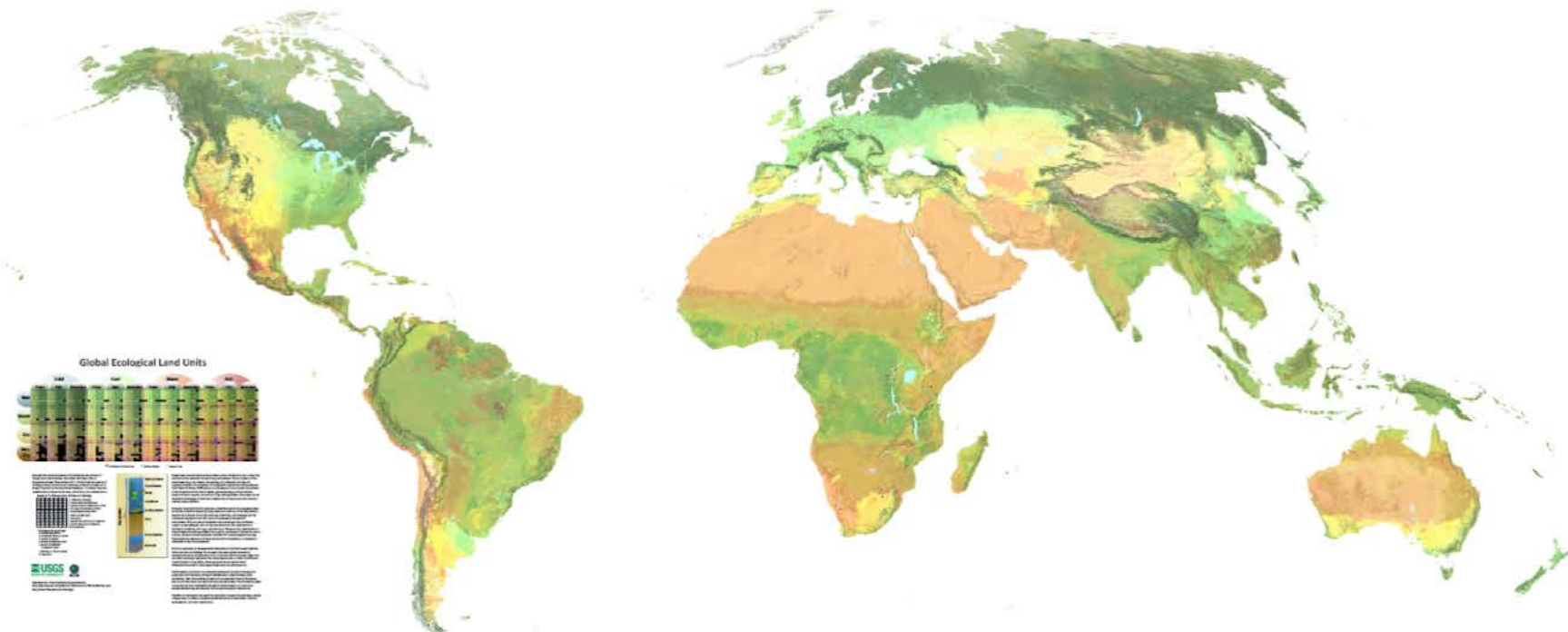


A New Map of Global Ecological Land Units



Roger Sayre (USGS)

**Charlie Frye, Pete Aniello, Randy
Vaughan, Sean Breyer, Dawn
Wright (ESRI)**

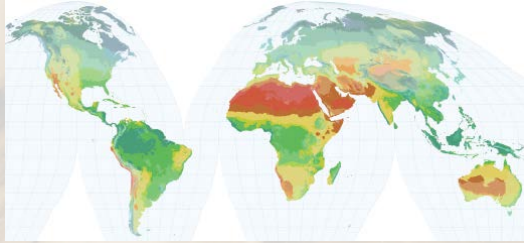


**UN SEEA EEA Experts Forum
28 April 2015
New York**

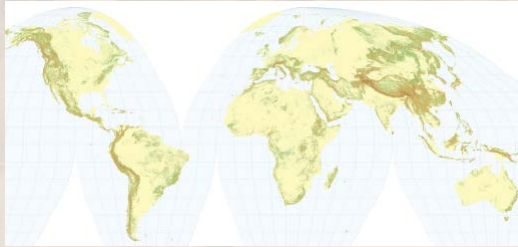


How Were The Global Ecological Land Units (ELUs) Developed?

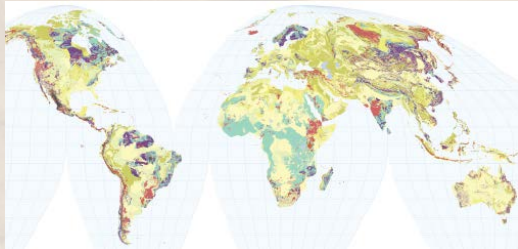
Bioclimate



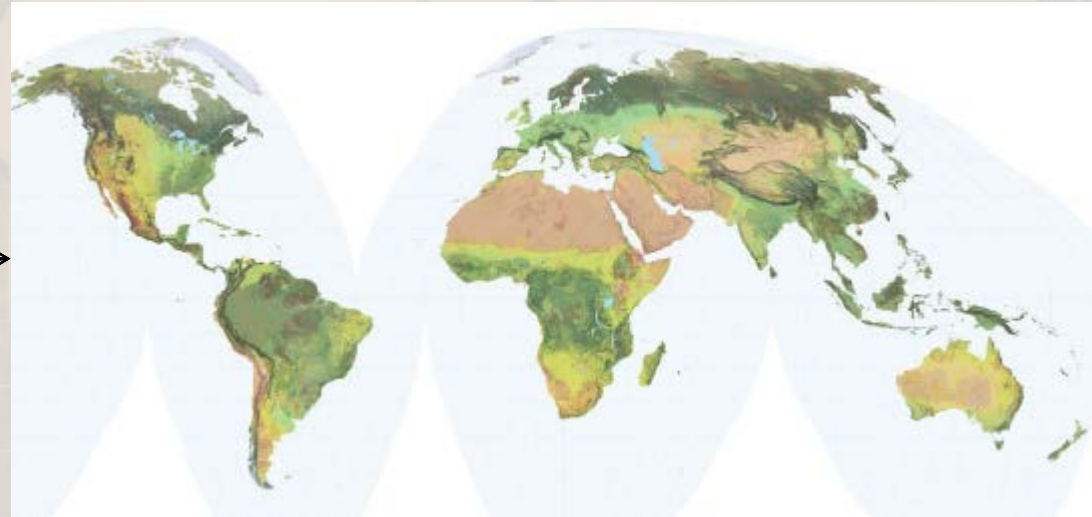
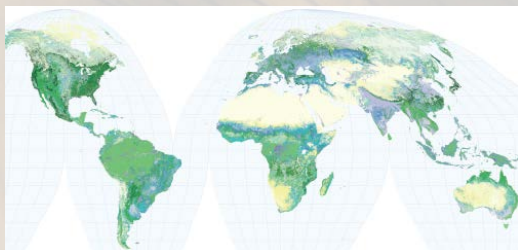
Landform



