

March 7, 2017

State of the Carbon Cycle Report-2 (SOCCR-2) - A Special Scientific Assessment of the State of the Carbon Cycle in the United States and surrounding North American Region

- A Prospectus

1. Overview
2. Proposed Focus Areas
3. Process
 - A. Audience and Communicating
 - B. Roles, Responsibilities and Required Expertise of the Writing Team
 - FEDERAL INTERAGENCY LEADERSHIP
 - a. Carbon Cycle Interagency Working Group (CCIWG)
 - b. Agency co-leads
 - c. SOCCR-2 Federal Steering Committee
 - d. Lead Agency, Legal Oversight and FRNs
 - e. Interagency Chapter Liaisons (Federal Liaisons)
 - f. U.S. Carbon Cycle Science Program Office
 - g. National Climate Assessment, Information Quality and Peer Review, NRC
 - WRITING TEAM
 - a. Science Leads
 - b. Chapter Teams
 - PRODUCTION, PUBLICATION, DISSEMINATION
 - C. Information Quality and Peer Review
 - D. Process for Public Engagement and Publication
 - E. Proposed Timing

1. Overview

The U.S. Global Change Research Program (USGCRP)'s U.S. Carbon Cycle Science Program and Carbon Cycle Interagency Working Group (CCIWG) have initiated an Interagency Special Report entitled the 2nd State of the Carbon Cycle Report (SOCCR-2). The focus of SOCCR-2 will be on U.S. and North American carbon cycle processes, stocks, and flows in the context of and including interactions with global scale budgets, and climate change impacts in managed and unmanaged systems. Carbon stocks and fluxes in soils, water (including oceans), vegetation, aquatic-terrestrial interfaces (coastal/ estuaries/ wetlands), human settlements, agriculture and forest systems are included. Relevant carbon management science perspectives and tools for supporting and informing decisions, as addressed in and related to the White House Climate Action Plan (2013), US Carbon Cycle Science Plan (2011), 3rd National Climate Assessment (2014), USGCRP Strategic Plan (2012), and the Global Change Research Act (GCRA) of 1990 will be considered. The status of and emerging opportunities for improving measurements, observations and projections of stocks and fluxes in the carbon cycle, including uncertainty identification, will be part of this assessment. All agency members of the CCIWG will be the co-leads.

2. Proposed Focus Areas and Table of Contents

The proposed focus areas are inspired by the U.S. **Carbon Cycle Science Plan (2011)** which emphasizes global scale research on long-lived, carbon-based greenhouse gases, carbon dioxide (CO₂), and methane (CH₄), and the major pools and fluxes of the global carbon cycle. The questions framing the U.S. Carbon Cycle Science Plan (2011) inspire SOCCR-2 questions, with a focus on US and North America in the global context: 1) How have natural processes and human actions affected the global carbon cycle on land, in the atmosphere, in the oceans and in the ecosystem interfaces (e.g. coastal, wetlands, urban-rural)? 2) How have socio-economic trends affected the levels of the primary carbon-containing gases, carbon dioxide and methane, in the atmosphere? 3) How have species, ecosystems, natural resources and human systems been impacted by increasing greenhouse gas concentrations, the associated changes in climate, and by carbon management decisions and practices? (Note: US Federal Carbon Inventories are the responsibilities of USDA and EPA. This assessment does not seek to evaluate, critique, or validate those inventories but rather seeks to explore and present the current state of the science of carbon cycle. Any discussions of the current US Inventory are conducted within the broader context of the carbon cycle. Where there are any apparent discrepancies with the US inventories or otherwise where appropriate, the report will explain or show a crosswalk.)

