Our work to support the AFNWA:

Regulations and Risk-management

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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

Regulations, Water Safety Planning (WSP), Sanitation Safety Planning (SSP)

Destination

Regulations: set the standards for drinking water production from source to tap
establish the standards for wastewater treatment and effluent quality requirements

WSP & SSP: a risk-based management approach to prioritize actions to ensure regulations are met and public and environmental health are protected

The map of how to get there

WSP + SSP = One Water Safety Planning ⟶ OWSP

Interim Regulations and Compliance

Regulations: determining standards for AFNWA communities for safe water and a healthy environment

+

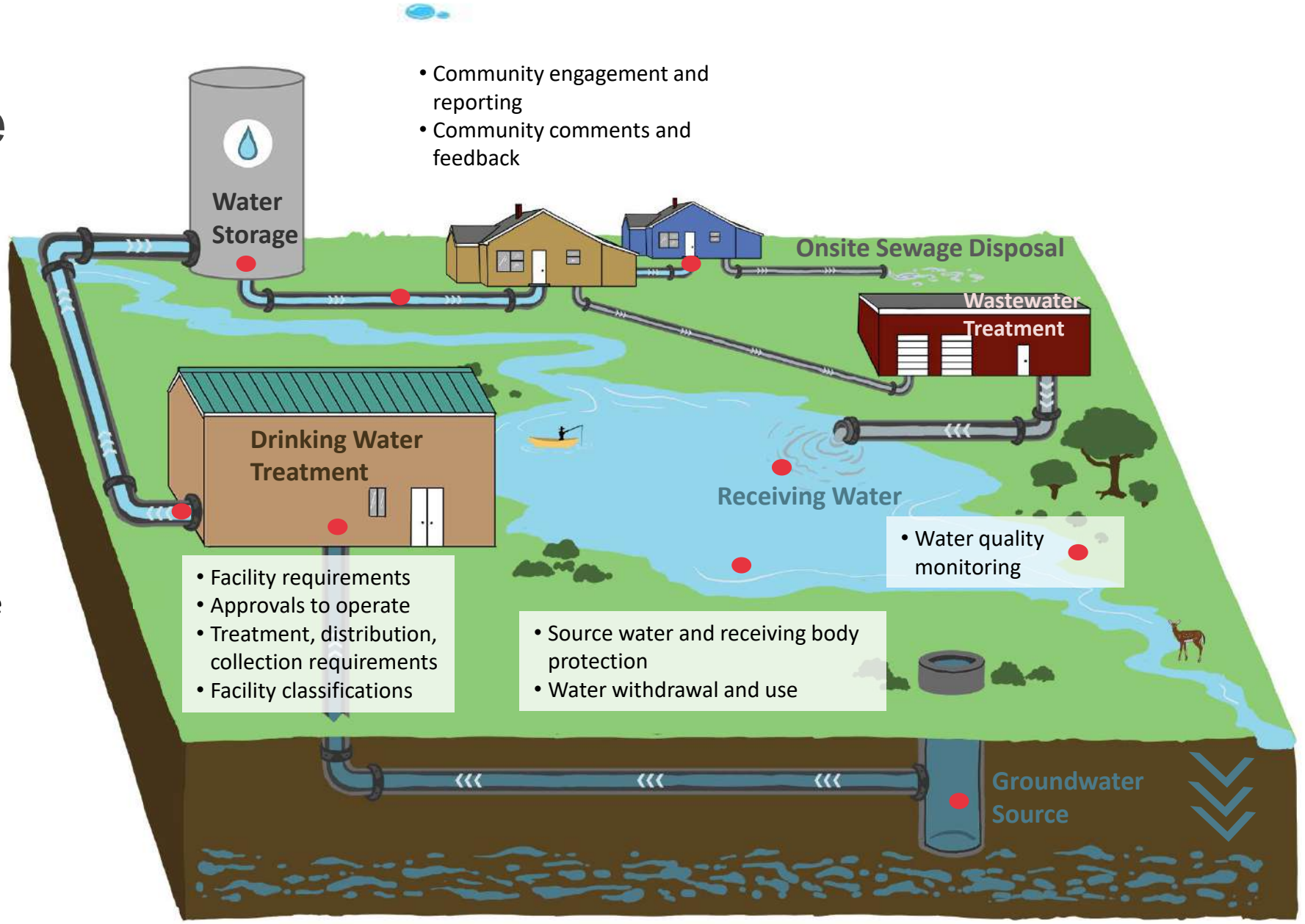
Compliance: Validation and verification that standards are met, corrective actions are taken when needed

