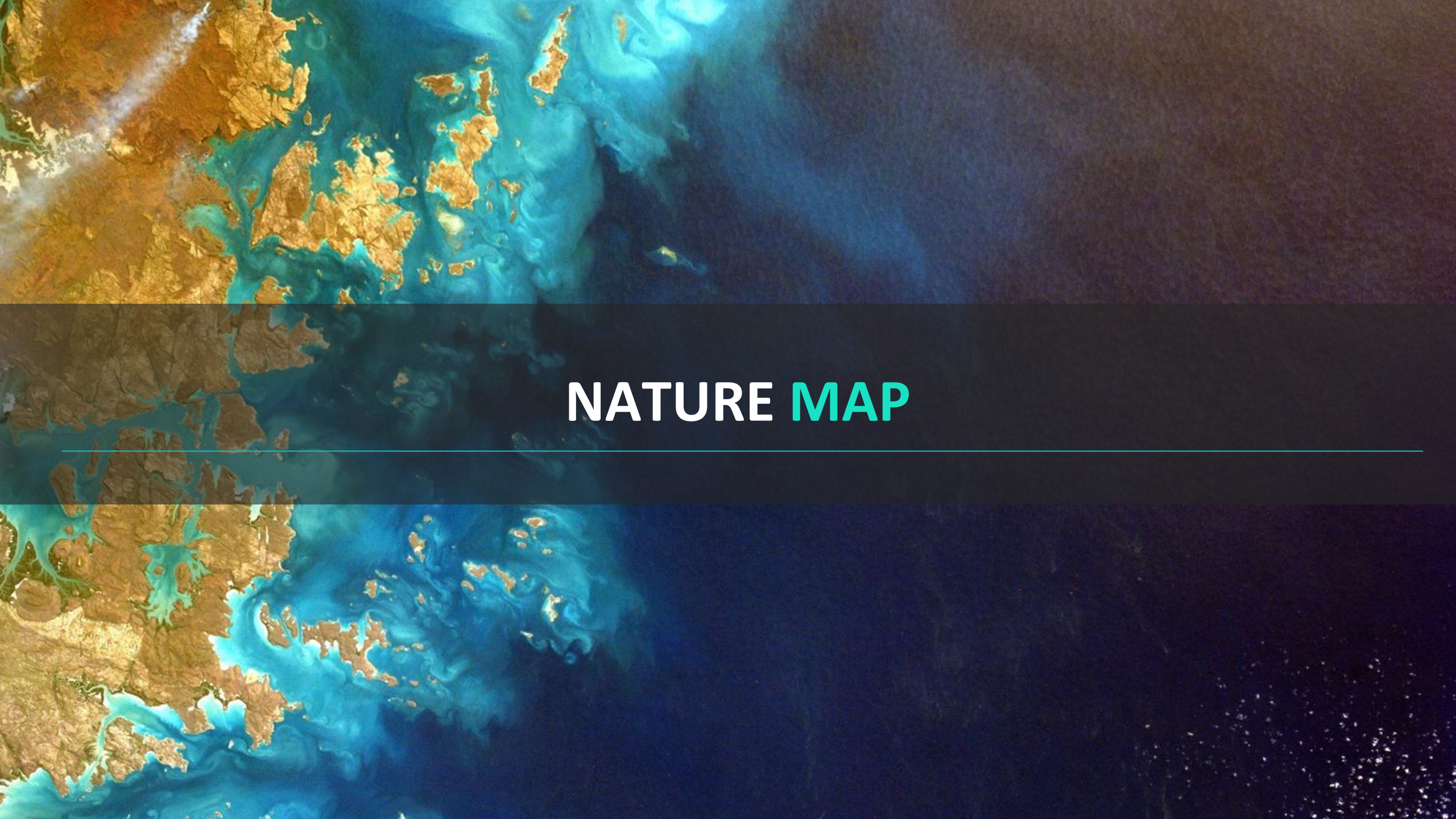
UNBiodiversity Lab

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.