Each chapter will cover the current status and near-term projections, if and where possible, including: Modeling of Carbon Cycle in CMIP5/post- SOCCR-1/multi-model syntheses, new Projections since CMIP5. Other cross-cutting themes in each chapter/as

appropriate are: Land use change, feedbacks, historical context, indicators and trends, societal impacts (This is also a separate chapter), North American and Global Context, Research needs (refer to pertinent sections in 2011 Carbon Science Plan). Each chapter/sub-chapter will contain the following sections: Introduction, Historical context (including socioeconomic drivers of carbon emissions), Current State of Carbon Cycle, Understanding of Fluxes and Stocks, Indicators and Trends, Feedbacks, North American and Global Context, Regional Perspectives (e.g. NCA 2014 regions), Societal Impacts, Carbon management and Decisions (what is out there and what do we know of the impacts), and Research Needs. Below, we provide a high level overarching theme, scope, chapter sections and draft table of contents with associated broad notional chapter outlines.

Overarching Themes and Scope

Below are baseline aspects that are addressed in the Report.

1. **Global Carbon Cycle Overview** — Major elements of the global carbon cycle (CO₂, CH₄, black carbon) and key interactions with climate forcing and feedback components from a global perspective.
2. **Carbon Cycle at Scales** — Assessment of the North American carbon cycle (scaled down from the global system above), including short- to long-term and local to regional perspectives on key carbon stocks and fluxes.
3. **Carbon in Unmanaged and Managed Systems** — Major stocks, fluxes, uncertainties, broader social drivers, carbon decisions. Assessment of key carbon stocks and fluxes within and between these pools, including key uncertainties and social drivers.

Example focus areas include:

- Urban and human settlements
 - Livestock and wildlife
 - Agriculture and forestry
 - Soils
 - Aquatic systems
 - Vegetation
4. **Interactions and Disturbance Impacts to the Carbon Cycle** — Role of disturbances on the carbon cycle, for example:
 - Fires
 - Ocean acidification
 - Pathogens
 - Land-use change, land-cover change
 5. **Carbon cycle information, management practices, tools, and needs at various scales**
 - Role of recent carbon management practices
 - Current state of carbon data management
 - Monitoring systems
 - Tools
 - Carbon-relevant modeling scenarios
 - Mitigation

All SOCCR-2 chapters (Table 2) are organized with the following sections, as appropriate:

- a. **Introduction:** A summary of the topic of the chapter, specifying the key questions needed to understand and quantify the carbon cycle. Spatial and temporal scales relevant to the chapter are included.
- b. **Historical Context (including socioeconomic drivers of carbon emissions):** Summary of the history of quantification of the carbon cycle, stocks, and fluxes with regard to the relevant spatio-temporal scope of the chapter. An introduction to the use of different approaches and their evolution over time, particularly focusing on findings that have emerged since SOCCR-1 (2007).
- c. **Current State of Understanding of Carbon Cycle Fluxes and Stocks:** The “state of the science,” in terms of conceptual understanding, measuring, quantifying, and/or modelling the carbon cycle at the spatio-temporal scale of the chapter. This section includes different methodologies employed (as appropriate) and mentions the different assumptions and caveats for each approach.
- d. **Indicators, Trends, and Feedbacks:** The exact observed indicators and trends of the carbon cycle at the spatio-temporal scale of the chapter. In particular, understanding of the extent of agreement or disagreement between presumed trends, pre- and post-2007 (if applicable). The section summarizes feedbacks among different ecosystem compartments and/or pools of Earth System or process models. Feedbacks to one ecosystem compartment may provide critical input to another compartment, for example, or from one spatial scale to another.
- e. **North American and Global Context and Regional Perspective**
 - **NCA 2014 regions/NCA 2018 regions:** This section is intended to place carbon processes, stocks, and fluxes at a particular scale in the chapter in the context of NCA regions, which are reflective of the scale at which physical and environmental processes operate, and because NCA regions could also be considered “actionable” by policymakers. The NCA 2014 regions consist of Northeast, Southeast, Midwest, Great Plains, Southwest, Northwest, Alaska, Hawai’i, Rural Communities, and Coasts. In NCA 2018, the Great Plains are split into the Northern Great Plains and Southern Great Plains.