Task 1: Regulatory review	Review provincial and federal regulations, policies, and standards and First Nations documents; Discuss with First Nations water experts
Task 2: Regulatory gap analysis	Identifying key gaps that exist between current practices and ideal benchmark; develop paths forward
Task 3: Integration of **safety plans**	Determine how to integrate risk-based management practices and approaches across all levels of the Authority
Task 4: Compliance and enforcement	Identify compliance mechanisms, practices, and standards; identify a regulatory body
Task 5: Engagement	We will be looking for operator feedback and guidance on various parts of this work

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

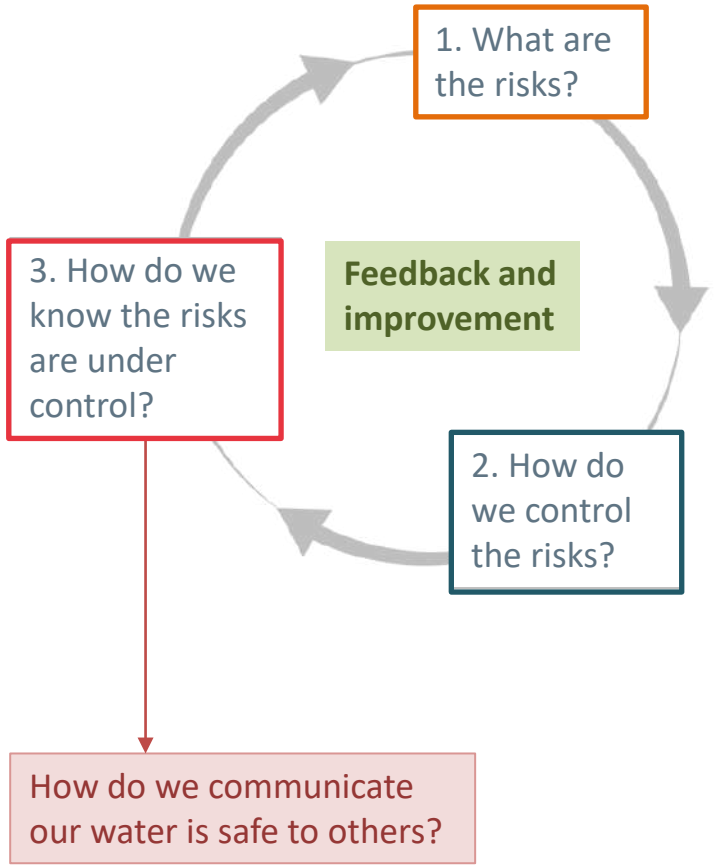


Safe water means negligible risk of harm

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

Risk: Risk management requires resources and knowledge

Monitoring, record keeping, and review:
- Sample, analyze, review water quality
- Inspections and communication
- Annual review of near-misses and incidents



Documenting the three steps!

System risk assessment process guided by operator knowledge:
- What are potential hazards
- What is the likelihood of it happening
- What is the consequence of it happening
- Identifying areas of **priority**

Multibarrier/control point approach:
- What is being done to protect source water
- What controls are in place in the treatment process
- What is being done to protect the distribution system
- Preventative maintenance schedules
- Infrastructure upgrades
- Communication and documentation