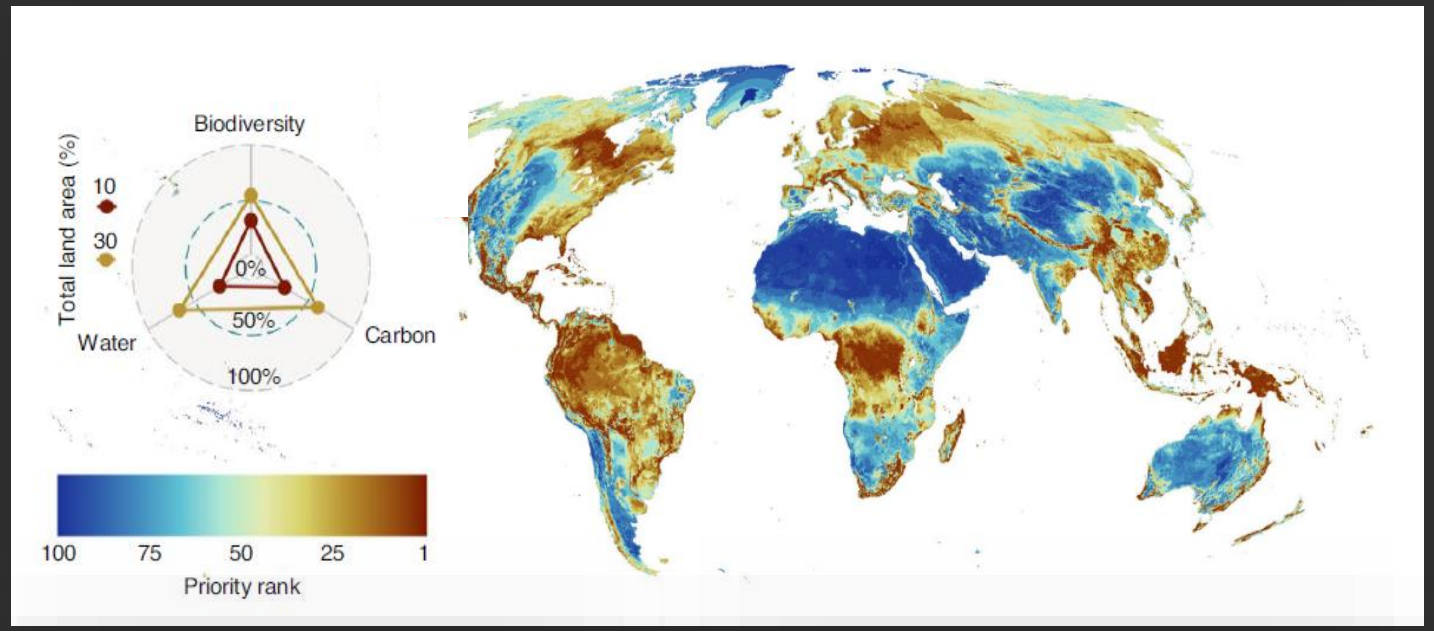
Learn more

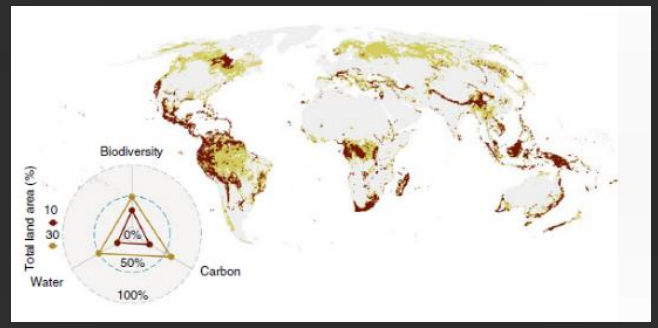


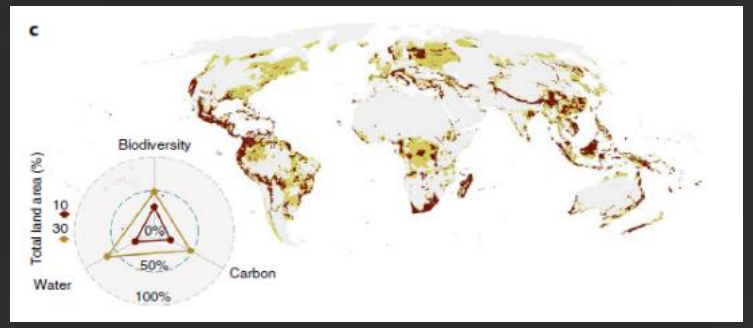
NATURE MAP

Integrated Spatial Planning to Deliver Multiple Benefits

- Global analysis shows potential to **achieve multiple targets** through **informed land-use decision making**
- Example: **30%** of land area could conserve **>60% of carbon stock, >65% clean water** provision, and meet conservation targets for **~60% of terrestrial vertebrates and vascular plants**[1]
- Global map =/= national plan!