- **United States, Mexico, and Canada:** This section is intended to place carbon processes, stocks, and fluxes at a particular scale in the chapter in the context of the globe, which is the scale at which most Earth System Models operate. The U.S. context is also presented because it is the scale at which information could be considered “actionable” by policymakers.
- f. **Societal Drivers and Impacts and Carbon Management and Decisions:** This section is intended to focus on observed and projected impacts of the carbon cycle, or changes to the carbon cycle, on ecosystems being considered, and on societal costs of the impacts, including economics. Carbon management and decisions are intended to focus on summarizing existing decisions (if applicable) that have been made regarding carbon management, on the efficacy of those decisions regarding their intended consequence, and on techniques for determining the effects of decisions on the targeted system. The section could also pose relevant scientifically based carbon management concepts as summarized from the literature.
- g. **Synthesis, Knowledge Gaps, and Outlook**
- Overarching synthesis of the current state of the carbon cycle
 - Key knowledge gaps/opportunities
 - Near-term future outlook on the North American carbon cycle

3. Process

A. Audience, and Communicating

The audience includes scientists, decision-makers in the public and private sectors and the general community across the US, extending to North American and global regions. Updated information on the observed status and trends in the carbon cycle as influenced by natural and anthropogenic changes will be disseminated to this audience. The report will inform policies but will not prescribe or recommend them. In that respect, it will help inform mitigation and adaptation decisions related to the carbon cycle, supporting improved coordination for pertinent research, monitoring and management activities for responding to global change.

B. Roles, Responsibilities and Required Expertise of the Writing Team

The SOCCR-2 will be a federal interagency report. In alignment with federal requirements, the writing team will comprise federal employees, as well as non-federal scientists, contractors and affiliates from the non-federal community. The team will be selected based on their scientific expertise, demonstrated accomplishments, academic interests and knowledge in the thematic areas specified in the draft outline, time availability and technical capability to work in this type of broad interdisciplinary and cross-cutting scientific assessment setting constrained by demanding timelines, typical to USGCRP/NCA reports.

The writing team will include members of the CCIWG, North American Carbon Program (NACP), Ocean Carbon and Biogeochemistry Program (OCB), broader PI networks of the CCIWG, and other federal employees and affiliates identified through existing networks and collaborations, encompassing U.S., Canadian and Mexican carbon cycle research scientists. Additional contributing authors with pertinent subject matter expertise and scientific background will be selected from suggestions and nominations received from members of the CCIWG, broader scientific networks and the general public through the federal register notice published on 02/12/2016, calling for Contributing Author Nominations. Additional subject matter experts may also be selected as needed, during the report writing and review process.

FEDERAL INTERAGENCY LEADERSHIP

Agencies, CCIWG, U.S. Carbon Program Office, USGCRP Roles

a. Carbon Cycle Interagency Working Group (CCIWG)

The CCIWG is the Lead Interagency Working Group for SOCCR-2. It is responsible for leading the compilation and synthesis of report contributions from all the authors, with the assistance of team members highlighted in this section and in Section 2 below.

b. Agency co-leads

The agency co-leads are all the CCIWG members who are representatives from departments and agencies including NOAA, NASA, DOE, USDA, USGS, NIST, EPA, USAID and NSF. They provide staff support including, where appropriate, contractor support.

c. SOCCR-2 Federal Steering Committee

1. A Federal Steering Committee of the USGCRP’s 2nd State of the Carbon Cycle Report has been established to provide guidance and coordination to the report staff and authors.
2. This Committee comprises a sub-set of members from the CCIWG and other pertinent federal programs or divisions, including interagency entities.
3. The Federal Steering Committee of the 2nd State of the Carbon Cycle Report will also work to schedule sessions, town halls and presentations at relevant conferences, and webinars to further engage the community of experts and the general public.

