Water Regulations & Water Safety Plans

Setting priorities for Clean Water

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Topics for today's presentation:

- Review the status of (interim) regulations and One Water Safety Plans (OWSP) recommendations – from source to tap

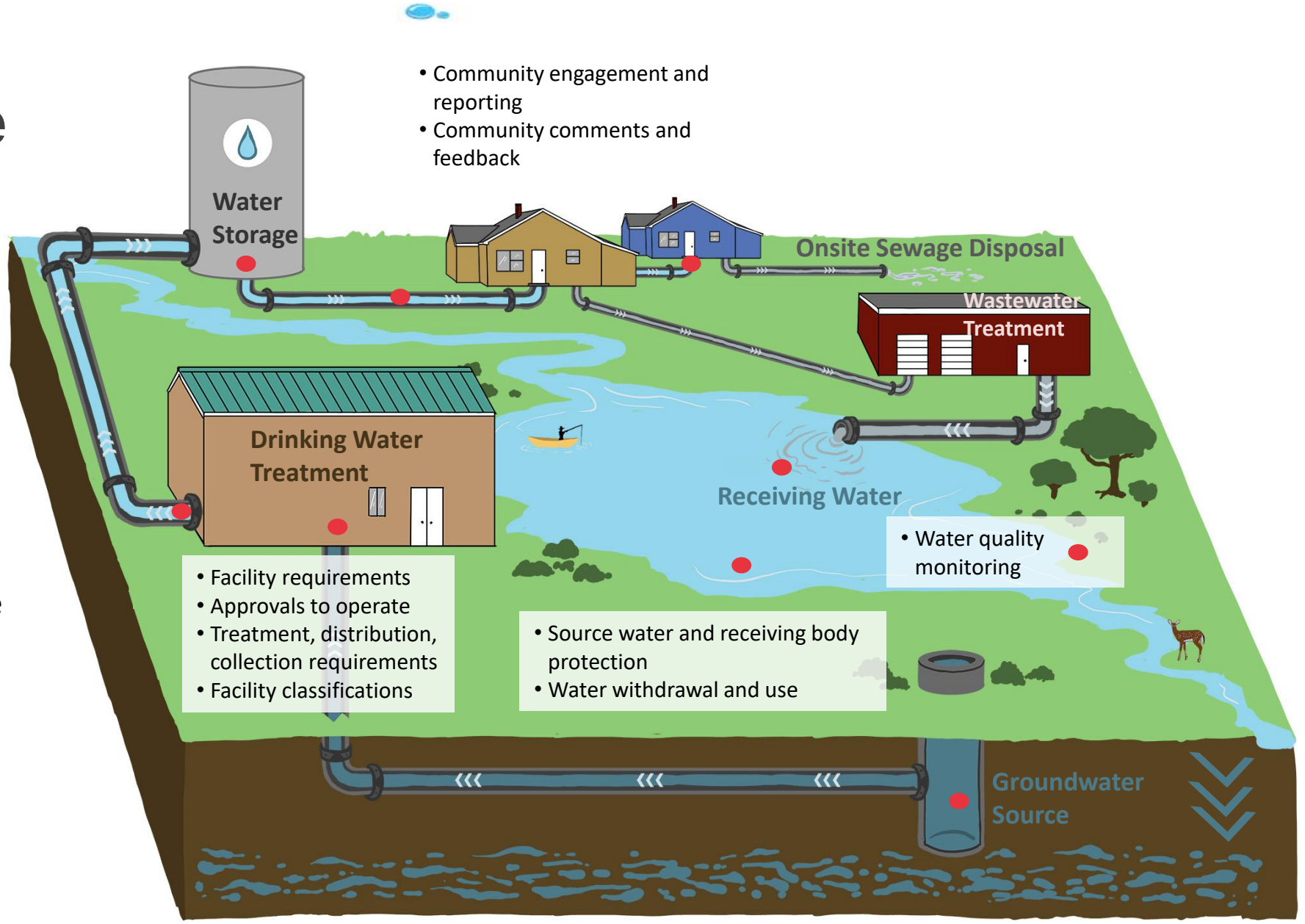
- Look at the role of hazard identification and risk assessment
  - Case study of recent water treatment failure in Ireland

- Discussion about risk management and internal/external auditing for regulations and OWSP

Regulations across the One Water Cycle

Regulations also include:

- Operator training/certification
- Reporting requirements
- Emergency planning and response
- Occupational health and safety
- Municipal transfer agreements



Safe drinking water and a healthy environment

Good stewardship ensures we return clean water back to the environment so it can sustain the broader ecosystem and future generations

How do we decide what **clean** water is? How can we know its **safe**?

