GLOBAL ENVIRONMENT OUTLOOK

GEO 6

UNEP

Regional Assessment for North America

AESS Annual Conference
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Jason Jabbour
United Nations Environment Programme

Michael Brody
American University

Organization of talk

- Evolution and purpose of GEO
- Process and organization for GEO 6
- Regional priorities and key findings
- Selected State and Trends in North America
- Conclusions

The Global Environment Outlook Process

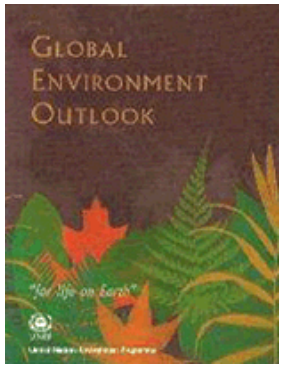
- GEO is an intergovernmental, consultative, highly participatory, capacity building process for reporting on the state of the environment, trends and future outlooks.

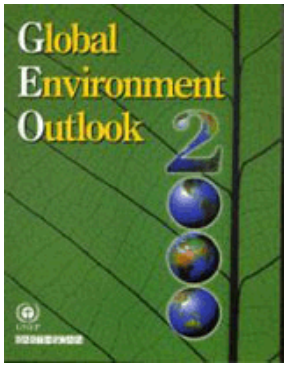
- Practical implementation of UNEP's mandate to keep the global environment under review; initiated at the request of the UNEP **Governing Council in 1995**.

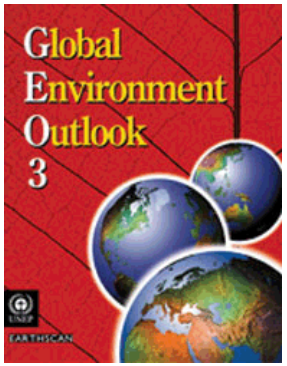
Core objectives

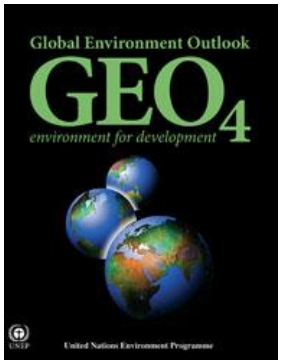
1. To provide access to the best scientific knowledge for international environmental governance and the mainstreaming of environmental concerns into social and economic sectors, and in support of internationally agreed environment goals;
2. Facilitate the interaction between science and policy through multi scaled and multi-dimensional integrated assessment process and products of high legitimacy, credibility and utility;
3. Build partnerships and capacity for environmental assessments.

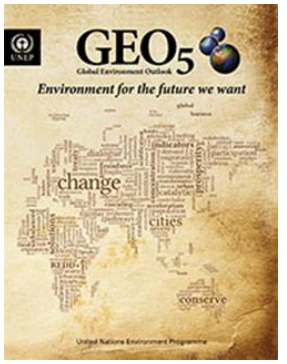
GEO Assessments and Products





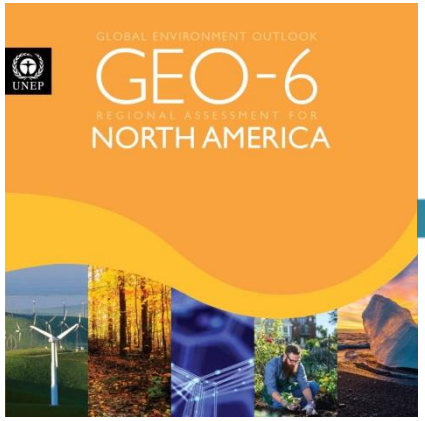


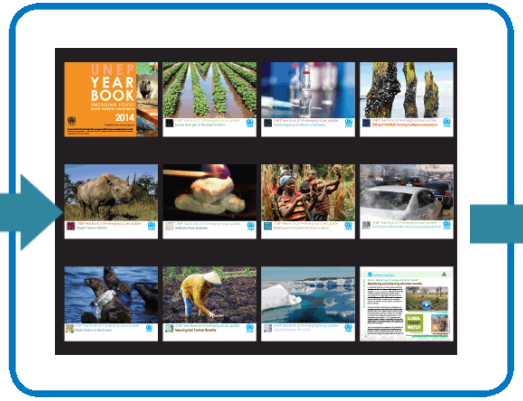


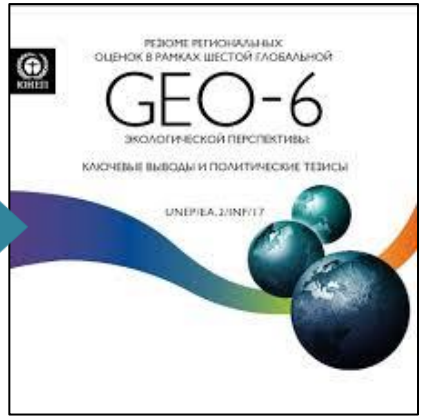


DIGITAL, DYNAMIC, SOLUTION-ORIENTED

“Live Digital Series”







