

# Why the World Needs Geography Now More Than Ever



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# Geography at the Intersection ... of Physical and Social Sciences

Environmental Degradation & Social Instability  
Are Creating Uncertainty in Many Areas – All Interconnected





# The Geographic Approach

*Integrating and Supporting  
Powerful Methodologies*

*Creating Building Blocks  
for Shared Understanding*

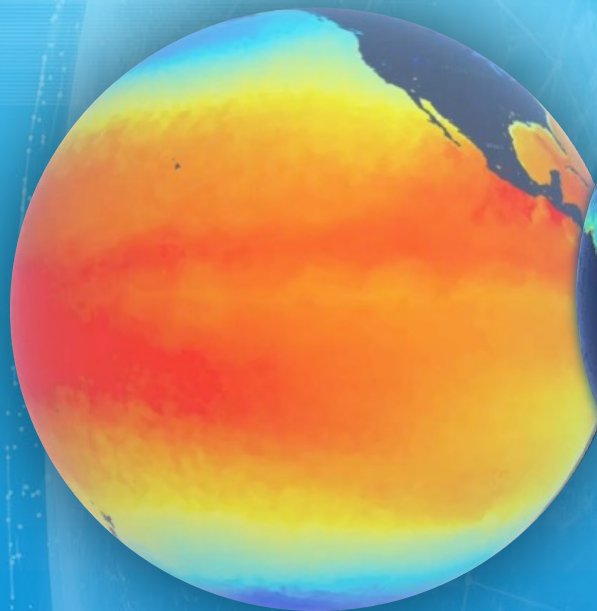
Transforming How  
We See the World



*All Critical for Building and Maintaining  
"Sustainability"*

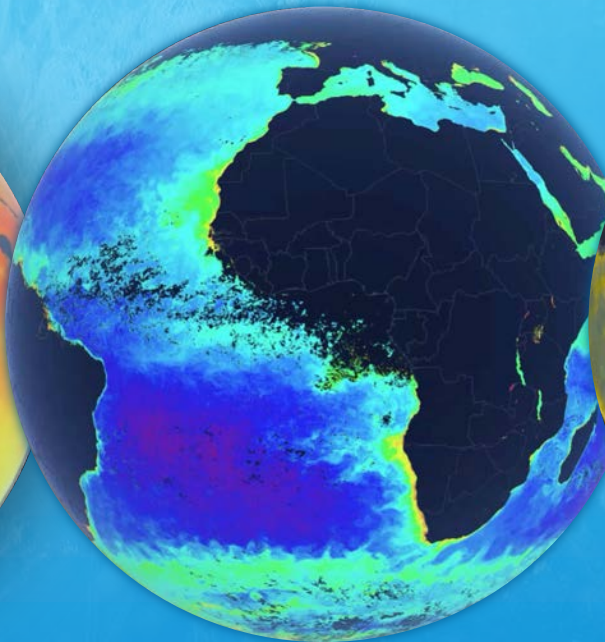
# A Global Geographic Framework is Emerging

