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Item No. 9.1.1
Regional Watersheds Advisory Board
October 12, 2023

TO: Chair and Members of Regional Watersheds Advisory Board

SUBMITTED BY: Brad Anguish, Acting Chief Administrative Officer

DATE: August 21, 2023

SUBJECT: Bedford West Water Quality Monitoring Spring 2023 Results

INFORMATION REPORT

ORIGIN

Bedford Municipal Planning Strategy, Bedford West Secondary Planning Strategy, Policies BW-3, BW-4, and BW-5. Development Agreements between the Halifax Regional Municipality and West Bedford Holdings Ltd, and between Halifax Regional Municipality and Cresco Ltd.

LEGISLATIVE AUTHORITY

The Halifax Regional Municipality Charter, Part VIII, Planning and Development, Section 240, Development Agreements.

BACKGROUND

The Bedford West area is one of three areas designated as existing growth areas under the Regional Plan for serviced development (municipal water and wastewater systems). The Bedford West area is approximately 1,052 hectares (2,600 acres) in size and located on the west side of the Bicentennial Highway, in the vicinity of Hammonds Plains Road and Kearney Lake Road. In 2006, the Bedford West Secondary Planning Strategy (BWSPS) was adopted with the policy directive to enable new mixed-use communities while ensuring their design considered protection of the natural environment. *Figure 1* illustrates the areas encompassed by the BWSPS. Sub Areas 2 to 9 have approved development agreements and are either constructed or under construction. Sub Areas 1, 10 and 12 are Special Planning Areas designated through the Province of Nova Scotia's *Housing in the Halifax Regional Municipality Act*.

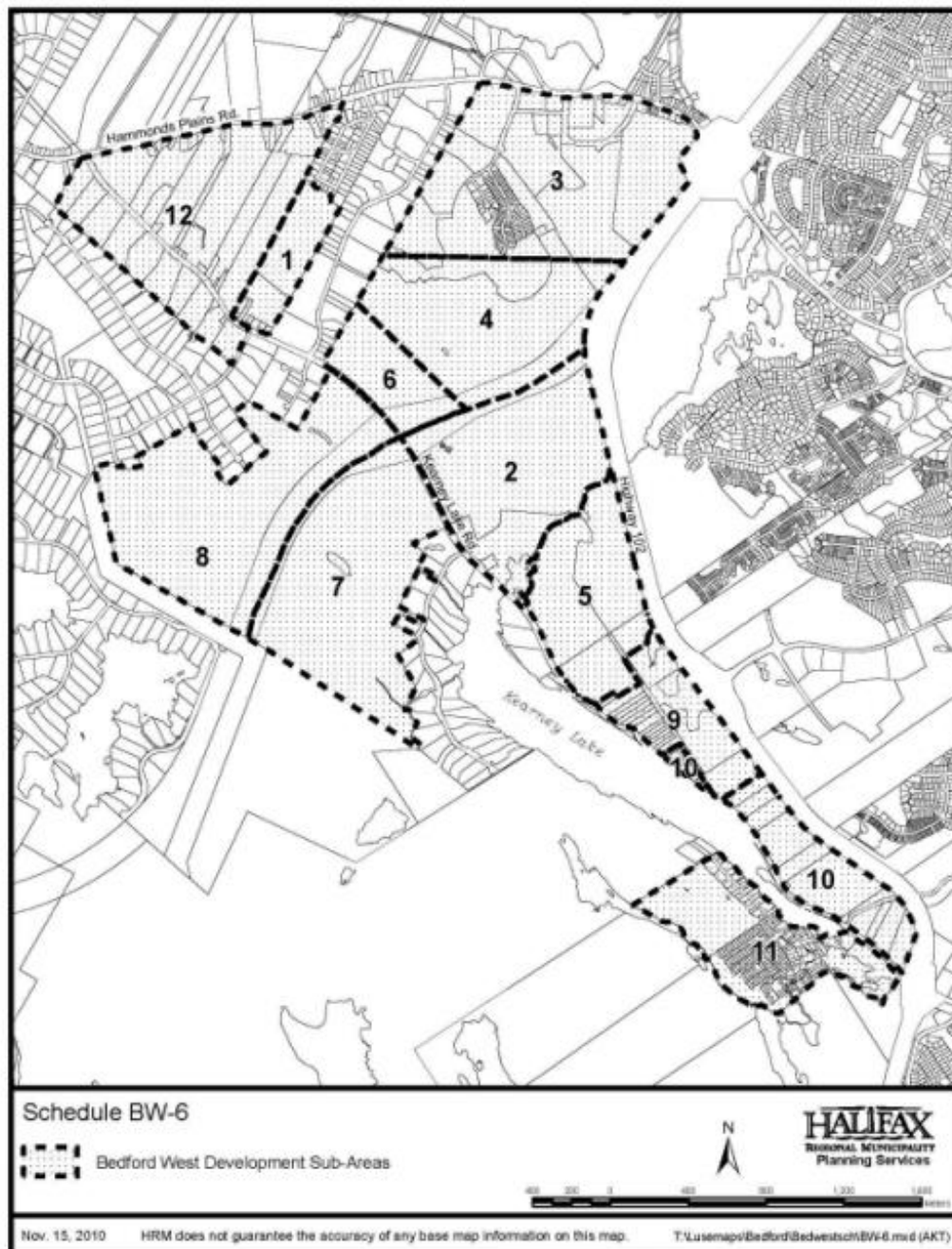


Figure 1: Sub Areas identified under the Bedford West Secondary Planning Strategy.

