USGS
science for a changing world

International Year of Planet Earth

Launch Event
12-13 February 2008
UNESCO, Paris

Theme 2
Earth resources: Threat or Treat?

Science, Society, and the Future of Earth's Resources
Mark Myers, Director, U.S. Geological Survey

U.S. Department of the Interior
U.S. Geological Survey

Humans become agents of environmental change

Ecological equilibrium disturbed

Human-induced changes on a global scale

"Anthropocene epoch"

Approaching thresholds of ecosystems

Threats to earth resources

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Night light produced largely from fossil fuels

An index of human power in the environment

NASA

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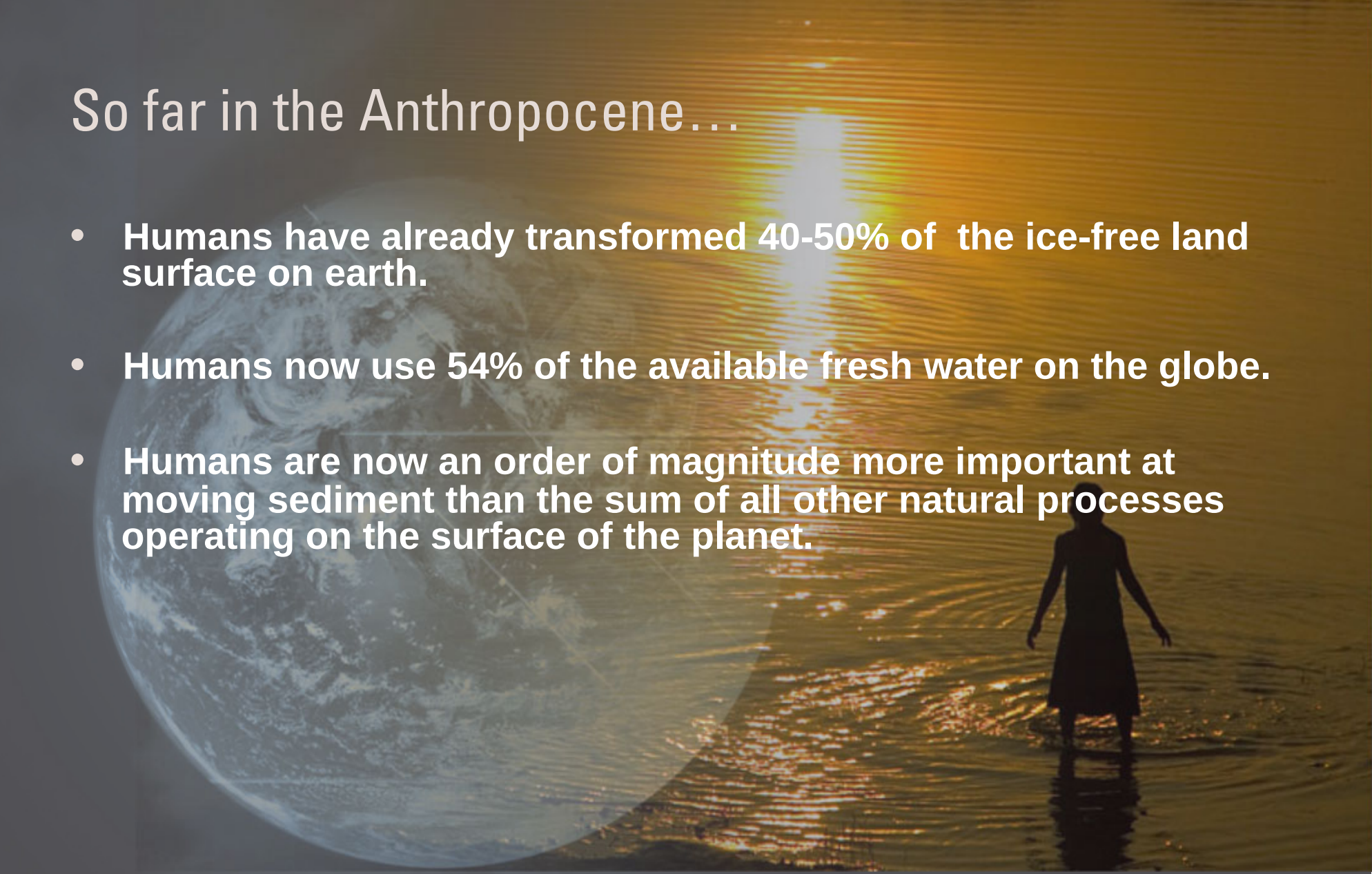
So far in the Anthropocene…



