The Second State of the Carbon Cycle Report (SOCCR2),

A New Scientific Assessment on Changes in Carbon Fluxes and Stocks in North America

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About the report

- Who is producing this report, for whom, and why
- A little about the process
- Organization of the report
- Main findings related to
  - Agriculture,
  - Forestry
  - Rangelands
  - Related resources

CCIWG--An Interagency Partnership and a New Assessment of Carbon in North America-- Science Informing Decisions

https://CarbonCycleScience.us

#SOCCR2

#20YearsofCarbonProgram

United States Carbon Cycle Science Program

An Interagency Partnership

Providing a coordinated & focused scientific strategy for conducting federal carbon cycle research

The U.S. Carbon Cycle Science Program, in consultation with the Carbon Cycle Interagency Working Group (CCIWG), coordinates and facilitates activities relevant to carbon cycle science, climate and global change issues under the auspices of the U.S. Global Change Research Program (USGCRP) Interagency Committee or USGCRP Principals.

The CCIWG supports the peer-reviewed research of carbon cycle science across the federal government and is responsible for defining program goals, setting research priorities, and reviewing the progress of the research programs that contribute to carbon cycle science.

Twelve federal agencies and departments coordinate and support our program activities.

Mission

To coordinate and facilitate federally funded carbon cycle research, and provide leadership to the U.S. Global Change Research Program (USGCRP) on carbon cycle science priorities

Carbon Cycle Interagency Working Group (CCIWG) Since 1998/99

What We Do

Promote interagency cooperation and coordination

Involve the scientific community in providing the needed science to understand the carbon cycle

Help secure funding, prepare individual & joint agency initiatives & solicitation

Atmosphere

Land

Water

Society

Interface

CCIWG instrumental in process of prioritization

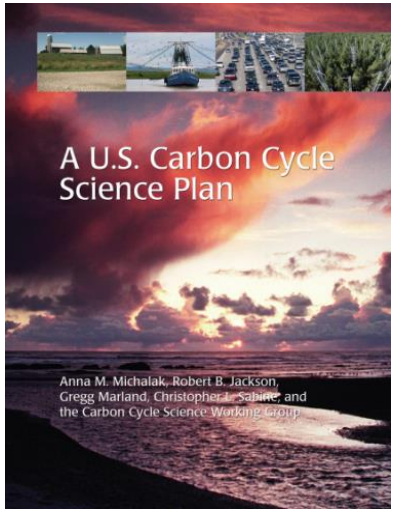
of

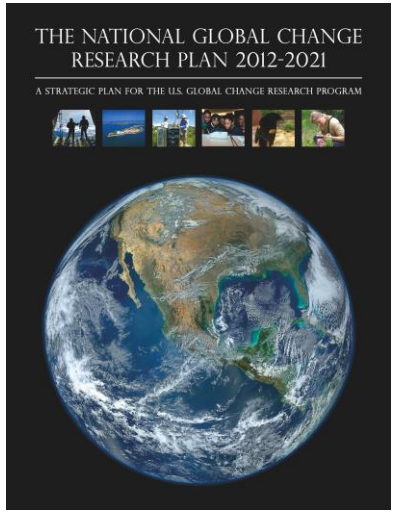
U.S. govt. carbon cycle science research themes

Recent developments and results of multi-agency coordination

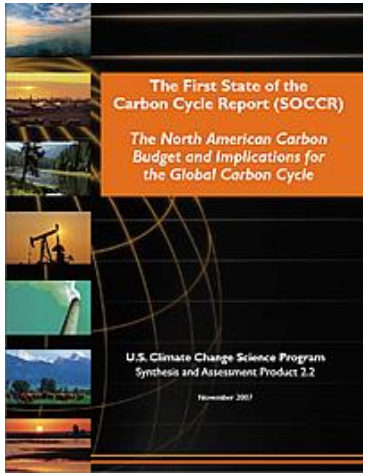
- Carbon cycle science – multi-agency calls – especially synthesis theme, and other joint or coordinated funding
- CCIWG sponsorship of workshops
  - Carbon predictions
  - Urban carbon
  - Blue Carbon
  - Soil Carbon workshop
- NACP and OCB All investigators meetings, interim syntheses, workshops
- International collaborations: CarboNA (CA-MX-US), Global Carbon Project (GCP)
- **SOCCR2**

Coming soon:
2nd State of the Carbon Cycle Report (SOCCR2)





- Follow-up to the 1st SOCCR (2007)
- Led by Carbon Cycle Interagency Working Group (CCIWG)/U.S. Carbon Cycle Science Program under USGCRP auspices
- Lead federal Administrative Agency is USDA.
- Focus on U.S. and North American carbon stocks and fluxes in managed and unmanaged systems
- Including relevant carbon management science perspectives and tools for supporting and informing decisions addressed in/related to U.S. Carbon Cycle Science Plan (2011), U.S. National Climate Assessment, USGCRP Strategic Plan (2012-2021) and Global Change Research Act (1990)



104 STAT. 3096 PUBLIC LAW 101-606—NOV. 16, 1990

Public Law 101-606
101st Congress

An Act

To require the establishment of a United States Global Change Research Pr aimed at understanding and responding to global change, including the cumu effects of human activities and natural processes on the environment, to pr discussions toward international protocols in global change research, and for purposes.