Lithology



Land Cover



3,923 ELUs Mapped
250 m Spatial Resolution

The Anchor Publication



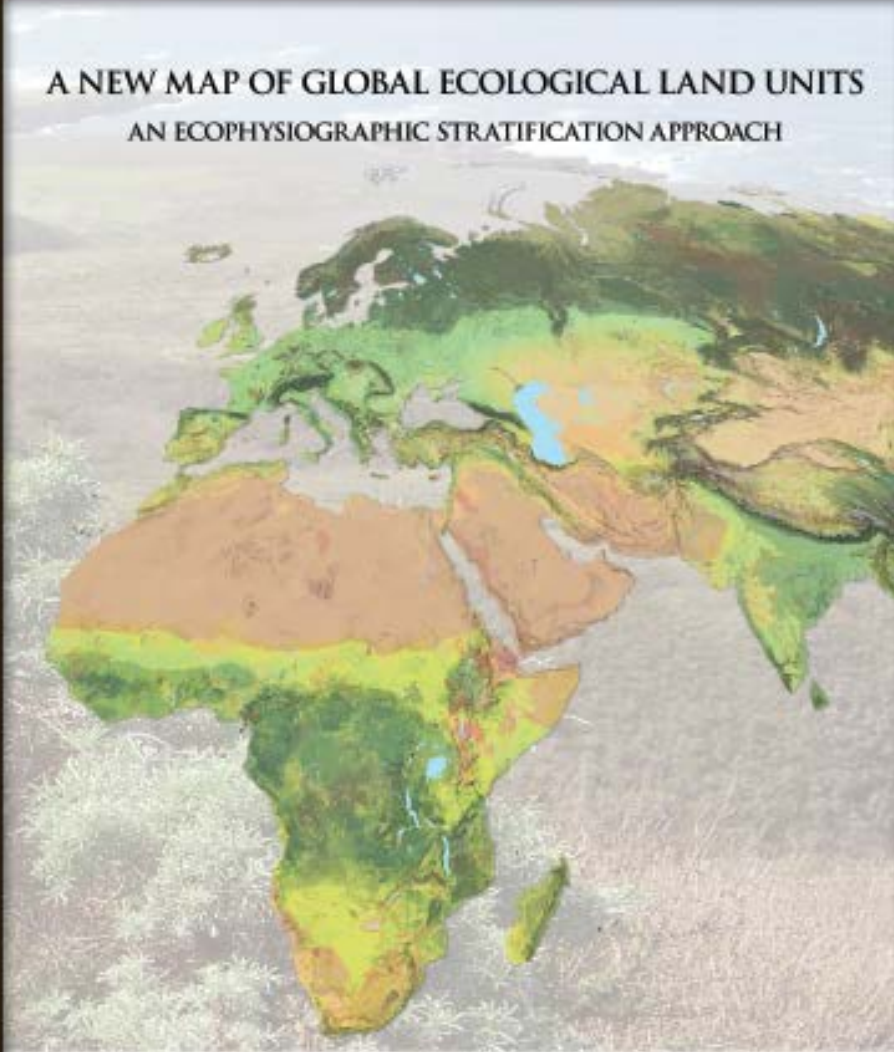
The United States Geological Survey (USGS), Esri, the Group on Earth Observations (GEO), and the Association of American Geographers (AAG) are pleased to present **A New Map of Global Ecological Land Units – An Ecophysiological Stratification Approach**. This paper describes the concepts and methods for delineating ecological land units (ELUs) as distinct physical environments and associated land cover. Detailed and beautiful maps of ELUs are presented for the Earth and the continents, as well as regional examples.


The ELUs were developed in response to the need for a high-resolution, standardised, and data-derived map of global ecosystems for use in analysis of climate change impacts, assessments of economic and non-economic value of ecosystem goods and services, biodiversity conservation planning, and natural resource management. The work was done in a public-private partnership between USGS and Esri, and was carried out by GEO as part of an inter-governmental protocol called the Global Earth Observation System of Systems (GEOSS). With this Special Publication, AAG recognizes the work as a contribution to understanding the physical and ecological geography of the Earth.


 **AAG**
ASSOCIATION OF
AMERICAN GEOGRAPHERS


A Special Publication
of the Association of
American Geographers

A NEW MAP OF GLOBAL ECOLOGICAL LAND UNITS AN ECOPHYSIOGRAPHIC STRATIFICATION APPROACH




 **USGS**
United for a changing world

 **esri**

 **GEO** GROUP ON
EARTH OBSERVATIONS

GEO BON
GEO ECO

 **AAG**
ASSOCIATION OF
AMERICAN GEOGRAPHERS

The Esri White Paper

Introducing the Global Ecological Land Units ArcGIS™ Online Services

An Esri® White Paper
March 2015



380 New York Street
Redlands, California 92373-8100 USA

800 447 9778
info@esri.com

esri.com

GEOSS Task EC-01-C1



EC-01-C1: Global Ecosystem Classification and Mapping

Develop a standardized, robust, and practical global ecosystems classification and map for the planet's terrestrial, freshwater, and marine ecosystems.

Why Do We Need A Global Ecosystems Map?

- *Assessments of Economic and Social Value of Ecosystem Goods and Services*
- *Biodiversity Conservation Planning*
- *Analysis of Climate Change Impacts to Ecosystems (and other impacts e.g. fire, invasive species, land use, etc.)*
- *Global Environmental Security*
- *Resource Management*
- *Research*

