



**CLIMATE CHANGE:
2021 and Beyond**

Preparing our communities for the future.

Great Lakes and St. Lawrence Cities Initiative Presents:

Understanding Climate Change – Physical Changes in the Region Over the Next Century

David A. Goldwater, Stantec

Stantec Tackling Climate Change

Net Zero
Carbon neutral
by 2022, then
net zero by 2030

Our Operational Pledge

#5
Ranked fifth
most sustainable
corporation
in the world

2021 Corporate Knights Global 100



GREAT LAKES AND ST. LAWRENCE
CITIES INITIATIVE
L'ALLIANCE DES VILLES
DES GRANDS LACS ET DU SAINT-LAURENT



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Climate and Water Supply



What are we seeing?

- Extreme weather is becoming the new normal
- Long-term water supply issues
- Change and implementation
- Increased pressure for more water diversions
- Availability and access, depleted wetlands and the great lake basin
- Water quality



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Coastal Erosion



- Drought and severe and frequent flooding have resulted in increased coastal and soil erosion with massive damage to the natural environment and built infrastructure.
- Natural defense against storms to protect our shorelines:
 - Wetland enhancement
 - Eco-revetments
 - Hardened dune systems
 - Shoreline plantings
 - Maritime
 - Forest restoration
 - Earthen berms



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Coastal Resilience



What is happening to our shorelines?

- Rising sea levels
- Extreme weather events



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Flood Protection

Communities must adapt—flooding is not going away

- Dams and levees help but when they are breached it can be a catastrophe
- Restore and protect community land
- Use land to store or redirect flooding—sustainable urban drainage (parks, ponds)
- Floating island ecosystems
- Design and model flood embankments
- Design secondary drainage networks and pumping stations



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Water Reuse



How do we expand our water supply?

- Enhancing rainwater use
- Stormwater harvesting and reuse
- Avoiding saturation of sewerage networks
- Minimizing the consumption and waste of drinking water
- Desalination
- Better approach to water and wastewater
- Conveyance



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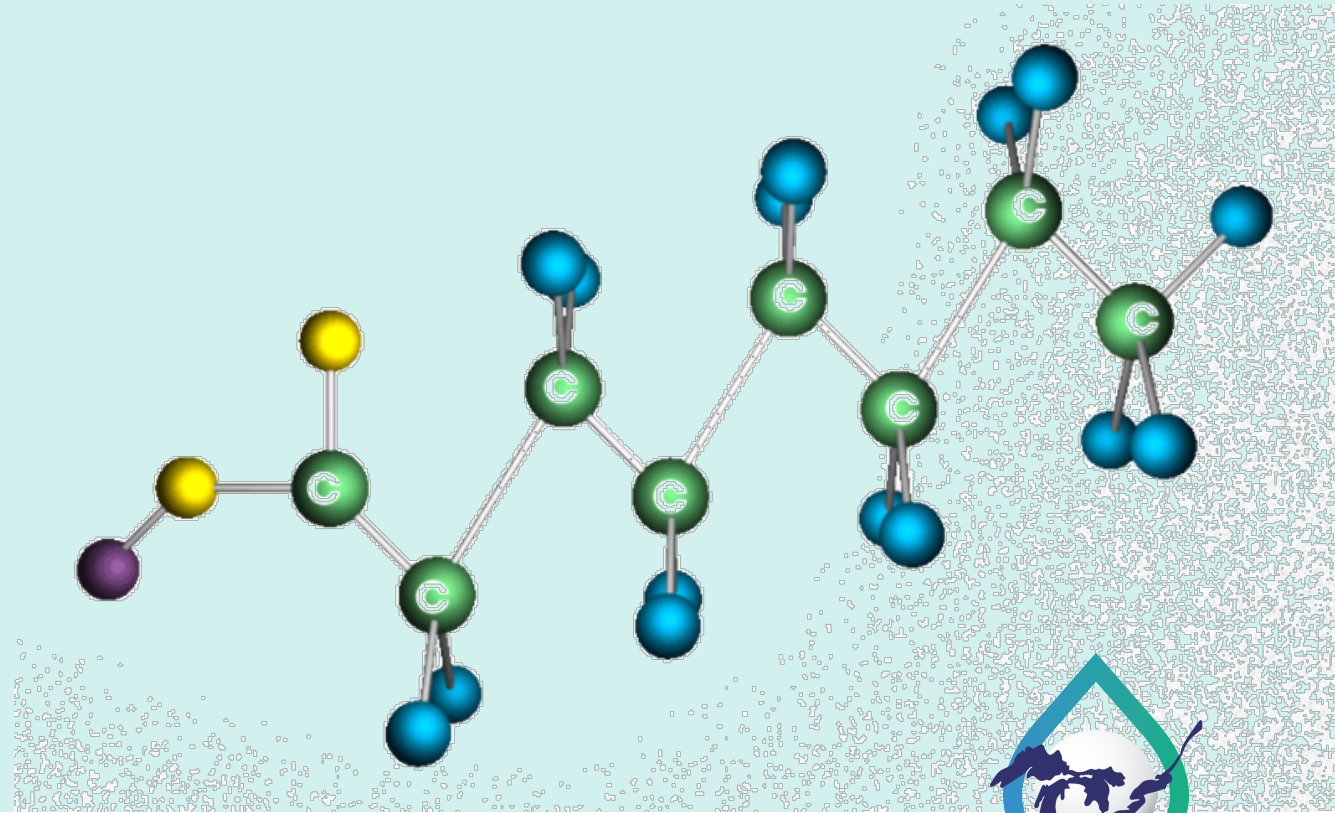