Safe water ensures we can live, eat, play, learn, and work in good health

ATLANTIC FIRST NATIONS WATER AUTHORITY INC.

Risk-management

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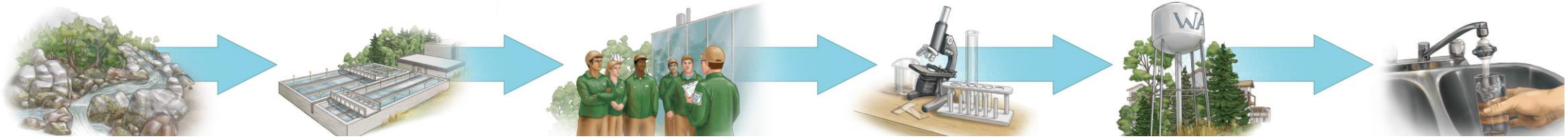
(Interim)

Regulatory compliance

Recommended Regulatory and One Water Safety Plan (OWSP) Components



	1 Source\Receiving Water Protection	2 Water/Wastewater Treatment	3 Inspection and Auditing	4 Sampling and Monitoring	5 Distribution and collection systems	6 Drinking Water at the tap
(Interim) **Regulatory Components:**	Source water protection plans WSER Deposits out or normal course (DONCE)	ACWWA guidelines for system designs Nova Scotia Treatment Standards (GUDI protocol; 3, 3, 4 log reduction for Crypto., Giardia, and viruses)	Interim Regulator will oversee drinking water compliance ECCC will continue to regulate wastewater systems	All compliance monitoring will be conducted by the AFNWA ** Discussions are still ongoing regarding the role of CBWMs **	Disinfection residuals, microbial, disinfection byproduct, turbidity monitoring etc. will follow Nova Scotia Standards	Metals testing and microbial monitoring will follow Nova Scotia's standards *(which follow the Guidelines for Canadian Drinking Water Quality (GCDWQ))*
OWSP Components:	Withdrawal monitoring plans Contingency plans Environmental Risk Assessments (ERAs) and Effluent Discharge Objectives (EDO)	Sanitation Safety Plan for wastewater systems Water Safety Plan for drinking water systems	An external firm will be contracted to perform OWSP auditing to ensure risk management practices are being followed	Optimization monitoring can be done as needed to guide the OWSP	Corrosion control program Cross-connection control program I&I reduction program	Corrosion testing Other health-related monitoring

Why have One Water Safety Plan Approach?

- Water Safety Plan are risk-based
  - Establish priority setting for a specific system
  - Get to know your “Water System”

- What are the consequences of **NOT** knowing your system?
  - Complacency - “Walkerton could never happen here”
  - Failure to recognize warning signs (e.g., equipment)
  - Failure to respond to known issues

Case Study: Irish Water - August 2021

Ireland's national water utility; responsible for providing water and wastewater services throughout Ireland

Incorporated in July 2013 as a company under the Water Services Act 2013, Irish Water **brought water and wastewater services of the 31 local authorities together** under one national service provider

Regulations and Risk: A case study - Ireland waterborne illness outbreak - *August 2021*

Creagh Water Treatment Plant provides water to Gorey, County Wexford – 6649 people, operating at 2113m^3/day from the river Bann

* Treatment includes: DAF, slow sand filtration, pH correction with lime, disinfection using sodium hypchlorite

Alarm system failed to alert that there was a high priority disinfection incident following a power outage related to a storm.

The contaminated water entered the system on August 19th and the problem was not noticed until August 24th. The Regulator was notified of the issue on August 26th.

The delay in action and notification meant that no Boil Water Advisory was issued.