4. The Federal Steering Committee establishes the scope of SOCCR-2 process and products ensuring GCRA requirements and coverage responsive to the 2011 Carbon Cycle Science Plan, the 2012-2021 USGCRP Strategic Plan and other documents highlighted in the Prospectus.
5. The Federal Steering Committee is the primary decision-making body for SOCCR-2 timeline, process and procedural matters, including the SOCCR-2 guidelines and signing off on the draft versions prior to reviews by the SGCR, the public, the National Academy of Sciences and the Office of Science and Technology Policy (OSTP).

d. Lead Agency, Legal Oversight and FRNs

1. The primary responsibility for legal oversight and legal support of the assessment process, including submission of Federal Register Notices, will be assumed by USDA. Specifically, USDA NIFA is the Lead, as represented by CCIWG co-Chair Dr. Nancy Cavallaro who serves on the CCIWG and the SOCCR-2 Federal Steering Committee.
2. USDA NIFA issued the first public Federal Register Notice announcing SOCCR-2, seeking nominations for contributors, comments on the draft prospectus, and submission of technical input on February 12, 2016.
3. After completion of a Public Review Draft of SOCCR-2, USDA on behalf of the USGCRP, will issue a second Federal Register Notice to announce a public comment period for the draft report.
4. The public will be able to view the draft and submit comments to an online docket available on the USGCRP's website.
5. Public comments received on the draft will be evaluated and used to inform the final report.

e. Interagency Chapter Liaisons (Federal Liaisons)

At least one member of the CCIWG or of the SOCCR-2 Federal Steering Committee will serve as Interagency Chapter Liaison for each Chapter Team within the Report Writing Team.

1. The Interagency Liaisons will oversee the development of the chapter in close coordination with the SOCCR-2 Federal Steering Committee and will regularly report back on chapter progress and needs to the Federal Steering Committee.
2. Interagency Liaisons may serve as authors in their respective chapters but will not be coordinating the chapter writing process. (The primary responsibility for coordinating chapter authors and chapter content is that of the chapter lead(s), as described later in this document.)
3. The Interagency Liaisons will work closely with the Writing Teams (mainly the Chapter Lead(s) and Science Leads) of their assigned chapter(s) to facilitate communication with the SOCCR-2 Federal Steering Committee and the CCIWG, and to ensure that the guidelines provided by the SOCCR-2 Federal Steering Committee for SOCCR-2 scope, structure and process is followed.

f. U.S. Carbon Cycle Science Program Office

1. The U.S. Carbon Cycle Science Program Office at the USGCRP serves a coordinating function to include leadership, support and facilitation for the development of the prospectus, report guidelines, workshops and engagement activities assembling CCIWG members, federal agency experts, and contractors, as appropriate.
2. The workshops and other engagement activities will facilitate the scoping and development of report outlines and drafts, including where needed, the identification of model analyses and/or data retrieval needed for the assessment.
3. The U.S. Carbon Cycle Science Program Office organizes the periodic meetings of the Federal Steering Committee of the USGCRP's 2nd State of the Carbon Cycle Report.
4. This Office will provide the Federal Steering Committee, the CCIWG, the USGCRP and associated federal and community partners with regular progress updates, in coordination with the Interagency Liaisons and the Science Leads.
5. This Office is led by its Director, who serves as the primary POC and Project Manager for SOCCR-2, under the leadership and as ex-officio member of the CCIWG and the SOCCR-2 Federal Steering Committee. In this role, the Program Office Director:
 - o Serves as the primary interagency liaison responsible for facilitating and supporting SOCCR-2 communications and decisions by the CCIWG, SOCCR-2 Federal Steering Committee and the USGCRP;
 - o Serves as the primary liaison between the Interagency Leadership of SOCCR-2, the Science Leads, and the Writing Team.
 - o Leverages and supports the SOCCR-2 Interagency Leadership in establishing the SOCCR-2 scope, guidelines and process, providing oversight for timely production and submission of SOCCR-2 deliverables.
6. SOCCR-2 logistical support for public engagement and community activities led by the U.S. Carbon Cycle Science Program Office and CCIWG is provided by UCAR-CPAESS (Boulder) staff.
7. Pertinent staff members from the USGCRP National Coordination Office (NCO) also provide support and leadership for relevant activities on an ad-hoc basis, to fulfill the requirements and standards of special USGCRP reports of the Sustained National Climate Assessment. E.g. for Global Change Information System (GCIS), meetings/workshops, online review system, SGCR and OSTP reviews, 4th National Climate Assessment needs etc.

g. National Climate Assessment, Information Quality and Peer Review, NRC

- SOCCR-2 will follow the third NCA (2014) guidelines for preparing USGCRP products, with referenced materials derived primarily from the existing peer-reviewed scientific literature and consistent with guidance regarding use of non-peer-reviewed literature.