Policy BW-3 of the BWSPS requires a water quality monitoring program for the Paper Mill Lake watershed to track the eutrophication process. Eutrophication is the process of nutrient enrichment in lakes. This process can happen naturally, through the accumulation of biological material. However, the eutrophication process is often accelerated through the impacts of human activities contributing excess nutrients to a lake, typically through the application of chemical fertilizers, and through land disturbances from development process. This results in relatively rapid changes in trophic state, from lower states (fewer nutrients) to higher states (more nutrients), with corresponding changes in appearance, functional uses, ecosystem health and amenity values.

The water quality monitoring program was specified in the BWSPS in response to the Municipality's statement "that best management practices may be needed both during development and afterward to maintain water quality in the lakes" and "that a water quality monitoring program be established on lakes throughout the watershed" as published in the BWSPS in 2006.¹

The terms of the monitoring program are specified within the Development Agreements that have been negotiated in consultation with the former Bedford Watershed Advisory Board (Sub Areas 1-9). This board was dissolved in 2013 and replaced with the broader Regional Watersheds Advisory Board (RWAB). All development agreements for the Bedford West subdivision negotiated since 2013 have been negotiated instead in consultation with RWAB, with the exception of those identified as Special Planning Areas.

All such Development Agreements have identified the value of 10 micrograms per litre (µ/L) of total phosphorus (TP) as a "trigger value," representing the transition point between the second-lowest trophic state (oligotrophic) to the next-highest trophic state (mesotrophic) per Environment Canada Criteria (*Table 1*).

Table 1: Summary of Canadian trophic status trigger ranges. Environment Canada (2004)

Trophic Status	TP (µ/L)
Ultra-oligotrophic	< 4
Oligotrophic	4-10
Mesotrophic	10-20
Meso-eutrophic	20-35
Eutrophic	35-100
Hyper-eutrophic	> 100

Threshold values for acceptable *E. coli* concentration under the terms of the Bedford West Development Agreements conform to Health Canada's Guidelines for Canadian Recreational Water Quality.² Threshold values for other parameters monitored under the terms of the Bedford West Development Agreements conform to Canadian Council of Environment Ministers (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life (CCME FAL).³

In accordance with the terms for the Bedford West Development Agreements, the Municipality is required to submit test results to the Developer, the North West Community Council (NWCC), and RWAB within three months of being received from the consultant, or immediately, if TP or bacterial results exceed management thresholds identified therein.

In cases where an exceedance is noted, staff can request confirmation testing and corrective action by the developer. Further assessments and corrective actions being undertaken by staff are described in the discussion section of this report.

¹ The Bedford West Secondary Planning Strategy can be found online here: [THE BEDFORD WEST SECONDARY PLANNING STRATEGY.pdf \(halifax.ca\)](#)

² Health Canada's Guidelines for Canadian Recreational Water Quality can be found online here: [Guidelines for Canadian Recreational Water Quality – Third Edition - Canada.ca](#)

³ CCME Water Quality Guidelines for the Protection of Freshwater Aquatic Life can be found online here: [Canadian Council of Ministers of the Environment | Le Conseil canadien des ministres de l'environnement \(ccme.ca\)](#)

DISCUSSION

The purpose of this report is to share the results of the water quality monitoring program in the Paper Mill Lake watershed undertaken as part of the Bedford West Development Agreements on June 13, 2023. Typically, the spring sampling event takes place in late May, but access to several sampling locations was limited due to ongoing wildfires and active evacuation orders in the area at that time.