- **Humans have already transformed 40-50% of the ice-free land surface on earth.**
- **Humans now use 54% of the available fresh water on the globe.**
- **Humans are now an order of magnitude more important at moving sediment than the sum of all other natural processes operating on the surface of the planet.**

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Energy and Mineral Resources

Global competition

Growing population, expanding economies heighten demand

Environmental consequences of development, extraction, use

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Water Quality and Availability

Water a limited resource, global issue

Diminished by climate change, population growth, agricultural use

Transboundary issues

U.S. supports UNESCO initiatives for sustainability

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Biological Resources

Increased desertification

Increased floods

Loss of biodiversity

Loss of reef building corals

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Understanding Earth Systems

All earth resources interrelated.

Climate change, population growth accelerate difficulties, complexity

USGS science strategy based on systems approach

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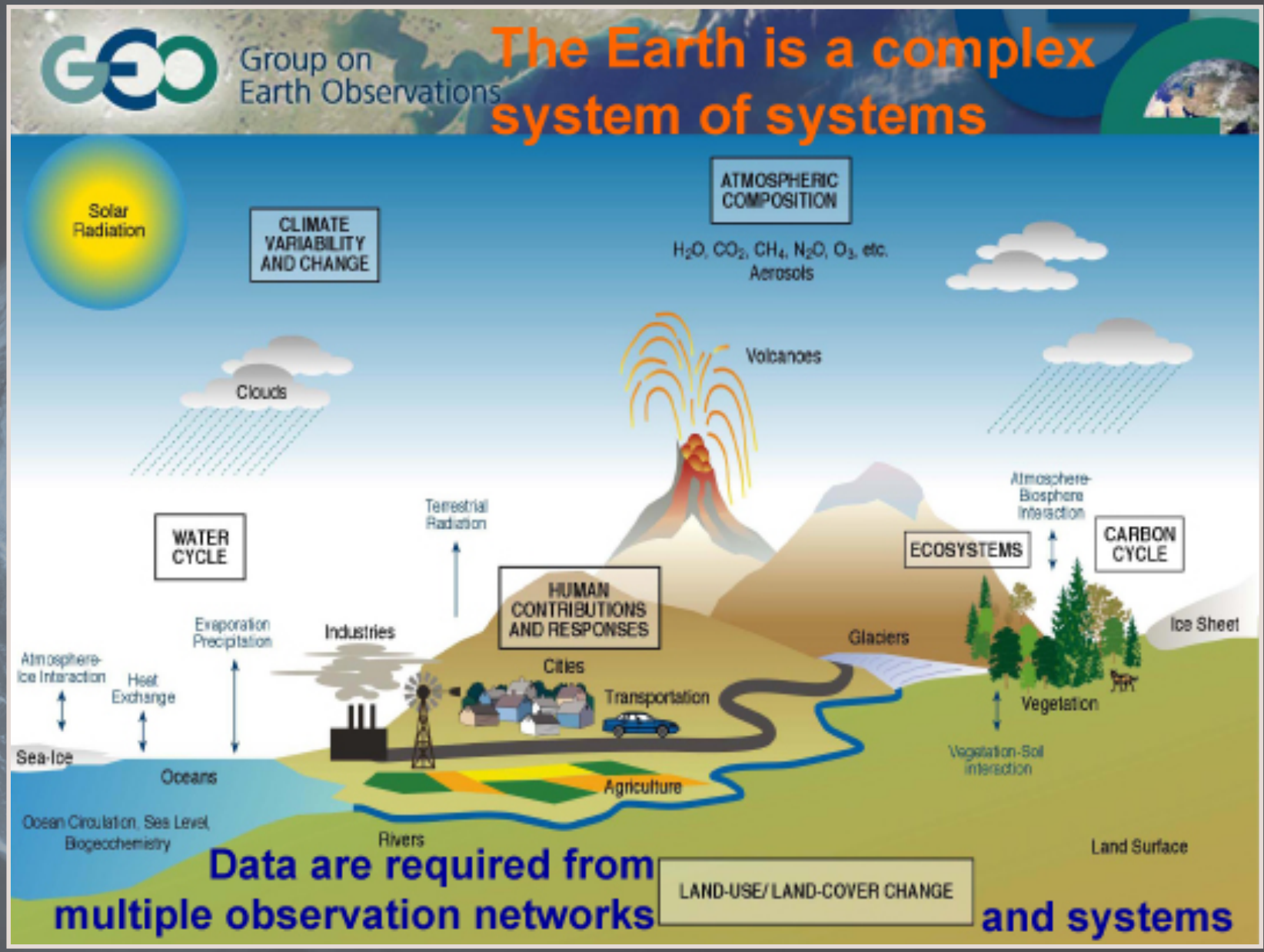
Group on Earth Observations
The Earth is a complex system of systems
Solar Radiation
CLIMATE VARIABILITY AND CHANGE
ATMOSPHERIC COMPOSITION
H_2O, CO_2, CH_4, N_2O, O_3, etc.
Aerosols
Volcanoes
Clouds
WATER CYCLE
Terrestrial Radiation
HUMAN CONTRIBUTIONS AND RESPONSES
ECOSYSTEMS
Atmosphere-Biosphere Interaction
CARBON CYCLE
Evaporation Precipitation
Industries
Glaciers
Ice Sheet
Atmosphere-Ice Interaction
Heat Exchange
Cities
Transportation
Vegetation
Sea-Ice
Oceans
Agriculture
Vegetation-Soil Interaction
Ocean Circulation, Sea Level, Biogeochemistry
Rivers
Land Surface
Data are required from multiple observation networks
LAND-USE/LAND-COVER CHANGE
and systems

