American Water Resources Association
2015 SUMMER SPECIALTY CONFERENCE
Climate Change Adaptation
June 15 - 17, 2015
New Orleans, LA

Wednesday, June 17
1:30 PM – 3:00 PM
SESSION 18: Planning for Action 3

Comparison of 2014 Climate Change Adaptation Plans - Kathleen White, U.S. Army Corps of Engineers Institute for Water Resources, Hanover, NH (co-authors: H. Conners, A. Taylor, J. Arnold)

This presentation will be based on a report that compares the 33 Climate Change Adaptation Plans released in 2014. This report is the result of an in-depth analysis which explored over 1,000 pages of adaptation plans to understand what other agencies are doing regarding adaptation. Part one of the Comparison of 2014 Adaptation Plans report details the unique actions that each agency is taking regarding climate adaptation, beyond the common, more general approaches such as forming internal working groups and establishing communities of practice. Part two of the report provides a crosswalk that is structured using the President's Climate Action Plan (PCAP). This crosswalk shows which agencies are addressing the various topics in the PCAP and how.

Evaluating Urban Resilience to Climate Change: Washington, D.C. Case Study - Julie Blue, The Cadmus Group, Inc., Waltham, MA (co-authors: S. Julius, N. Hiremath)

In support of EPA's Office of Research and Development, Cadmus collaborated to develop and pilot a tool to assess the resilience of urban areas to climate change. The approach engages municipal decision-makers in assessing a broad spectrum of relevant topic areas that support local climate change planning efforts. A multi-sector Technical Steering Committee helped guide our development of the tool that consists of: * a data-driven component in the form of a menu of indicators that measure resilience quantitatively across our eight sectors * a menu of questions that solicit qualitative information from city managers on factors contributing to resilience Cadmus and EPA then partnered with Washington DC's District Department of the Environment to pilot the tool. Experts from EPA, academia, industry, and the District's government participated in the assessment to support city/District managers' planning efforts and build on the substantial work that was already done for the District's Sustainable DC plan (http://www.sustainabledc.org/). The assessment produced a qualitative and quantitative determination of the District's resilience based on District managers' input across eight sectors: water, energy, transportation, public health and emergency response, economy, land use/land cover, the natural environment, and telecommunications. The project team convened District government leaders for two full-day workshops. At the workshops, participants responded to the qualitative questions and provided expert judgment on the importance of the quantitative indicators to the effort at hand. This work can be seen in the context of the mayor's plan to make Washington DC the "healthiest, greenest, and most livable city in the United States" within 20 years. The team designed and implemented a resilience evaluation process that effectively employed expert judgment and quantitative data to assess climate change resilience comprehensively within the context of the District's current efforts. Sustainable DC intends to demonstrate how "enhancing our natural and built environments, investing in a diverse clean economy, and reducing disparities among residents can create an educated, equitable, and prosperous society."

The results of this work on the District's resilience to climate change have: * prioritized threats to and measures of resilience for the District, * identified available data on the District's resilience, * provided a tool that facilitates qualitative and quantitative assessment of the resilience of drinking water infrastructure, socio-economic structures, landscapes, transportation, and other important urban sectors, * explored the interaction among ecological and socioeconomic factors to understand tradeoffs, and * explored methods for communicating information about vulnerability to communities. The project also identified important community characteristics and activities that may be used to help strengthen adaptive capacity at the national scale. Ultimately, the tool is useful in improving understanding of specific communities' resilience to climate change and the traits of those communities that enhance or inhibit their adaptive capacity.

