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

Wednesday, June 17
10:30 AM – 12:00 Noon
SESSION 17: Water Supply and Adaptation 2

Water Supply Resiliency: The Means to a Successful End - Michael McMahon, HDR Engineering Inc. , Denver, CO

Water supplies in the U.S. are under a growing number of regulatory constraints that are further exacerbated by risks from natural hazards such as climate change, drought, water quality issues, earthquakes and malicious acts. Investigation into, and decision support for, risk adaptation and negotiating regulatory pitfalls is an ongoing practice for some in the water management community. This presentation will discuss how these adaptation solutions are being derived through collaborative efforts among water managers, municipalities and utilities in the U.S. Project examples will be used to show that water reliability/resiliency studies are not a "one size fits all" methodology, and that education and outreach to rate-payers is as important as the initial vulnerability assessment for a given system. The holistic process for adaptation to future water supply risks begins with a quantification and qualification of those risks and vulnerabilities. This exercise is generally followed by the development of a strategic plan for adaptation, which is followed by the re-imagining and redesign of infrastructure or system operation to mitigate risk. It is in these two latter phases of a water supply resiliency analysis where every solution will need to be vetted through a regulatory microscope; Are the solutions allowable? Will regulatory policy require change for adaptive management to take place? Is there a tipping point where this change could occur? It will be the goal of this presentation to illicit a discourse on the efficacy of water supply resiliency studies that may possibly promote and improve their outcomes.

Forecasting the Future Structure Inventory in Storm Impacted Areas - Joseph Berlin, AECom, Metairie, LA

Forecasts of the future structure inventory in a study area are necessary for estimating the benefits of federal projects, as the primary National Economic Development (NED) benefits of these projects are structure damages avoided. The life cycle of federal projects is 50 years and the structure inventory of a project study area, both residential and commercial, is likely to change significantly during that timeframe. Through the implementation of Army Engineering Regulations regarding sea level change (SLC), and flood insurance rates, structure inventory forecasts can be indirectly impacted by climate change. Structure inventories and forecasts were conducted after Hurricane Katrina in much of coastal Louisiana, for several federal

projects. These forecasts were developed for each parish based upon projected population growth for residential structures and employment growth for commercial structures. The location of future structures was forecasted based upon the location of existing structures, economic development trends, and building codes. The size and configuration of new structures was forecasted by decade to estimate their value. The HEC-FDA software used to estimate flood damages avoided in coastal Louisiana is based upon three residential categories of structures: single family homes, multi-family homes, and mobile homes. The proportion of residential structures in each of these categories has not changed during the past 30 years and was not forecasted to change over the study period. The development of future commercial structures was dependent upon employment growth in relevant employment categories, and these forecasts changed the commercial structure inventory. Louisiana has seen slow growth for the past 30 years relative to the U.S. in general, and most economic forecasts expect continued slow growth, which lowered the forecast of new structures in the study areas. The forecasted new structures are expected to be concentrated in urban areas near industrial development, which are further inland and less impacted by coastal storms. A structure inventory was also conducted in Rockaway, New York after Hurricane Sandy. Beach Fx software was used estimate damages avoided based upon simulated storm events. This inventory included more detailed data regarding structure type and foundation type, to estimate damages avoided by damage category: erosion, wave or inundation. For this estimate, new structures were not forecasted, since the study area is considered completely developed. The structure inventory changed over time during a simulation as structures with greater than 50% damage were not rebuilt after simulated storm events. Several structure development trends are evident that will impact the configuration of federal projects. Although coastal Louisiana is primarily rural, new structure development is concentrated in larger urban areas, such as Houma, rather than small towns and outlying areas. New residential development is built at higher elevations, to meet elevation requirements for flood insurance, and is therefore less flood-prone. In near shore study areas structures are assumed not to be rebuilt after major damages are incurred, which decreases structure damages (and structure damage avoided) over time. The assumptions made regarding future investments in structures have a major impact on the cost benefit analysis of federal projects.

Comparative Visualization Future Flow Frequency and Duration Curves - Bryan Baker, U.S. Army Corps of Engineers Cold Region Research and Engineerin, Hanover, NH (co-authors: J. Arnold, A.Taylor, J. Gade)

This presentation will present a method to visualize and compare biased corrected global climate model hydrology using 97 climate model traces in the western half of US. The frequency curves were developed using the standard Bulletin 17B process and duration curves were developed using the USACE statistical software package HEC-SSP. These visualizations were developed in support of the U.S. Army Corps of Engineers (USACE) climate change information in hydrologic analyses and present the data in a reference point assuming stationarity to communicate with the widest possible user base still working under the assumption of stationarity. The climate data is derived from a multi-agency consortium of government and academia organizations.