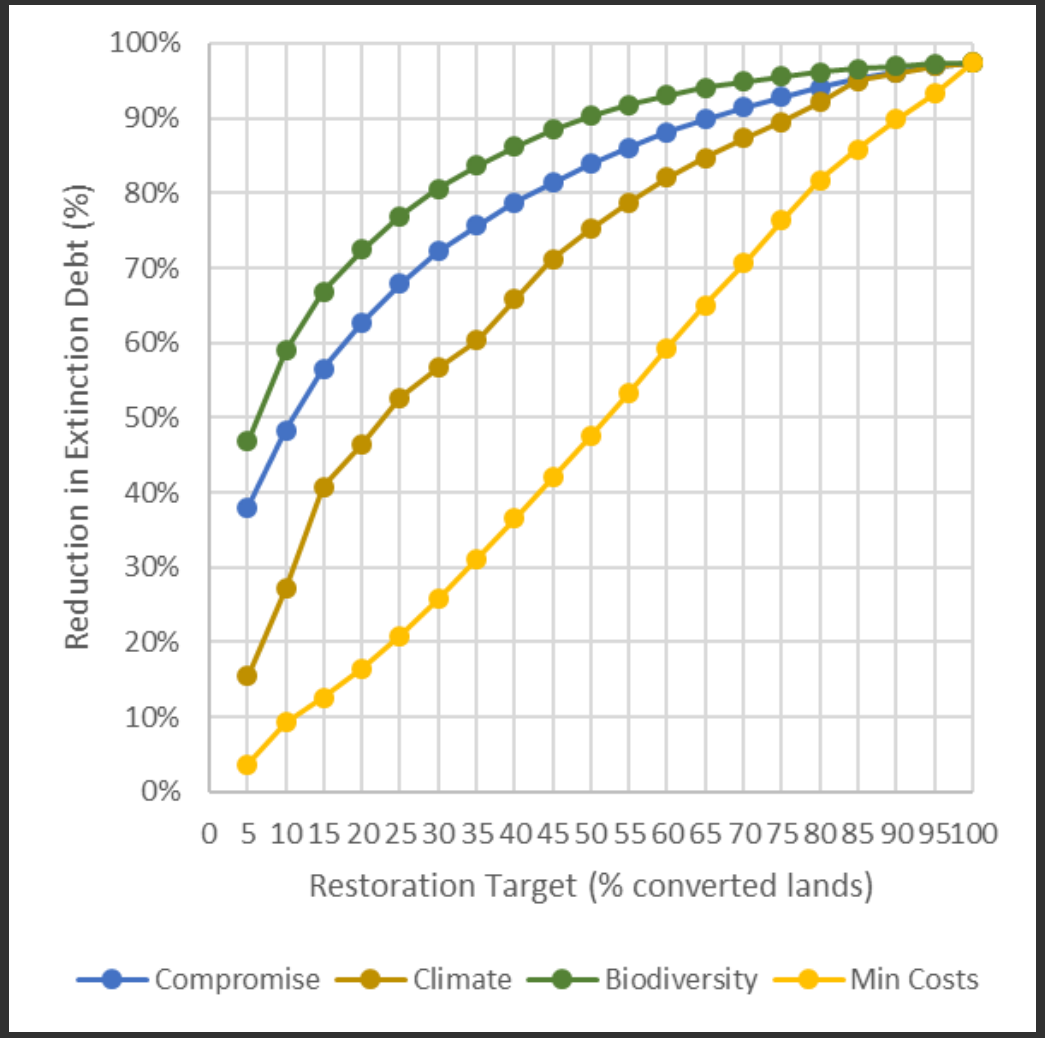
1. See source paper for species datasets and approach: https://www.nature.com/articles/s41559-021-01528-7?proof=t

Spatial Analysis to Efficiently Meet Multiple Goals

- Huge differences in outcomes for the same area target, depending on where action takes place

  Example:
  The same 5% area target for restoration could reduce expected extinctions by 4% - 43% depending on locations selected.

- Compromise scenario meets carbon and biodiversity goals simultaneously



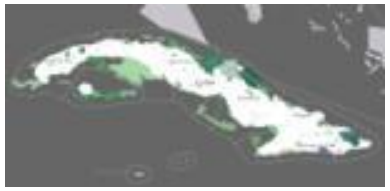
IIS

MAPPING ESSENTIAL LIFE SUPPORT AREAS

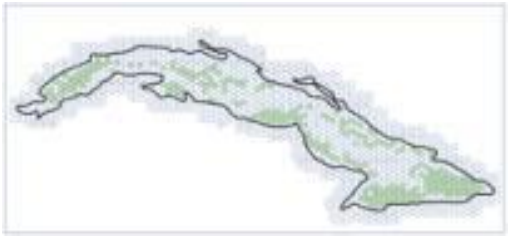
From planning for biodiversity persistence…