- Like the NCA, this report will follow the Office of Management and Budget (OMB) federal information quality, transparency, and accessibility guidelines appropriate for a Highly Influential Scientific Assessment (HISA) (See Appendices 1 and 2 of the third NCA for more details).
- The report will undergo peer review by the National Research Council of the National Academy of Sciences, public review, and final interagency clearance.

WRITING TEAM (FEDERAL AND NON-FEDERAL MEMBERS)

All SOCCR-2 writing team members should be accomplished scholarly writers and have demonstrated technical expertise and academic proficiency in at least one of the carbon cycle science topics outlined in the prospectus, including the human dimensions of carbon cycle sciences. The main roles and responsibilities of the Science Leads, Chapter Leads and Contributing Authors include the preparation of the report drafts:

- a. Compiling the necessary background literature;
- b. Synthesizing,
- c. Analyzing and interpreting the existing science;
- d. Contributing intellectual and technical input.

Furthermore, the collective role of the Report Writing Team including the Science Leads, Chapter Leads and Contributing Authors encompasses:

- a. The preparation of the initial draft of the report, including the text and any analysis required to synthesize the underlying studies from the existing peer-reviewed literature that serves as the basis for the report.
- b. The review of relevant literature or technical input/information submissions made through the February 12, 2016 Federal Register Notice Call for Information and
- c. Responding to public comments on the draft report.

a. Science Leads

The team of five Science Leads represent pertinent fields of carbon cycle science. The responsibilities of the science leads team include:

1. Ensure balance and consistency of information across and within topics and chapters;
2. Ensure emphasis on new information since the first SOCCR (2007);
3. Ensure clear organization of report, with a unified structure and narrative;
4. Develop higher level synthesis and overarching key findings, ensuring the report covers broad understanding of what is known, not known, and associated uncertainties.
5. Responding to review comments on scope, emphasis, balance, overarching key findings etc. coordinating response to specific content with chapter authors.
6. Produce guidance for author teams by establishing foundational assumptions such as for scenarios and data, and ensuring that the report meets the Information Quality Act (IQA) requirements.
7. Organize the chapters; develop the Executive Summary and related high level summary documentation of the report.
8. Ensure connectivity with community engagement (via conferences, workshops, stakeholder events, websites, etc.).

b. Chapter Teams

Within each chapter team: The Chapter Leads and Contributing Authors team will comprise up to 10-15 authors from the broad carbon cycle science research community. See below for details.

Chapter Leads/Chapter co-Leads

1. The Chapter Lead/co-Leads include a selection federal employees, affiliates, and members of the scientific community identified through existing agency collaborations and networks as well as via the Federal Register Notice issued by USDA NIFA on February 12, 2016.
2. Each Chapter Lead or co-leads decide how best to organize their respective chapter teams, including division of responsibility and time requirements among the Contributing and Chapter Leads.
3. The Chapter Lead/co-Leads provides/provide intellectual and scientific leadership for their designated chapter and is/are responsible for the production of the designated chapter, addressing items of the prospectus, based on the best available scientific, technical and socio-economic information.
4. The Chapter Leads/co-Leads
 - i. Coordinate their respective chapter author team; ensuring that major sections of the chapter are completed to a high standard, are collated and delivered to the SOCCR-2 Science Leads and Federal Interagency Leadership in a timely manner, and conform to the overall standards of style set for the document;
 - ii. Coordinate chapter revisions with the Oak Ridge Editorial team, SOCCR-2 Science Leads, Interagency Leadership and Review Editors.

Contributing Authors

1. Contributing Authors will include scientists with relevant subject matter expertise nominated by lead authors, the CCIWG or other interagency members, and the general public (through the February 12, 2016 public federal register notice calling for Contributing Author nominations).
2. Where needed to fill gaps in expertise, additional subject matter experts may be selected to be Contributing Authors based on expertise such as peer-reviewed publications and other pertinent criteria.