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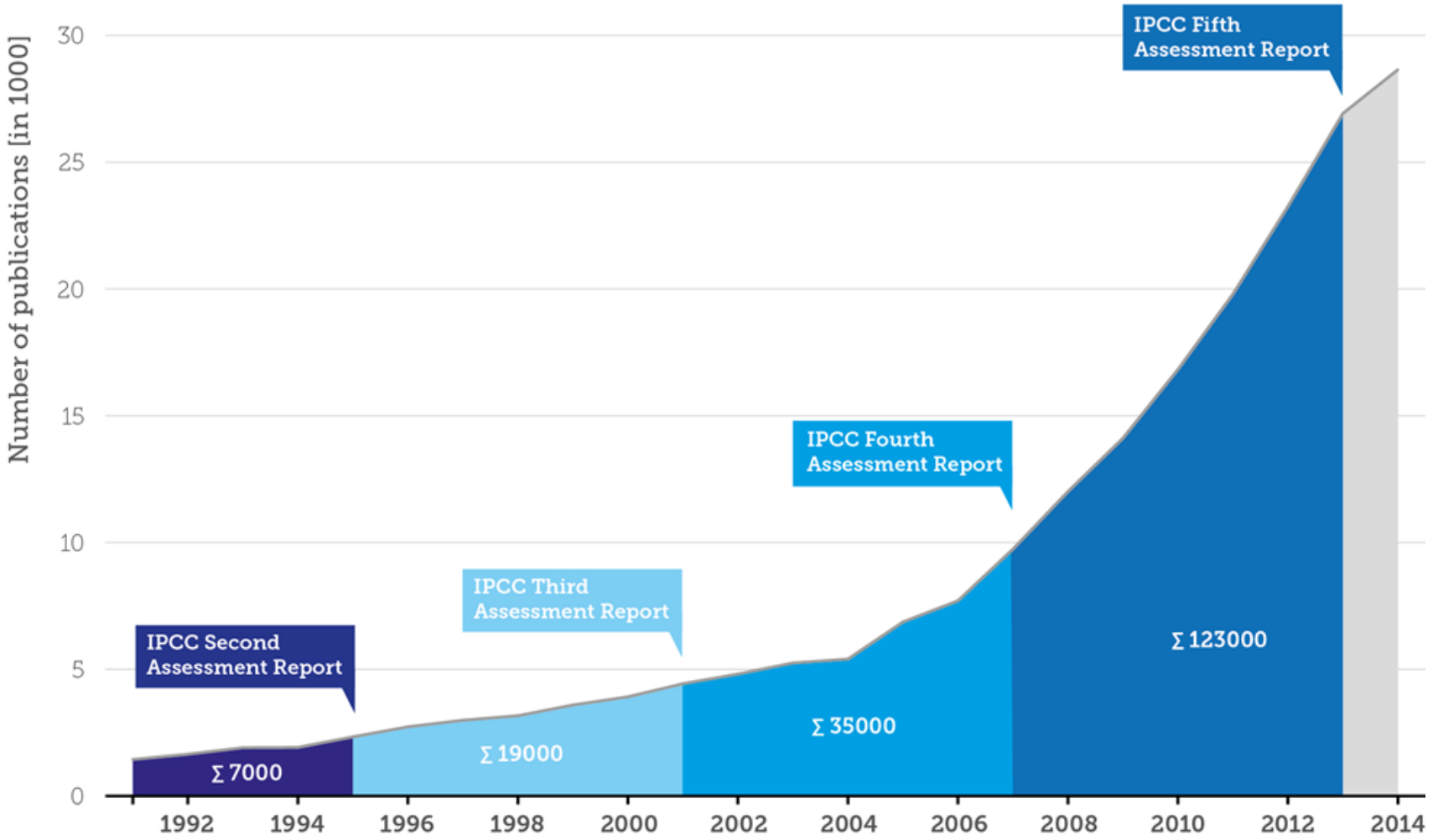
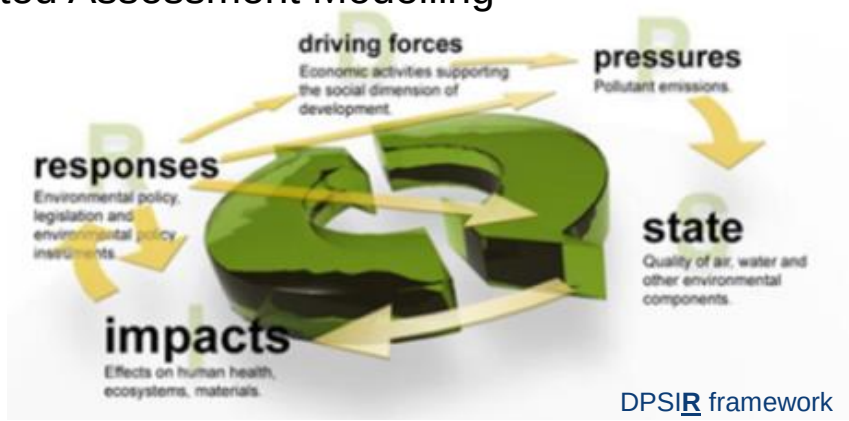
Rising epistemic complexity



