Implementation of the Water Management Framework for the Industrial Heartland and Capital Region

NSWA Water Quality Forum
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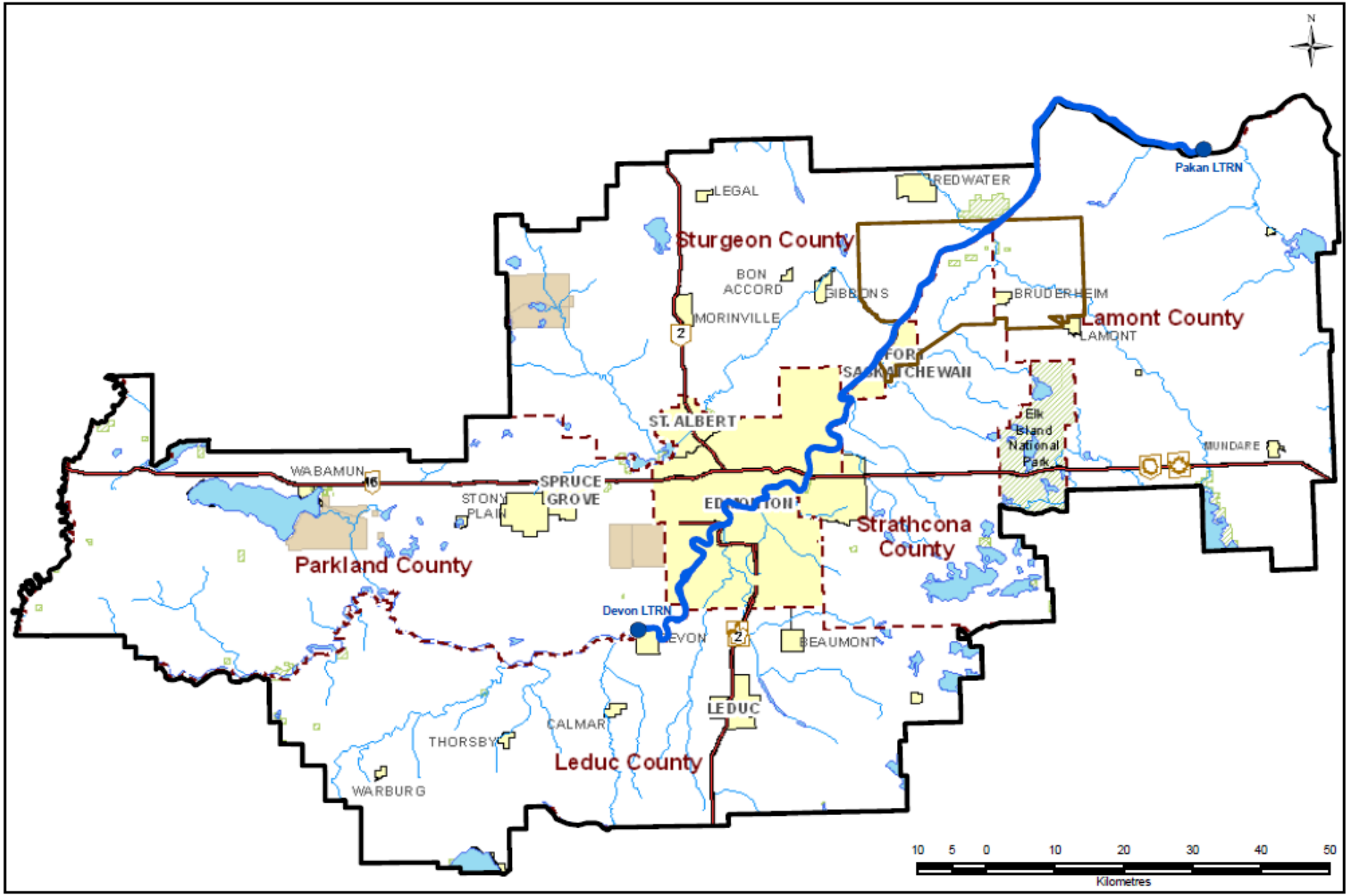
Overview

- History of the Industrial Heartland and Capital Region Water Management Framework.
- Load management approach.
- Development of Water Quality Objectives and Maximum Allowable Loads.
- Development of operational programs.
- What's next for implementation.