Ocean Overheating



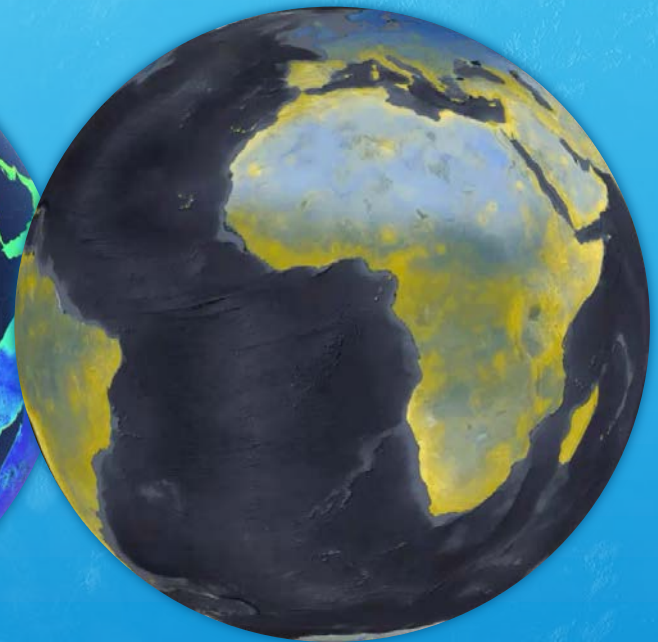
Sea Surface Temperature  
NOAA

Ocean Health



Chlorophyll-a Concentration  
NOAA

Biodiversity



Global Species Range Rarity  
E.O. Wilson Biodiversity Foundation

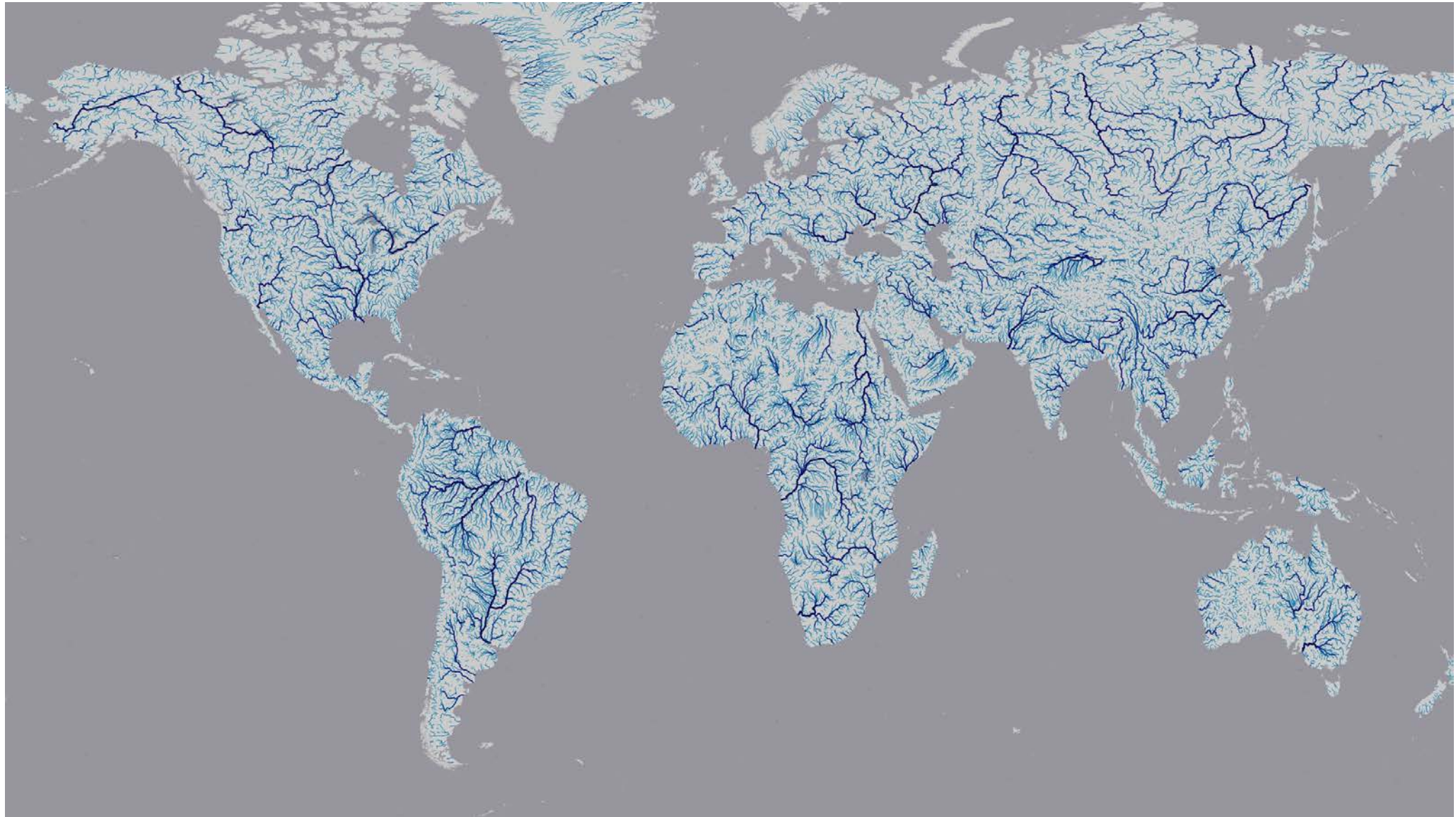


# GEO GLOWS

GLOBAL WATER SUSTAINABILITY