Audiences and Architecture

Landscape Ecologists

Public

Resource Managers

Geodesign Planners

AGOL

Workflows

Data

Tools

Authoritative Classifications

Updated Classifications

Outreach



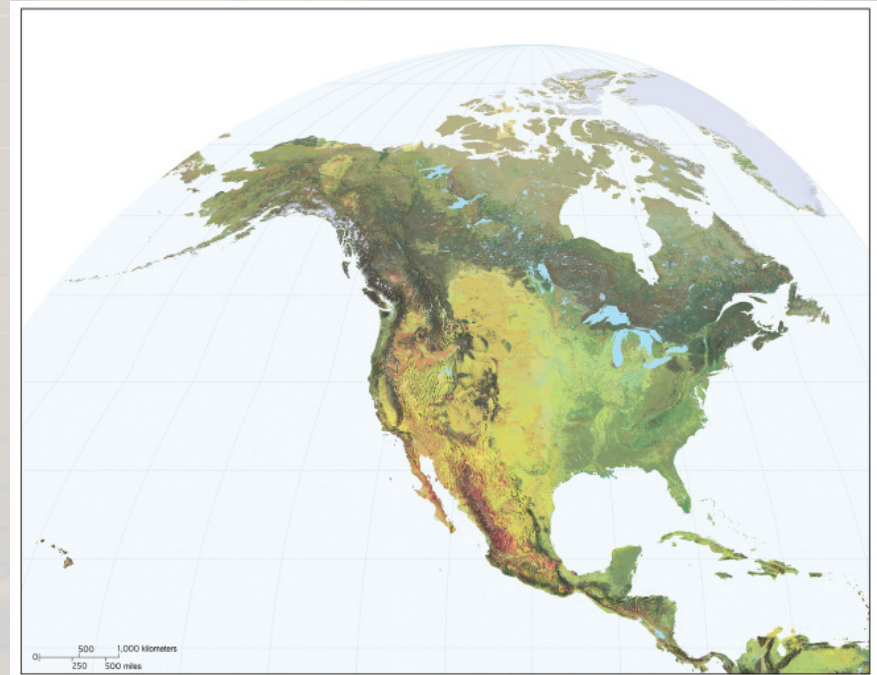
Exposure



WIRED

NEW MAP SHOWS THE WORLD'S ECOSYSTEMS IN UNPRECEDENTED DETAIL

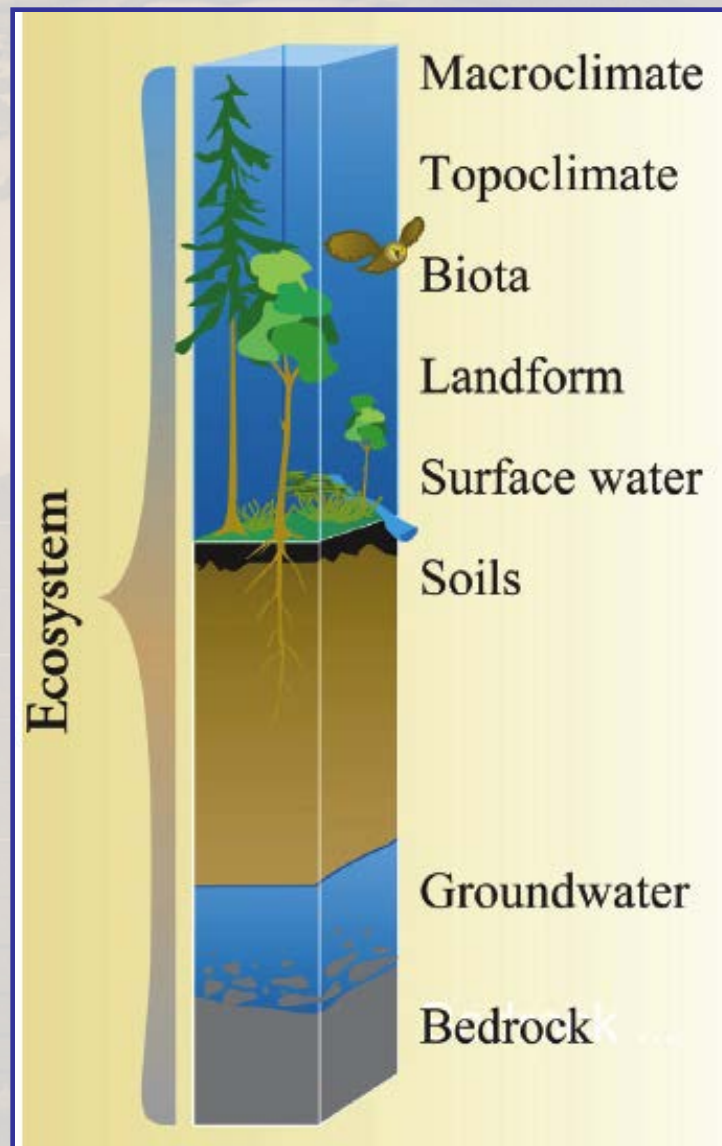
- Secretary of the Interior Sally Jewell announces release of ELUs
- Part of the President's Climate Data Initiative for Ecosystem Vulnerability
- Launched at ACES (A Community on Ecosystem Services) conference in December 2015.



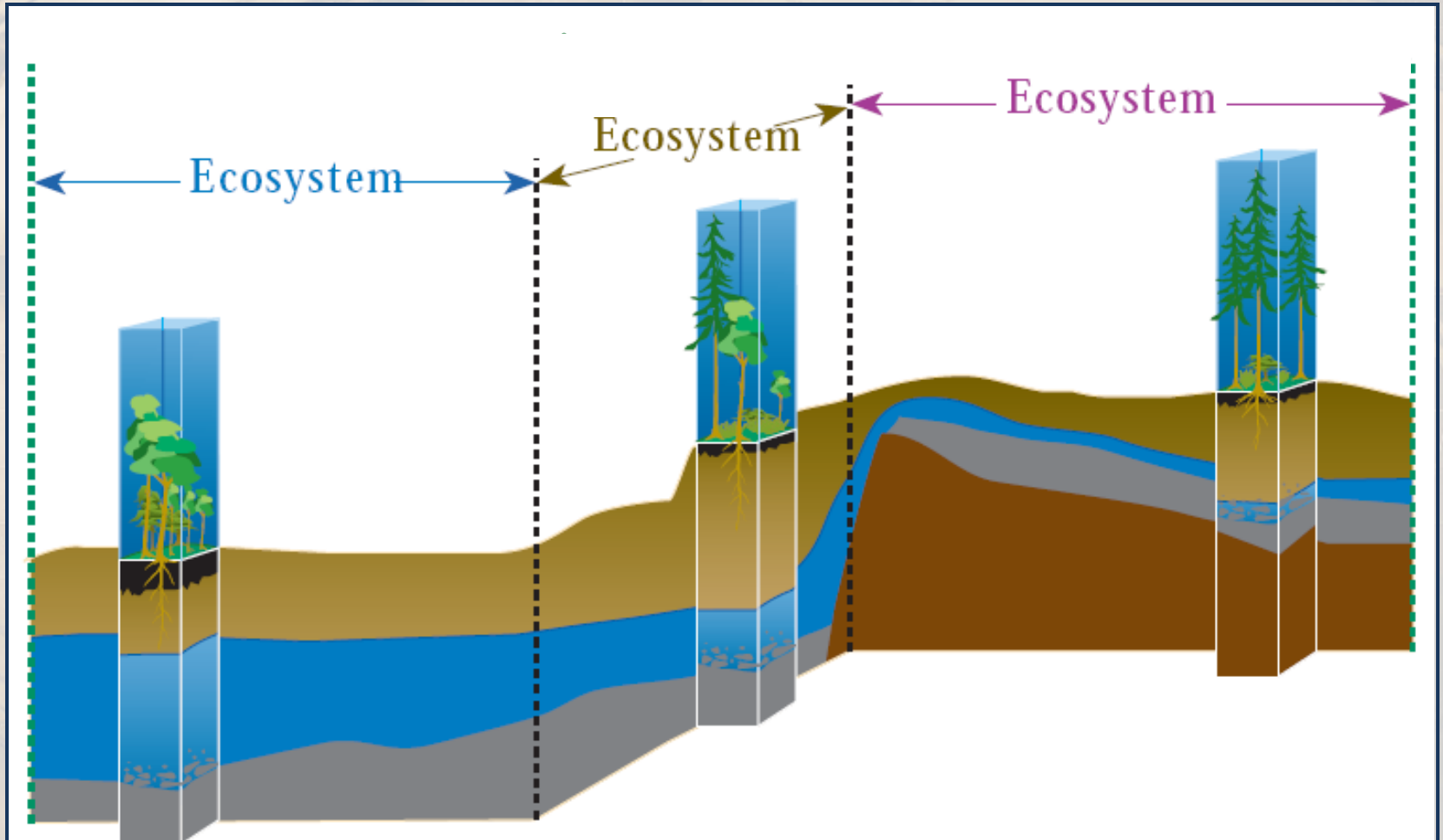
My Desktop Ecosystem



Terrestrial Ecosystems



Ecosystem Structure Varies Geographically



Terrestrial Ecosystems Mapping Model

*Step One- Prepare
Input Layers*

Landforms

Geology

Bioclimate

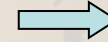
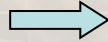
Vegetation