Author: Megan Mallon (ESRD)

Legend

- Water Management Framework Boundary
- Land Management Boundary
- Air Management Framework Boundary
- Parks & Protected Area
- Municipal District
- First Nation Reserve
- City, Town, or Village

Capital Region/ Industrial Heartland Cumulative Effects Program

Projection	Datum	Scale	Date
10 TM	NAD 83	1:800,000	June 2012

http://www.environment.alberta.ca/

PS-8.5x11 L

Regulatory context

- ***Environmental Protection and Enhancement Act* (EPEA)**
  - **Regulates a wide range of activities through the use of regulations, approvals and codes of practices.**
    - Detail specific construction, operating and reclamation requirements.

- **EPEA approvals are reviewed and managed on a facility-by-facility basis.**

Early Implementation of the Framework

- **Initial implementation priorities included establishing water quality baseline conditions and building on regional scientific knowledge:**
  - **Effluent and water withdrawal information**
  - **Increased monitoring**
  - **River modelling**
  - **Engineering study**
  - **Developed Maximum Allowable Loads (MALs) for contaminants of concern**
- **The load management approach was identified as the management process to follow to meet the Framework goal of "maintain or improve water quality".**

Transition towards Load Management

- **Load management:**
  An approach to water quality management that analyzes how a water body responds to the introduction of contaminants, and determines the allowable limits (in terms of mass) the water body can accept before deterioration in water quality is noted.

  – Once the allowable threshold is determined, the discharge of contaminants cannot exceed that mass in order to preserve quality and quantity of that water source.
  – Tools and policy assist in calculating the mass and prescribe management actions to achieve social, environmental and economic objectives.

- End result = seasonal loads in approvals

Load Management Process

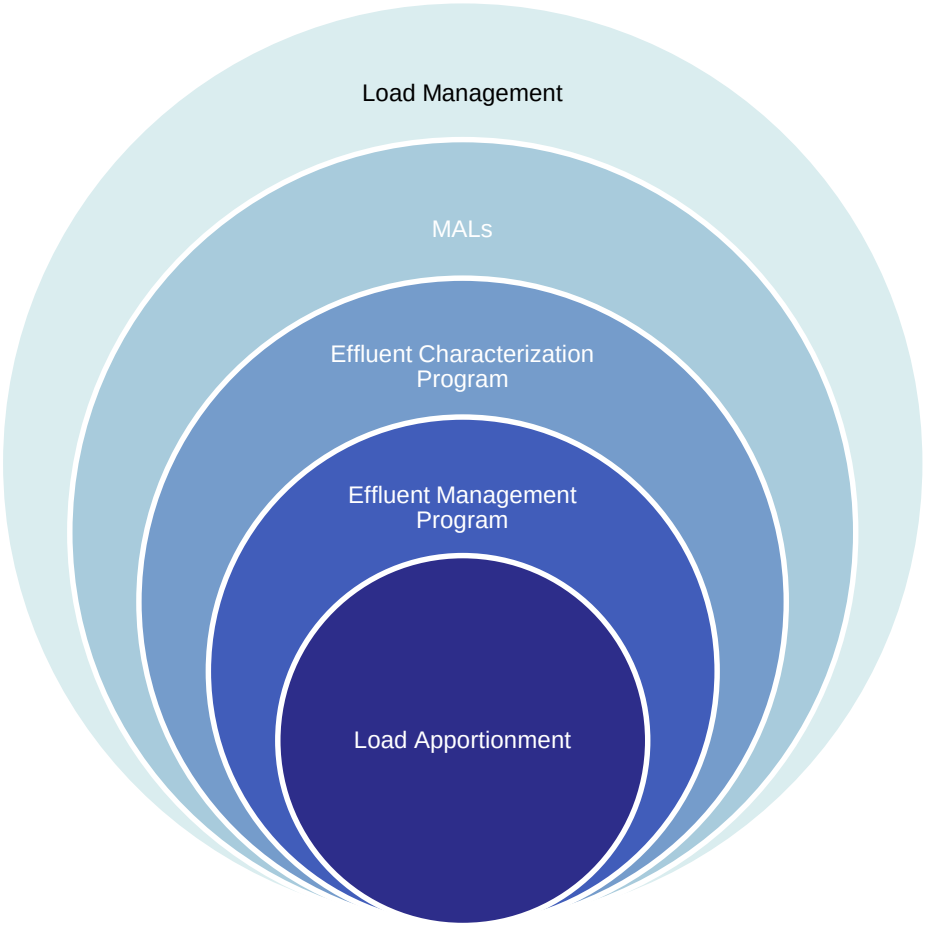
Initial Screening – Effluent Characterization Program