PRODUCTION, PUBLICATION, DISSEMINATION

CCIWG, U.S. Carbon Program Office, Authors, USGCRP, NCA, GCIS, Oak Ridge Technical Team

1. The CCIWG and USGCRP will publish the final report electronically with an interactive web interface, including hard copy publications produced (e.g., edited, layout, etc.) and published with the assistance of the Editorial Team at DOE's Oak Ridge National Laboratory.
2. The CCIWG and the USGCRP will facilitate the online integration of the report with future phases of the USGCRP's Global Change Information System (GCIS).
3. A full communications plan for dissemination of the USGCRP 2nd State of the Carbon Cycle Report findings will be developed by the U.S. Carbon Cycle Science Program and CCIWG agencies along with designated authors, with input and assistance from the USGCRP communications team.

C. Information Quality and Peer Review

The USGCRP 2nd State of the Carbon Cycle Report will follow the third NCA (2014) guidelines for preparing USGCRP products, with referenced materials derived primarily from the existing peer-reviewed scientific literature and consistent with guidance regarding use of non-peer-reviewed literature. Like the NCA, this report will follow the Office of Management and Budget (OMB) federal information quality, transparency, and accessibility guidelines appropriate for a Highly Influential Scientific Assessment (HISA) (See Appendices 1 and 2 of the third NCA for more details). The report will undergo peer review by the National Research Council of the National Academy of Sciences, public review, and final interagency clearance.

The following cut-off dates will be applied for publications to be included in the USGCRP 2nd State of the Carbon Cycle Report:

- For all papers being assessed and cited in the 2nd State of the Carbon cycle Report:
 - March 7, 2017: Deadline for papers to be *accepted* in a peer reviewed journal
 - Papers that are published after March 7, 2017 AND are submitted during the public comment period or National Academy of Sciences peer review period may be assessed and may be cited as deemed necessary and appropriate in response to those reviews.

D. Process for Public Engagement and Publication

A SOCCR-2 planning and scoping workshop was organized on May 28, 2015. A public forum was organized on February 2, 2016 to facilitate engagement with stakeholders, including federal and non-federal subject matter experts, and the interested public. Additionally, the CCIWG has provided/is providing several opportunities for public engagement with the scientific community throughout the report scoping, planning and writing process via special presentations, sessions, town hall meetings and side-events at national and international scientific conferences, including the 2015 and 2016 American Geophysical Union Meetings, the 2015 and 2016 Ecological Society of American Meeting, and the 2015 and 2017 North American Carbon Program Principal Investigators' Meeting. This first federal register notice issued by USDA (February 12, 2016) on behalf of the USGCRP and CCIWG announces the following:

- (i) Request for Comments on this Draft Report Prospectus: A 30-day call for comments on the objectives, proposed topics/table of contents, and process as outlined in the Draft Prospectus.
- (ii) Call for Scientific Information/Technical input: A 30-day call for submissions of recent, relevant, scientific and/or technical research studies including observed, modeled and/or projected carbon cycle science information that have been peer-reviewed and published or accepted for publication in scientific journals and/or government reports.
- (iii) Nominations for Contributing Authors: A 30-day call for nominations of Contributing Authors to assist chapter author teams in the development of the USGCRP 2nd State of the Carbon Cycle Report chapters or sections. Interested parties are invited to submit nominations of subject matter experts, with descriptions of relevant expertise and publications.

After completion of a Public Review Draft of the USGCRP 2nd State of the Carbon Cycle Report, USDA on behalf of the USGCRP, will issue a second Federal Register Notice to announce a public comment period for the draft report. The

public will be able to view the draft and submit comments to an online docket available on the USGCRP's website. The Federal Steering Committee of the 2nd State of the Carbon Cycle Report will also work to schedule sessions, town halls and presentations at relevant conferences, and webinars to further engage the community of experts and the general public. Public comments received on the draft will be evaluated and used to inform the final report.