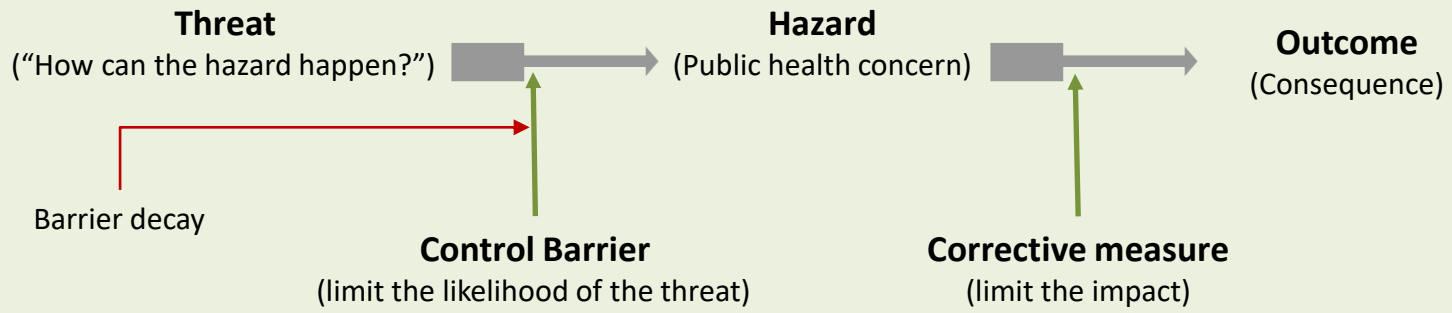
There have been **52 confirmed illnesses linked to the incident**, including cases of Shiga toxin-producing E. coli (STEC), with **a number of hospitalizations**.

Utility and the Regulator has undertaken a full review of all alarm settings at the Creagh plant, carried out repairs, and serviced equipment.

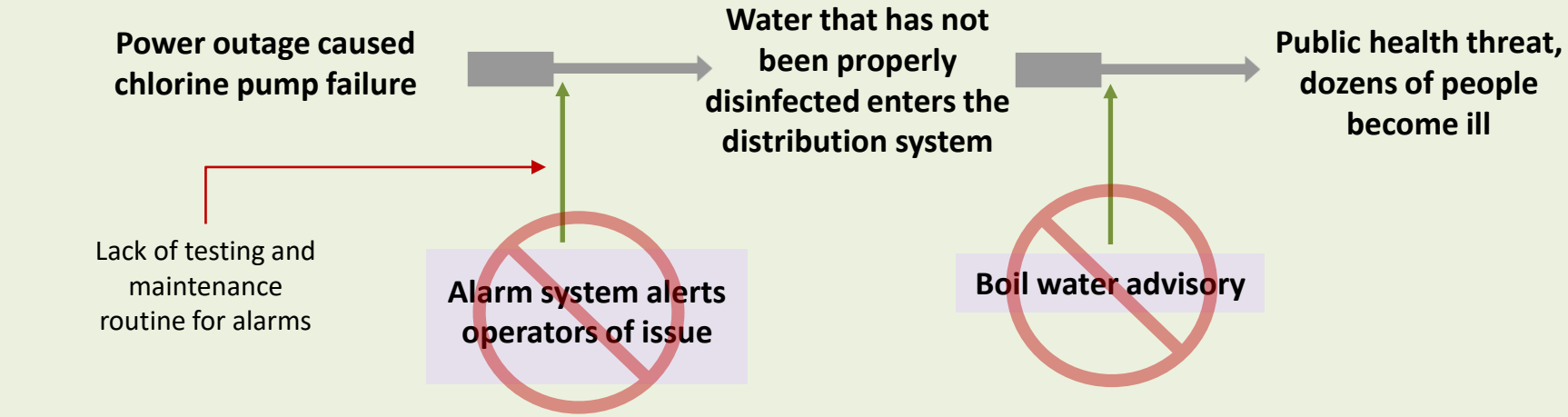
Hazard identification and risk assessment:

- Identify the hazard to safe water
- Look at control barriers – are they present? Are they in good condition? What could make them fail?
- Look at corrective measures – what will happen if the hazard occurs? Are you ready to respond?
- Estimate the consequences of the hazard?

A. General Example



B. Creagh System



Regulations and risk-management plans do not, by themselves, ensure safe water.

