Changes in Local Precipitation due to Climate Change: State-of-the Science Synthesis

Megan Granato (MDNR) & Jim George (MDE)

Q2 ARWG Meeting

May 20, 2019

ARWG
2019 Work Plan

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Ongoing Priorities for 2019 Status Updates

14. *Addressing Increased Precipitation at the Local Level*

…In 2019, ARWG partners will explore regional downscaled precipitation models, which could help Maryland communities better assess their localized flood risks and plan to become more resilient to precipitation-induced flooding.

Synthesis Work to Date

Contacts Currently in Our Network:

- Gopal Bhatt, Penn State
- John Bolten, NASA
- Kaye Brubaker, UMD Department of Civil & Environmental Engineering
- Melissa Deas, District of Columbia
- Joel Dreessen, MDE Air and Radiation Administration
- Jeremy Hoffman, Virginia Museum of Science
- Zoe Johnson, Naval Facilities Engineering Command
- Beth Olsen, UMD Earth System Science Interdisciplinary Center
- Tom Schuler, Chesapeake Stormwater Network
- Gary Shank, USGS
- Phil Stratton, UMD State Climatologist's Office
- Dan Walker, UMD Center for Technology and Systems Management

Synthesis Work to Date

Groups Currently in Our Network:

- Chesapeake Bay Program Climate Resiliency Workgroup
- Chesapeake Bay Program Urban Stormwater Workgroup
- Eastern Shore Climate Adaptation Partnership
- MDE Dam Safety Program
- MDE Stormwater Program
- National Meteorological Society
- National Weather Association
- NOAA Geophysical Fluid Dynamics Laboratory
- Pacific Northwest National Laboratory
- EPA

Downscaling Work in Progress

UMD Department of Civil & Environmental Engineering's Maryland Water Resources Research Center
Dr. Kaye Brubaker

•Two global climate models downscaled for Maryland through State Highway Administration Project

•Eastern Shore Climate Adaptation Partnership's "Changing Precipitation Patterns on Maryland's Eastern Shore" project

- Focused on the six eastern shore counties
- Two main research questions:
  - Are the regional patterns of extreme precipitation changing?
  - How might extreme precipitation change in the future?

Lawrence Berkeley Lab

•The lab received a DOE grant to develop Intensity Duration Frequency Curves in the Susquehanna watershed

Synthesis Questions

MARYLAND DEPARTMENT OF NATURAL RESOURCES

1. What is the state of science on predicting the characteristics of future storm events, i.e., frequency, magnitude, duration, regional/geographic patterns, as a result of climate change?
   - Are the current methods sufficient to generate useful estimates now, or does the state of the science need to evolve further before we should invest in generating estimates?
   - If current methods are not sufficiently robust, what are the knowledge and data gaps, e.g., downscaling methods?

2. Who are the expert researchers and technical practitioners involved on this subject?

3. Is anyone else working on a similar synthesis?

4. If useful estimates are available now, what type of tools and resources do we need to generate to assist our local communities to apply the information?

Next Steps

- Seek ARWG Review of Synthesis Questions
- Continue to reach out to identified experts and related groups
- Convene partners with downscaling work in progress to determine what work is already completed, what work is in progress, and appropriate next research steps