



Climate change risks to wastewater and stormwater infrastructure

Katrina Kessler, P.E. | Assistant Commissioner | February 2, 2021



Our mission

Protect and improve the
environment and human health.

Consideration of risk is foundational

Design flows for stormwater and wastewater infrastructure

- **Major factor in designing new** or expanded pipes, pumps and treatment systems
- **Wastewater infrastructure:** uses actual flows such as peak hourly flow during wet weather events that include intense rainfall
- **Stormwater infrastructure:** is designed according to standards such as the 10-year or 25-year storm event which is based analysis of historical frequency of heavy rainfall events



Climate adaptation: Surface Water Monitoring Program



Warmer & Wetter



More Damaging Rains



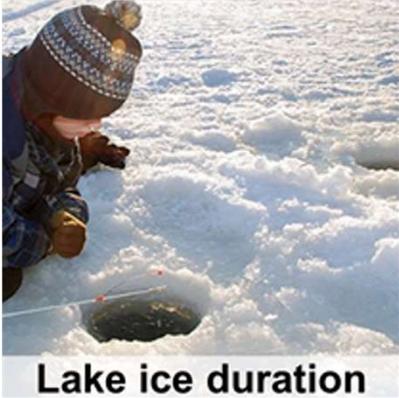
Cold Weather Warming



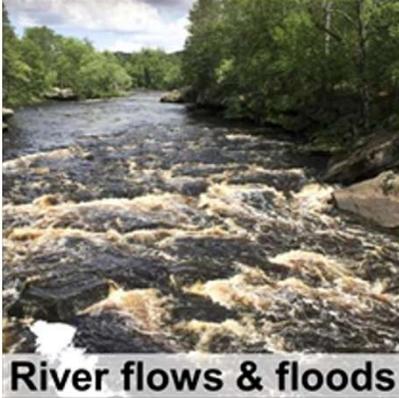
Lake temperatures



Biology

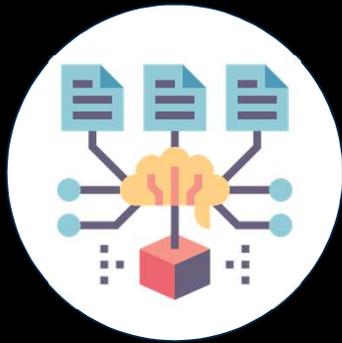


Lake ice duration



River flows & floods

Analyzing data on climate change risks



Use models

Use models to determine if proposed actions will be sufficient and appropriate in a changing climate.



Understand precipitation

Nonpoint water quality issues are directly related to precipitation. Understanding timing, duration and intensity is key to analysis.



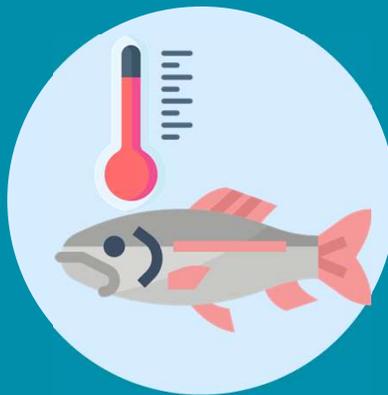
Analyze flow

Actions to address average flows can be different than actions to address precipitation-driven peak flow.

Analyzing climate change impacts: Lake Superior South, Cloquet and Nemadji Watersheds



Modeled hydrology and water quality (flow, sediment and nutrient loading, and water temperature) to determine vulnerability to climate change



All modeled streams in the Duluth urban area are likely to have temperatures that exceed the stress temperature for brook trout



Model showed that over time there would minimal change in total flows but when and how flows would respond to rain events would change significantly

Consideration of climate change risk: Permitting



We consider flow and precipitation data in our evaluation of projects



If our analysis shows that climate driven risks exist we require changes to the project scope and design to mitigate impact



Implementing water quality standards to protect fishing, swimming and drinking water sources at critical flow rates



New feedlot general permit expands cover crop requirements and restricts when manure can be applied

Raising awareness of climate change risks

- **Collaborate to be successful**
- **Raise awareness of impacts to communities, especially water impacts**
- **Advocate for resources to local partners to assess vulnerabilities and mitigate risk**



Advocating for local capacity to assess risks

Grants to assess climate vulnerabilities

- 2015 grant to University of Minnesota, Morris for extreme weather and resilience planning
- 2015 grant to Saint Paul to develop a [Strategic Framework for Community Resiliency](#) including an assessment of climate change impacts and areas of potential hazards, exposures and vulnerability
- In 2018 grant to the paleBLUEdot to [allowed 40 cities](#) to assess potential climate impacts to vulnerabilities including Akeley, Brainerd, Faribault, Granite Falls, Rainer, St. Louis Park
- 2019 grant opportunity saw 32 applications totaling more than \$1.3 M, awarding 11 grants for total of \$244,000 for adaptation planning, adaptive urban forest management research, community flood modeling and prioritization of at-risk infrastructure

Next steps



- **Climate risk assessments and planning** FY22-23 Gov budget includes \$2.9 million to establish a resilience fund that would provide grants to local partners to complete climate risk assessments and planning work needed to be prepared for bonding dollars



- **Resilience grants to communities** MPCA previously requested bonding dollars for grants for communities to implement projects to increase resilience



- **Environmental review and climate change** Environmental Quality Board updates to environmental review process to require information about how proposed projects may exacerbate problems already accentuated by climate changes and potential strategies mitigate

Thank you!

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