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# Climate Science Special Report: Objectives and Progress

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U.S. Global Change  
Research Program

# Objectives of the CSSR

- Provide an updated detailed analysis of the findings of how climate change is affecting the weather and climate across the United States
  - Written for those with strong technical awareness
- Provide an executive summary that will be used as the basis for the science summary for NCA4
  - Written for Congress and the public
- Provide foundational information and projections for climate change, including extremes, to improve “end-to-end” consistency in sectoral, regional, and resilience analyses for NCA4
  - Important input to impacts and resilience chapters in NCA4
  - Risk-based approach
  - Provide scenarios and datasets for use in impacts analyses



# USGCRP Climate Science Special Report

- A special product for 4<sup>th</sup> National Climate Assessment
  - Currently 362 pages of text, figures, references, and traceable accounts
  - Report written by Lead Author team (with 3 CLAs)
  - Additional Contributing Authors for special needs
  - Three planned meetings (1<sup>st</sup> April 18-19; 2<sup>nd</sup> Nov. 2-4)
  - Extensively reviewed
  - Publish in 4<sup>th</sup> quarter of 2017
- The Executive Summary will be the basis for the chapter on climate that appears in NCA4
  - May update for NCA4 as needed (based on newer findings)



# Organization

- OSTP and USGCRP
- NOAA as lead agency
- Science steering committee
  - CLAs, Ben DeAngelo (USGCRP), Wayne Higgins (NOAA); Jack Kaye (NASA), Dorothy Koch (DOE), Russ Vose (NOAA NCEI)
- CLAs (D. Wuebbles, D. Fahey, K. Hibbard)
- Lead authors (28 federal, academic, and industry scientists)
- Recently added Debbie Huntzinger (N. Arizona Univ.) to provide ties to the SOCCR-2 report
- Also have contributing authors as needed

# Outline for CSSR: 15 Chapters

1. Introduction: The globally changing climate
2. The scientific basis for climate change
3. Detection and attribution of climate change
4. Projections of climate change
5. Large scale circulation and climate variability
6. Temperature changes in the United States
7. Precipitation changes in the United States
8. Droughts, floods, and hydrology
9. Extreme storms
10. Terrestrial biogeochemistry and land-cover changes
11. Arctic changes and their effects on Alaska and the rest of the United States
12. Sea-level rise
13. Ocean acidification and deoxygenation
14. Perspectives on climate change mitigation
15. Potential surprises: Compound extremes and tipping elements



# Models, Scenarios, and Projections

- Early selection of climate projections made for 2018 NCA
- USE CMIP5 models and the RCPs 4.5 and 8.5 as primary focus for impacts analysis
  - CSSR to add weighting to CMIP5 models
  - Also consider regional models and statistical downscaling in CSSR
- Other information—i.e., RCP2.6—to be included as appropriate
  - Effects of Paris Agreement in scenarios chapter
- Provide results and datasets for impacts analyses
  - Hopefully will result in more literature using consistent scenarios for impacts studies!

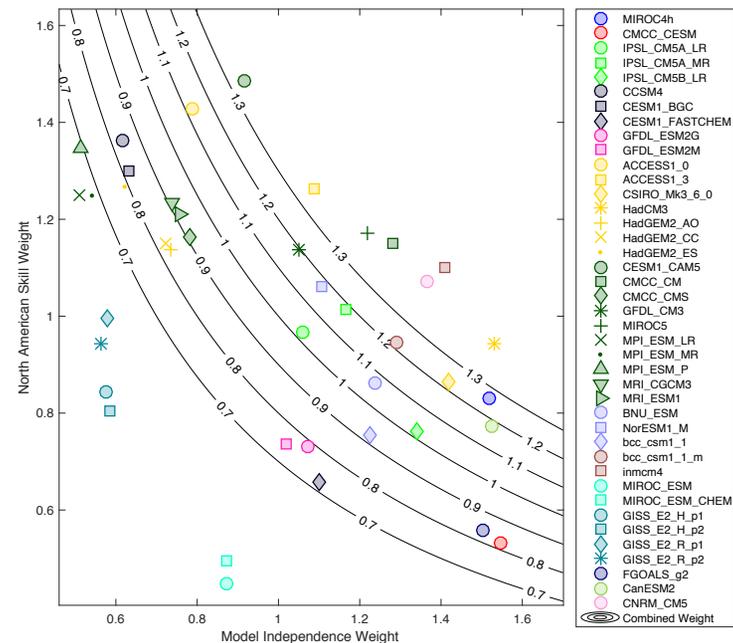




# Weighting of CMIP5 models (cont.)

- Produce weights reflecting each model’s skill and independence that optimize reconstruction of mean
- To degree possible, demonstrate that this improves reliability of out of sample perfect model future projections

Apply the resulting weightings to analyses of temperature, precipitation and other climate variables analyzed in the assessment



\*B. Sanderson, personal communication, September 2016

# Downscaled Analyses Provided for NCA4

- Coordinated with USGCRP Climate Scenarios Task Force
- For 1<sup>st</sup> time, we are trying to provide impacts chapters in NCA4 with a consistent set of data for their analyses
  - Aim at future NCAs using such datasets throughout the impacts studies
- Downscaled model results using LOCA statistical downscaling model
  - 1/16 degree (~6 km) resolution across the continental United States
  - Past and future: Daily 1950-2099
  - RCP 4.5 and 8.5
  - 32 models: With and without weighting
- “State Fact Sheets” using these scenarios ready soon
  - Using LOCA downscaled product

# Risk Framing in CSSR

- Risk framing can be quite important to resilience analyses based on potential climate impacts
  - What risky outcomes are possible/cannot be ruled out?
  - Distinguish between two questions: “What is most likely to happen?” and “How bad could it be?”
- We are making initial stabs at risk framing in CSSR
  - Adding discussion of risk assessment principles to Guide to this Report
  - Consideration of high risk scenarios in the climate effects chapters
    - Already included for Sea-level Rise
    - Being considered for extreme temperature and extreme precipitation
    - Broaden the discussion in Chapter 15 on Potential Surprises to better account for risk framing
- Risk framing should be greatly expanded upon in future assessments

# Timeline

- First Draft Development
  - 1<sup>st</sup> Lead Authors Meeting (April 18-19, 2016)
  - Authors respond to comments: August-Sept/2016 ([Prepare Second Order Draft](#))
- SGCR Review
  - Out for SGCR review: early to mid-Oct/2016
  - Authors respond to comments: Until early Nov/2016 ([Third Order Draft](#))
- Author meeting: Nov 2-4, 2016 ([Fourth Order draft](#))
- Public & NRC Reviews
  - Authors draft proposed responses to public comments: until mid-Feb/2017
  - Authors respond to all comments: until end of Mar/2017
- Author meeting: Late Feb/2017 ([Fifth Order Draft](#))
- Interagency and LRM reviews
- CSSR REPORT RELEASE: Oct/2017