*Step Two - Combine
Input Layers*

Ecological
Facets
(45,560)

*Step Three – Aggregate
Classes Produced from
Combination*

Ecological Land
Units (3,923)



Terrestrial Ecosystems Mapping Model

*Step One- Prepare
Input Layers*

Landforms

Geology

Bioclimate

Vegetation

*Step Two - Combine
Input Layers*

Ecological
Facets
(45,560)

*Step Three – Aggregate
Classes Produced from
Combination*

Ecological Land
Units (3,923)

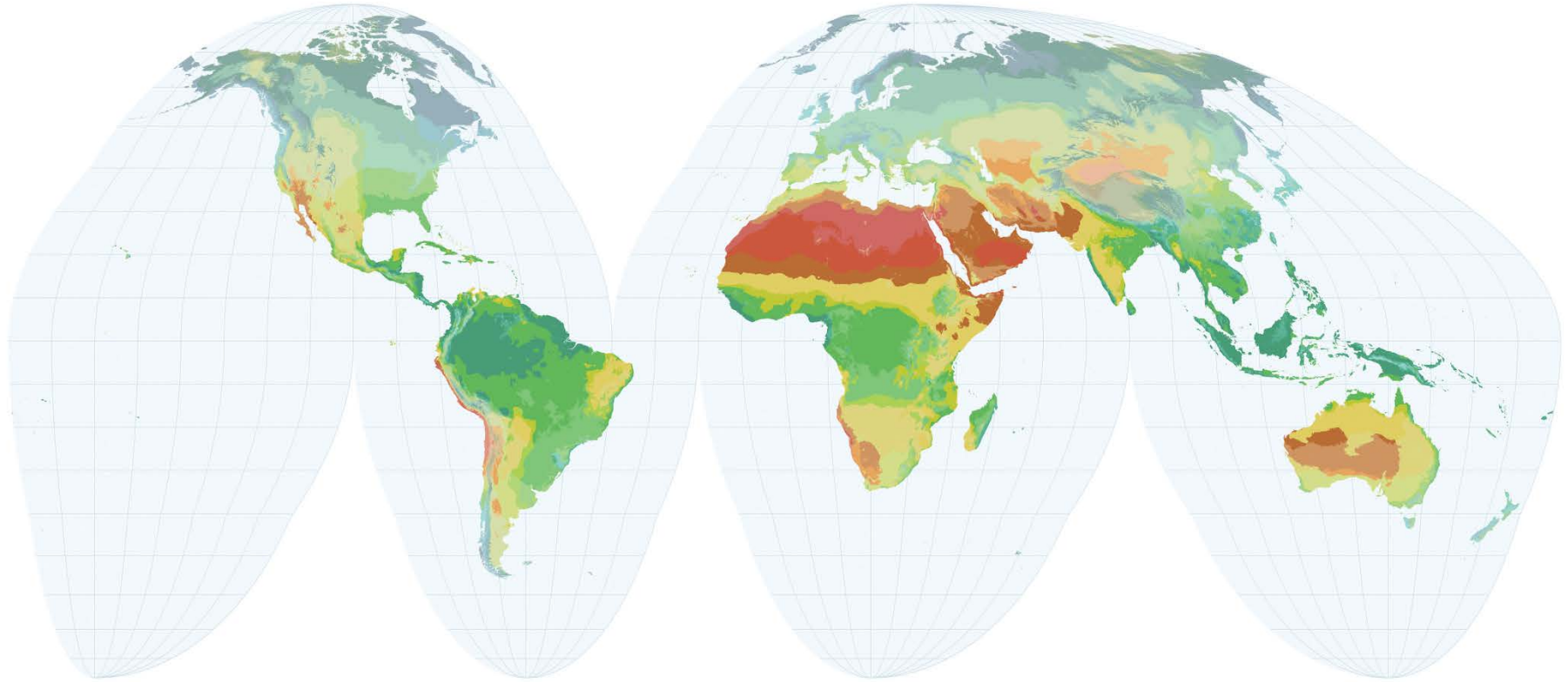
UN SEEA EEA

BSU – 250 m pixels

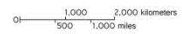
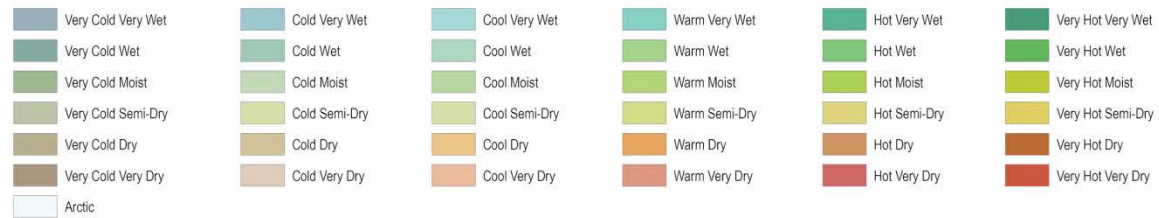
LCEU – ELUs