Nov. 16, 1990
[S. 169]

Be it enacted by the Senate and House of Representatives o United States of America in Congress assembled,

Global Change Research Act of 1990.
15 USC 2921 note.

SECTION 1. SHORT TITLE.

This Act may be cited as the "Global Change Research A 1990".

SEC. 106. SCIENTIFIC ASSESSMENT.

On a periodic basis (not less frequently than every 4 years), the Council, through the Committee, shall prepare and submit to the President and the Congress an assessment which—

(1) integrates, evaluates, and interprets the findings of the Program and discusses the scientific uncertainties associated with such findings;

(2) analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and

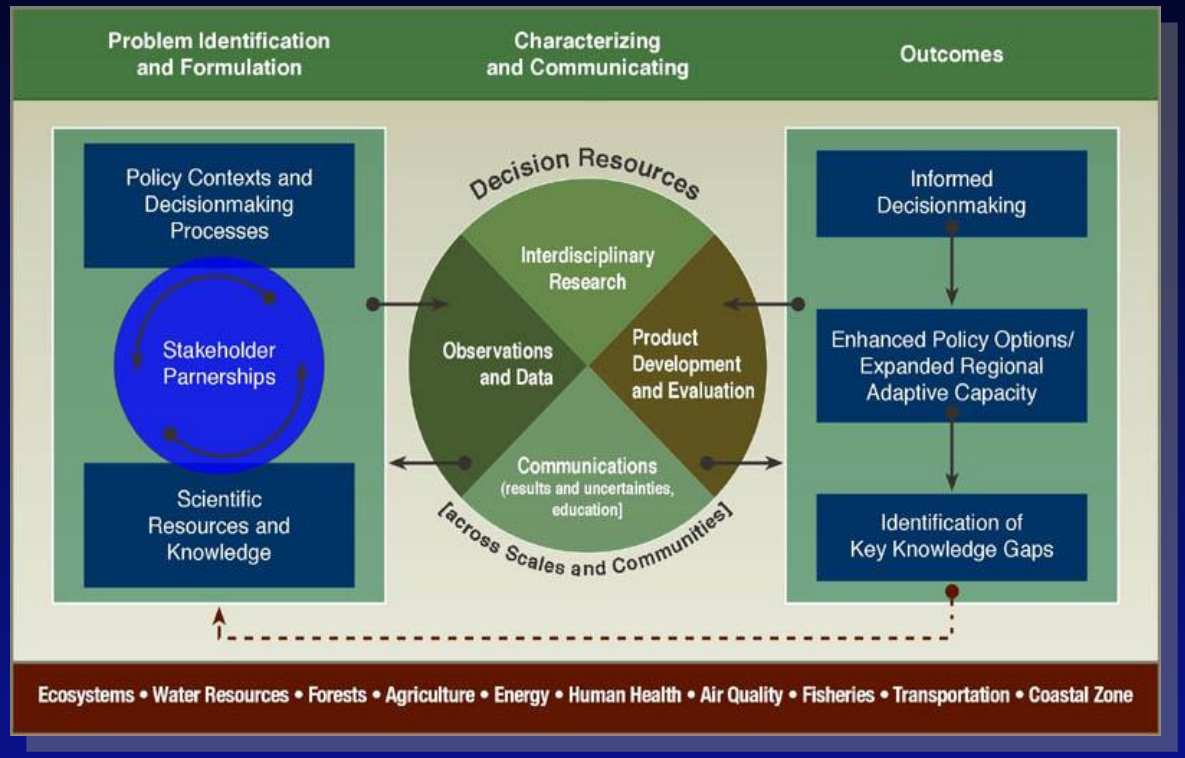
(3) analyzes current trends in global change, both human-inducted and natural, and projects major trends for the subsequent 25 to 100 years.

1st State of the Carbon Cycle Report: (SAP 2.2) SOCCR-1 (2007)

2 major goals of SOCCR-1 (2007)

1. To summarize scientific knowledge about carbon cycle properties and changes for North America.

2. To provide scientific information for decision support and policy formulation concerning carbon.



U.S. Climate Science Program (former name for U.S. Global Change Research Program) Decision Support Strategy

Who wrote it and for whom

A U.S. government report but CA and MX contributions

- Outline and organization developed in consultation with leaders in the scientific community in the US, Canada and Mexico
- Written by experts who volunteered via open calls
- PMC y CCP helped via contribution from both countries in supplying estimates and in writing most of the chapters, and supplying specialists for technical reviews
- Written for decision makers in the public and private sectors, scientists, educators
- Purpose is to inform policy and decision, not to prescribe or recommend policy