Kowarsch, Jabbour *et al*. (2016/ *forthcoming*)

A shift to solution-oriented assessments

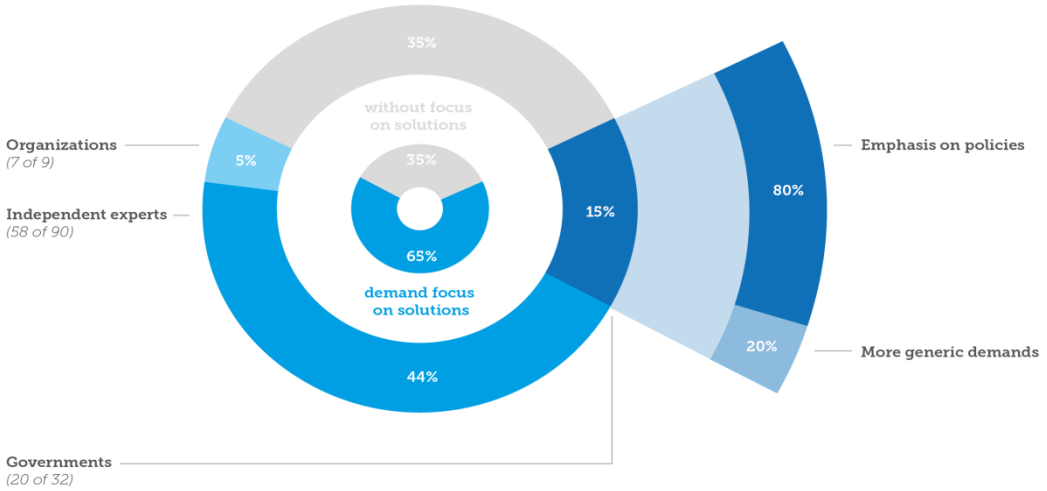
Integrated Assessment Modelling



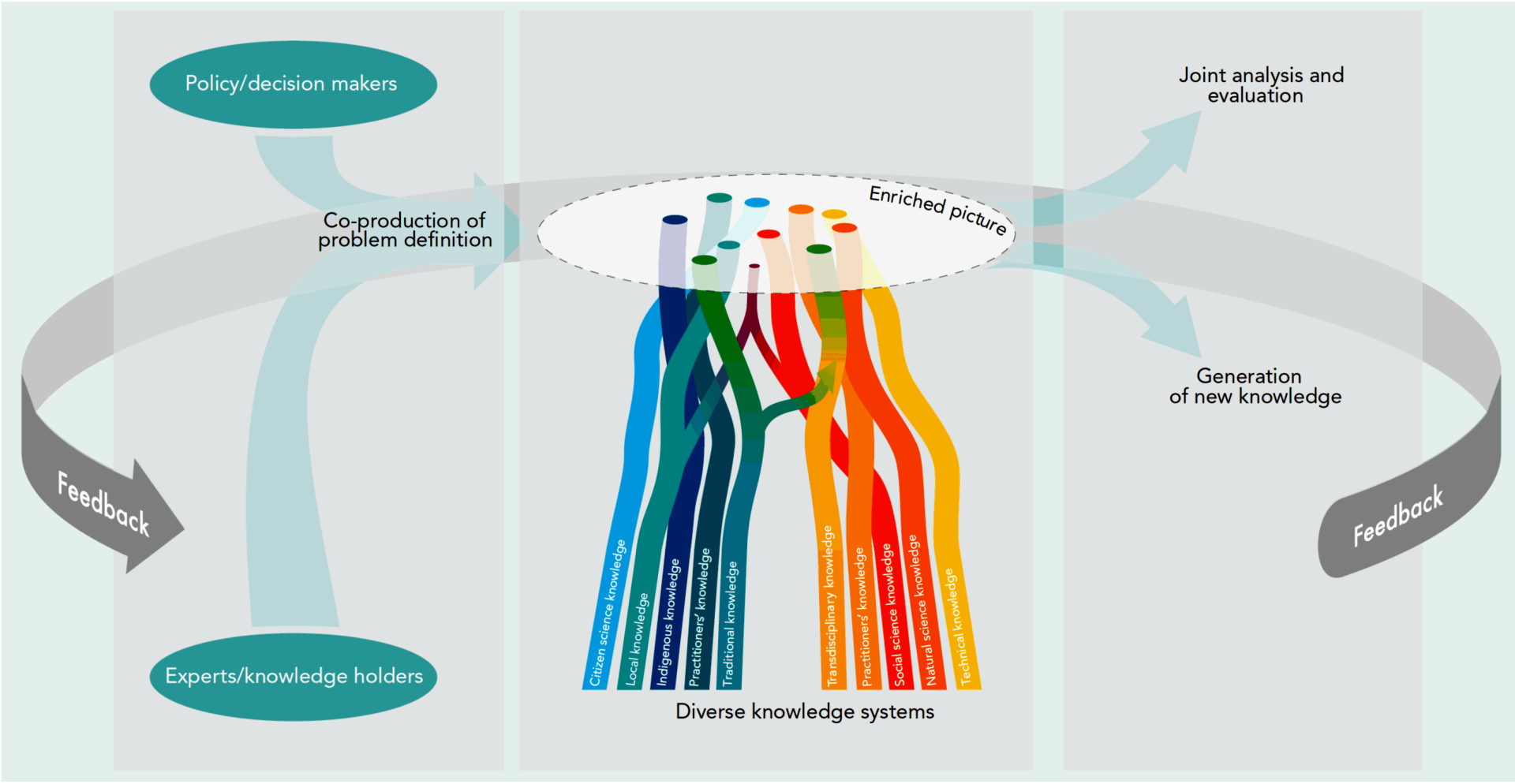
DPSIR framework

High demand for more assessment of solutions

131 IPCC reform responses



