

Floods, Roads, and Infrastructure: Payback to Planning and Protection

A DVRPC Climate Adaptation Forum | December 7, 2018 | Meeting Summary

Welcome and Introductions

Rob Graff, manager of DVRPC's Office of Energy & Climate Change Initiatives, welcomed attendees and panelists, reviewed logistical details, and provided an overview of climate change-related activities at DVRPC, including the agency's climate change adaptation work, two recently released DVRPC reports – *Municipal Management in a Changing Climate* and *Energy Use and Greenhouse Gas Emissions Inventory for Greater Philadelphia*, an upcoming study on electric vehicles, and past Climate Adaptation Forums. Rob concluded his presentation with several slides detailing historic and projected changes in climate for the Philadelphia region. Rob also recommended that participants look at the Fourth National Climate Assessment Volume II released on 11/23/18, as it is a concise, authoritative and accessible resource.

Presentations

Michael Scott, Ph.D., Interim Dean, Henson School of Science and Technology; Professor, Department of Geography and Geosciences; Director, Eastern Shore Regional GIS Cooperative—Salisbury University (Salisbury, MD)

Dr. Michael Scott presented his work modeling the effect of sea level rise (or “sea level change”) on roadways and transportation infrastructure in parts of coastal Maryland. Dr. Scott and his team created depth grids for the 10%-, 4%-, 2%-, 1%-, and 0.2%-chance floods in both 2050 and 2100 for both mean sea level and mean high higher water. His team used Army Corps of Engineers sea level rise estimates for these scenarios. With the depth grids in place, the depth of water above flooded road segments could be calculated and mapped. Dr. Scott then demonstrated a Network Trace Analysis that showed the impact of flooded road segments on travel times for a variety of origin-destination pairs. He also showed which locations would become unreachable due to flooding under a variety of scenarios. Dr. Scott's depth grids are also being used for individual storm response and community vulnerability assessments.

Elkins Green, Director of Environmental Resources, NJDOT

Mr. Green spoke about NJDOT's efforts to assess how changes in precipitation could impact vulnerable culverts along selected stretches of I-80 and Route 23. This work was performed as part of NJDOT's FHWA-funded *Extreme Weather Asset Management Pilot Study*. The study looked at both the number of flooding incidents at specific locations along with the frequency of maintenance activities. Based on this analysis, the study determined that the root cause of flooding in these locations was a lack of maintenance activities, not under-sized culverts. Furthermore, the capacity of the existing culverts is

predicted to accommodate future increases in streamflow due to climate change and will therefore not contribute to increased roadway flooding. However, future increases in rainfall will likely exacerbate the stormwater flooding associated with a lack of proper maintenance. Two challenges identified in the study include: 1) gaps in data showing when, where and how long a road is closed due to a flooding-related event; and 2) the storing of asset management data in multiple systems that do not communicate with one another. Overcoming these challenges will help NJDOT to better adapt their asset management practices to accommodate future extreme weather events.

Dan Szekeres, Senior Associate, Michael Baker International

Mr. Szekeres spoke about PennDOT's efforts to address transportation system resiliency. The main goals of the work are to: 1) better understand the risks associated with historic flooding; 2) assess the impact of future flooding due to higher precipitation events; and 3) evaluate the cost-effectiveness of adaptation strategies. Dan spoke about PennDOT's *Extreme Weather Vulnerability Study* published in March 2017 and their on-going work conducting hydrologic and hydraulic analyses to assess the vulnerability of transportation infrastructure to climate change. The 2017 study identified historic flooding vulnerabilities and identified high-risk locations across the state. PennDOT is currently working to automate their risk mapping process and is integrating the results of the study into their maintenance, planning, project prioritization and asset management activities. The pilot study currently underway will provide a detailed template for conducting H&H studies that include climate change impacts.

Questions and Answers

Mr. Graff facilitated a round of questions and answers, including some that he posed as well as some solicited from the audience.