Changes in Wet-Weather Extremes

Science Leads: Mimi Hughes & Fiona Horsfall Rapporteur: Tim Green

Scope:

This theme focused on long-term projections of wet-weather extremes in terms of how climate projections (not short-term weather forecasts) would or could be used by stakeholders/users of climate information. Both direct precipitation and other climate variables (primarily temperature) that affect snowmelt and hydrology are of interest. Extremes are often not well defined, and temporal sequences of these variables are used to derive intensity and duration relationships, with emphasis on changes in the frequency distributions of these relationships.

Highlights of Expressed Needs and Messages:

1. Communication with stakeholders and other federal agencies:
   a. Clarify and refine CCAWWG's role. (Several participants were unclear.)
   b. Each agency needs to communicate up its hierarchy to integrate activities more.
   c. Take advantage of recent Whitehouse priorities.
      Note: The deputy advisor to the President listens to CCAWWG!
   d. Define the pathway for communication of needs, including entities (active parties) and relationships between them.
   e. Involve other agencies, like DOT, more in CCAWWG.
2. Education:
   a. Explain methods/tools used to create projected extremes in an accessible way.
   b. Fill knowledge gaps about what processes influence the system.
3. Applications and system responses vary by region:
   a. Provide regional and system-based definitions of extreme events.
   b. Define and publish skill/confidence of projected extremes geographically.
   c. Improve connections between decision makers and modelers regarding time and space scales. Help establish relationships, and make collaboration more efficient.
   d. Select focus basins to help regionalize this work.
4. Temporal dynamics and spatial organization of climate variables matter.
   a. Quantify the time periods between multiple extreme events
      (not the same as return period).
   b. Project changes in frequency of wet-weather events, including changes in annual cycle and type of precipitation.
   c. Predict joint timing of extremes in precipitation and temperature. For example, this is needed to project changes in runoff due to rain on snow.
5. Provide improved tools and access to climate information at different levels of detail.
   a. Create a query-able data base, possibly built upon NOAA's climate portal of CMIP5.
   b. Bridge weather and climate information (span short and long term needs).
   c. Identify changes in the spatial and temporal extents and spatial structure or patterns.
6. What's missing: Focus on *drought or changes in dry period duration* too.