Climate Impact Studies - Estimating Population Projection Using ICLUS to Reflect Selected Representative Concentration Pathways - Sivasankkar Selvanathan, Dewberry Consultants, Fairfax, VA (co-author: M. Sreetharan)

Estimating future population is an integral part of projecting future climate scenarios. To assess the human and material cost of potential catastrophic event(s), future population estimates are necessary for decision makers today. In addition, a growing population needs additional housing, transportation, and water and energy consumption - meeting these needs generally increase the impervious areas within a watershed and contribute in creating larger runoff from the same amount of rainfall. Therefore, estimating future population distribution is a key parameter necessary for evaluating anticipated climate change impacts. This presentation summarizes a methodology developed to assess future population of the United States (US) reflecting two of four the future growth scenarios - Representative Concentration Pathways (RCPs) - defined in the Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report. This methodology utilizes Environmental Protection Agency's Integrated Climate and Land Use Scenarios (ICLUS) housing density ESRI grid data for the estimation. The presentation will also summarize preliminary results obtained for the US population distribution for the year 2060. The output of Global Climate Models (GCMs) developed for the Intergovernmental Panel on Climate Change Fifth Assessment Report (AR5) was released in September 2013. A key change from its predecessor, the IPCC's Fourth Assessment Report (AR4, 2007), is the introduction of Representative Concentration Pathways (RCPs). RCPs represent greenhouse gas concentration scenarios modeled for future period through the year 2100 based on a variety of socioeconomic projections. The RCPs are consistent sets of projections of only radiative forcing meant to serve as input to GCMs and are different from Special Report on Emission Scenarios (SRES) used in AR4, SRES included assumptions of anticipated socio-economic changes. Major emission scenario families considered for AR4 are A1, A2, B1, and B2; alternatively, AR5 uses four RCPs - 2.6, 4.5, 6.0, and 8.5. For generating for populations estimates for the year 2060, our study considered a weak (RCP 2.6) and strong (RCP 8.5) scenario. EPA's ICLUS data used in conjunction with the Census 2010 population to estimate population for 2060was the only such data available on a national scale; ICLUS's B1 and A2 were identified as analogous scenarios for our weak and strong climate change AR5 scenarios respectively. The Census 2010 census block population was used as the baseline and ICLUS's housing density growth rates were applied to the baseline population to estimate future population. ICLUS has housing density data every 5 years starting 2010 that enabled us to build population changes gradually. This presentation summarizes the key factors related to the two chosen climate change scenarios, their analogous predecessors in the AR4 report, how the EPA's ICLUS dataset was used to estimate future population at a spatial resolution that can be utilized for evaluating impacts on demography due to climate change, and our preliminary results.

The Central Utah Water Conservancy District's Water Supply Variability Model - What If Things Get Worse? - Steven Thurin, HDR, Salt Lake City, UT (co-authors: T. Shannon, C. Lambson)

The Central Utah Water Conservancy District ("District") is in the final stages of developing a new computer model with climate change hydrology to allow the proactive evaluation of potential impacts to its future water supply. In addition to evaluating the possible impact of climate change on its supply, the new tool (named the CUPSIM model) will help to evaluate the amount of water that can be delivered and the reliability of the water yielded by the Central Utah Project (CUP) by:
1. Evaluating the combinations of meteorological and operational conditions that stress the system 2. Understanding the vulnerability of the system under conditions more adverse than those that have been observed
3. Understanding the sensitivity of the system to projected climate variability
4. Developing operational criteria and plans to aid in operating the system under adverse conditions.

The District operates the large reservoirs, transbasin diversion tunnels, and collection systems of the US Bureau of Reclamation's Central Utah Project (CUP). In addition to guaranteeing instream flows that provide a wide range of environmental benefits, in the near future the District will be delivering more than 150,000 acre-feet of primarily M&I water supply to its wholesale and retail customers. The District is concerned with the impact that future potential adverse hydrological scenarios may have on water supply reliability. In addition to primarily snow-melt driven runoff, the CUP supply is reliant on several transbasin diversions and water right exchanges and conversions which may be impacted by hydrological conditions that are more variable than those observed in the last 50 years (under which the project's water supply has been previously evaluated). HDR Engineering is developing a RiverWare model of the CUP system and its water rights that will allow forecasting of operations under several scenarios of adverse conditions, including: downscaled global circulation model climate scenarios, re- sampled paleohydrologic data from tree-ring studies, and re- sampled historical data. The CUPSIM model will allow both a planning mode and a forecasting mode. The latter model mode will use current water supply conditions and potential future hydrology to estimate potential deliveries and reservoir storage conditions over the next one to ten years.