Statistical results – Effluent Management Plan

Apportionment of Loads

Load limits into Approvals

Load Management Process – 10 year plan



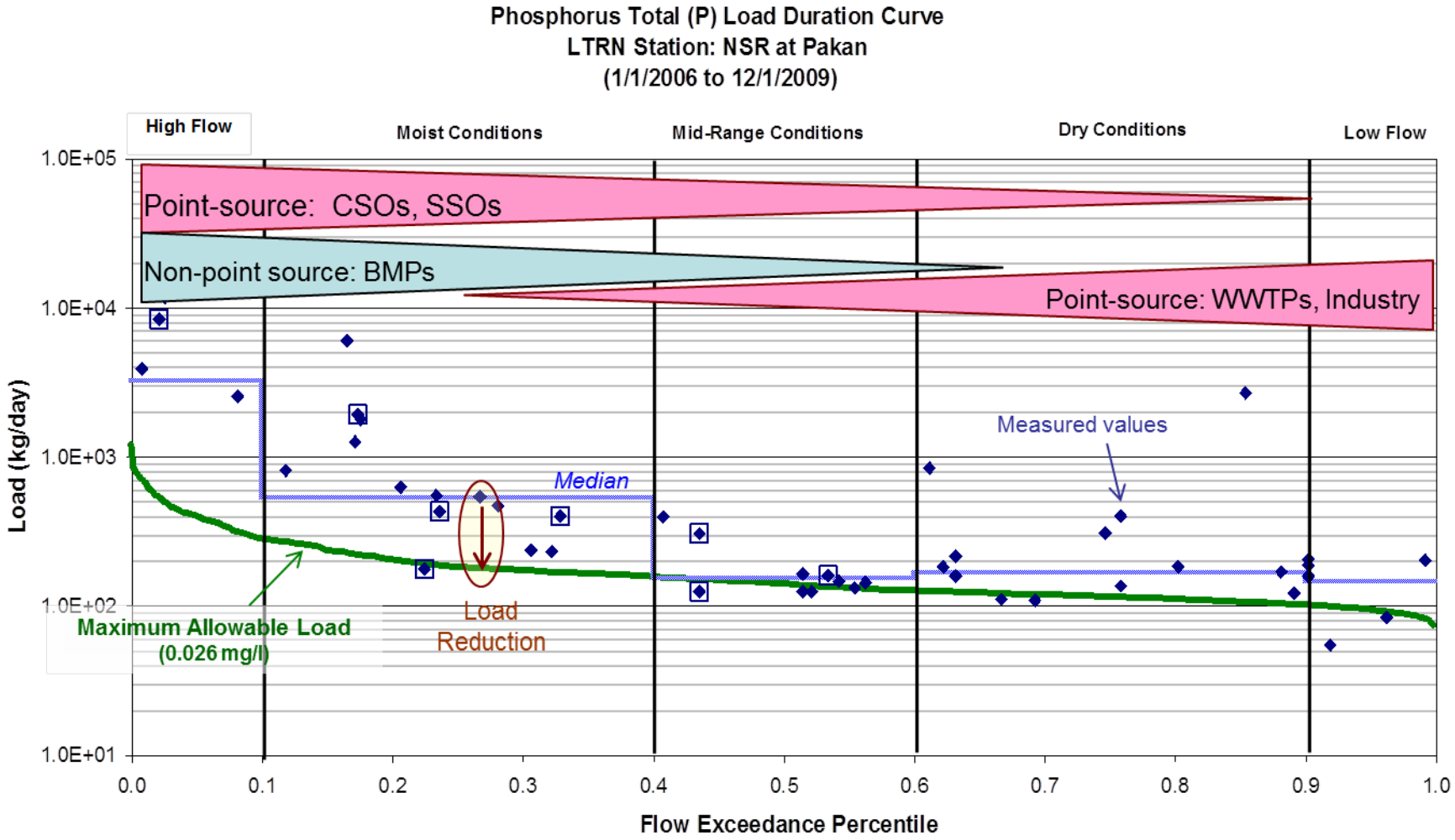
- **Load Management**
  - Water quality management
- **Maximum Allowable Loads**
  - Acceptable loading levels and seasonality
  - Upstream contributions
- **ECP**
  - Sector management
- **EMP**
  - Facility management
- **Load apportionment**
  - Parameter limits in individual approvals