EAU – Aggregation of ELUS

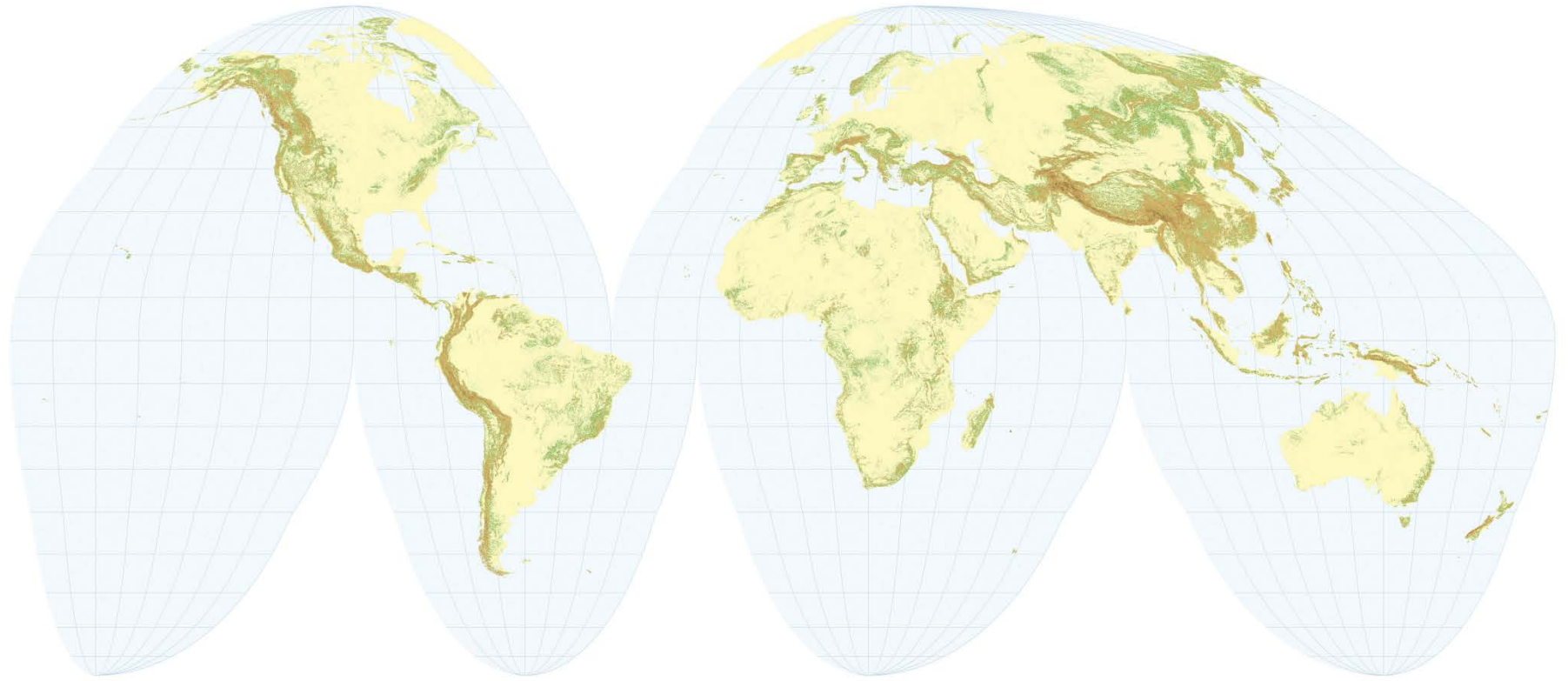
Input Layers - Bioclimates



Bioclimates



Input Layers - Landforms



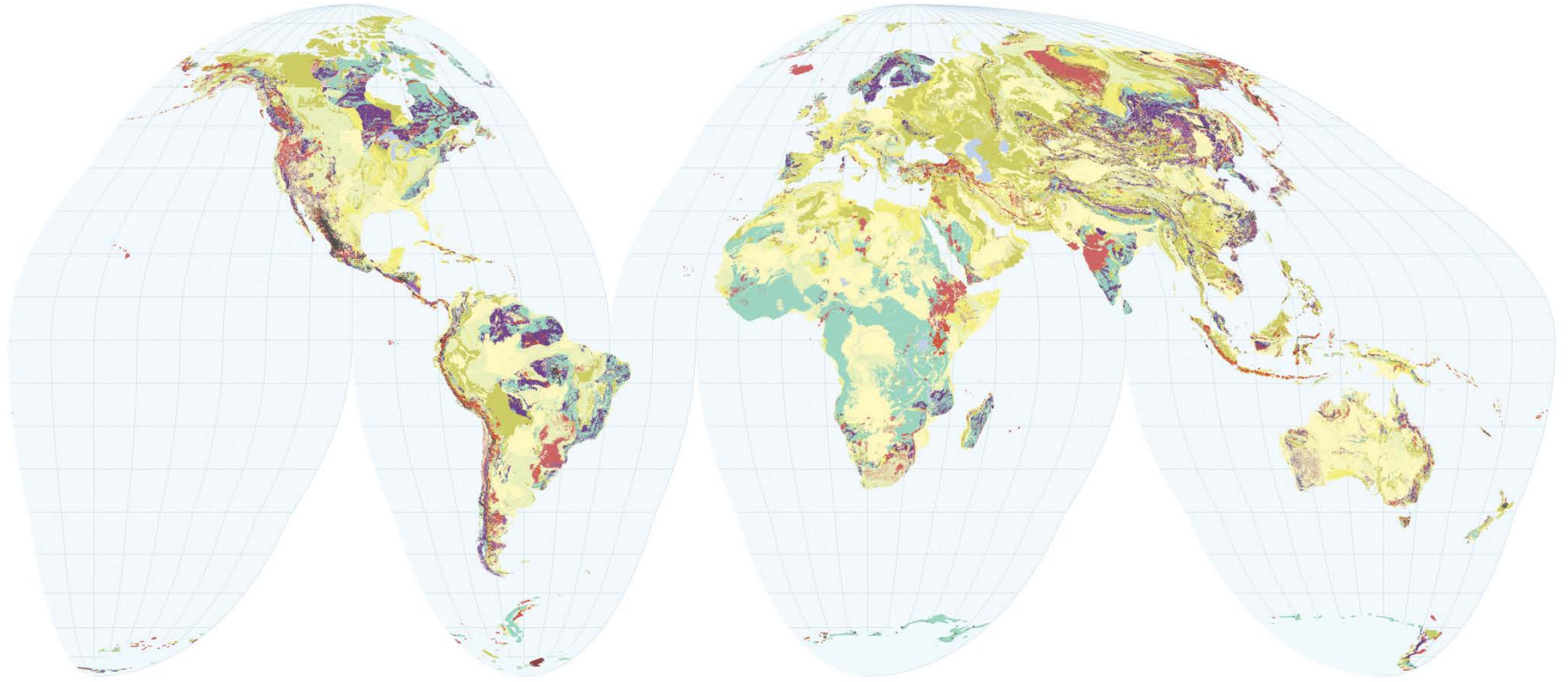
Landforms

- Flat or Smooth Plains
- Low Hills
- Hills

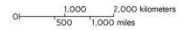
- Breaks/Foothills
- Low Mountains
- High Mountains/Deep Canyons