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USGS Science Strategy Directions

Understanding Ecosystems and Predicting Ecosystem Change

Energy and Minerals for America's Future

A National Hazards, Risk, and Resilience Assessment Program

The Role of Environment and Wildlife in Human Health

A Water Census of the United States

Climate Variability and Change

Data Integration and Beyond

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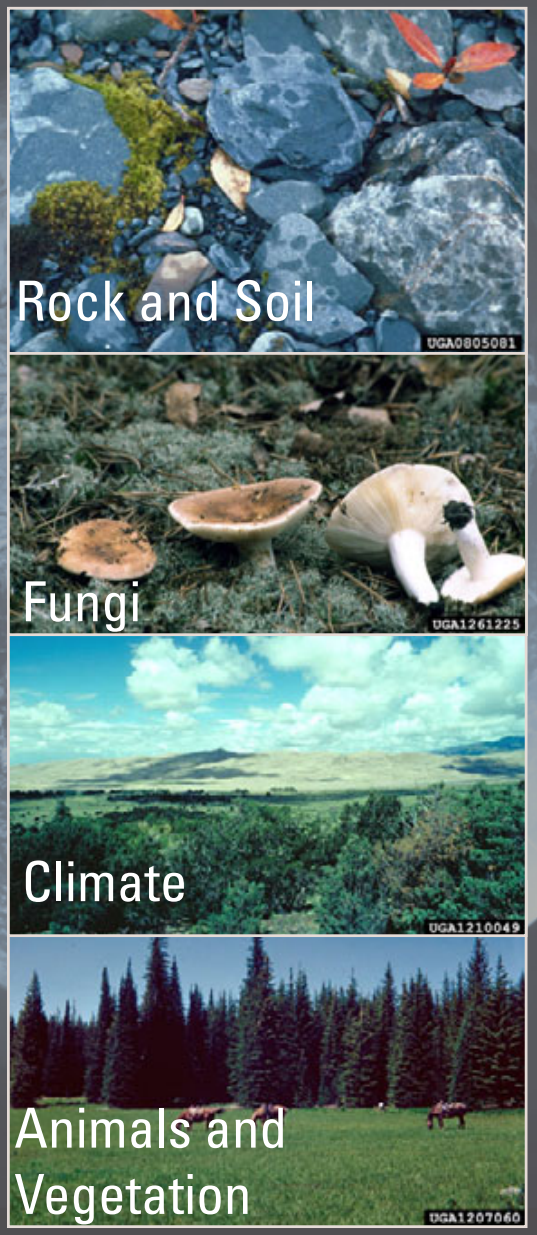
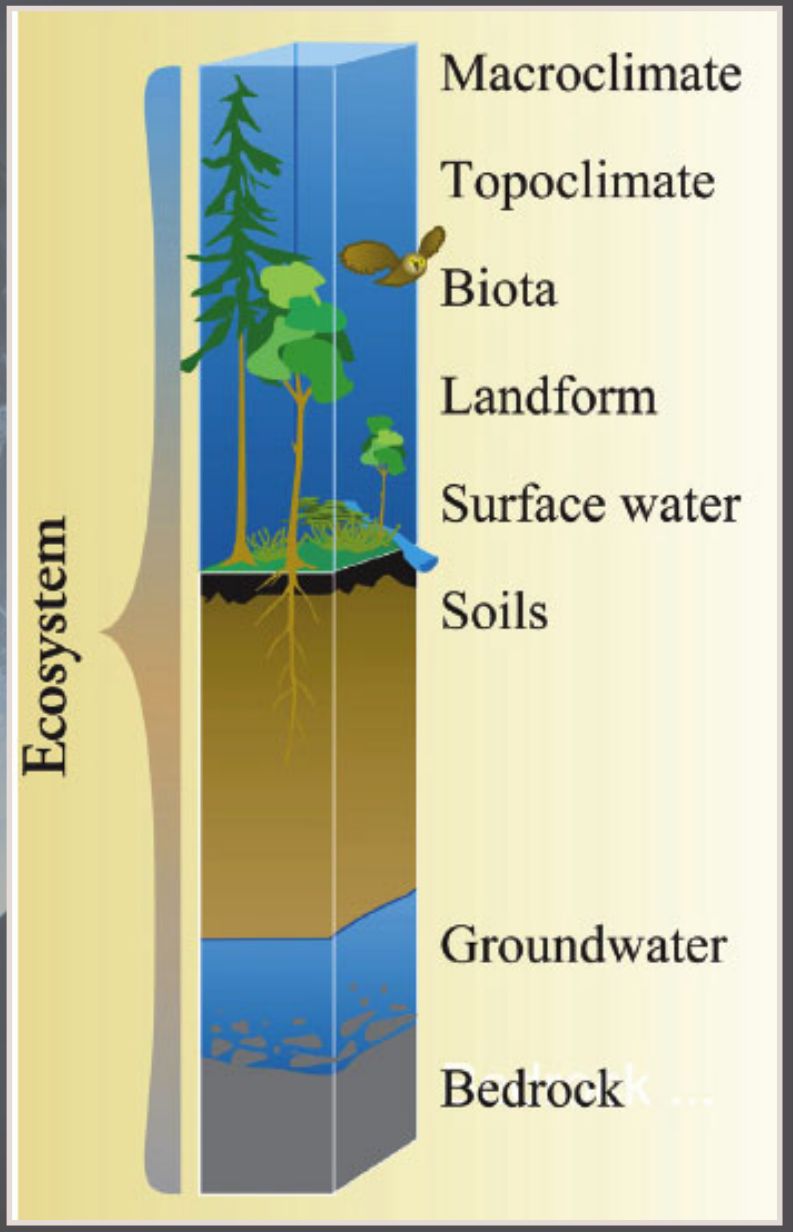
Ecosystem Structure