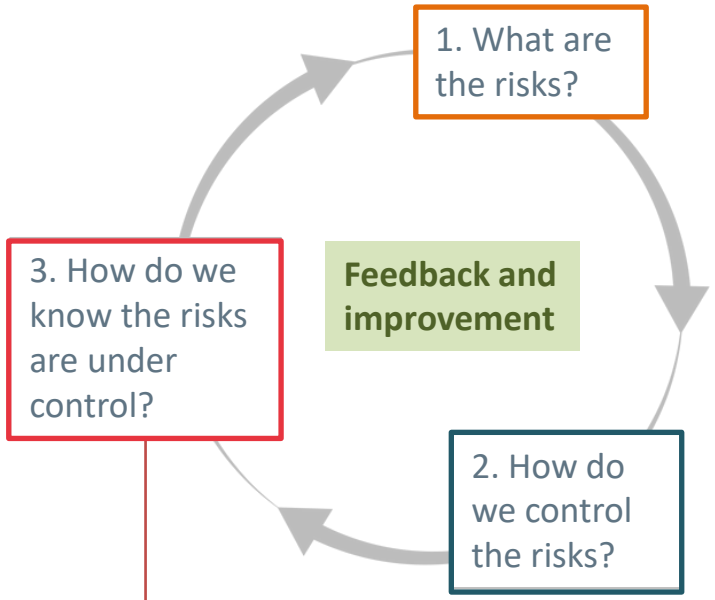
Safe water means negligible risk of harm: Cycle of continual improvement

OWSP: the processes for reducing risk in the systems and achieving the agreed upon standards

Auditing: The review of evidence (documents, communication practices, and other forms of knowledge) to evaluate and assess professional judgement and system performance

Monitoring, record keeping, and review:

- Sample, analyze, review water quality and treatment processes
- **Inspections and communication**
- Annual review of near-misses (internal audits) and incidents (external reports/inspections – Regulator)



System risk assessment process guided by operator knowledge:

- Make a risk registry from source to tap for each water and wastewater system
- What is the likelihood of each risk happening
- What is the consequence of each risk happening
- Identifying areas of **priority**

Multibarrier/control point approach:

- Identify key control barriers
- Make sure the barriers are working (validation)
- Plan corrective measures and be ready to act

Documenting the three steps! and undergoing **external audits**

Reporting, Audit, and Inspection Cycles

OWSP cycle – 4 years

Risk management improvement cycles/OWSP will be **externally audited** on a 4-year cycle to verify incremental improvements to mitigate risks to public and environmental health. Audits will ensure that incidents and near misses are investigated and result in updates in the OWSP risk assessment and mitigation strategies.

Regulator Inspection/Audit cycle – 2 years

Routine system inspections and regulatory audits will include review of documentation (annual sampling plans, source water protection plans, QA/QC programs, calibration logs, operator training logs, etc.), annual reports, water quality sampling results, and an inspection of treatment systems and distribution/collection systems. **Regulator** will identify deficiencies and areas of non-compliance. AFNWA will develop corrective action plans.

Annual Report by AFNWA

Annual reports will summarize water quantity used, verification of treatment efficacy, annual trends for monitored parameters, incidents and corrective actions taken, source water protection plan updates, WSER performance etc., as required per the regulations guiding operation. Annual report will also summarize updates made to the OWSP due to operational and/or public health concerns, incidents, and near misses. (Interim) **Regulator** will identify deficiencies, areas of concern, or areas of non-compliance **per the regulations** applied to the AFNWA.


Wela’lin!
If you have any questions or comments, please email me at megan.fuller@dal.ca

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SW/GUDI

Continuously or daily grab	Turbidity at well head or raw water source	Turbidity (multiple locations) Chlorine residual Chlorine dioxide * UV transmissivity UV intensity pH (entering DS and per process, at CT control point) Water volume Flow rate Temperature (at CT control point)	Chlorine residual (storage outlet)	
Weekly	Cyanobacterial blooms/toxins (weekly visual, as needed if detected)	Free ammonia Nitrate/nirite (for chloramination) E. Coli Total coliform Chlorine residual Turbidity } entering DS	E. Coli Total coliform Chlorine residual Turbidity	
Monthly		Aluminum (entering DS, if Al coagulant)	Bromate (if ozone)	
Quarterly	Manganese	Manganese (entering DS) Alkalinity, pH, temp, conductivity, DO, Chlorine residual, corrosion inhibitor (if used) (entering DS)	THMs/HAA5 Chlorate/chlorite and bromate Alkalinity, pH, temp, conductivity, DO, Chlorine residual, corrosion inhibitor (if used) Manganese	
Annually	Cyanobacteria toxins Paired testing of chemical/physical parameters (raw/treated)	Paired testing of chemical/physical parameters (raw/treated)	Paired testing of chemical/physical parameters (raw/treated) Lead samples	Lead (optional metals, i.e., cadmium, copper)
Other	Source water protection plan monitoring	**Full GCDWQ Health-related parameters (every 5 years)**		