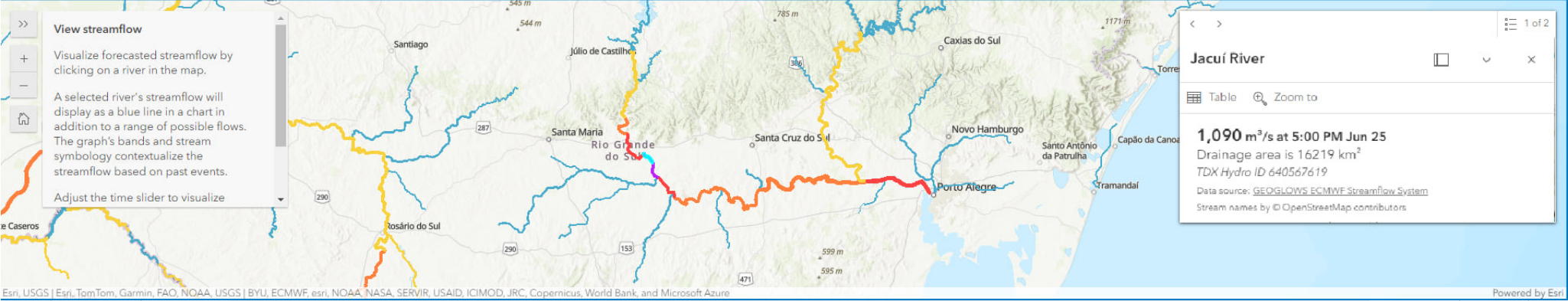
*Esri – BYU collaboration since 2017*



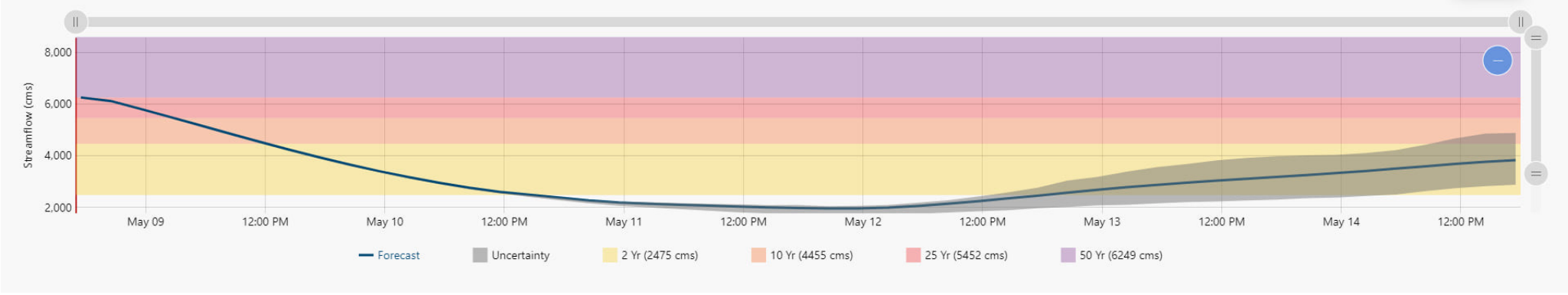


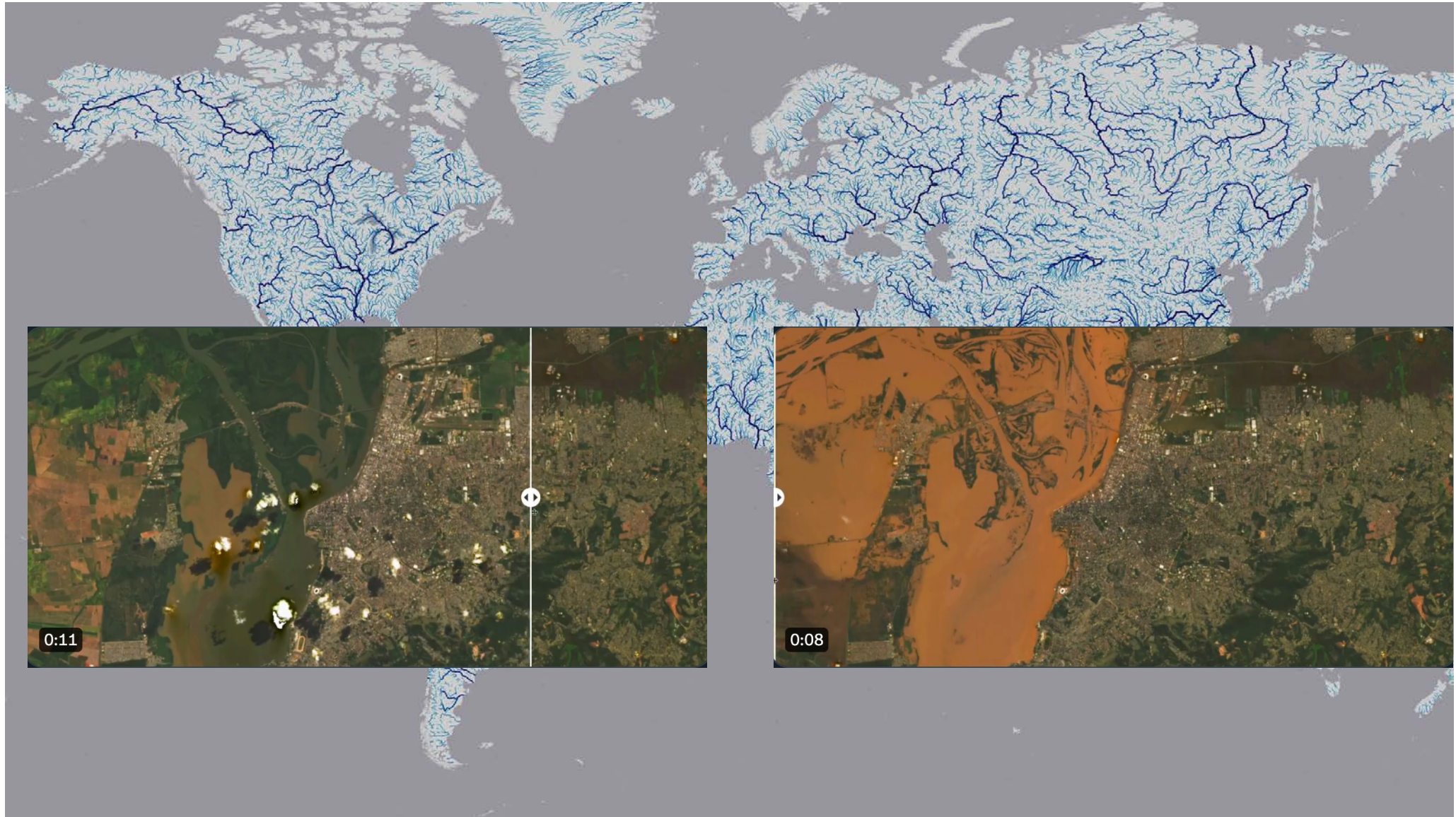


# GEOGLOWS Sistema de Previsão de Rios do Brasil



Esri, USGS | Esri, TomTom, Garmin, FAO, NOAA, USGS | BYU, ECMWF, esri, NOAA, NASA, SERVIR, USAID, ICIMOD, JRC, Copernicus, World Bank, and Microsoft Azure