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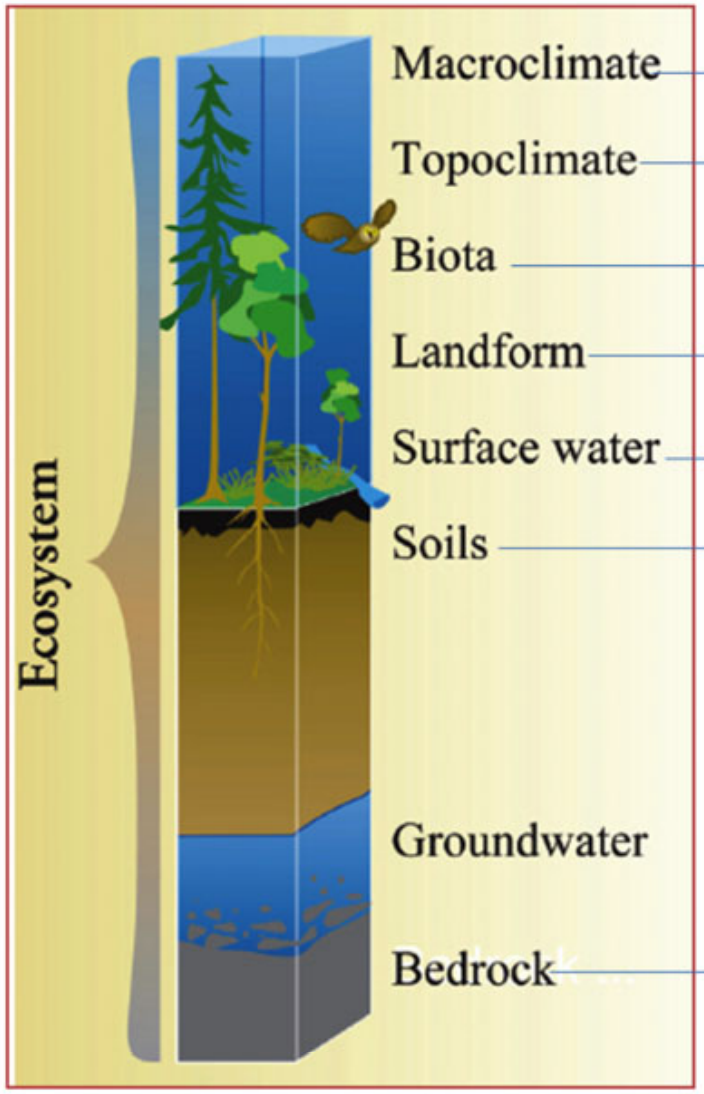
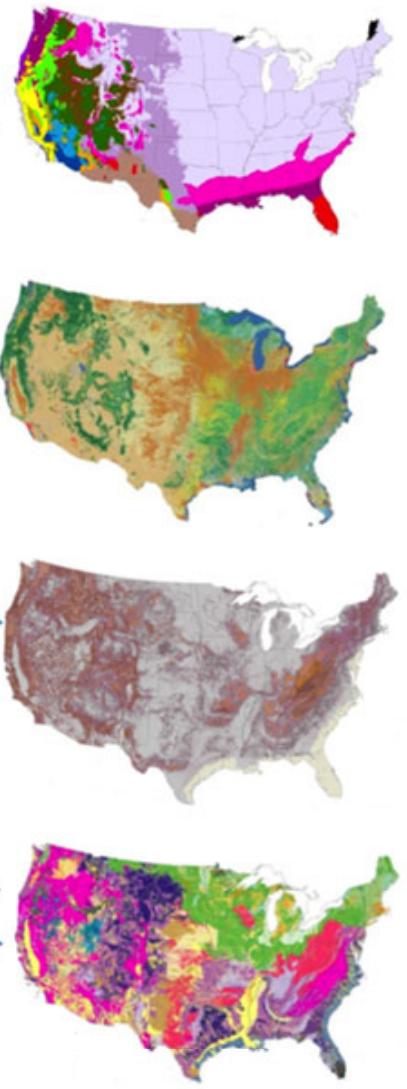
Ecosystem Mapping