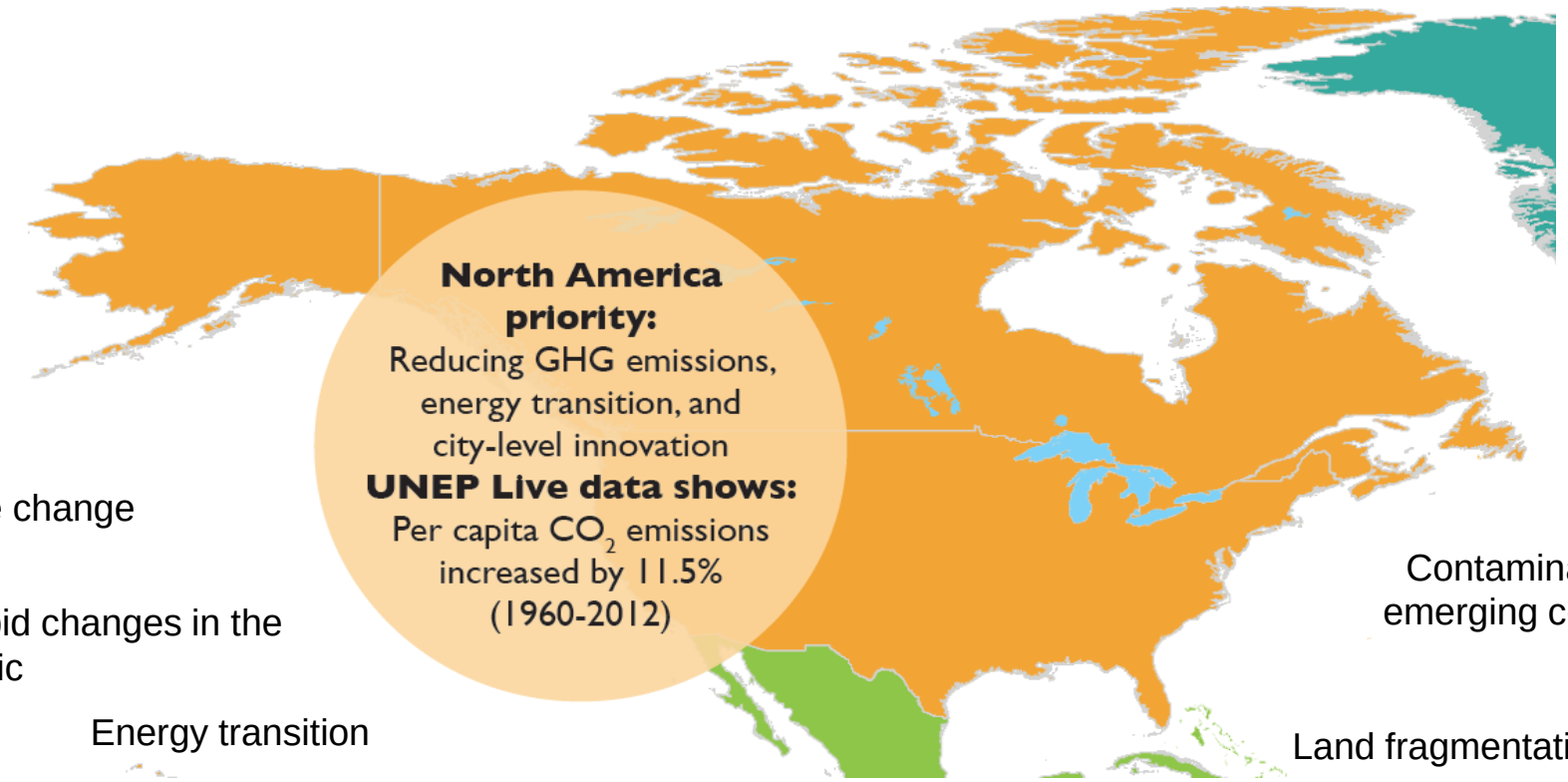
Multiple evidence base approach



A framework for connecting diverse scientific knowledge systems

Regional priorities

Expert consultation in Gatineau, Canada in May 2015 identified 11 regional priorities and agreed on overarching narratives and themes for the assessment