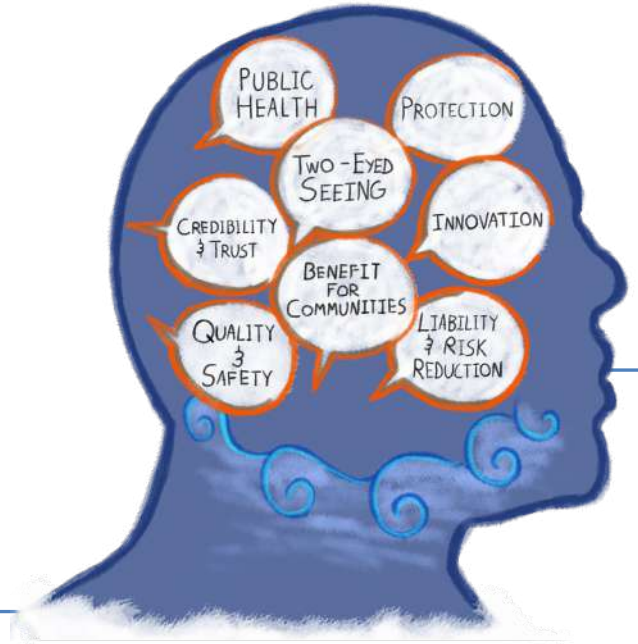
Building tools to help with knowledge sharing

Operator's Logbook

SCADA

WaterTrax

Data sharing



Knowledge sharing

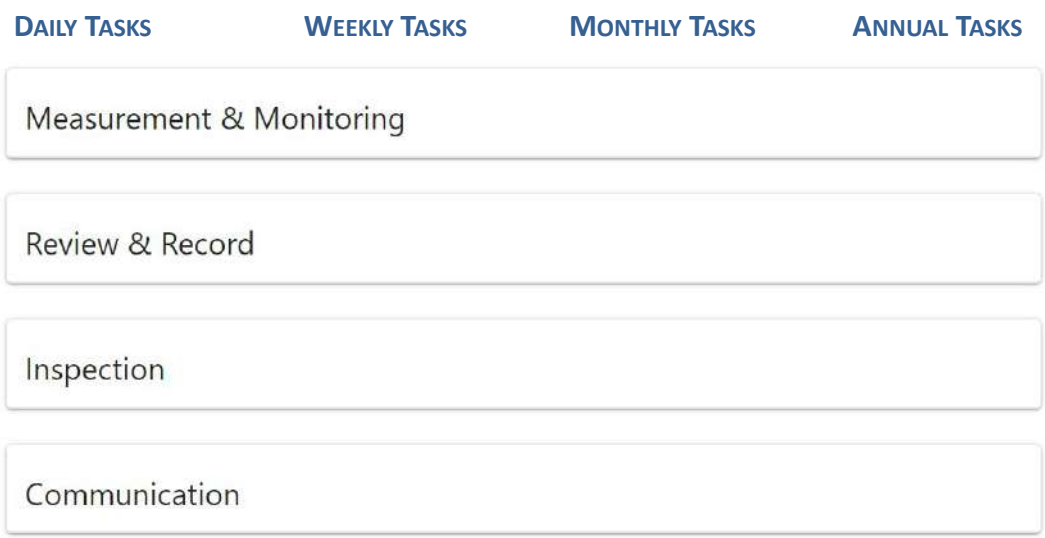
Atlantic First Nations Water Authority Inc.

We don’t (can’t) build tools for you.
We want to build tools with you.

We are working on a web-based tool to help **collect your thoughts** and make a record of what’s happening in the systems

We are looking for operator input to identify what key tasks/actions they take to:

- keep water safe
- look for risks/potential problems in the system
- make sure risks are controlled
- help communicate to others that risks are under control



Questions we have for you…

What is the easiest part of your job?

What is the hardest part of your job?

What does a bad day at work look like for you?

What keeps you up at night?

What could be done on a daily, weekly, monthly basis to help address these things?


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

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Gap analysis: Monitoring

System assessment and design

- Water withdrawal and use
- Source water protection
- Receiving body protection
- Facility requirements
- Approval to operate
- Facility classification
- Treatment and distribution/collection requirements

Monitoring

Management and communication

- Operator certification
- Reporting
- Community engagement and communication
- Emergency planning and response
- Occupational health and safety
- Municipal transfer agreements

Robust monitoring (and evaluation) is a central component of both regulatory compliance and risk assessment and mitigation efforts.

