Summary of Responses
Public Comment on an Annotated Outline for the Fourth National Climate Assessment

Request for information:
https://www.federalregister.gov/articles/2016/07/05/2016-15807/public-comment-on-an-annotated-outline-for-the-fourth-national-climate-assessment

Respondents: 40 total, including individuals from government agencies and regional government programs, tribal communities, professional societies, public and private universities and research institutes, the private sector, and non-profits.

Other files uploaded: 8 reports, papers, and other documents

Summary of main themes in comments:

- **Built environment as a standalone chapter**: Engineering and design communities have distinct needs from other planners and strongly support the development of this chapter. There is a need for urban and rural topics to also be addressed, potentially as a separate chapter.
- **Populations of concern:** Topic is valuable and could be addressed both throughout all chapters as a section and case studies as well as with a standalone chapter.
- **Key messages and uncertainty and confidence language:** This should be continued forward from NCA3 with care taken when applying the lexicon to new peer-reviewed papers.
- **Social science integration:** Important throughout. Could also help with response to and usage of NCA4.
- **Visualization, case studies, and tools:** Videos could be useful as introductions to chapters. Use case studies throughout - both to present information and to engage stakeholders as authors and users such as indigenous peoples.

General Comments:

- **NCA3 related**: Key messages, supporting evidence, and confidence levels should be continued. Support for approach of highlighting advancements and improvements since NCA3. In response to gaps in NCA3, it would be helpful to call out ongoing research at federal agencies that addresses these gaps.
- **Health**: Information related to children's health, reproductive health (e.g., premature labor during extreme heat events) and regional climate changes should be provided in detail. Emphasize crucial importance of documenting and monitoring the current psychological impacts of climate change and its stress and impacts. Include psychological and social environmental impacts (PSIAs).
- **Engineering/built environment:** For engineering purposes, need information by hazard at local and city scale with uncertainty quantification. Engineers and planners also need estimates of potential impacts, consequences, severities, economic valuations,

countermeasure and mitigation strategies, and associated effectiveness and costs, all characterized in probabilistic terms for varied design periods if applicable.
    - Buildings have their own importance and separate chapter from urban would make sense
- **Urban/city focused chapter**: Strong need for it. Urban resilience to extreme weather events also a topic of interest.
- **Populations of concern**: Valuable topic and would be interesting to see a paired analysis of human and institutional capacities in these populations relative to others. These populations should also be better engaged in the NCA process itself through technical inputs, NCAnet, etc.
    - Use tribal chapter as a model for engaging and writing about issues related to populations of concern and use case studies throughout other chapters
    - Should there be a dedicated chapter? Could cover: Communities of Color, Low Income Populations, Immigrants, Limited English Proficiency Groups, Children and Women, Older Adults, Persons with Disabilities and Chronic Medical Conditions
    - Include women, including pregnant women, as a population of concern
    - Maybe also look at populations of potential - where would our dollars be best spent? With limited resources and demanding timelines, how do we maximize return on investment?
    - Include tribal youth voices
    - Case studies in the US and around the world on human migration related to climate change
- **Governance challenges:** Articulate these in the face of climate change (e.g., community relocation, wildlife management)
- **Social science:** A heavy social science component is a good idea, especially with risk, impacts, changes, etc. - delivering the information in the right way ensures that there's a better response and usage of the materials in NCA4. Need for more psychological and social science perspectives in climate change research and reporting.
- **Visualizations**:
    - Short video introductions to each of the chapters - even embedded like an e-book.
    - Video modules to present NCA4 info could reach different audiences.
    - Consider including a short online course consisting of videos and quizzes to present NCA4 information.
    - Case studies, photos, etc. important.
    - Survey and focus groups of NCA3 site users to better assess the NCA3 website.
    - Helpful to distill NCA4 findings and data into customizable PowerPoint presentations for different purposes (i.e., for elementary school, secondary school, adult informal education, college curricula, public officials, etc.)
- **Indicators:** Important component of NCA.
- Timing and pace of report is a concern with current timeline