Climate change

Rapid changes in the arctic

Energy transition

Contaminant of emerging concern

Land fragmentation

Adaptive governance

Water security

Data revolution

Natural capital accounting

Non-point source contamination

Sustainable consumption and production

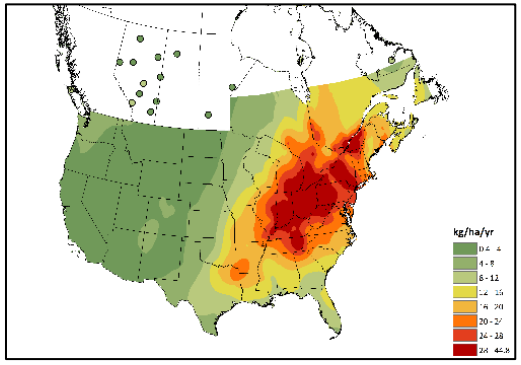
Key findings

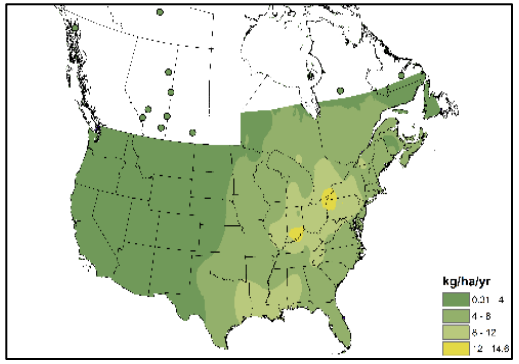
1. Conditions have improved because of effective policies
   - e.g. Air quality, water quality, land resources
2. Environmental challenges have emerged that are harder to manage within existing policy frameworks
   - e.g. Climate change, Arctic, energy system, new contaminants, water scarcity, coastal and marine environment, fisheries
   - hard-to-manage challenges are characterized by multiple, interacting threats triggering complex, systemic change.
3. Energy system is undergoing rapid change

   -Challenges include aggressive hydrocarbon extraction

   -Ongoing trends in alternative energy, rising efficiencies and energy storage opportunities show potential for sustainable energy

Wet sulfate deposition,
1990 (left) and 2013 (right)





