Water Quality Monitoring & Watershed Planning Review

Presentation to the Regional Watersheds Advisory Board

Consideration of Objectives and Priorities

July 12, 2017

Focus for Today's Discussion

To obtain your recommendations for the objectives of the Water Quality Monitoring & Watershed Planning Review

Meeting Agenda

- Meeting Purpose
- “Review” Overview
- Current scope of HRM Watershed Management Functions
- Origin & Chronology, Corporate WQM
- Why monitor water quality? Context
- Corporate water quality policy objectives to date
- Discussion: Objectives for Review, HRM Water Policy, and Water Quality Monitoring

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Review Overview

- P&D's 2016-17 Business Plan committed to the development of a 3-year watershed / water quality work plan, based on outcomes of the corporate watershed studies & water quality monitoring (WQM) programs

- 2017-18 Business Plan commits to
  - Conducting & completing WQM program to inform future Regional Plan Review (complete 17/18)
  - Developing watershed management program directions (complete 18/19)

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Review Overview – cont'd

- Forthcoming report to ESSC (3Aug2017) pushes forward delivery of WQM Review results to Dec. 2017

- Review initiated b/c:
  - Ongoing calls for WQM by Council & community
  - Former WQM program not assessed
  - No current WQM policy
  - Existing / prior programs disconnected
  - Opportunity to connect watershed management, water resource management, & WQM

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Review Overview (cont'd)

Watershed Planning Review to address:

- Strengths, weaknesses, opportunities for watershed study program
- Context of watershed management in municipalities and HRM specifically
- Connection of watershed management & water resource management
- Identify emerging watershed management issues and recommend potential responses. E.g.:
  - Weed or algae growth in lakes

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Origin & Chronology, Corporate WQM

- 2003: Water Resources Management Strategy (Dillon)
- 2006: Water Quality Monitoring Program initiated
- 2006: RMPS. Policy E-16 (Watershed Studies Program);
  Policy E-18 (WQM Functional Plan)
- 2010: WQMFP Report (Stantec)
- 2010: WQM Service Review (internal)
- 2012: WQM Program ends due to budget cut
  (last monitoring event: Fall 2011)
- 2012: Water Quality Data Analysis (Stantec)

- ’06-’13:
  - Watershed Studies (10 complete)
  - DA-based Monitoring (2 major, 8 minor)

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Current Scope Watershed Management Functions – per RMPS

Objective, Environment, Energy & Climate Change:

> *"Promote an approach to environmental management and economic development that supports a sustainable future through cooperation with other levels of government, government agencies, private landowners, and non-government organizations"*

- Water Resources:
  - Potable water supply (s. 2.3.1)
  - Wetlands protection (s. 2.3.2)
  - Riparian buffers (s. 2.3.3)
  - Floodplains (s. 2.3.4)
  - Coastal inundation (s. 2.3.5)

- Watershed Planning
  - Policy E-23: Watershed studies

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Current Scope Watershed Management Functions - per RMPS (cont'd)

- Water, Wastewater, and Stormwater Services (Chapter 8)
  - Municipal role for stormwater management (s. 8.4)
  - Water service areas (s. 8.5.1)
  - Private on-site sewage disposal systems (s. 8.5.2)
  - Groundwater supplies (s. 8.5.3)

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Why Monitor Water Quality - Context

Water Quality Assessments ("WQA") – a Guide to Use of Biota, Sediments, and Water in Environmental Monitoring (UNEP et al.,1996):

- Def'n: "WQM" is the actual collection of info … to provide the data which may be used to define current conditions, establish trends, etc.
- Def'n: "WQA" is the process of evaluation of nature of water re natural quality, human effects, and intended uses
- Logical sequence: i) Monitoring, then ii) Assessment, then iii) Management (plus feedback loop)

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Why Monitor Water Quality (cont'd)

10 basic rules for successful assessment programs:

1. Objectives must be defined first; programme to be adapted to them (not vice versa)
2. Type and nature of the water body must be fully understood
3. The appropriate media must be chosen
4. The variables, sample type, frequency, station location, must be chosen with respect to objectives
5. The equipment and facilities must be selected in relation to the objectives and not vice versa
6. A complete and operational data treatment scheme must be established
7. Aquatic environment monitoring must be coupled with hydrological monitoring
8. The analytical quality of data must be regularly checked
9. The data should be given to decision makers in interpreted form and assessed by experts with relevant recommendations for management action
10. The programme must be evaluated periodically, especially if the general situation or any particular influence on the environment is changed

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WQM Context (cont'd)

- **Water Quality Monitoring- A Practical Guide to the Design and Implementation of Freshwater Quality Studies and Monitoring Programmes (UNEP et al., 1996)**

  - "Monitoring provides the information that permits rational decisions to be made on the following:
    - Describing water resources and identifying actual and emerging problems of water pollution
    - Formulating plans and setting priorities for water quality management
    - Developing and implementing water quality management programmes
    - Evaluating the effectiveness of management actions