Comments on Part 1: Intro and Context for NCA4

- **Global context**: Address how the global political and climate policy context has changed since NCA3 (e.g. Paris Agreement)
    - Also include how American acceptance and understanding of climate change has changed (or not) since NCA3 by using social science
    - Strong support for including how NCA4 relates to complementary domestic and international assessment efforts, especially the IPCC AR6.
    - Should discuss international topics of interest, in particular, as they pertain to North America, but should retain its focus on domestic issues and the sustained assessment process
- **Timeframes**:
    - The timeframe involved makes rerunning secondary models difficult. Instead there is a suggestion that NCA4 ask authors to use qualitative descriptions of scenarios and timeframes used to compare and contrast them to NCA4 "official" scenarios
    - Include time frames well past 2100 to help readers understand that climate impacts don't stabilize then but continue to unfold.
    - Should think about specific analyses, contexts, and literature that will be relevant and available in the timeframe from now until 2018.
- **Scientific advancements:**
    - Should add advancements in science of "Arctic Amplification"
    - Need to add advancements in understanding about shifts in "average return intervals (ARI)" for storms
- **Uncertainty lexicon:** Enthusiasm about using common lexicon for confidence and uncertainty of key statements, but care must be taken when meshing new peer-reviewed studies with new common lexicon. Qualitative descriptions between measures of confidence may address this.
- **Economics**: Need emphasis on economic sector to better understand investment processes into the future. Include modeling of the economic impacts of change in the agricultural sector.
    - Think about noting that there is very solid evidence that "the least we expect is…" as this information would be very helpful for decision-makers, property owners, and the general public.
    - Socio-economic status is a big condition affecting human/community resilience and vulnerability and should be addressed (goes beyond change and development)

Comments on Part 2: The Foundational Physical Science (Based on the Climate Science Special Report)

- **Modeling:**
    - Higher resolution models and downscaling to the appropriate scales for the water sector

    - Strong support for NCA's incorporation of CMIP5 models because they are the IPCC standard and encourage and allow for collaboration
- **Observations:** Chapter is about more than what climate models are able to simulate. There should be a very strong role for observational science.
    - Use results derived from satellites to show the impacts of extreme climate on agriculture, forests, and the natural environment
    - Sub-annual changes are often better indicators of change than annual averages (particularly where growing season is relevant - forests, ecosystems, and agriculture)
- **Authorship:** Maintain the engagement of the CSSR authors past the publication of the report. They can provide support on climate science topics throughout the report.
- **Attribution:** Critical to have a synthesis of the science behind attribution studies
- **Data availability:** NCA4 should make data associated with the published projections available and usable.
- **Topics to consider:**
    - Biophysical feedbacks to climate change, El Niño in the context of climate change
    - Simulation research to see if the adoption of renewable energy technologies has consequences
    - How changes in precipitation patterns manifest across geography and time at a subregional level

<u>Comments on Part 3: Human Health and Welfare, Societal and Environmental Vulnerabilities</u>

- Be careful with definitions of vulnerability, resilience, risk, etc. Be consistent.
- **Chapter topics:**
    - All suggested topics are important including the cross-sectoral and special topics and, if not stood up as full chapters, should be highlighted in the special reports section or larger research needs chapter, as appropriate.
    - Strong support for cross-sectoral and interacting topics and suggest that they be covered at regional as well as national scales
    - Support for a chapter looking at water-energy-land nexus
- **Tribes, populations of concern, and community vulnerability:**
    - Tribes and populations of concern and specifically disadvantaged communities must be addressed, or they will continue to be differentially affected
    - Should draw attention to the effects of climate change on cultural heritage
    - Women, including pregnant women, are often more susceptible to climate impacts like heat and air pollution and should be included as a population of concern
    - Mapping of community vulnerability to storm surge and other hazards requires knowledge about social and familial networks, financial networks, risk perceptions, etc.
- **Water**:
    - Mention impacts on water resources and water sector in this chapter