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Ecosystem Analysis

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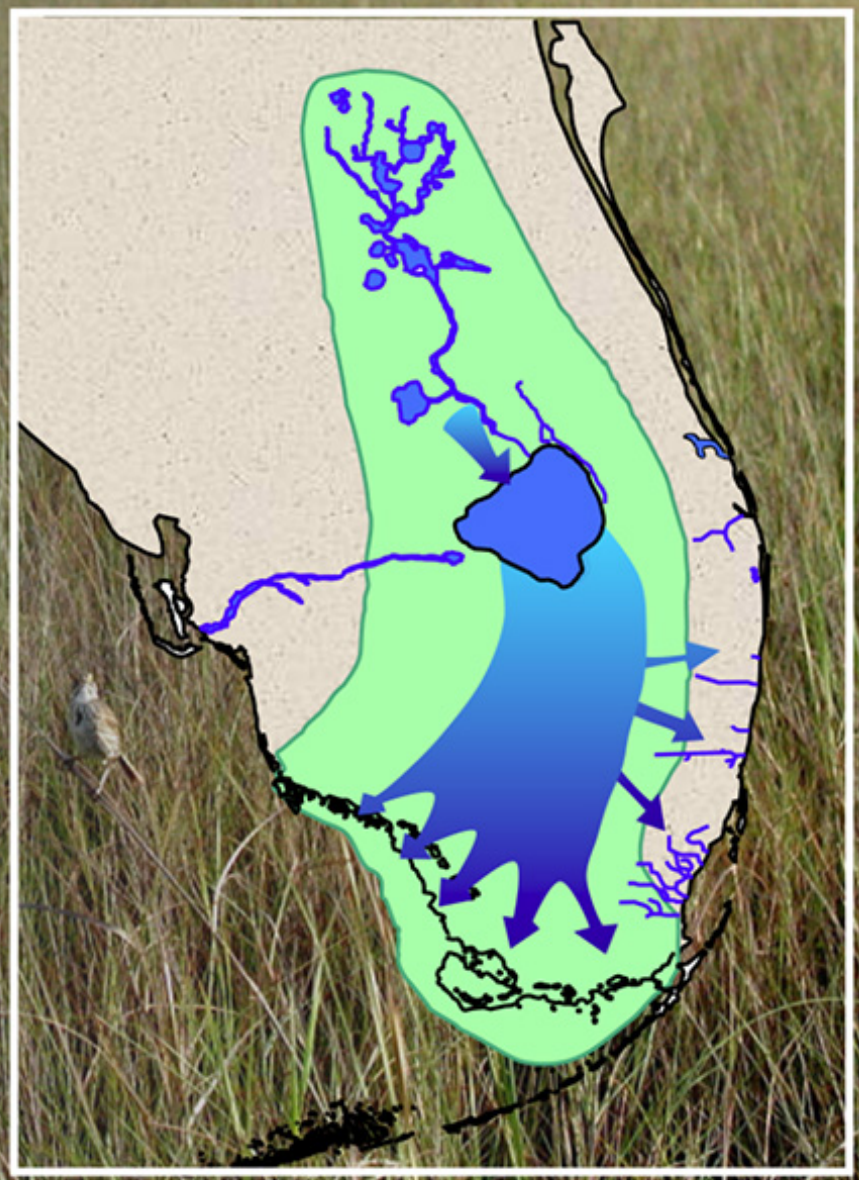
Integrated Science in the Everglades



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Integrated Science in the Everglades

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USGS International Science - examples

In alliance with valued partners

Global Seismic Network

International Polar Year

International Council for Science

UNESCO International Hydrological Programme (IHP)

Global Earth Observations System of Systems (GEOSS)

A Satellite Image Atlas of Endangered World Heritage Sites (UNESCO)

Famine Early Warning System Network (FEWS NET, U.S.)

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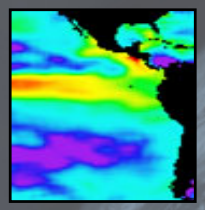
Famine Early Warning (FEWS)

Environment Monitoring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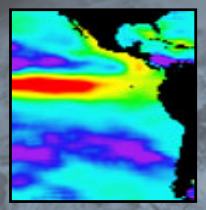
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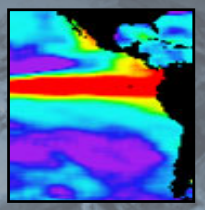
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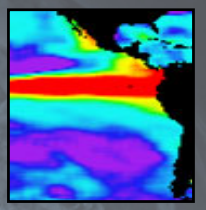
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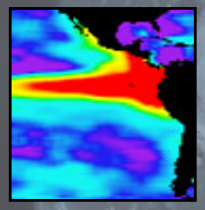
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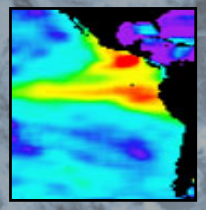
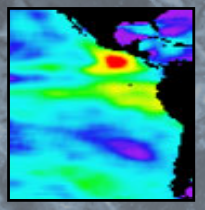

Jan 1998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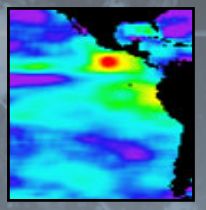
Mar 1998

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(08-08-00)

UNESCO International Hydrological Programme (IHP)

UNESCO Director General and U.S. Ambassador to UNESCO to lead workshop with US agency heads