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Emerging Contaminants

PFAS

- Forever chemicals
- Find them everywhere
- Resistant to water
- Exposure to PFAS is mainly through consumption of drinking water
- Current standards and regulations



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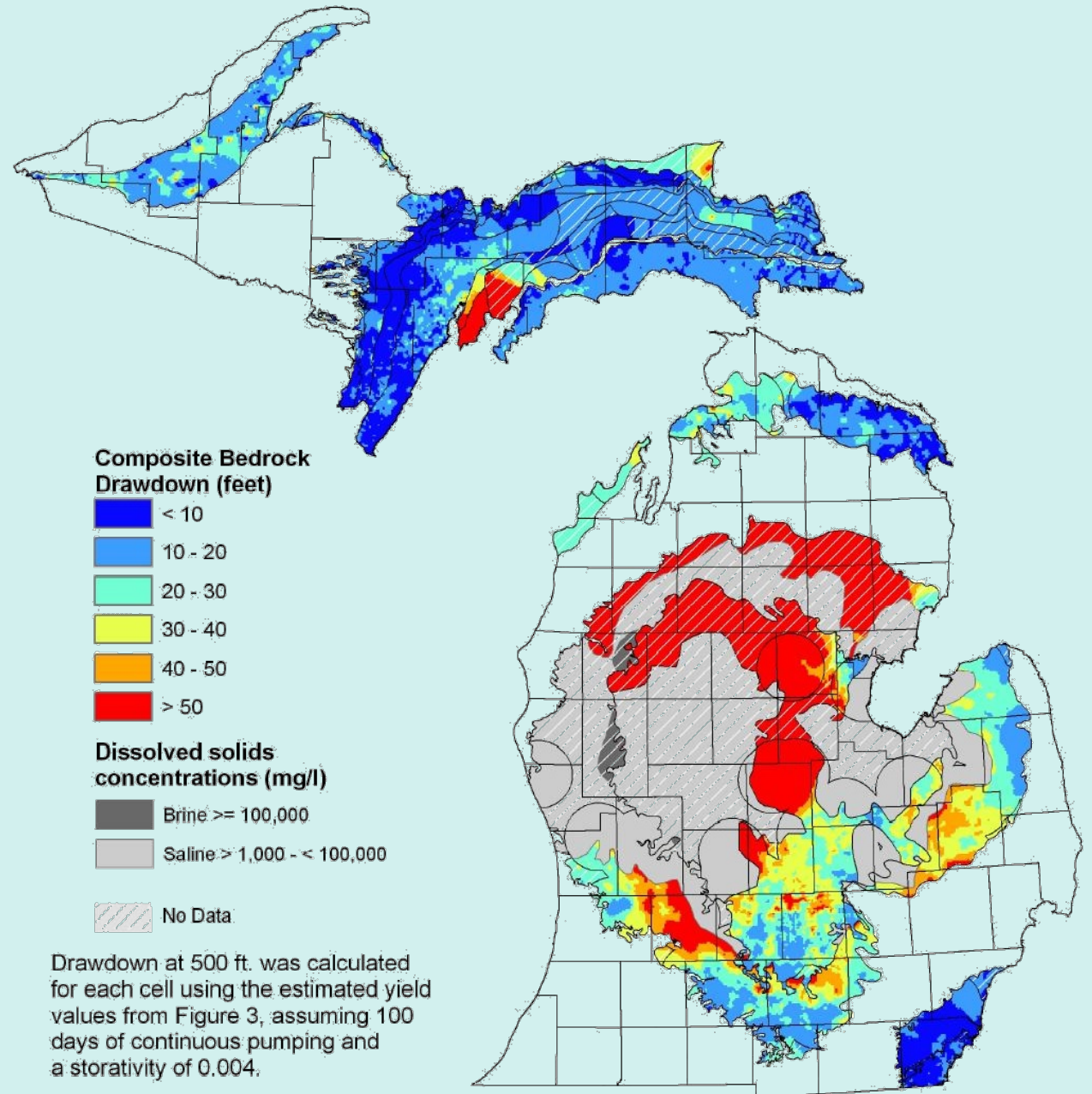


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Redundancy

- Redundancy of critical infrastructure (intakes, conveyance pipelines, etc.)
- Aquifer Recharge
- Reservoirs
- Quarry Reuse



Groundwater

Different kinds of bedrock in aquifers can cause differences in how quickly groundwater recharges