0 1,000 2,000 kilometers
500 1,000 miles

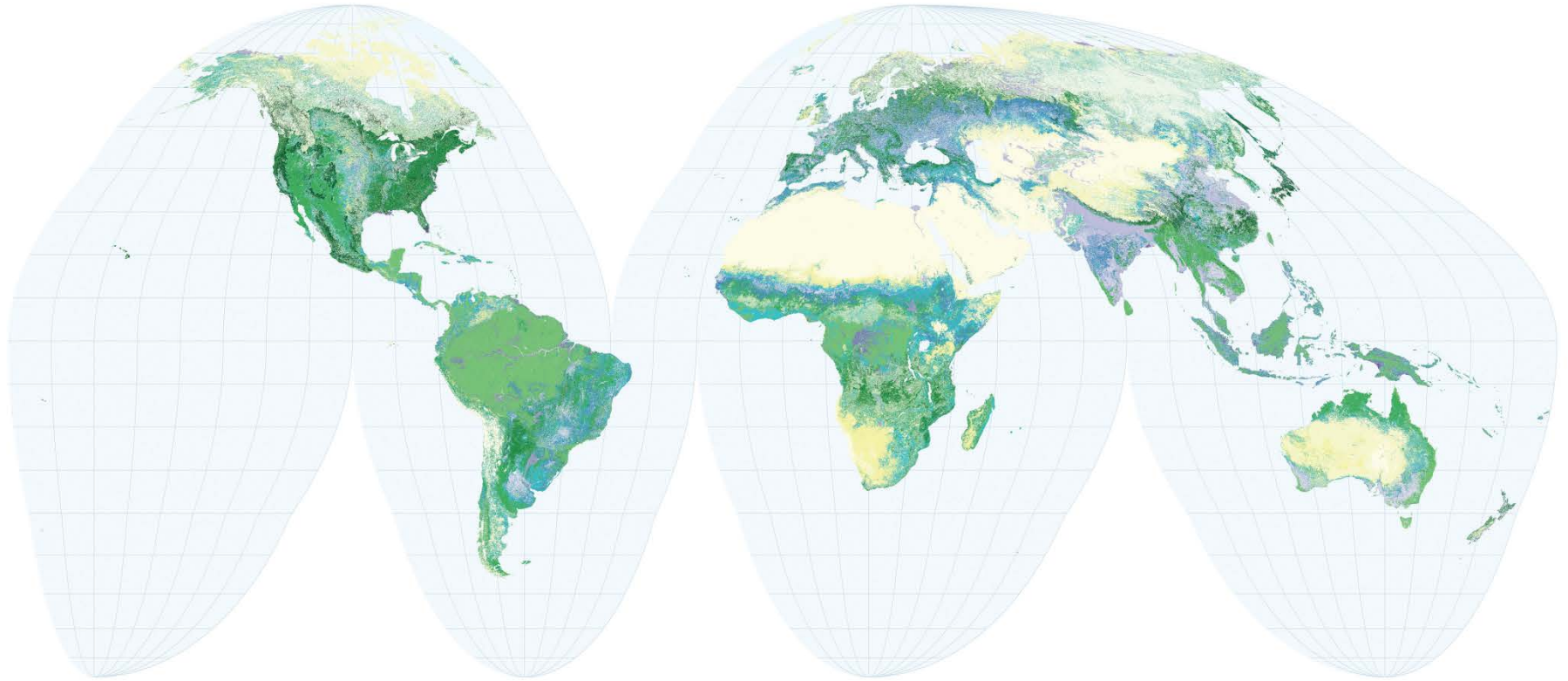
Input Layers - Lithology



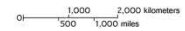
Lithology



