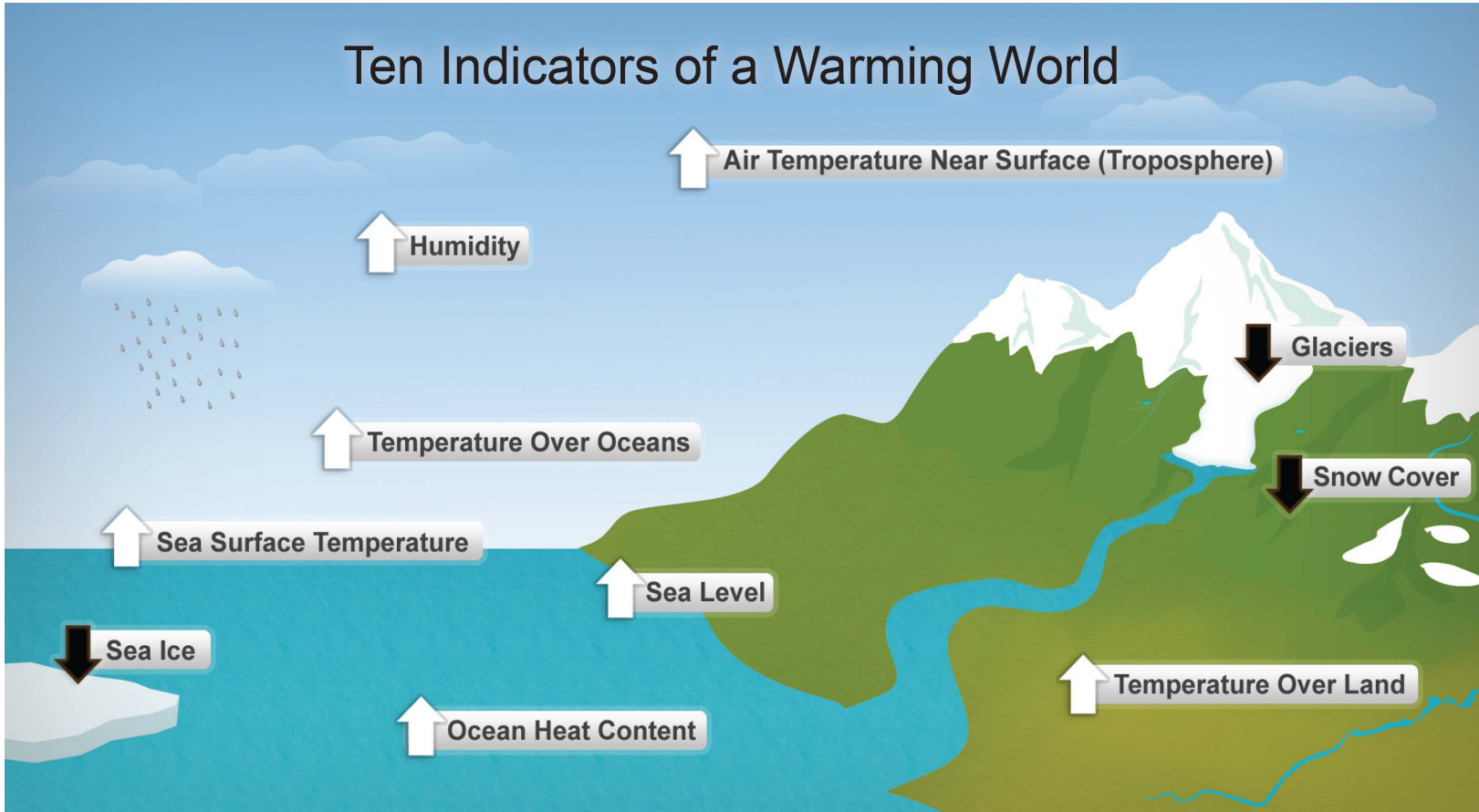


Walkerton Clean Water Centre

Provincial Workshop DWQMS – Managing Change

Walkerton Clean Water Centre 20 Ontario Road, PO Box 160 Walkerton, ON N0G 2V0

PREPARING FOR CLIMATE CHANGE



DWQMS Version 2.0

New Potential Hazardous Events for Municipal Residential Drinking Water Systems to Consider in the DWQMS Risk Assessment

We are going to discuss risk assessment and emergency preparedness in the time of climate change

We will discuss the potential hazardous events and associated hazards that are, at a minimum, required to be assessed as part of these risk assessments

Definitions

DWQMS Version 2.0

- **All Systems** - all municipal residential drinking water systems, including distribution-only systems.
- **Treatment Systems** - all municipal residential drinking water systems that include equipment used to provide primary and/or secondary disinfection of the drinking water, including those with groundwater and/or surface water sources unless otherwise noted.