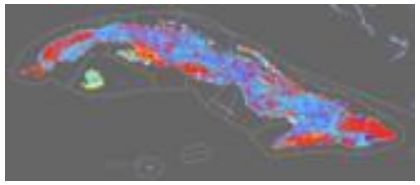

Intactness

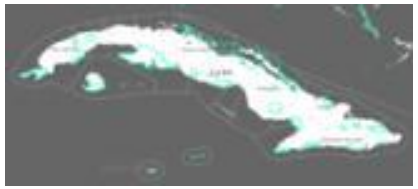

Human Footprint


Protected Areas

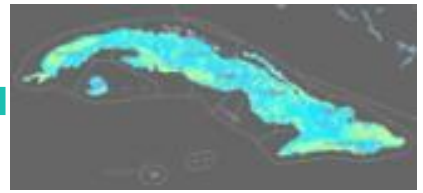

Marine PAs


ECOSYSTEM INTACTNESS


Threatened Species

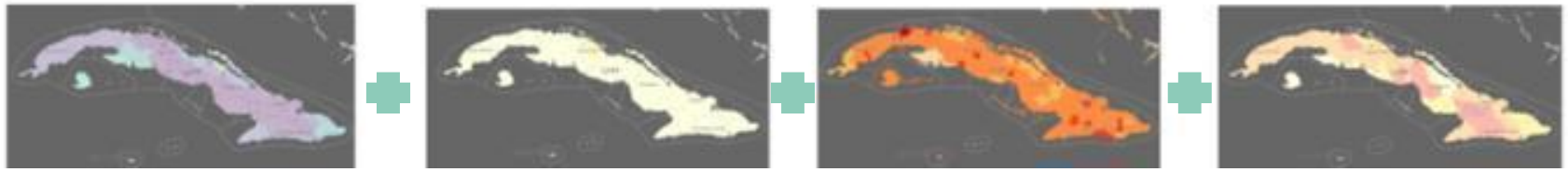

Key Biodiversity Areas


Connectivity


Species Richness

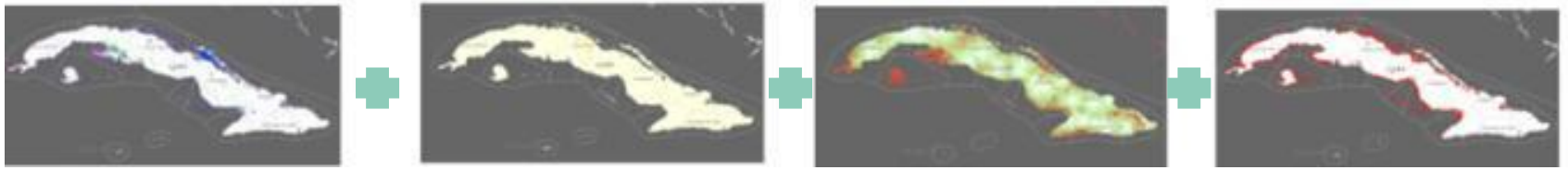

SPECIES PERSISTENCE

…to planning for integrated nature-based solutions



Protected Aqueduct Drought Severity Population Density Water Stress

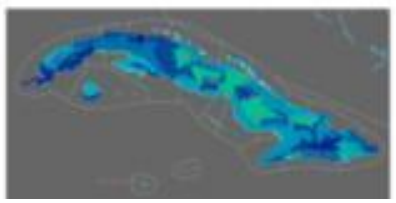
WATER SECURITY

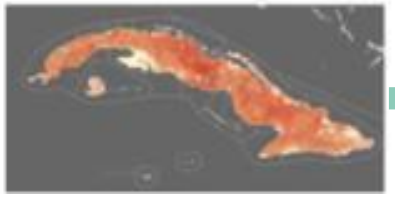


Wetlands Drought Severity Population Mangroves

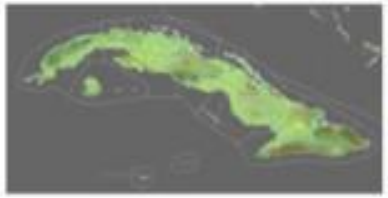
DISASTER RISK REDUCTION

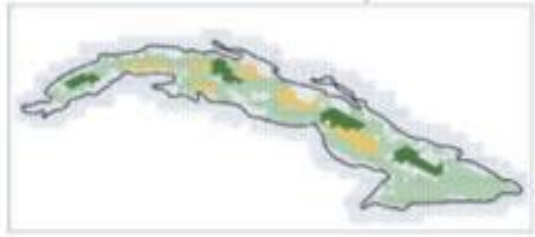
…to planning for integrated nature-based solutions