    - Map showing potential changes in evapotranspiration (ET) by season needed in addition to those showing projected changes in soil moisture/water storage
    - The California drought needs to be discussed
- **Health:**
    - Include mental health, psychosocial responses to climate change, and migration in response to climate change
    - Health safety net of state and federally funded clinics and health centers ought to be recognized as critical infrastructure
- **Ecosystems:**
    - For Ecosystem chapter, use framework from Millennium Ecosystem Assessment
    - Include freshwater inland wetlands as they are very important for ecosystem services
    - Impact on food security of wildlife and pollinators in general is a case study idea
    - Chapter on forests, or include in ecosystems?
    - Talk about forest pest infestations
- **International**:
    - Include look at global supply chains

<u>Comments on Part 4: Regional Analyses Within the United States</u>

- **Audience and authorship:**
    - Identifying the audience for the regional component is important
    - Embed indigenous voices (feds, non-feds, and faculty at Tribal Colleges and Universities) within regional analyses
- **Scale and geographic focus**:
    - Expand regional analysis to acknowledge that huge part of US population lives in urban areas
    - Support for a subregional discussion in this section
- **Cross-cutting topics and needs:**
    - Need more on regional micro and macroeconomics
    - Use water as a cross-cutting topic in chapters
- **Great Plains**:
    - Support for cutting Great Plains into two regions
    - Include discussion of economics of reduced irrigation and shift to dryland agriculture
- **Case studies and tools**:
    - A social sub-section would be a good way to bring in populations of concern as would case studies
    - In addition to case studies, it would be useful to highlight tools and resources that decision makers and citizens can use to access trends and projections at various spatial scales
    - Include case studies about impacts on tribal communities and on tribal climate adaptation planning
    - Use adaptation plans, go beyond potential adaptive measures

Comments on Part 5: Identifying the Information Needed To Support Climate Change Adaptation, Increased Resiliency, and Risk Reduction

- Emphasize this section more, in particular social science research on the human response to adaptation, resilience, and mitigation
- **Audience and needs:**
    - Include case studies and costs when possible
    - Be aware of and then address the differences between the needs of state licensed architects and engineers for building design and infrastructure design and those of planners and managers
- **Adaptation:**
    - The NCA should reference and review the National Fish, Wildlife and Plants Climate Adaptation Strategy, the National Oceans Policy, the Freshwater Action Plan, the State, Local and Tribal Leaders Task Force Report, and states' wildlife action plans.
    - Link to information that's already available like in the Climate Resilience Toolkit.
    - Discuss barriers to adaptation planning and management and explore ways to close the gaps between policy and implementation
    - Consider including individual behavior adaptation and the social components of resilience.
    - Cost-benefit analyses on how buildings may be impacted by climate change and cascading effects should be considered.
    - Cultural heritage can help communities recover from disaster faster.
    - Provide case studies of tribes doing vulnerability assessments.
    - Address role of natural infrastructure as a near-term climate adaptation strategy and provide case studies related to its affordability.
- **Decision support:**
    - Include RISAs, Climate Hubs, CSCs, USGS' National Wildlife and Climate Change Science Center, LCCs, and initiatives like data.gov
    - Identify and distinguish tools that are appropriate for individual landowners, small businesses, and publicly traded companies to inform choices about investments in adaptation
- **Mitigation:**
    - Analysis of avoided risks is worth it even if the outcome is we need to know how to do these kinds of assessments better
    - Incorporate cultural heritage into this section including reusing historic buildings instead of building new construction
- **Uncertainty/Confidence:**
    - Separate uncertainty by type and source
    - Instead of assigning confidence levels to estimates, it would be more useful for engineers to set the confidence at 90% across all variables and to provide estimate ranges for this level (or multiple levels if needed)
    - Develop communication tools to convey uncertainty to decision makers

- **Risk reduction/management:**
    - Include information on how to measure risk reduction across the country on regional and sectoral scales
    - How do insurance rates affect property value and sale?
    - What relocation efforts have worked well and which have not, and why?
        - Develop tools and communication strategies around this
    - Consider linked systems and cascading effects
    - Need quantitative characterization of the frequencies and intensities of hazards needed for engineering decisions for adaptive risk management - developed at the national scale and then applied at regional and local scales