POTENTIAL HAZARDOUS EVENTS

	Hazardous Events
All systems	Source water supply shortfall
All systems	Extreme weather events (e.g., tornado, ice storm)
All systems	All systems Sustained extreme temperatures (e.g., heat wave, deep freeze)
All systems	Chemical spill impacting source water
All Systems	Sustained pressure loss
All Systems	Backflow
All Systems	Terrorist threat

POTENTIAL HAZARDOUS EVENTS

	HAZARDOUS EVENTS
Treatment Systems	Sudden changes to raw water characteristics (e.g., turbidity, pH)
Treatment Systems	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
Treatment Systems	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
Treatment Systems (Surface Water)	Algal blooms



Water Supply Flood / Shortfall

Impacts-

- Increase/decrease water levels – flooding / drought (causing water supply shortfall)
- Global Climate Change – migration of people – Increased population, increase in water demand – high winds and wind direction can impact the level of turbidity

Control Measures

- Increased storage, increased population in other areas, decrease water use, Plan for infrastructure redundancy
- Increased monitoring – proactive vs reactive
- Public education, increased water cost, Treatment considerations and adjustments re: turbidity and organics,
- Wastewater Treatment issues

Extreme Weather Events

Impacts

Increased water demand, infrastructure damage, Transportation issues for staff response, treatability, personnel coverage, loss of service, fuel supply's, power failure, loss of communications loss of facility

Control Measures

OnWARN, ERP, contingencies, backup power, no natural gas or diesel, Plant restarts ,BWA, Essential suppliers, alternate water supply

Sustained Extreme Temperatures

Impacts

- Frozen services and water mains
- Ice storm and frozen water towers
- Increased water demand from broken water mains
- Frozen hydrants
- Heat wave issues warmer water resulting in decreased chlorine residuals
- Drought, increased fire threat
- Water quality, microbiology issues
- More side stream feeders high in organics, less fresh lake/river water

Sustained Extreme Temperatures

Control Measures

- Emergency plan, backup power, training, OnWARN, tracked historical frozen service/water mains, run taps.
- cycling water, less time in the tower/reservoir (keep water temperature up (cold temperatures) or down (hot temperatures),
- Ice caps blocking column in water tower, install mixing system, water conservation
- Increased sampling, public education

Chemical Spill Impacting Source Water

Impacts

- Water source/supply characteristics may change e.g. increase use of road salts impact source water (link to climate change)
- Derailment (chemical impact to source water)– Potential impact to public health
- Operational challenges impact reputation, customer confidence/trust

Chemical Spill Impacting Source Water

Control Measures

- Spill booms around intake
- Monitor for sodium
- Additional treatment, increased sampling, flushing,
- SWPP and RMP
- Public Outreach

Terrorism and Vandalism Actions

Impacts

- Cyber terrorism impact on SCADA
- Public Health – Chem/bacti contamination
- Infrastructure failure
- Increased security costs
- Increased repair and replacement costs
- Disgruntled employees

Terrorism and Vandalism Actions

Control Measures

- Security management
- Cyber, chemical, biological, radio, Bomb,
- Security measures – camera system. Alarms fencing, training, auto-shutdown system
- Increased water quality monitoring
- Public education
- Emergency response plans

Sustained Pressure Loss

Impacts

- Increased potential for back-flow / cross connection
- Decreased water supply quality of treated water
- AWQI,
- Fire response time, fire protection, not meeting fire flows
- Compromised water quality in distribution system
- Risk to public health
- Impact to water supply

Sustained Pressure Loss

Control Measures

- Infrastructure planning
- Dispatch operation notification
- Train staff, fire department
- Public health advisories, BWA, BWO, don not use,
- Flushing, sampling, testing,
- Communications between supplier and receiving distribution system.

Backflow

Impacts

- Water quality, chemical or bacte
- Water quality due to contamination of treated was
- Public health – decrease in public confidence
- Increased enforcement, increased inspection costs

Backflow

Control Measures

- Bylaws
- Backflow Prevention Programs, device testing, review inspection records (BFPP)
- Enforcement
- View remote metering data
- Main repair air gap, flush, isolate
- Abandoned property programs

Sudden Changes in Raw Water Characteristics

Impacts

- Wind direction changes in turbidity
- Process changes, process strained, chemical costs
- Plant performance
- CT Times
- Treatment process ineffective
- Altered aesthetics (e.g. colour)
- Decrease in consumer confidence

Sudden Changes in Raw Water Characteristics

Control Measures

- DAF system for turbidity
- Change, clean. Rotate filter more frequently
- Monitor process, increase dosages, Chemicals,
- Process optimization
- Training
- Aesthetic treatment for taste and odour

- <https://www.epa.gov/nutrient-policy-data/control-and-treatment#what4>
- Thank you
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