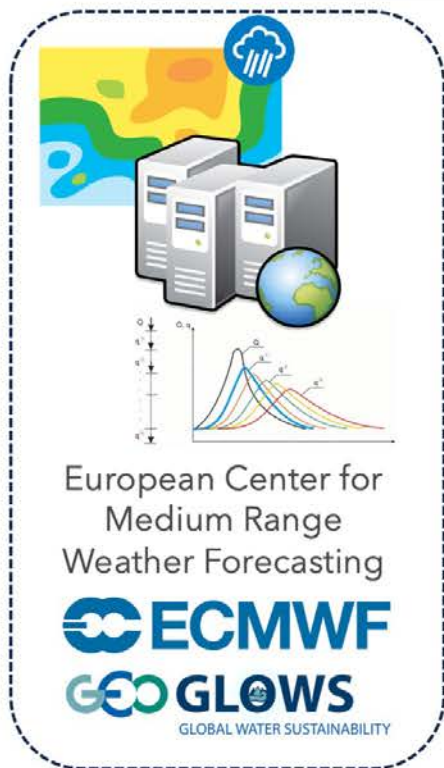






# Group on Earth Observations Global Water Sustainability (GEOGLOWS) Version 2

GEOGLOWS V.2 **Delivers** (Free!) Data and Web Service Sources <https://data.geogloWS.org> **Which Power** Locally Adaptable Open-Source Code and Web Apps <https://training.geogloWS.org>