Parameter selection, sampling frequency, and sampling location requirements vary by province. Nova Scotia regulations were chosen as the reference for the AFNWA regulatory framework.

The following slide details what must be measured where and how often. There are currently a range of monitoring practices employed in First Nations communities. Sampling processes will need to be augmented and harmonized to achieve the proposed standards.

We are in the process of identifying roles and responsibilities, as well as necessary resources, to support these monitoring practices in communities.

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 coag)	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	SWPP monitoring (per sampling plan)	**Full GCDWQ Health-related parameters (every 5 years)**		

System design and assessment

A) Water withdrawal and use

B) Source water protection

C) Receiving body protection

A Reciprocity, stewardship, and a recognition of the interconnectedness of all things guide First Nations relationships, including relationships with future generations. The PEI Water Act provides a regulatory reference for water withdrawal practices that prioritize source water sustainability for future generations, including **drought contingency plans.** Nova Scotia Environment Act provides requirements for withdrawal approval applications including monitoring plans, contingency plans, and **water conservation plans.** A combination of Traditional Knowledge and regulatory components from PEI and NS are recommended to develop a First Nations approach to water withdrawal and use.

B Source water protection plans should be required as a condition for operation. It is recommended that the guide and template for SWPP development presented in Saskatchewan First Nations Drinkable Water Regulations be considered as a guiding document for the AFNWA. Nova Scotia Environment also has a useful guidance document for supplementary reference. The SWPP should capture land use practices and appropriate monitoring plans to understand source water risks. Source water protected area designation is an additional mechanism for protecting source waters and associated watersheds. Band by-laws would need to be developed to achieve designation. Work by the Canadian Environmental Law Association has resulted in a Legal Tool Kit that may provide guidance for communities to pursue by-laws and other legal approaches through First Nations Land Management.

C Receiving body protection is managed in provincial waters through the implementation of the CCME Strategy's Environmental Risk Management Framework and Environmental Risk Assessment. It is recommended in addition to WSER compliance, receiving body ERAs determine the need for additional effluent treatment. This is an area where Two-eyed seeing and Traditional Ecological Knowledge can improve current practices, particularly for systems <100m^3/day.

D) Facility requirements:

D.1 facility design approvals,
D.2 procurement construction,
D.3 facility operating approvals

D The ACWWA Water and Wastewater Guidelines provide comprehensive guidance for facility and treatment design, including new provisions for climate change resiliency and adaptation. It is recommended that these guidelines be adopted by the AFNWA. Regional and provincial references alone will not be adequate:

1 Currently there is no mechanism for design approvals outside of ISC. These are best practice for establishing abstraction/discharge locations, treatment processes, etc. Design approval processes, following ACWWA Guidelines, will need to be reviewed by the regulatory body.

2 With the removal of ISC as procurement and construction facilitators, in the future AFNWA will take on the responsibility of procurement and construction for water and wastewater infrastructure projects in participating communities.

3 Approvals to operate establish terms and conditions for operation, treatment, monitoring, and reporting. They represent a crucial compliance component that is currently not present in First Nations systems. The interim regulatory body will need to issue and oversee approvals to operate.

E) Approval to operate:

E In provincial settings the approval to operate is issued from a regulatory body to a utility. There is no equivalent system present in First Nations communities. Because approvals to operate depend directly on the nature and structure of the regulatory entity, there is not yet a formal recommendation for how to implement approvals to operate in participating communities.

Possible models are being considered and potential stakeholders are being consulted.

System design and assessment, cont'd

F) Treatment, distribution, collection requirements

F Nova Scotia's surface and groundwater treatment standards are the most comprehensive and robust drinking water standards of the Atlantic provinces. Detailed guidance documents are available to operationalize the regulations. The wastewater regulations are silent on treatment requirements. These are managed through approvals to operate. It is recommended that PEI's Water Act be used as reference for the development of wastewater treatment standards. The AFN voiced numerous concerns about the CCME Strategy and WSER requirements in 2008 through a published Impact report. It is recommended that ERAs and associated EDOs remain unregulated best practices until additional First Nations co-development is achieved. * It should be noted that ERAs are being done now *

G) Facility classification

G PEI's Water Act and Water supply system and wastewater treatment system regulations define small (20 – 150 service connections) and very small systems (5 – 20 service connections). Systems that serve populations over 500 people (or equivalent flow) are categorized as Class I through IV based on population (distribution/collection) and points (treatment complexity). It is recommended that PEI's facility classification system be adopted by the AFNWA to acknowledge the importance of categorizing small and very small systems.