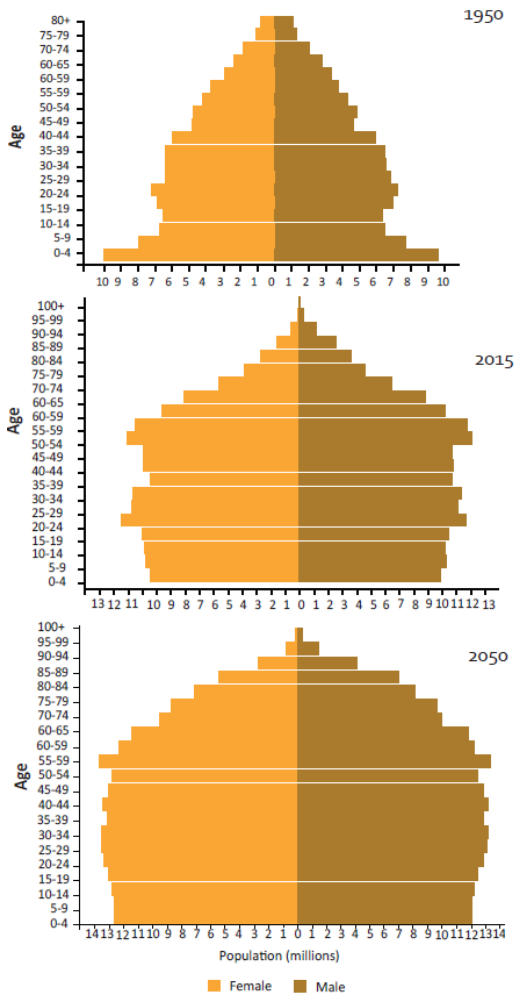
Key findings

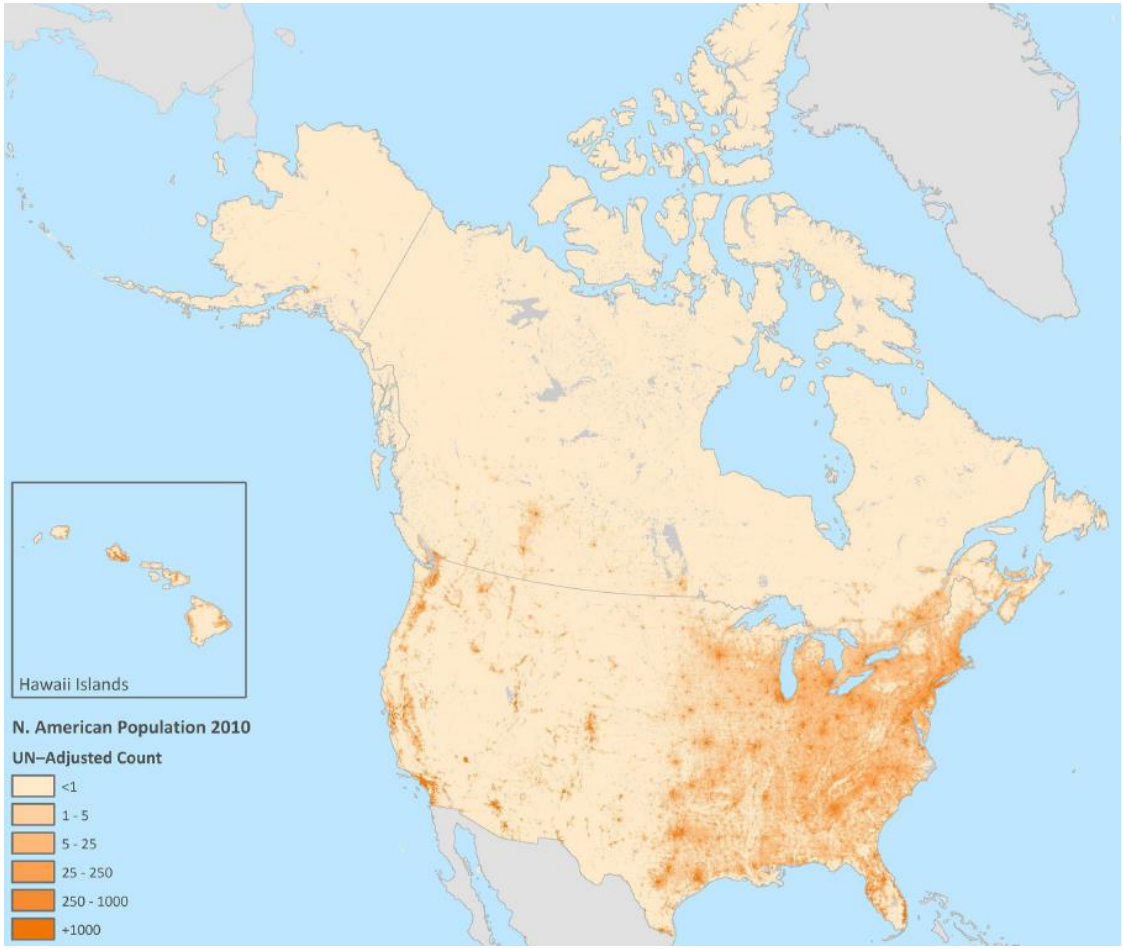
1. The traditional policy toolkit still plays a crucial role, even if insufficient.
2. A new toolkit is emerging and proving its value.
3. Problems that seemed overwhelming now appear more tractable.
   - Significant progress on GHG reductions, climate adaptation, energy systems.
4. Some progress is driven by a renaissance in adaptive governance strategies.
   - Artful combination of participation, learning, system innovation, management efficiency deployed at multiple scales.
5. Other progress is driven by sustained attention to foundational governance elements generate cross-system benefits.
   e.g. Natural Capital Accounting, SCP, environmental information/ analytics.
6. New chemical contaminants are of concern for public health and the environment
7. Water scarcity is of increasing concern in the arid western areas
8. Coastal and marine environments are under increasing threats
9. The outlook poses challenges and opportunities.

Solutions to Challenges are Emerging

- Efforts to mitigate climate change – reducing GHGs and enhancing carbon sequestration are creating a foundation for major advances
- Governments, business and communities are taking action to adapt to climate change
- Natural Capital Accounting provides important tools to integrate natural resource, environmental, economic and social information
- Sustainable consumption and production brings together options to reduce environmental pressures
- North America is an energetic driver of the Data Revolution
- The Outlook for North America is a mixture of emerging possibilities and problems

