Incorporating Climate Change into Stormwater Design Standards

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Dr. Michelle Miro, RAND Corporation

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Building climate change-informed IDF curves

We developed future-projected IDF curves for the entire Chesapeake Bay Watershed and Virginia and are hosting them on a web-based tool.

Projected IDF Curve Tool

More resilient infrastructure

Incorporating climate change into IDF curves means that infrastructure designed using these curves should be more resilient to future precipitation events.

User-friendly tool

Based on the best available science, the tool is conceptually simple and uses transparent data, so it is easy to use and easy to understand.

Supports diverse policy considerations

Because there is no single best estimate, the tool provides an uncertainty range, which the user can explore to make the best plans possible for their agency.

Downscaled climate model datasets examined in the study

- Bias-Corrected Constructed Analogs, version 2 (BCCAv.2)
- Multivariate Adaptive Constructed Analogs (MACA)
- Localized Constructed Analogs (LOCA)
- North American branch of the Coordinated Regional Downscaling Experiment (NA-CORDEX)

Historical and future IDF curves

First, we followed Atlas 14 methods for deriving IDF curves to calculate IDF curve values for the historic (1950-2000) and two future (2020-2070, 2050-2100) periods.

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IDF curve change factors at the grid level

Then, we calculated change factors at the grid-scale across downscaled datasets for each

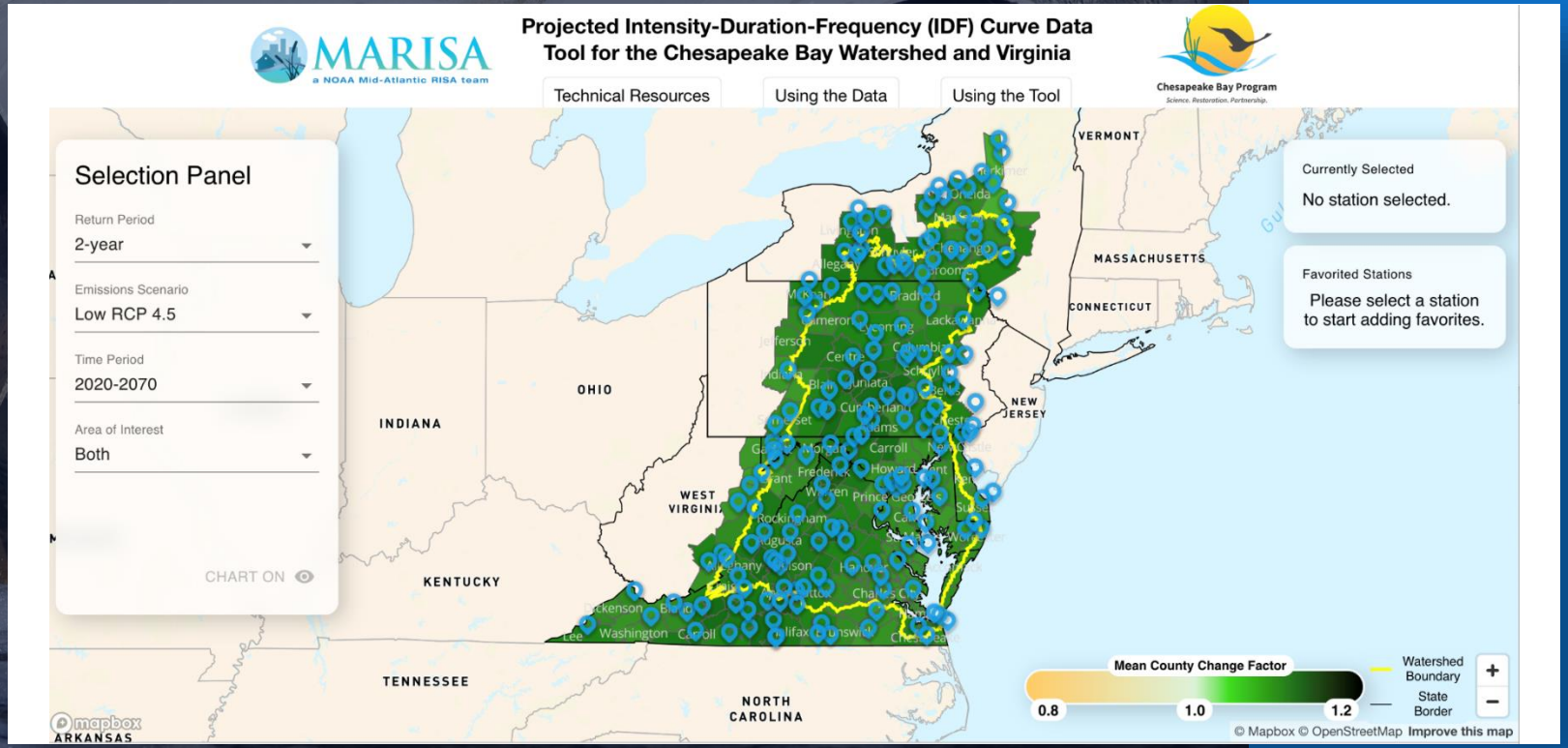
- time period
- greenhouse gas emissions scenario, and
- return period

$$change\ factor = \frac{\text{future IDF curve value}}{\text{historic IDF curve value}}$$

County-level change factors and projected IDF curves

Then we,

- aggregated the grid-level change factors to create county-level change factors,
- calculated an uncertainty range for those change factors, and
- applied these county-level change factors to Atlas 14 IDF curves.



https://midatlantic-idf.rcc-acis.org/

Future directions for research

Develop guidance for range of uncertainty to consider for specific infrastructure types

Examine how stormwater managers are currently operationalizing ranges of future changes in climate

Deeper dive into sub-hourly change factors

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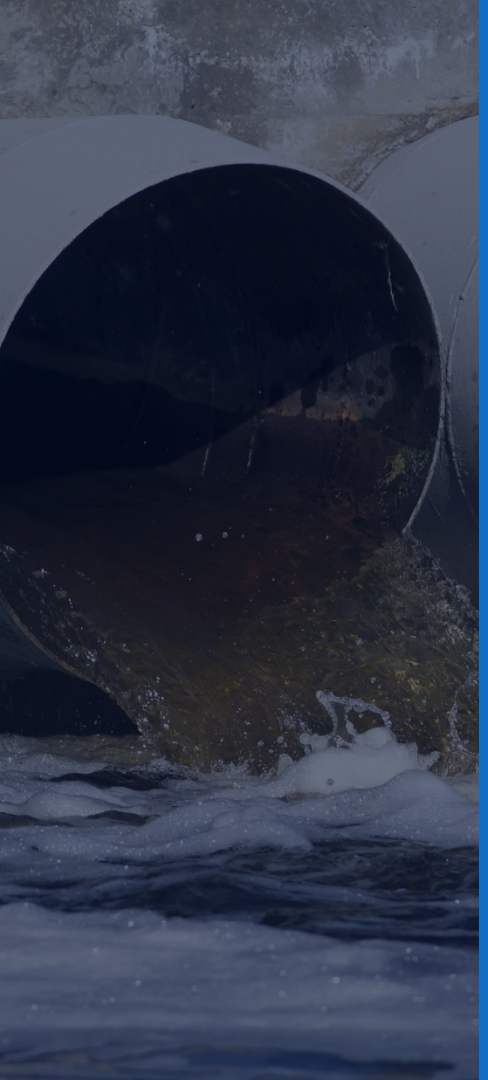

Questions?

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