Monitoring

A.1) Operational monitoring:

- Source water
- Treatment parameters/process control
- Distribution system parameters

A.1

Nova Scotia has the most comprehensive and rigorous operational monitoring requirements for drinking water, regulated either directly or through approvals to operate. Operational monitoring of wastewater treatment systems is not regulated (unless through approvals to operate), but recommended monitoring practices are detailed in the ACWWA wastewater guidelines.

Source water characterization and monitoring requirements are informed by the source water protection plan. Raw water process control monitoring is required through approvals to operate. Nova Scotia also regulates monitoring within the water treatment plant related to CT/IT design parameters to ensure adequate disinfection.

Nova Scotia recommends a range of distribution system monitoring beyond what is required for compliance monitoring. It is recommended that the AFNWA develop operational sampling plans following Nova Scotia's Guidelines for Monitoring Public Drinking Water Supplies. It is also recommended that an operational sampling plan be developed for wastewater systems, following ACWWA guidance and industry best practices (there is no formal provincial reference for best practice.) These operational sampling plans can be required through approvals to operate rather than direct regulations.

A.2) Incident response monitoring:

A.2

Nova Scotia has detailed requirements and processes for incident response monitoring associated with the issuance of a drinking water advisory. Incidents that require or may require a boil water advisory are established in the Guidelines for Monitoring Public Drinking Water Supplies.

Wastewater incident monitoring is established through approvals to operate and are largely guided by adherence to the Fisheries Act and provincial Environment Acts. In First Nations systems, federal acts and regulations (Fisheries Act and CEPA) will determine incident monitoring requirements. New Brunswick's approval to operate for wastewater systems require a Detailed Emergency Report to be produced within 5 days of an incident. Content and data required for the Report is detailed in operating terms and conditions. It is recommended that the AFNWA adopt Nova Scotia's monitoring guidance for drinking water and follow provincial practices similar to NB and NS for wastewater incident monitoring.

Coordination, lines of communication and reporting between AFNWA, FNIHB, HC, community health directors, Chief and Council, and provincial medical officers will need to established to ensure that public health response to water quality concerns is organized, robust, effective, and transparent.

A.3) Compliance monitoring

- Microbiological quality
- Disinfection and DPB
- Chemical/physical parameters
- Health-related parameters
- Corrosion monitoring program
- Manganese
- Cyanobacterial toxins

A.3

Nova Scotia has the most comprehensive and rigorous compliance monitoring requirements for drinking water. Nova Scotia regulates the immediate adoption of MACs set by Health Canada's Guidelines for Canadian Drinking Water Quality. Immediate implementation of MACs can lead to conflicts and incongruencies with established sampling SOPs and operational guidance. It is recommended that the AFNWA adopt Nova Scotia's compliance monitoring requirements but address the cumbersome and overly conservative immediate implementation of HC changes to MACs. Developing an approach to phase in new HC MACs on an annual or biannual basis will help to harmonize the water quality parameter limits with sampling SOPs and operational guidance.

Compliance monitoring for wastewater effluent is federally mandated by WSER. Additional monitoring to verify receiving body vulnerability and associated EDOs could be required through the approval to operated or performed as a best practice rather than as a requirement. Ecosystem and water body health is a guiding principle for First Nations people, approaches for ensuring the protection of receiving bodies should be co-developed with individual communities and receive adequate funding and resources. This is an area where both western technical approaches and Traditional Ecological Knowledge can inform the other.