Crop Suitability

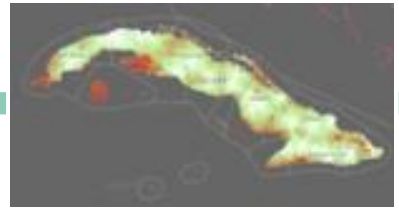

Cattle Density

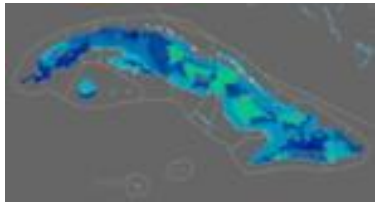

Mangroves


Land Use/Cover


FOOD SECURITY


Land Degradation


City Proximity


Crop Suitability


Change by 2040


JOBS & LIVELIHOODS

…to planning for integrated nature-based solutions

Carbon Increase by Agriculture

Soil Organic Carbon

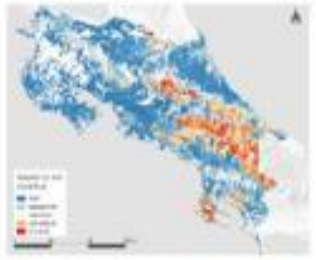
Mangrove Carbon

Restorable Carbon

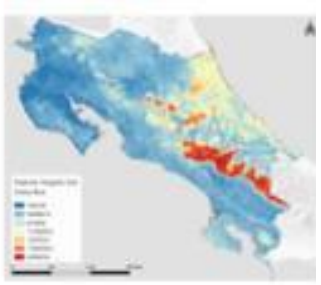
CLIMATE CHANGE MITIGATION

Customization Based on Priorities

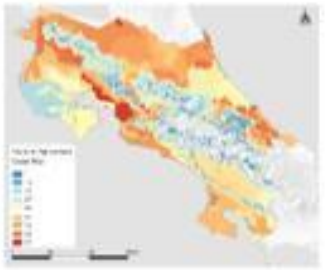
Water Security



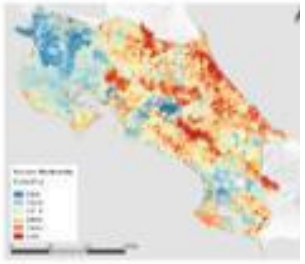
Livelihoods



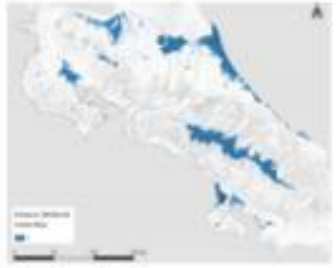
Climate Change Mitigation



Food Security



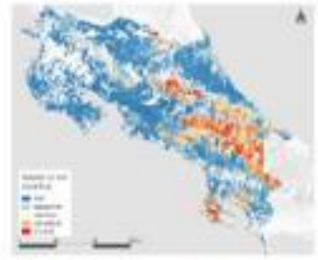
Endangered Species



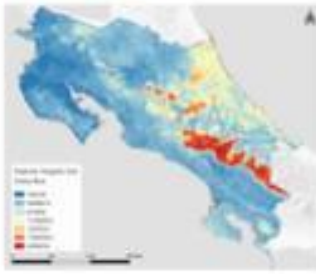
Disaster Risk Reduction

Customization based on priorities