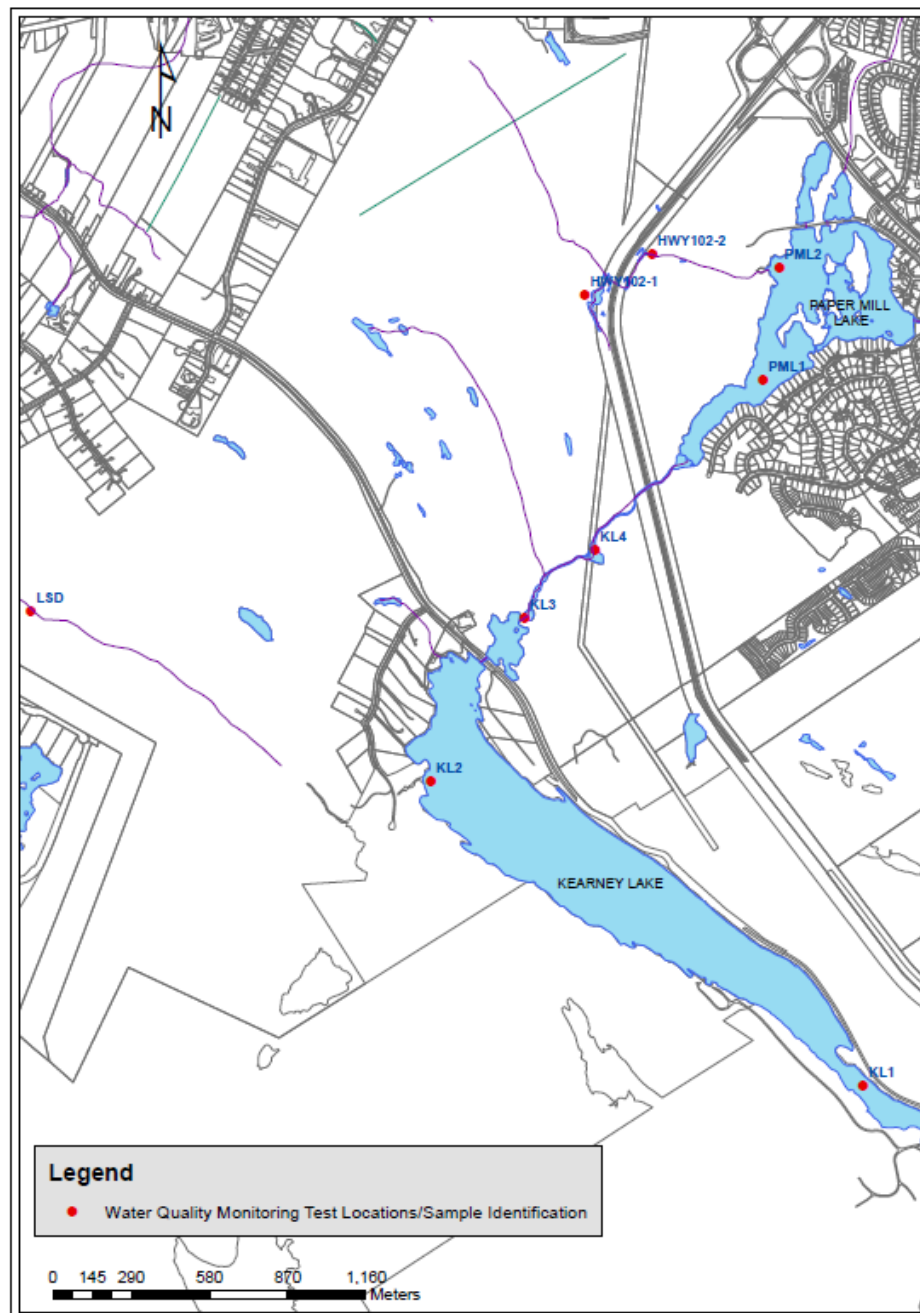


Figure 2: Sampling locations in the Bedford West Water Quality Monitoring Program.

Sampling results are included as Attachment A. No exceedances of phosphorus (10 µg/L) or *E. coli* (200

CFU/100mL) were observed at any location during the spring 2023 sampling event. Other water quality parameters were measured that exceed thresholds set in the CCME FAL guidelines. These values are tabulated in Attachment B.

Of note are aluminum concentrations, which were significantly above the guideline (5 µg/L at pH <6.5, using 100 µg/L based on average pH) at every location except HWY102-1.⁴ Aluminum concentrations in exceedance of the guideline value ranged from 111 µg/L at sampling site LU to 335 µg/L at sampling site LSD (sites identified in *Figure 2*). These values are slightly higher than in previous years, but aluminum concentrations in excess of the guideline values have been consistently observed in this watershed prior to the start of development activities. Aluminum concentration in a lake depends on pH, with aluminum solubility being lowest between 5.5 and 6.0. Heavy rain prior to sampling, and higher than average water temperatures, in addition to the effects of development activities, could also contribute to these higher concentrations. The effects of lake recovery, a positive phenomenon in which increasing surface water pH is being observed in Nova Scotia as a result of a reduction of the effects of acid rain, can be expected to contribute to some increase in aluminum concentrations. Aluminum can have toxic effects on fish in concentrations above the guideline level.

The next monitoring event for 2023 will be conducted in August, with the final 2023 sampling event taking place in October. Results will be reported within three months of their receipt by staff, as per the conditions stated in the development agreements.

FINANCIAL IMPLICATIONS

There are no financial implications for this report.

COMMUNITY ENGAGEMENT

No community engagement was required for this report.

ATTACHMENTS

Attachment A: Spring 2023 Water Quality Monitoring Results

Attachment B: Spring 2023 Exceedances

A copy of this report can be obtained online at [halifax.ca](https://www.halifax.ca) or by contacting the Office of the Municipal Clerk at 902.490.4210.

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⁴ These Sample IDs are incorrectly labelled as HWY 101-1 and HWY 101-2 in the lab results sheets included in Attachment A.