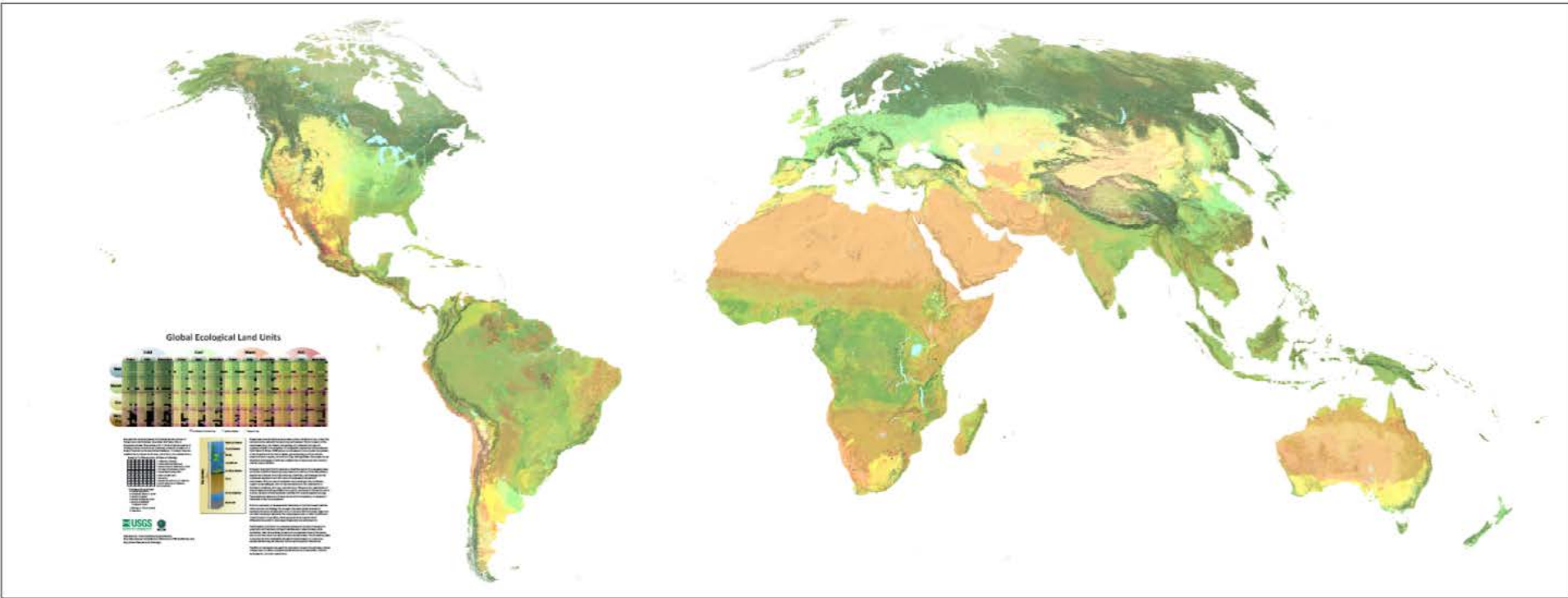
Input Layers – Land Cover



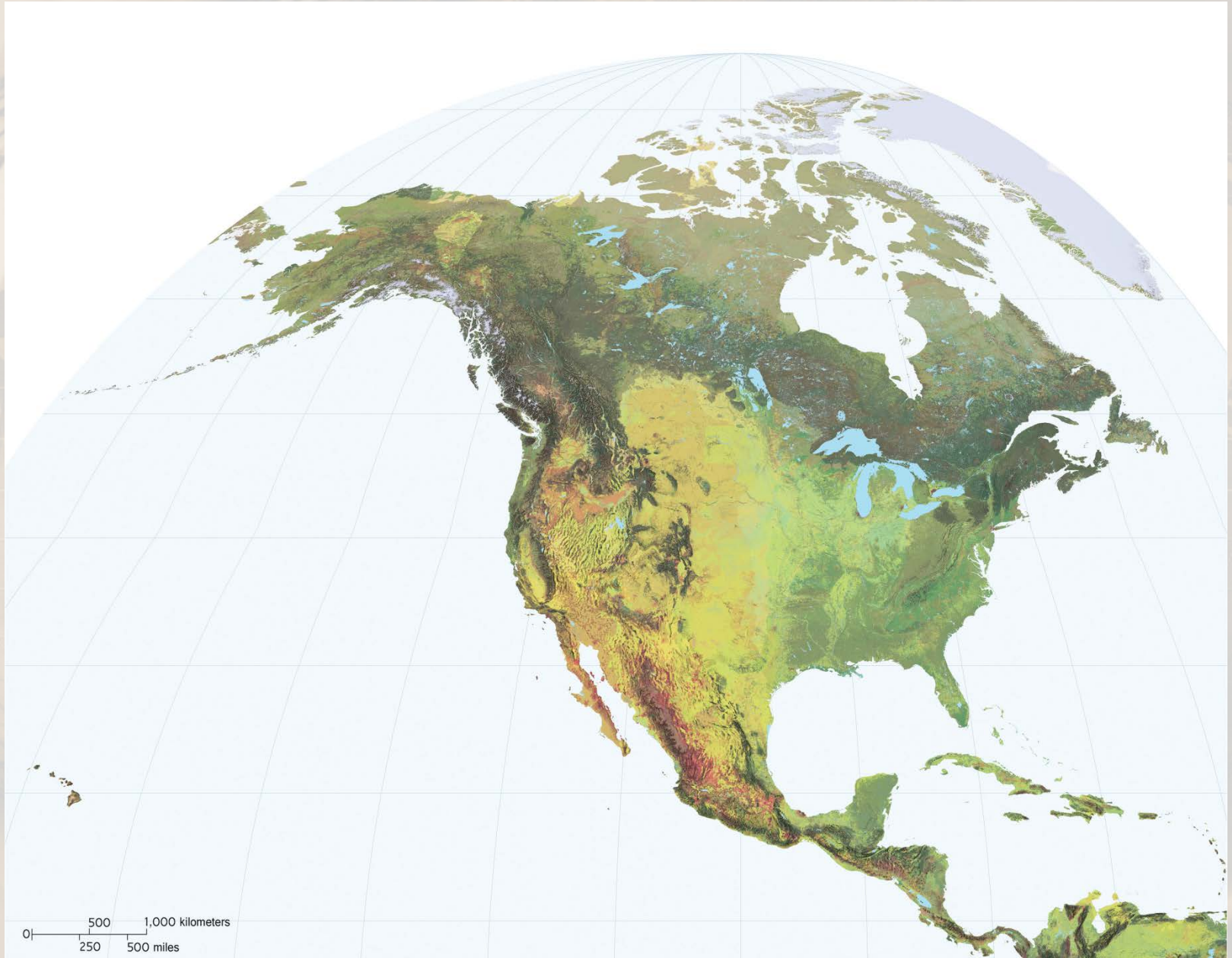
Land Cover



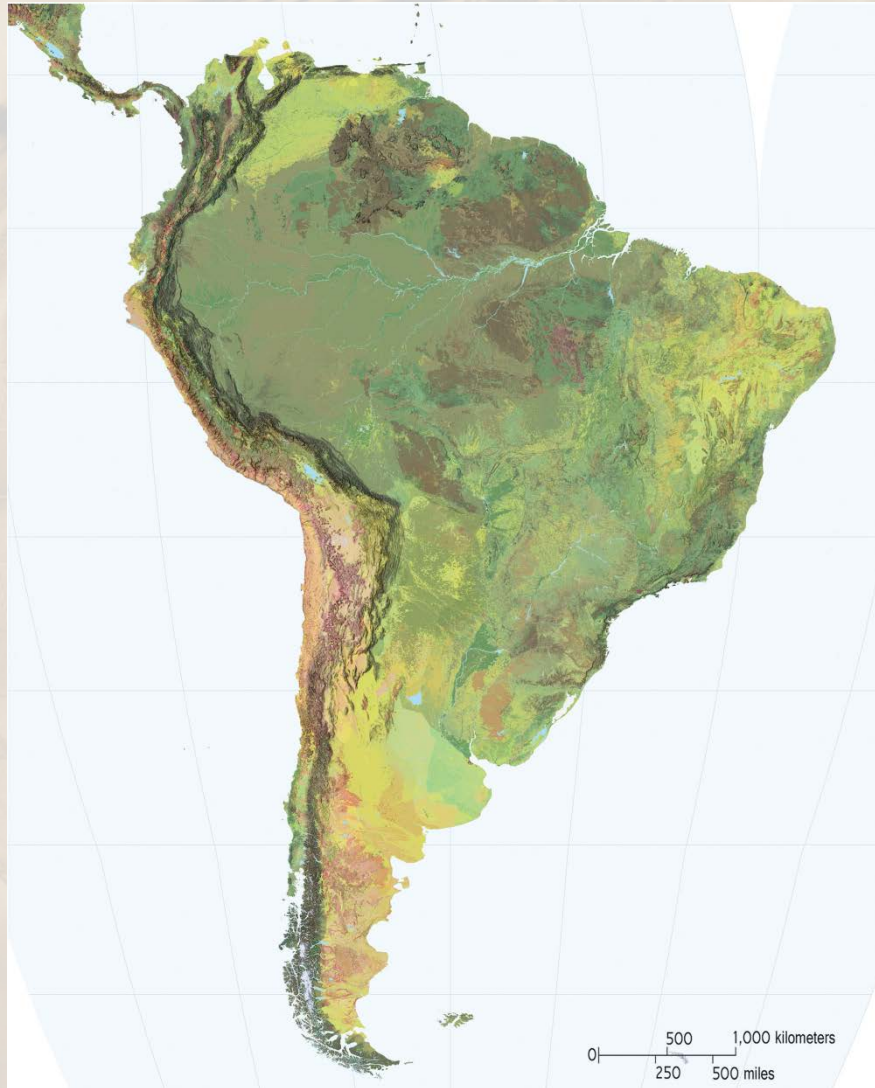
Global Ecological Land Units (3,932)