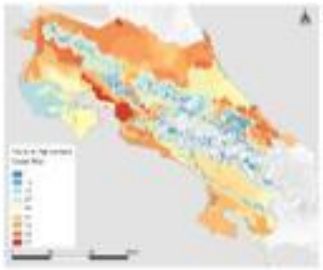
Water Security



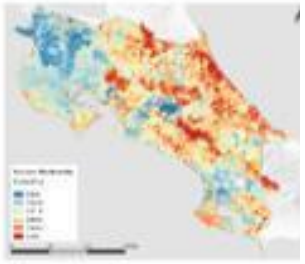
Livelihoods



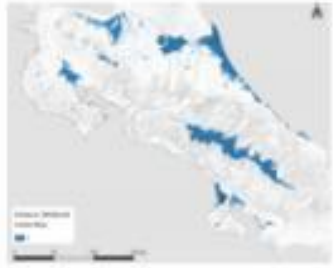
Climate Change Mitigation



Food Security



Endangered Species

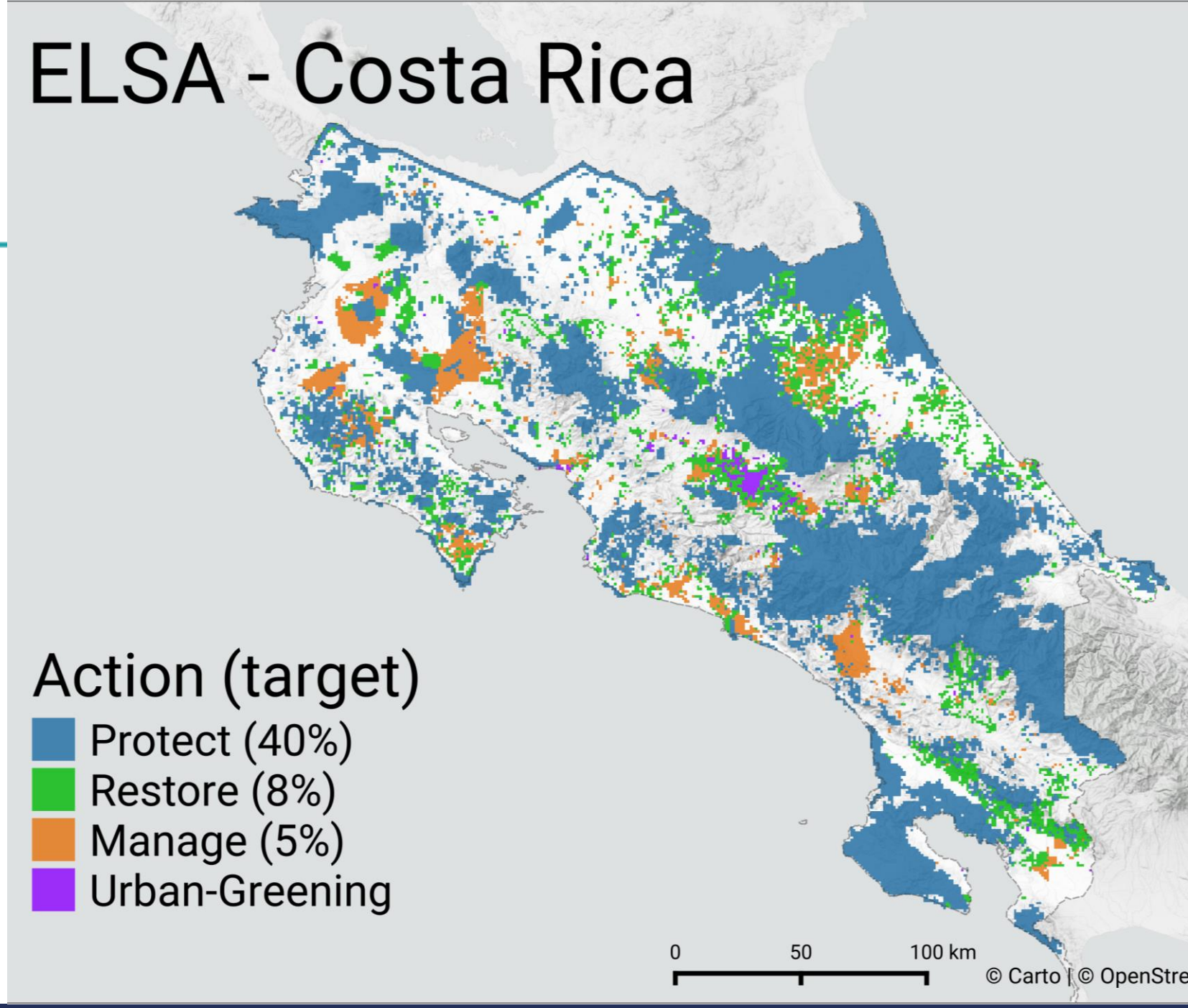


Disaster Risk Reduction

Maps of Hope

Maps of nature-based actions for:

- Biodiversity
- Climate
- Sustainable Development
- And more!




COSTA RICA
GOBIERNO DEL BICENTENARIO


MINAE
Ministerio de Ambiente y Energía


CeNAT


PRIAS


CENIGA
Centro Nacional de Información Geoambiental


UNDP


gef


INSTITUTO
HUMBOLDT
COLOMBIA


IDEAM


QAZAQSTAN


GORDON AND BETTY
MOORE
FOUNDATION


Sida


I.G.N.I.G.S


one
earth


NATIONAL
GEOGRAPHIC


Impact
Observatory


GOBIERNO REGIONAL DE
Ucayali
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PERÚ
Ministerio
del Ambiente


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CENTRAL
RAPE | Estamos Construyendo Región