27 June 2008

Washington, DC

Goal: to accelerate U.S. contributions to address water resources and water quality problems in developing countries

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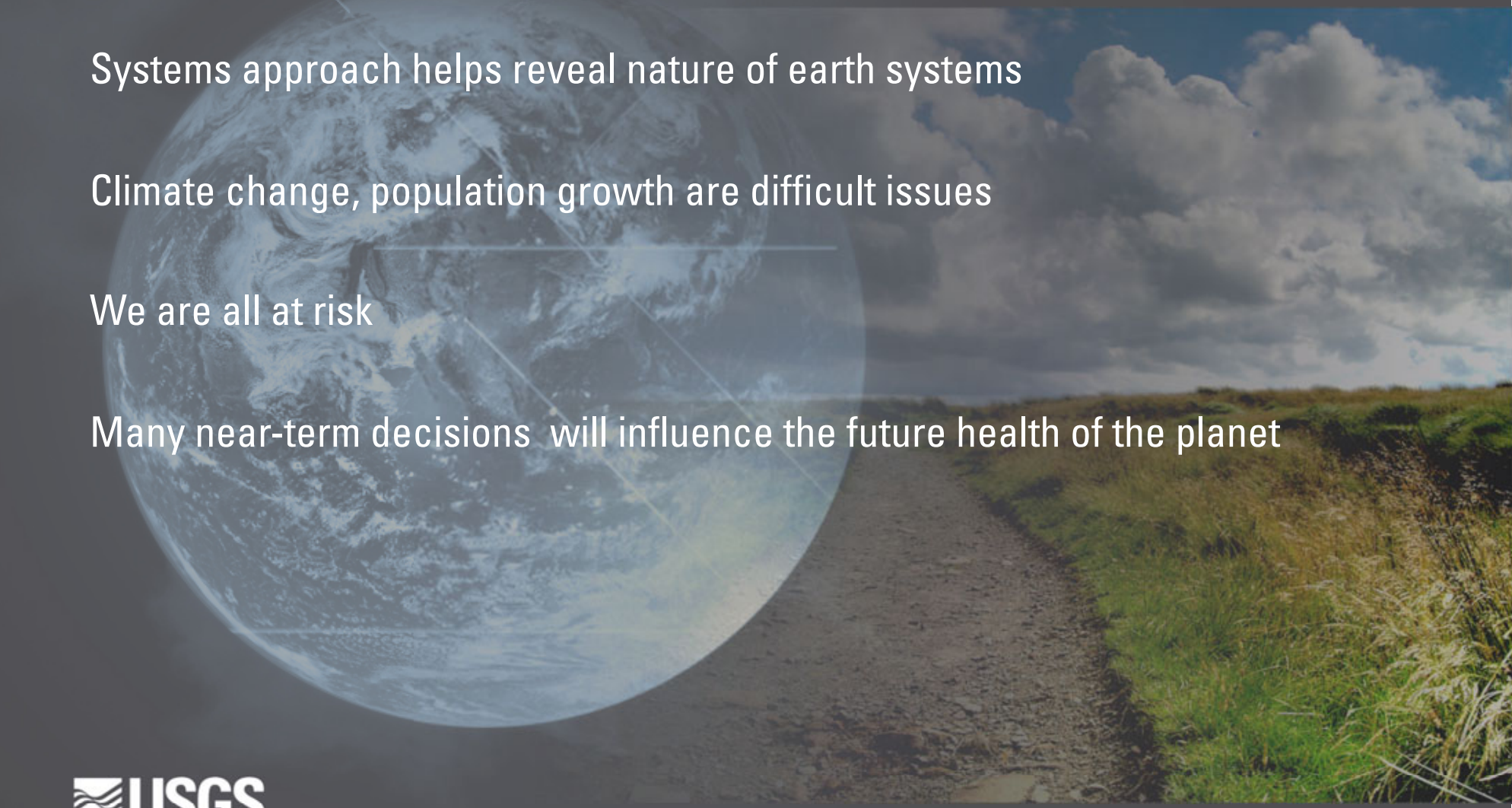
Living for the Future



Systems approach helps reveal nature of earth systems

Climate change, population growth are difficult issues

We are all at risk

Many near-term decisions will influence the future health of the planet

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