Management and communication

A) Operator certification:

A PEI's operator certification system includes certification requirements and processes for operators of small and very small systems (following ABC's small system operator category). It is recommended that the AFNWA adopt PEI's operator certification regulations.

B) Reporting:

- Immediate
- Annual
- Ad hoc
- System assessment reports

B Nova Scotia has detailed requirements and processes for immediate incident response reporting associated with the issuance of a drinking water advisory. Incidents that require or may require immediate reporting are established in the Guidelines for Monitoring Public Drinking Water Supplies and associated regulations.

Wastewater incident reporting is established through approvals to operate. New Brunswick's approval to operate for wastewater systems require a Detailed Emergency Report to be produced within 5 days of an incident. Content and data required for the Report is detailed in operating terms and conditions. In Nova Scotia all municipal owner/operators are required to report spills and overflows to ECCC.

Nova Scotia requires owners/operators to produce annual reports, the details of which are established in the approval to operate and include summary of quantity and quality of water produced, annual trend graphs for parameters that are continuously monitored, summary of emergencies, updates on the source water protection plan, verification of operational monitoring conditions to achieve CT/IT. Annual reports are also required for wastewater treatment systems and include summaries of effluent quantity and quality.

Nova Scotia regulates ad hoc reporting through the Guidelines for Monitoring Public Drinking Water Supplies to clarify communication responsibilities of owner/operators regarding modifications or changes to the facility, new or relevant information that may relate to terms and conditions of the approval to operate, changes in sampling locations, etc. Ad hoc reporting for wastewater treatment systems may be required for certain instances, as required by the approval to operate.

Nova Scotia requires comprehensive system assessment reports every 10 years. PEI requires similar reports every 5 years. These reports inform the auditing and review process for systems and ensures that system upgrades keep pace with water treatment technology and source water changes.

It is recommended that the AFNWA follow Nova Scotia's general reporting structure with system assessment reports required every 5 years.

C) Community engagement and communication

C Community engagement, knowledge exchange, and responding to customer concerns/feedback will be necessary to build trust and repair the relationship between communities and water safety. Robust community reporting and communication should be developed by the AFNWA to share important health and environmental outcomes with participating communities. Pertinent characteristics of the communication strategy should be outlined in the approval to operate.

D) Emergency response planning

D Nova Scotia requires owners/operators to produce operations manuals that must contain contingency plans for operating under normal and incident conditions. The manual must include emergency response plans (ERP) and must be updated annually per the approval to operate. ERPs must include emergency reporting procedures, procedures for initiating and removing drinking water advisories, initiating corrective action plans, etc. It is recommended that the AFNWA develop ERPs as part of the approval to operate. It is important to coordinate emergency response efforts into the larger community emergency response plans. Coordination should be accomplished through planning with the Chief and Council.

E) Occupational health and safety

E Because the AFNWA is owned by First Nations, federal legislation and regulations regarding employment and OHS apply. The Canada Labour Code sets actions and requirements pertaining to OHS. There are Indigenous third-party organizations that specialize in developing training and educational materials for workplace safety for Indigenous workers. It is recommended that First Nations led OHS activities are developed for the AFNWA as a matter of capacity building.

Management and communication, Cont’d.

F) Municipal transfer agreements

F

Moving forward, MTAs should be developed with consistent terms and conditions agreed upon by the AFNWA on behalf of the participating community and the supplier utility/municipality. Applicable provincial regulations will apply to the utility providing the service(s) until the band reserve boundary. Distribution and collection systems under AFNWA responsibility will be required to meet the standards established in this regulatory framework. Any specific conflicts or incongruencies between the provincial regulations and this framework will be handled on a case-by-case basis by the AFNWA, its regulatory entity, and the utility providing service(s). Terms and conditions addressing roles and responsibilities, data management and sharing, communication of water quality parameters, sampling practices, service interruptions, and incident and emergency management should be detailed in the MTA.

An approval to operate may still be necessary for the AFNWA to distribute drinking water and collect wastewater in communities serviced by an MTA. Infrastructure maintenance, sampling responsibilities, and other terms and conditions of distribution/collection activities under the responsibility of the AFNWA need to be formalized, reported, and audited.