Secretaría
Planificación
Sectorial de
Ambiente


SERNANP
PERÚ


Sida


SIMOCUTE


FOR GOD AND MY COUNTRY


NEMA
National Environment Management Authority
ENSURING SUSTAINABLE DEVELOPMENT

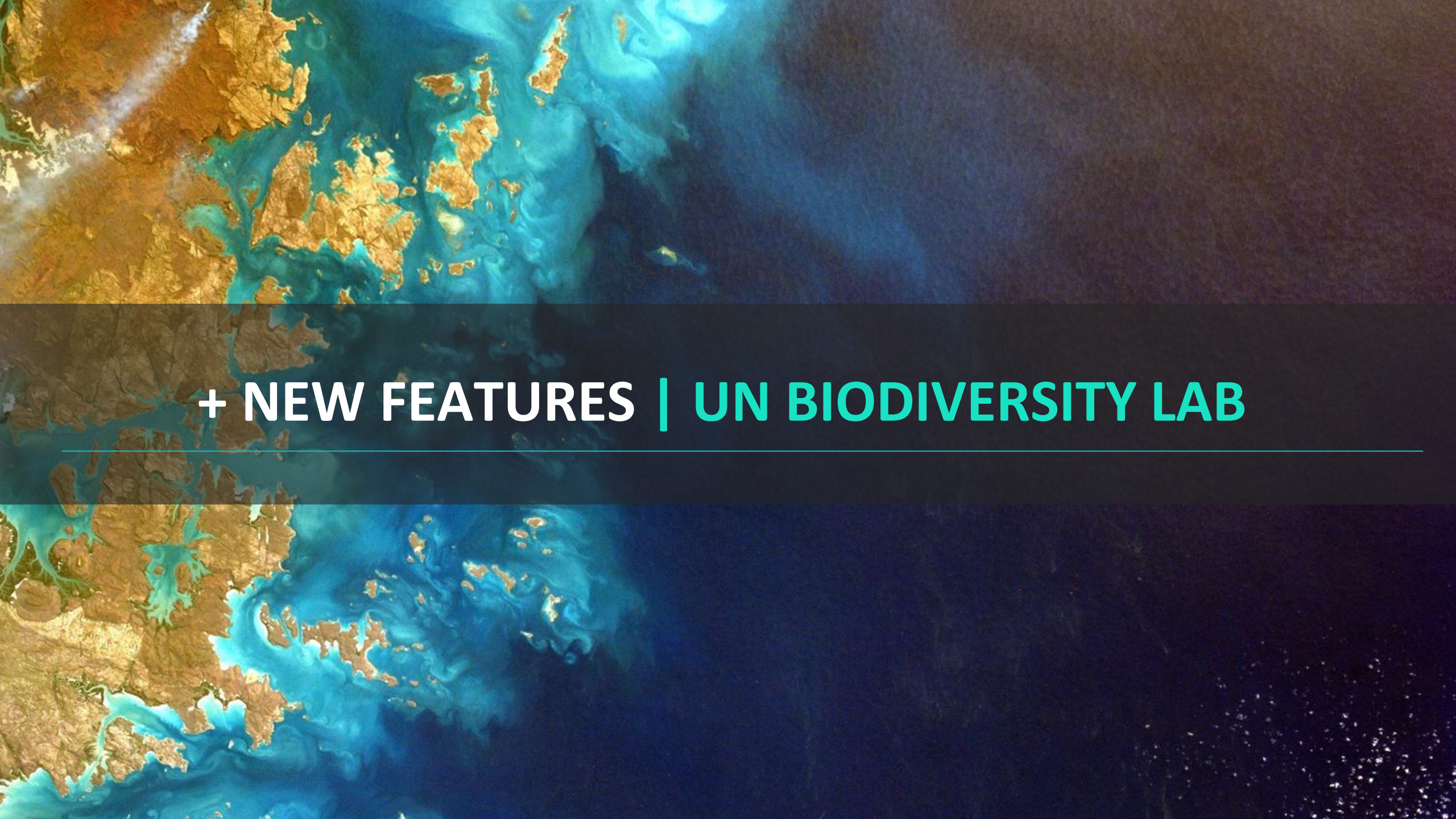

UNBC
UNIVERSITY OF
NORTHERN BRITISH COLUMBIA


upra
Unidad de Planificación
Rural Agropecuaria

ELSA VIA UN BIODIVERSITY LAB

THE GOAL | ELSA VIA UNBL

- Develop the science to run an ELSA analysis for any country in the world based on global policy priorities and global data
- Develop the technology to make ELSA available on UN Biodiversity Lab
- Demonstrate this capability with three initial pilot countries