The CCIWG and USGCRP will publish the final report electronically with an interactive web interface, including hard copy publications produced (e.g., edited, layout, etc.) and published through DOE's Oak Ridge National Laboratory. The CCIWG and the USGCRP will also explore online integration of the report with future phases of the USGCRP's Global Change Information System (GCIS). A full communications plan for dissemination of the USGCRP 2nd State of the Carbon Cycle Report findings will be developed by the U.S. Carbon Cycle Science Program and CCIWG agencies along with designated authors, with input and assistance from the USGCRP communications team.

E. Proposed Timing

This 2nd State of the Carbon Cycle Report is an interim report, designed to be released before the quadrennial fourth National Climate Assessment. A draft of the Special Report is expected to be made available for public comments by mid-2017, with final publication expected by the end of 2017 or early 2018.

Appendices

TABLE 1: GCRA (1990) Mandates, and goals of 2011 Carbon Cycle Science Plan Goals and 2012 USGCRP Strategic Plan

Mandates for USGCRP in 1990 Global Change Research Act: Assist the Nation and the world to --	Goals of the US Carbon Cycle Science Program / 2011 Carbon Cycle Science Plan	Goals of the 2012 USGCRP Strategic Plan
<p>1. UNDERSTAND,</p> <p>2. ASSESS*,</p> <p>3. PREDICT, and</p> <p>4. RESPOND to human-induced and natural processes of global change.</p> <p>*Section 106. Scientific Assessments - Not less frequently than every 4 years, prepare and submit to the President and the Congress an assessment which:</p> <p>1. Integrates, evaluates, and interprets the findings of the USGCRP and discusses the scientific uncertainties associated with such findings;</p> <p>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;</p> <p>3. Analyzes current trends in global change, both human- induced and natural, and projects major trends for the subsequent 25 to 100 years.</p>	<p>1. Variations and Uncertainties Assessment and Communication: Provide clear and timely explanation of past and current variations observed in atmospheric CO₂ and CH₄, and the uncertainties surrounding them.</p>	<p>1. Advance Science: Advance scientific knowledge of the integrated natural and human components of the Earth system to understand climate and global change.</p> <p>2. Inform Decisions: Provide the scientific basis to inform and enable timely decisions on adaptation and mitigation.</p> <p>3. Conduct Sustained Assessments: Build sustained assessment capacity that improves the Nation's ability to understand, anticipate, and respond to global change impacts and vulnerabilities.</p> <p>4. Communicate and Educate: Advance communication and education to broaden public understanding of global change and develop the scientific workforce of the future.</p>
	<p>2. Socio-economic Drivers, Monitoring, and Verification: Understand and quantify the socioeconomic drivers of carbon emissions, and develop transparent methods to monitor and verify those emissions.</p>	
	<p>3. Ecosystem Vulnerability Evaluation: Determine and evaluate the vulnerability of carbon stocks and flows to future climate change and human activities, emphasizing potential positive feedbacks to sources or sinks that make climate stabilization more critical or more difficult.</p>	
	<p>4. Scenarios and predictions: Predict how ecosystems, biodiversity, and natural resources will change under different CO₂ and climate change scenarios.</p>	
	<p>5. Carbon Management assessment: Determine the likelihood of success and the potential for side effects of carbon management pathways that might be undertaken to achieve a low-carbon future.</p>	
	<p>6. Decision-making support and communication: Address decision maker needs for current and future carbon cycle information and provide data and projections that are relevant, credible, and legitimate for their decisions.</p>	

Figure 1: Notional USGCRP/CCIWG SOCCR-2 Road Map representing tentative timeline (2014-2018)