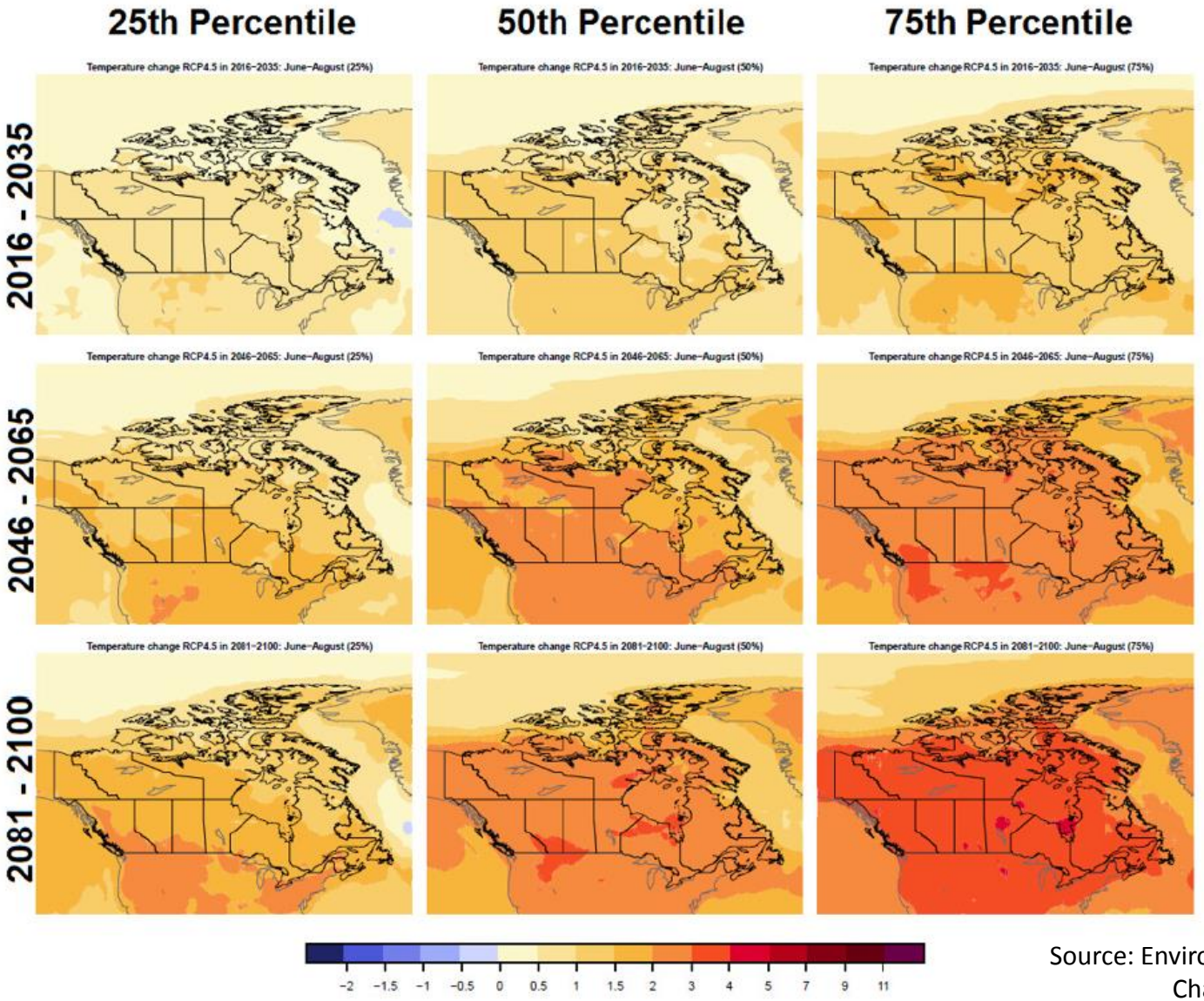
Projected North American Population





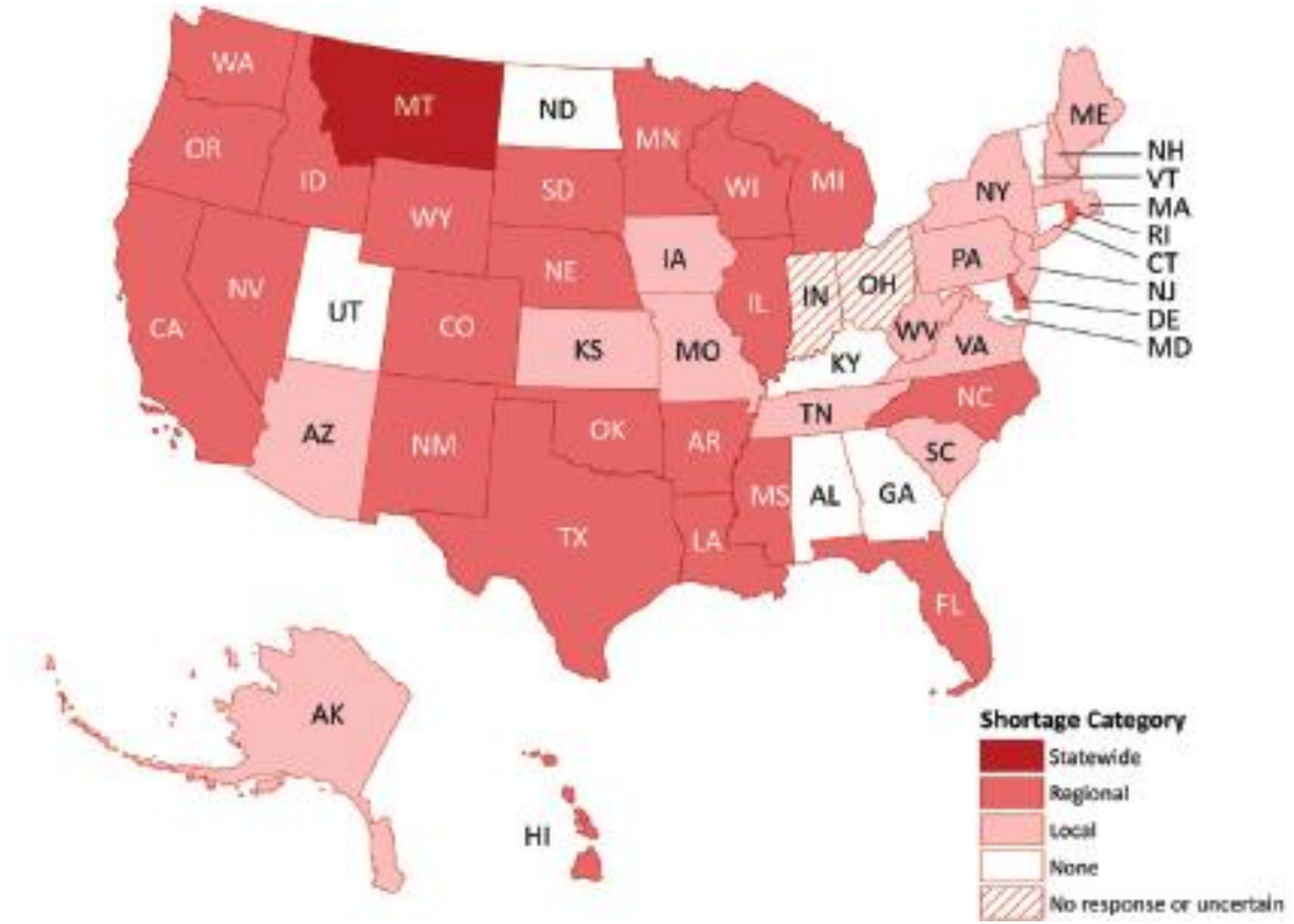
Source: Colby and Ortman (2015); UN DESA (2015); Statistics Canada (2011)