SOCCR2 Chapter Leads

- **Vanessa Bailey**, Pacific Northwest National Laboratory
- **Lori Bruhwiler**, NOAA
- **David Butman**, University of Washington
- **Wei-Jun Cai**, University of Delaware
- **Abhishek Chatterjee**, Universities Space Research Association, NASA
- **Sarah R. Cooley**, Ocean Conservancy
- **Grant Domke**, USDA Forest Service
- **Katja Fennel**, Dalhousie University
- **Kevin Robert Gurney**, Arizona State University
- **Daniel J. Hayes**, University of Maine
- **Alexander N. Hristov**, The Pennsylvania State University
- **Deborah N. Huntzinger**, Northern Arizona University
- **Andrew R. Jacobson**, University of Colorado, Boulder; NOAA
- **Jane M. F. Johnson**, USDA ARS
- **Randall Kolka**, USDA Forest Service
- **Kate Lajtha**, Oregon State University
- **Elizabeth L. Malone**, Independent Researcher
- **Peter J. Marcotullio**, Hunter College, City University of New York
- **Maureen I. McCarthy**, University of Nevada, Reno
- **A. David McGuire**, University of Alaska, Fairbanks
- **Anna M. Michalak**, Carnegie Institution for Science
- **John B. Miller**, NOAA
- **David J. Moore**, University of Arizona
- **Elise Pendall**, Western Sydney University
- **Stephanie Pincetl**, University of California, Los Angeles
- **Vladimir Romanovsky**, University of Alaska, Fairbanks
- **Paty Romero-Lankao**, National Renewable Energy Laboratory
- **Ted Schuur**, Northern Arizona University
- **Carl Trettin**, USDA Forest Service
- **Rodrigo Vargas**, University of Delaware
- **Tristram O. West**, DOE
- **Christopher A. Williams**, Clark University
- **Lisamarie Windham-Myers**, USGS

Questions that guided the report

- **How have natural processes and human actions affected the global carbon cycle on land, in the atmosphere, in ocean and freshwater systems, and at the interfaces of ecosystems (e.g., the interface between land and water or between urban and rural areas)?**
- **How have socioeconomic trends and management decisions affected the levels of carbon dioxide (CO_2) and methane (CH_4) in the atmosphere?**
- **How have increasing greenhouse gas (GHG) concentrations, associated changes in climate, and carbon management decisions and practices affected species, ecosystems, natural resources, and human systems?**

SOCCR-2 Organization– Sections

1) Synthesis—The global context, what is the carbon cycle and why do we care, the North American carbon budget in a global context, continent, country, and regional perspectives

2) Human dimensions of the carbon cycle: Energy, societal institutions, agriculture, urban areas, Indigenous lands

3) The roll of carbon in systems: soils, inland waters, coastal and near shore ocean, atmosphere, terrestrial-aquatic interfaces, forests, grasslands, the arctic

4) Consequences of Carbon Cycle Changes and Understanding Potential Paths Forward

SOCCR-2	#	State of the Science – Chapters - Draft	Required sections for each chapter
	I	Preface/motivation for the report/ advances since SOCCR-1	i. Key Message/ Findings/Highlights (incl. traceable accounts) ii. Introduction iii. Historical context (incl. socioeconomic drivers of carbon emissions) iv. Current State of Carbon Cycle Understanding of Fluxes and Stocks **v. Indicators**, Trends, Feedbacks **vi. North American and Global Context, Regional Perspective** • **NCA regions** • **U.S., Mexico, Canada** • **Arctic, Tropics, RECCAP** **vii. Societal drivers and impacts, carbon management and decisions** viii. Synthesis, conclusions, gaps in knowledge, and (near) future outlook • overarching synthesis of the current state of the carbon cycle • key knowledge gaps/ opportunities and near-term outlook on the North American carbon cycle
	II	Policies and management context	
	III	Executive Summary	
Part I Synthesis	1	What is the C cycle and why care/the C cycle in a global context	
	2	North American C budget past, present, and future	
Part II Human Dimensions of the C Cycle	3	Energy Systems (incl. Transportation)	
	4	Urban	
	5	Agriculture	
	6	Society and Carbon	
	7	Tribal Lands	
Part III: State of Air, Land and Water	8	Atmosphere	
	9	Forests	
	10	Grasslands	
	11	Arctic/Boreal/Permafrost regions	
	12	Soils	
	13	Non-tidal wetlands	
	14	Inland waters	
	15	Tidal wetlands and estuaries (incl. blue carbon)	
	16	Oceans and continental Shelves (oceans, methane hydrates etc.)	
Part IV: Consequences and ways forward	17	Consequences of rising atmospheric CO2 (e.g., ocean acidification etc.)	
	18	Decision-support/ Informing decisions (social, behavioral, economic)	
	19	Future projections and associated climate change in North America	

Domain of The Second State of the Carbon Cycle Report. In addition to the land masses and inland waters of Canada, Mexico, and the United States, this report covers carbon dynamics in coastal waters, defined as tidal wetlands, estuaries, and the Exclusive Economic Zone (EEZ). The seaward boundary of the EEZ is typically 200 nautical miles from the coast. The geographical scope of the U.S. analysis includes the conterminous United States, Alaska, Hawai'i, and Puerto Rico. [Figure source: Christopher DeRolph, Oak Ridge National Laboratory.]

The end