Water Quality Objectives (WQOs)

- Site-specific Water Quality Objectives were set using a stakeholder process.
  - WQO is a concentration for a contaminant established as a measure of water quality for a specific location in a water body.
- WQOs were set at two long-term river network (LTRN) stations along the North Saskatchewan River.
  - Devon and Pakan
- WQOs are set based on the 50th and 90th percentile of the historical values for summer and winter.
  - No regulatory enforcement.
  - Typically lower than Environmental Quality Guidelines for Alberta Surface Waters as there must be some capacity left for downstream reaches.
- WQOs are used to calculate Maximum Allowable Loads.

Maximum Allowable Load (MAL)

- MAL definition
  - The maximum amount of a pollutant that a water body can receive while still meeting water quality objectives – can be seasonal.
  - Expressed as mass per time, it included any natural, point-source, and non-point sources of the pollutant.
- MALs work in partnership with (don't replace) concentration limits such as Environmental Quality Guidelines for Alberta Surface Waters.
- MALs reflect Total Maximum Daily Load methodology, applied throughout the USA.
- Pilot MALs for two seasons have been developed for application on the North Saskatchewan River (NSR).
- Expressed as a mass per time (kg/day).


Phosphorus Total (P) Load Duration Curve
LTRN Station: NSR at Pakan
(1/1/2006 to 12/1/2009)
High Flow
Moist Conditions
Mid-Range Conditions
Dry Conditions
Low Flow
Point-source: CSOs, SSOs
Non-point source: BMPs
Point-source: WWTPs, Industry
Measured values
Median
Load Reduction
Maximum Allowable Load
(0.026 mg/l)
Load (kg/day)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Flow Exceedance Percentile

Effluent Characterization Program (ECP)

- **Purpose:**

  Screening exercise for a one year monitoring program for facilities that directly release effluent to the NSR or tributary thereof.
- **Facilities propose a representative sampling program for 4 samples capturing the seasonal differences in the NSR.**
- **The results of the program:**
  - **Determine significant contributors of the variables of concern.**
  - **Further develop MALs.**
  - **Support other water quality management tools (i.e. models, monitoring infrastructure).**
- **This program is for industrial facilities only – similar programs for municipal systems to follow.**
- **Not intended to capture rare “exceedance” events.**

Effluent Management Program (EMP)

- **Purpose**
  - **Allow for further, more frequent monitoring of the variables of concern which will provide further statistical strength to assign loads.**
  - **Facilities will also be asked to provide management actions on how they can reduce substantial sources contributing to their load – equitability issue (if reductions are needed).**

- **This program will be scoped with the multi-stakeholder committee.**

Continued Collaboration on Framework Implementation:

- **North Saskatchewan Regional Plan**
  - **Surface Water Quality Management Framework**
    - Maintain or improve water quality goal.
    - Describing WQOs and possible management actions.

- **Load Management Policy (draft)**
  - **Providing Provincial direction on load apportionment.**
  - **Guidance documents.**

In Summary

Initial Screening – Effluent Characterization Program

Statistical results – Effluent Management Plan

Apportionment of Loads

Load limits into Approvals

Alberta Government

Questions?

Thank you!

More information on the Framework and supporting water quality reports can be found at:

http://aep.alberta.ca/lands-forests/cumulative-effects/regional-planning/capital-region/capital-region-cumulative-effects-management.aspx