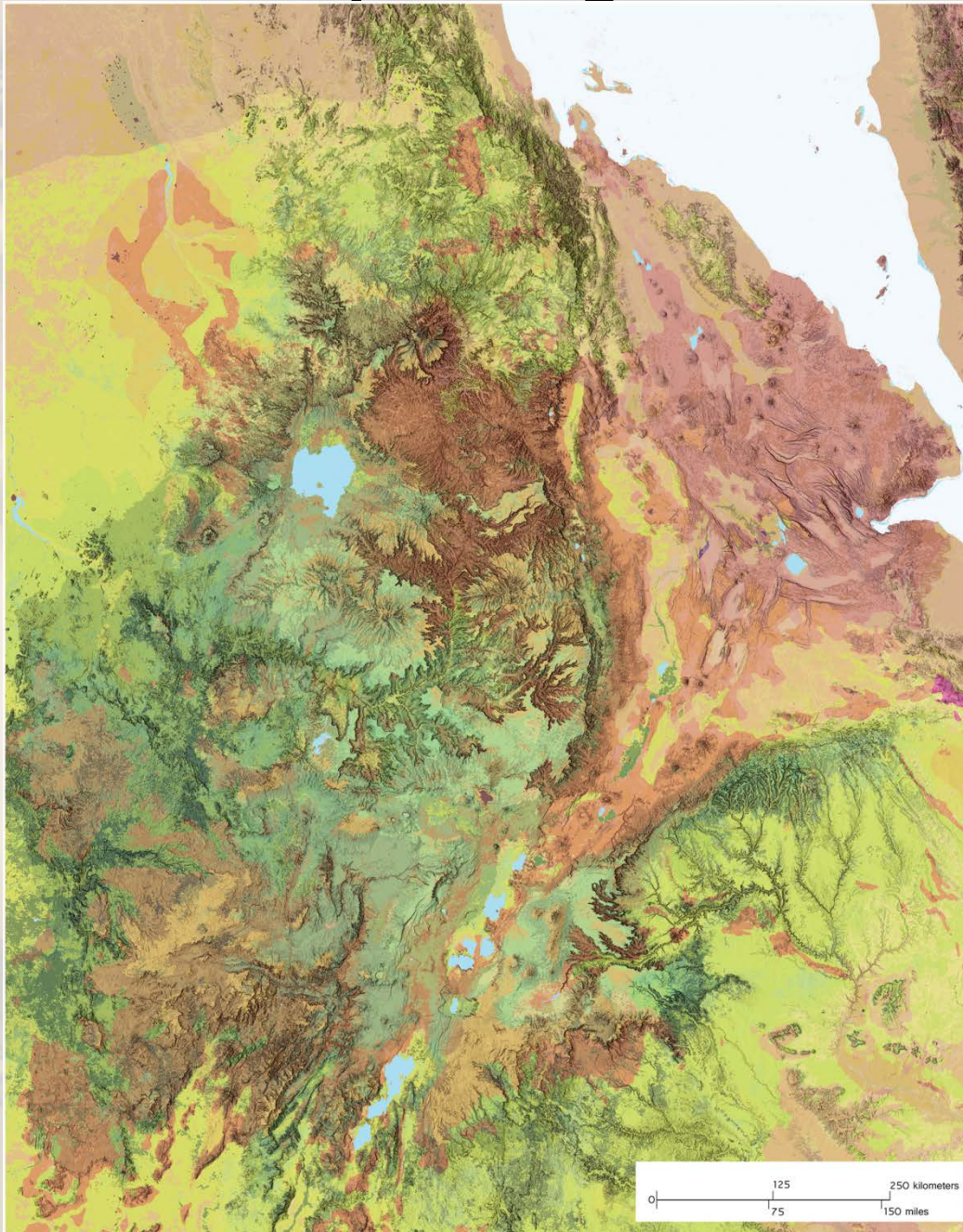
ELUs of North and Central America



ELUs of South America and Africa



Ethiopian Highlands



Can We Map Global Ecological Marine Units?

*Step One- Prepare
Input Layers*

Landforms

Geology

Bioclimate

Vegetation

*Step Two - Combine
Input Layers*

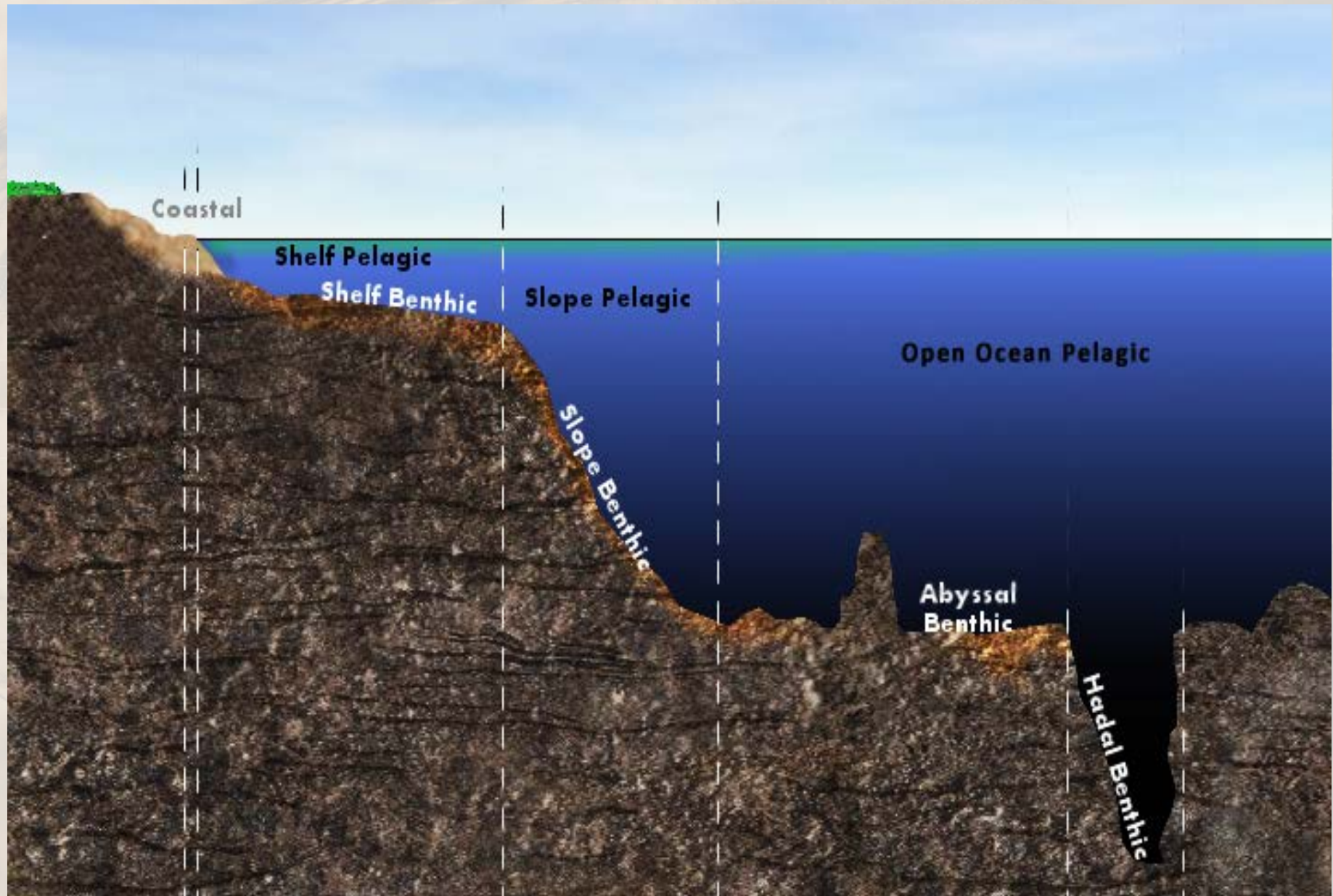
Ecological
Facets
(45,560)

*Step Three – Aggregate
Classes Produced from
Combination*

Ecological Land
Units (3,923)

**Analog Data Layers?
Voxels, not Pixels**

Global Ecological Marine Units (EMUs)



Global Ecological Land Units (3,932)