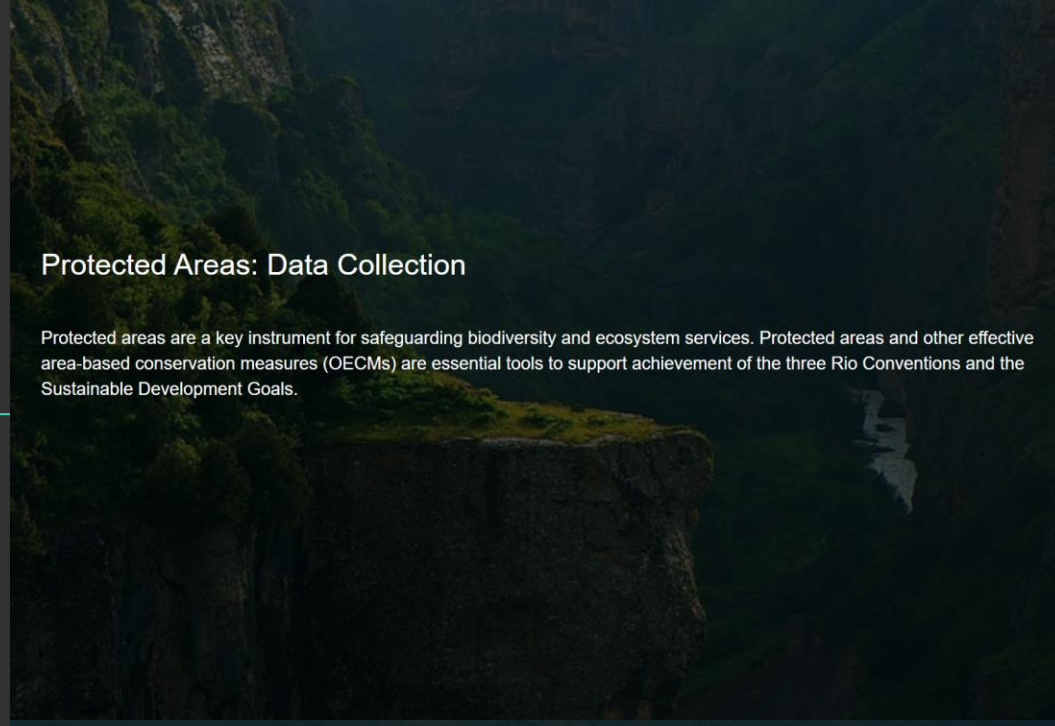
+ NEW FEATURES | UN BIODIVERSITY LAB

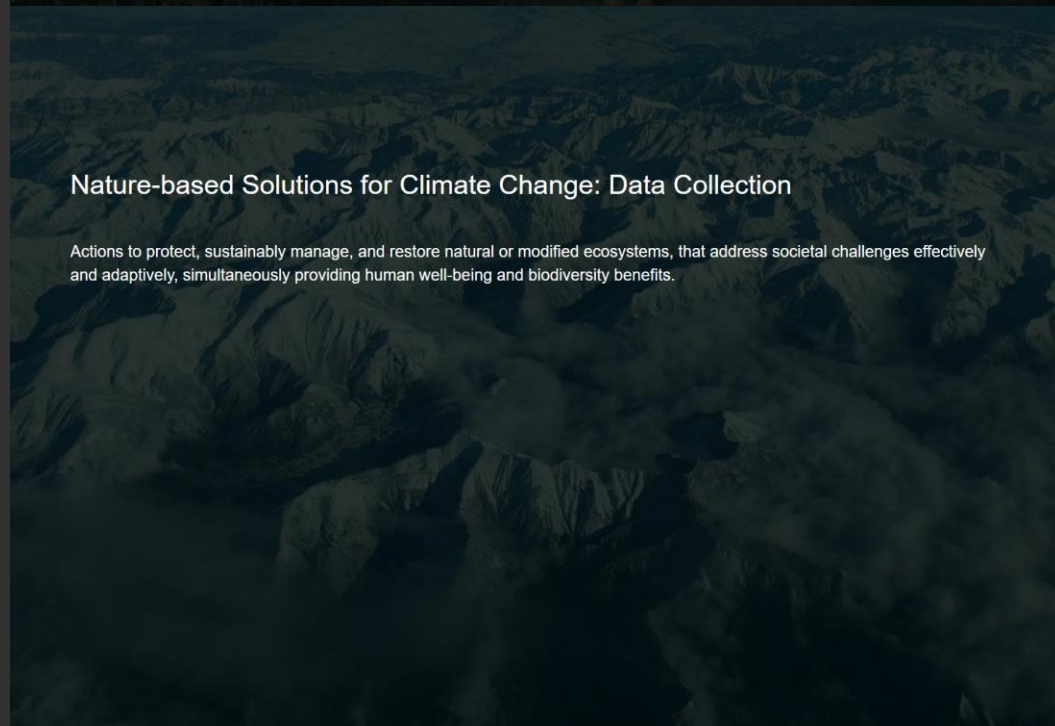
NEW FUNCTIONALITIES
IN DEVELOPMENT

- Enhanced data tagging and search functionality
- ESRI & Azure API connectors
- Updated UN basemap and country boundary layers
- Exploring the potential to connect to near-real time and high-resolution satellite imagery
- ELSA via UNBL proof of concept

NEW FUNCTIONALITIES
LOOKING FORWARD

- New collections on the post-2020 global biodiversity framework, restoration, & more
- Expanded metrics for automated reporting on critical global indicators
- Seamless connections to national data repositories
- Story maps to better communicate your work
- ELSA via UNBL for any country in the world





UNBL COMMUNITY

Priscilla Mora Flores / UNDP Costa Rica

Photo Credit: Priscilla Mora Flores | UNDP Costa Rica

SPACES

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Spatial intelligence for a sustainable future

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Contacts

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  - Di Zhang: di.zhang@undp.org
- Training Webpage:
  - https://appliedsciences.nasa.gov/join-mission/training/english/arset-using-un-biodiversity-lab-monitor-pulse-planet

Check out our sister programs:

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!