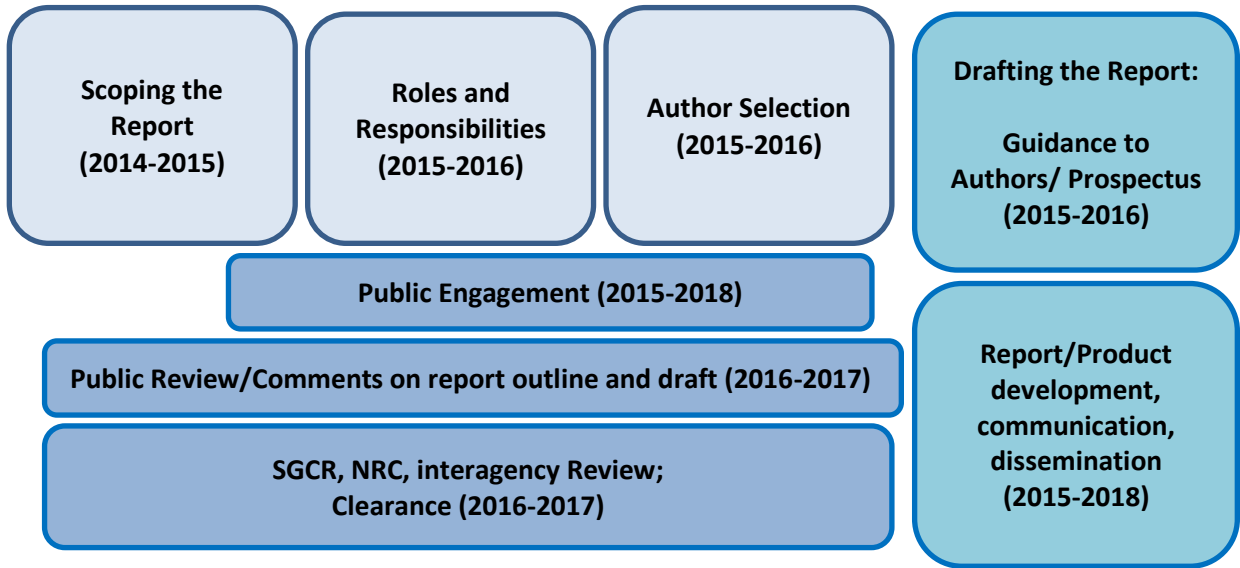


TABLE 2: Draft Table of Contents and Chapter Structure provided to writing team

DRAFT TABLE OF CONTENTS			
Categories	Chapter #	State of the Science	Required sections for each chapter (modified in some chapters, as appropriate)
	I	Preface/motivation for the report/ advances since SOCCR-1	
	II	Governmental, inter-governmental and interagency context	
	III	Executive Summary	
Part I Synthesis	1	What is the C cycle and why care/the C cycle in a global context	i. Key Message/ Findings/Highlights (incl. traceable accounts with supporting evidence)
	2	North American C budget past, present, and future	
Part II Human Dimensions of the C Cycle	3	Energy Systems (incl. Transportation)	ii. Introduction
	4	Urban Systems	iii. Historical context (incl. socioeconomic drivers of carbon emissions)
	5	Agriculture	
	6	Carbon and Society	iv. Current State of Carbon Cycle Understanding of Fluxes and Stocks
	7	Tribal Lands	v. Indicators, Trends, Feedbacks
Part III: State of Air, Land and Water	8	Atmosphere	vi. North American and Global Context, Regional Perspective
	9	Forests	<ul style="list-style-type: none"> • NCA regions • U.S., Mexico, Canada • Arctic, Tropics, RECCAP
	10	Grasslands	
	11	Arctic/Boreal/Permafrost regions	
	12	Soils	vii. Societal drivers and impacts, carbon management and decisions
	13	Terrestrial wetlands	
	14	Inland waters	viii. Synthesis, conclusions, gaps in knowledge, and (near) future outlook
	15	Tidal wetlands and estuaries (incl. blue carbon)	<ul style="list-style-type: none"> • overarching synthesis of the current state of the carbon cycle • key knowledge gaps/ opportunities and near-term outlook on the North American carbon cycle
	16	Oceans and continental Shelves (methane hydrates etc.)	
Part IV: Consequences and ways forward	17	Consequences of rising atmospheric CO2 (e.g., ocean acidification etc.)	
	18	Carbon cycle science in support of decision-making	
	19	Future projections and associated climate change in North America	