European Center for Medium Range Weather Forecasting  
**ECMWF**  
**GEOGLOWS**  
GLOBAL WATER SUSTAINABILITY

1. Weekly Historical Data

powered by **aws**  
  
Store and Share Data

2. Daily Animated Maps

  
**esri**  
Map Visualizations

3. Daily New Forecasts

**GEOGLOWS**  
GLOBAL WATER SUSTAINABILITY  
  
Application Programming Interface Data on Demand







Expected annual loss reports



View real time hazards



Identify funding opportunities



Capacity building tool



High & Low emissions scenarios



Inform green job opportunities



Support decision making for new development in low-risk areas



Identifying vulnerability

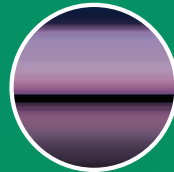


Relevant data

(climate, tribal, disadvantaged communities, building codes, and more)



Climate Action Plans



Reducing Carbon Emissions



Pursuing Environmental Justice

Climate Mapping for Resilience & Adaptation Portal





[resilience.climate.gov](https://resilience.climate.gov)



# Climate Mapping for Resilience and Adaptation



[resilience.climate.gov](https://resilience.climate.gov)

Climate Mapping for Resilience and Adaptation (CMRA) integrates information from across the federal government to help people consider their local exposure to climate-related hazards. People working in community organizations or for local, Tribal, state, or Federal governments can use the site to help them develop equitable climate resilience plans to protect people, property, and infrastructure. The site also points users to Federal grant funds for climate





## Climate-related hazards in real-time

Climate-related hazards are affecting U.S. communities every day. View real-time statistics and maps documenting where people, property, and infrastructure may be exposed to hazards. Click any hazard below to display its associated map. Click areas of interest on any map for more information.

### Wildfire

Active fires  
Last 30 days



Source: National Interagency Fire Center

### Drought

People experiencing drought

51,926,773

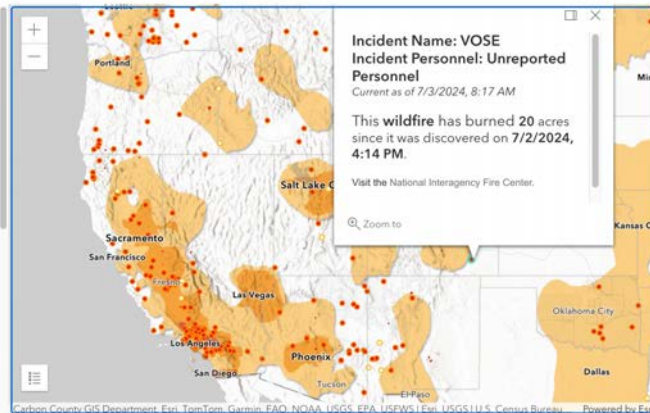
Source: NOAA/NIDIS Drought.gov

### Inland Flooding

People under flash flooding alerts

14,140,738

Source: NOAA National Weather Service



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People under heat alerts

21,402,103

Source: NOAA National Weather Service

### Coastal Flooding

People under coastal flooding alerts

9,349,303

Last 30 days



Source: NOAA National Weather Service

### Extreme Heat

People under heat alerts

146,388,512

Source: NOAA National Weather Service

### Extreme Cold

People under cold weather alerts

0

Source: NOAA National Weather Service



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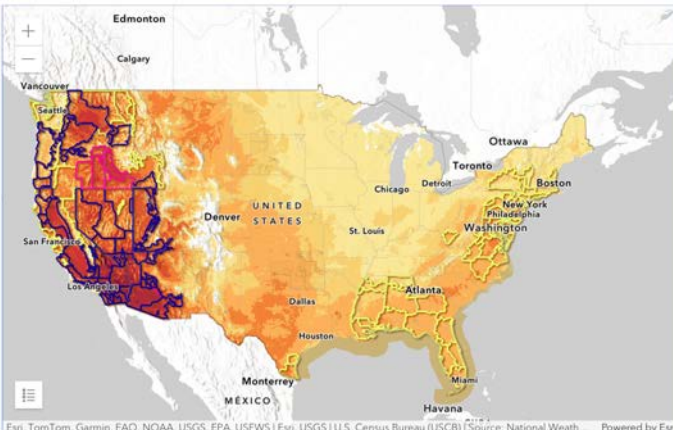
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People under cold weather alerts

