2019 USWG Climate Resiliency Strategy

GOAL: Deliver engineering tools and management solutions to communities so they can protect their current and future watershed restoration investments from climate change risk.

2020 GIT Research Funding Proposal

Piloting the Development of Probabilistic Intensity Duration Frequency (IDF) Curves for the Chesapeake Bay Watershed

Urban Stormwater WG/WQGIT - $150,000

Project Role

Michelle Miro, PhD The RAND Corporation 9 Project Principal Investigator
Krista Romita Grocholski, PhD The RAND Corporation 1.5 Co-Principal Investigator
Jordan Fischbach, PhD The RAND Corporation 15 Co-Investigator
Arthur DeGaetano, PhD Cornell University 28 Cornell Principal Investigator
Constantine Samaras, PhD Carnegie Mellon University 12 CMU Principal Investigator
Stephanie Tanverakul Pardee RAND Graduate School 10 Graduate Student

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Northern Virginia Regional Commission

IDF Curve Pilot Project

Primary objectives of this Scope include:

1) Evaluation of downscaling methods and climate model combinations to assess their ability to replicate historical precipitation extremes
2) Downscaling of projected precipitation extremes for future periods
3) Quantification of methodological and climate model uncertainties for the projected precipitation extremes for future periods
4) Development of probabilistic intensity duration frequency (IDF) curves
5) Development of web-based tools and appropriate outreach to make results accessible to end-users

Regions of Interest for Curve Development

- District of Columbia
- Virginia
    - Northern Virginia Regional Commission
    - Rappahannock-Rapidan Regional Commission
    - Richmond Regional Planning District Commission
    - Thomas Jefferson Planning District Commission
    - Hampton Roads Planning District Commission

- **Rand Corporation – Voluntary project match for remainder of watershed**

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Step 1: 3/1/2020 to 4/30/2020

- Develop and submit a Draft Quality Assurance Project Plan (QAPP); address comments to the draft QAPP and submit Final QAPP.
- Meet with Urban Stormwater Workgroup and project leads to understand project needs
- Identify similar efforts that are either ongoing or recently completed.

** Will request meetings with:

- Modeling Subcommittee
- Climate Resiliency Workgroup

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Step 2:

- Evaluate National Weather Service (NWS) Cooperative Observer Program (COOP) Network with long-term daily precipitation data for qualification
- Based on information gathered, evaluate downscaling method–climate model combinations (RCP 8.5, RCP 4.5) to assess their ability to replicate historical precipitation extremes.
- Procedures to be evaluated include: Dynamical Downscaling, Delta Method, and the Analog Method
- Historical and future 2-, 5-, 10-, 25-, 50-, and 100-year recurrence interval precipitation amounts computed for 1-, 2-, 3-, 6-, 12-, 18-, and 24-hour durations
- Potential time frames envisioned are: 2010-2029; 2030-2049; 2050-2069.

Step 3: 11/1/2020 to 12/30/2020

- Write-up describing uncertainties and recommended application of projected IDF curves.
- Development of the web-based products (usable by a wide audience of varying knowledge as defined in the Project Outcomes section above) that will include Station-Specific IDF Curves, Statewide Maps of Projected Changes, 30-year Exceedance Probabilities, and an instructional video/webinar.

Step 4: 12/1/2020 to 12/15/2020

Submit Draft Report document and present results as a webinar or in-person presentation to the Urban Stormwater Workgroup for peer review to gather feedback and understand any additional needs for the web-based tool development. Address comments to draft documents and submit Final Report to the CBP.

Step 5: 1/15/2021 to 2/26/2021

Respond to stakeholder feedback, as appropriate. Outreach and final development of web-based tools to make results accessible to potential end-users.

Final project deliverables include:

- Draft Report document and presentation of draft results as a webinar or in-person presentation to the Urban Stormwater Workgroup
- Response to Comments Document (from Draft report)
- Historical and future 2-, 5-, 10-, 25-, 50-, and 100-year recurrence interval precipitation amounts computed for 1-, 2-, 3-, 6-, 12-, 18-, and 24-hour durations
- Historical and future IDF curves for the Virginia portion of the Chesapeake Bay Watershed as well as DC.
- The raw data used in the analysis and associated reports explaining the data and how the analyses were completed (i.e., data and metadata).
- An interactive webpage allowing the end-users to navigate final research products.
- Instructional video/webinar explaining the project need, results, and how to use the IDF curves and other final products, data, and reports.
- Final report document which will include describing uncertainties and recommended application of the projected IDF curves