  – It is essential that the design, structure, implementation and interpretation of monitoring systems and data are conducted with reference to the final use of the information for specific purposes

  – Types of Monitoring include: Multi-objective; Baseline monitoring; Operational Surveillance; Trend monitoring; Background monitoring; Preliminary survey; Emergency survey; Impact survey; Modelling survey; Early warning surveys

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WQM Context (cont'd)

- **Halifax Harbour Solutions Advisory Committee, Final Report (1998) Recommendations:**
    1. Watershed management be required for all watersheds in HRM. HRM shall promote water management and watershed planning through activities such as … water quality monitoring
    2. HRM develop a consistent stormwater management policy to address water quantity and quality

WQM Context (cont'd)

- **Water Resources Management Study Recommendations (Dillon 2003):**
  - Undertake a moderate level of performance monitoring based on 50-70 sites 3-4 times per year for 4 physical-chemical base parameters and occasional more complex analysis including bioindicators.
  - Undertake lake based or watershed based studies to establish community based water quality objectives, targets and monitoring parameters and to establish comprehensive development criteria
  - Assess data on annual basis to assess effect of development as measured against the objective standards established for water quality

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WQM Context (cont'd)

- **Canada-wide Framework for Water Quality Monitoring (CCME 2006)**
  - Every monitoring program should have a clear underlying purpose and supporting rationale, and the intended end use of resulting data should be identified

  Example Objectives include:
  - Provide assurance that surface & groundwater meet site specific water quality objectives set for its use
  - To investigate the reasons why water at a specific location doesn't meet set objectives
  - To establish a record of water quality to use as a basis for developing site-specific water quality objectives
  - To determine long-term trends or track changes in water quality over time (which may be due to changes in land or water use)

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WQM Context (cont'd)

- **WQM Functional Plan (Stantec 2010):**
  - Recommend program to identify trends, identify problem areas, establish relationships between water quality monitoring and land development trends
  - HRM needs to integrate considerations of stormwater management
  - Climate change may impact hydrology and water quality in HRM watersheds
  - Water quality process modelling should be developed and continuously applied

Corporate Policy Objectives to date

RMPS 2006:

HRM will strive to meet body contact recreation standards for our lakes, waterways and coastal waters where feasible. It is also the desire of HRM to stem the decline of lakes from the accelerated process of eutrophication, and sedimentation and inputs from other urban runoff by managing development on a watershed basis.

Corporate Policy Objectives to date (cont'd)

- RMPS 2014 (Principal objectives):
  - *i) Protection of water … is a significant component of this Plan.*
  - *ii) This Plan will seek to achieve public health standards for body contact recreation and to maintain the existing trophic status of our lakes and waterways to the extent possible.*
  - iii) Policy E-24: Preparation of a WQM Protocol to provide guidance for WQM plans

  ➢ Also see list on slides 8 & 9: RMPS policies

- Halifax Green Network Plan (In development; draft directions approved in principal by HRC)
  - *"Implement a more comprehensive water quality monitoring as part of the watershed management program"*
  - *"Develop source water protection strategies … carrying capacity of groundwater resources"*

Corporate Policy Objectives to date (cont'd)

- Watershed Studies (sample)

Study	WQM Objectives (NOT Policy Objectives)
Fall River - Shubenacadie Lakes (2010) – Jacques Whitford	- Set TP objectives for local lakes to upper limit of current trophic status - Ensure future sediment mass loads stay within 100% of baseline values
Musquodoboit Harbour (2007) – CBCL	- Allow primary contact (swimming) - Consider additional uses (fishing, shellfish gathering, boating, preservation of Ramsar site)
Birch Cove Lakes (2012) – AECOM	- Specific objectives for TP, Nitrate, Ammonia, TSS, Chloride, E. coli. - Included early warning alert value, and method to determine each.

Discussion: Objectives of Review, Water Policy, Water Quality Monitoring

Objectives as currently stated:

- To clarify the Municipality's role in watershed management
- To assess the Municipality's former water quality monitoring program and current monitoring activities for successes and failures, gap identification, efficiency and effectiveness;
- To determine the Municipality's policy objectives for water quality;
- To develop a recommended municipal water quality monitoring program framework;
- To inform key stakeholders of the scope of watershed management and typical roles and responsibilities in the Canadian context;
- To document the Municipality's activities in respect to its role of watershed management;
- To identify successes, shortcomings, and opportunities of the municipality's watershed studies program;
- To identify options for the Municipality's response for watercourses experiencing undesirable conditions;
- To identify and describe, in summary form, a summary of watershed management issues facing the municipality;

Discussion: Objectives of Review, Water Policy, Water Quality Monitoring (cont'd)

The previous list does not address:

- integrated watershed management,
- ecosystem management,
- pollution prevention,
- sustainable community planning, or
- climate change