Climate change projection for North America



Source: Environment and Climate Change Canada (2016)

Likely Water Shortages by State



Source: US GAO (2014)

Potential New Technologies:
Bioenergy with Carbon Capture Storage

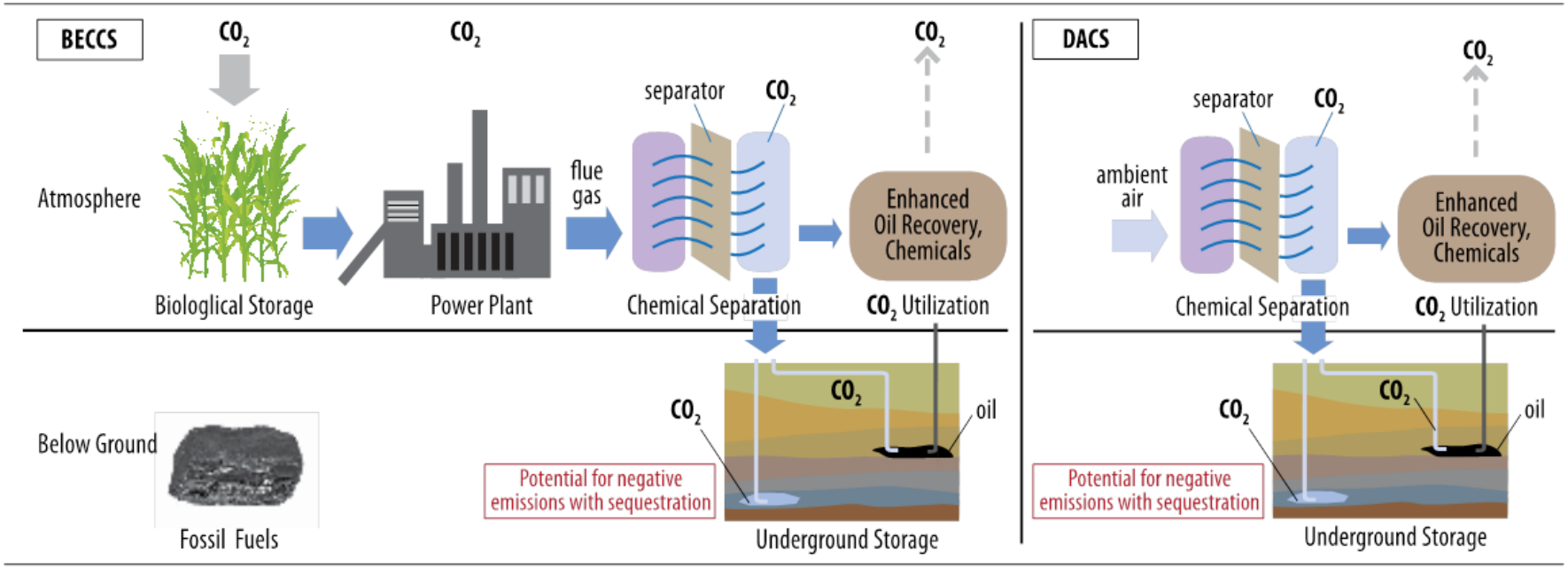


Figure 1. *In Bioenergy with Carbon Capture and Sequestration (BECCS, shown on left), crops such as corn or switchgrass take up carbon dioxide from the atmosphere as they grow. The crops can be burned in power plants to produce electricity, and the carbon dioxide generated is captured and sequestered underground. In Direct Air Capture and Sequestration (DACS, shown on right), carbon dioxide can be removed from the atmosphere as air passes through air filtering structures and is sequestered underground. Block arrows represent fluxes of carbon (as fuel or as carbon dioxide); dashed arrows indicate residual carbon dioxide emissions.*

Source: US NAS (2015)

Conclusions

- The outlook for North America is mixed
- High degree of uncertainty (e.g. Climate Change)
- Further and More Rapid Developments in Biotechnology
  - Enabled by CRISPR – the new gene editing technology
- “Internet of Things” – growing connectedness and implications to energy use
- Ongoing changes in nanotechnologies
- A new toolkit is emerging and proving its value

Questions?

http://www.unep.org/geo/