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## Climate-related hazards in real-time

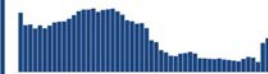
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### Drought

People experiencing drought

51,926,773

Last 52 weeks



Source: NOAA/NIDIS Drought.gov

### Inland Flooding

People under flash flooding alerts

21,402,103

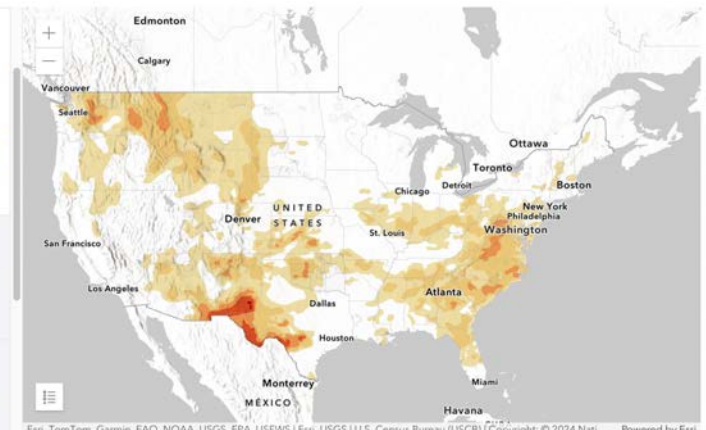
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### Coastal Flooding

People under coastal flooding alerts

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San Bernardino County, CA

Select a geography:

Census Tract County Tribal Area



Climate Projections

Map Exploration

Climate Hazards

Extreme Heat

Drought

Wildfire

Flooding

Coastal Inundation

Climate Projections for

Early Century (2015-2044)

Lower emissions

Higher emissions

Indicator	Lower emissions	Higher emissions
Annual days with maximum temperature > 90°F	133.4 Days + 16.1 since 1976-2005	135.0 Days + 17.8 since 1976-2005
Annual days with maximum temperature > 95°F	102.7 Days + 17.6 since 1976-2005	104.8 Days + 19.7 since 1976-2005
Annual days with maximum temperature > 100°F	69.2 Days + 17.7 since 1976-2005	71.6 Days + 20.1 since 1976-2005
Annual days with maximum temperature > 105°F	36.2 Days + 14.1 since 1976-2005	38.5 Days + 16.3 since 1976-2005
Annual single highest maximum temperature	111.9 °F + 2.9 since 1976-2005	112.2 °F + 3.2 since 1976-2005
Annual highest maximum temperature averaged over a 5-day period	108.9 °F + 2.8 since 1976-2005	109.2 °F + 3.2 since 1976-2005
Cooling-degree days (CDD)	3,052.0 Degree Days + 485.1 since 1976-2005	3,115.6 Degree Days + 548.6 since 1976-2005

Indicator Details

Chart Table

Annual days with maximum temperature > 90°F



Modeled History (1976-2005)  
Lower emissions  
Higher emissions



Interoperable, standards-compliant platforms are essential for advancing science

# Open Science

Explore Open Science →

- Open Science
- Weather and Climate Science
- Ocean Science
- Solid Earth Science
- Geographic Information Science
- Social Science

Open Science

Weather and Climate Science

Ocean Science

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Social Science



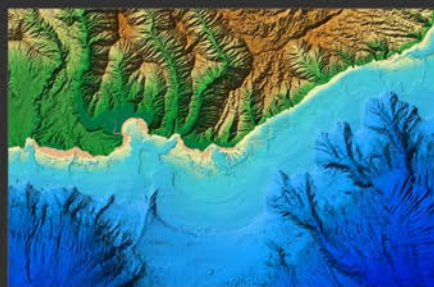
### Fighting the climate crisis together

Learn about the benefits of incorporating GIS into your climate action planning, and consider making Esri your trusted partner in



### Esri and the scientific community

We support the science community and seek to do good science too, as it underpins much of what we do as an organization. This



### Esri's ArcGIS Living Atlas of the World

As a compelling part of Esri's science portfolio, this resource enables great mapping and analytics, secure sharing and



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[esriurl.com/collab](http://esriurl.com/collab)