WATER RESOURCES RISK TEAM

Resilient water infrastructure in the Great Lakes region

Costly and damaging floods are on the rise in the Great Lakes region, overwhelming water infrastructure.

Lake and sewer overflows are increasing in frequency and severity, as are flash floods. Precipitation extremes, driven by climate change, are challenging water utilities and stormwater management systems in the Great Lakes region. Aging, crumbling infrastructure is a compounding hazard. Wastewater treatment plants, sewer systems, reservoirs, and water pipes are deteriorating. Some infrastructure is over a century old and cannot survive today's or tomorrow's climate extremes.

Regional economic problems exacerbate the water crisis.

Poverty is rising and populations are declining in the Great Lakes region due to the hollowing out of manufacturing and other sectors. The populations most vulnerable to the impacts of flooding and failing water infrastructure—low-income, people of color, immigrants, and seniors —are hurt the most. In the last decade, nearly 370,000 water shut-off notices have been issued due to poverty and the rising costs of water infrastructure maintenance[1].

An abandoned house in the Delray neighborhood of Detroit, Michigan. The Great Lakes region is a hotspot for recent poverty increases. Flooding events disproportionately affect poorer neighborhoods. Photo credit: Public domain.

Saginaw River Flood in Bay City, Michigan in April 2017. The Great Lakes region experienced extreme rain events during 2017-2019 that led to serious flooding in urban areas. Such unusually large rain events are becoming more common in the region. Source: Michigan Sea Grant.

Water utilities, stormwater managers, and civil engineers are seeking actionable climate information from NOAA to help them upgrade their water infrastructure.

Great Lakes region stakeholders need to know projected lake levels and rainfall rates. They would like to know how much rain can fall in an hour in any given downpour. They need information tailored to each locality's unique topography and water systems; they must account for variables like snow melt, lake level, and adequacy of drainage. They aim to understand the uncertainty in climate projections and models, and what populations, infrastructure, and property are at most risk. They seek the most authoritative, precise climate information to help guide and inform these million- and billion-dollar decisions. They must make decisions on how to allocate precious dollars on planning timelines ranging from days to decades.

Reference: 1. https://www.apmreports.org/story/2019/02/07/great-lakes-water-shutoffs

How does the Water Resources Risk Team aim to serve the Great Lakes region?

VISIT [URL]

EMAIL: [Team lead/group email]

The Water Resources Risk Team will continuously engage with stakeholders and regional experts to co-produce actionable information for water system managers.

Through stakeholder engagement and training, the Water Team will help local stakeholders understand how their regional water cycle is changing in the current climate, and projected future climate scenarios. We will explain uncertainty and ranges of plausibility in regional precipitation extremes. Partnerships with governments and boundary organizations can build the Water Team's capacity. Partners include federal science agencies (FEMA, EPA), the NOAA Water Initiative (including Sea Grant, National Weather Service, etc.), and non-profit organizations (the Water Research Foundation, U.S. Water Alliance, the Water Utility Climate Alliance, and the Association of Climate Change Officers). The Water Team will also work to ensure that its climate expertise is distributed equitably among vulnerable populations.

Lake Michigan in Chicago, Illinois. The Great Lakes water levels can fluctuate to high and low extremes, causing access problems, erosion, and property damage. Source: John Coggin.

GREAT LAKES REGION WATER SYSTEM:

>12,000

Water utilities, each serving populations from 10,000 to 1 million+

>$175 billion

Required through 2030 to maintain and upgrade water, wastewater, and stormwater infrastructure[2]

20%

Of the world's surface liquid fresh water is held in the Great Lakes and provides drinking water to 40 million U.S. and Canadian citizens

10%

Increase in the region's precipitation from 1901-2015—more than double the rate for the nation

1 in 4

Of the region's jobs are in water-dependent industries like agriculture, recreation, and manufacturing

Heavy rainfall events are becoming more common, which overwhelm stormwater infrastructure and exceed the capacity of storm sewers to handle runoff. Source: NOAA.

The Water Resources Risk Team aims to help localities make wise investments that will safeguard public health, protect livelihoods, and yield the greatest return.

When water systems managers better understand climate risks and infrastructure vulnerabilities, they can more efficiently plan the magnitude of infrastructure investments to make and when. The Water Team envisions a future where the Great Lakes region enjoys a safe, plentiful water supply produced efficiently. Localities will experience flooding, but stormwater management systems will have the capacity to protect their citizens. The Great Lakes region can then share outputs and lessons learned to boost the resilience of other U.S. coastal communities.

Reference:
2.http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_greatlakes_021318_FINAL_RGB.PDF