

Soil & Water Conservation Society of Metro Halifax (SWCSMH)

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Ref.: portlandhillsphases4&5 (3 pages and 2 exhibits; total= 5 pages)

To: **Chair, Jim Smith and Members, Harbour East Community Council, HRM**

From: S. M. Mandaville Post-Grad Dip., Professional Lake Manage.
Chairman and Scientific Director

Date: **Hand delivered to the Municipal Clerk on June 22, 2006**

Subject: **Portland Hills, Phases 4 & 5 Development Agreement: Public hearing scheduled for June 29, 2006**

There are three Aspects (I to III) here on our recommendations and two Exhibits (A & B) which are provided as support documentation. Russell Lake recent anecdotes are included for comparative purposes since the staff and/or committee reports refer to it.

In a nutshell, our concerns embody the subspecialties of Limnology, BENTHIC BIODIVERSITY and BIOTIC INTEGRITY! There are national and international scientific handbooks widely available on them! Our interests are not temporary, construction-related, events.

Aspect-I: Overview and caution on tracking incremental impacts of developments:

A senior HRM environmental engineer, Ms. Renee Roberge PEng, who reported to John Sheppard PEng, was equally concerned on somewhat related matters. Her concerns from then are even more relevant today. We are including one of her emails as Appendix-A.

We are also quite concerned how some consultant reports, e.g., the Jacques Whitford report on Russell Lake modelling, have utilized synoptic sampling spearheaded by several Government agencies (generally referred to as the 'BIO data') when the officials themselves have cautioned that their TP (total phosphorus) data was questionable. Appendix-B clearly cautions the reader about significant shortcomings in their reported total phosphorus (TP) data.

The routine sampling of lake water carried out generally around HRM by hired consultants and/or as envisaged by HRM (under the Regional Plan) is considered as almost 'beginner-level limnology', especially in shallow and/or coloured lakes.

Incremental impacts of new developments can rarely be tracked by inlake sampling unless the developments are of significant size. This is primarily because of the competition between PHYTOPLANKTON, MACROPHYTES, and BACTERIA, though there could be a myriad of other factors as well (a discussion on this will be too lengthy here but our web pages in limnology address them with leading references).

Aspect-II: One practical aspect that is achievable, if HRM takes pragmatic leadership, is the Lake Carrying Capacity (LCC) in total compliance with the national peer-consensus CCME (2004) Phosphorus Policy:

Any deviation recommended by HRM as in the case of Russell Lake per its report of May 31, 2006 would be self-defeating and may be wholly frivolous and counter productive:

Based on the said CCME (2004) Phosphorus Policy, our updated/upgraded predictive model yields an LCC for Morris Lake as 4.4 µg/l TP; it can be incremented to 5 (five) µg/l which is somewhat higher than 50% over natural background value!

The LCC's are not based on current or recent phosphorus values; they are set based on pre-cultural values, i.e., the values that would have existed prior to any human activity within the watershed. It is however cautioned that direct aerial deposition of phosphorus on land is included here but during the pre-cultural times there would have been little-to-zero deposition of TP.

The CCME document as well as its scoping literature clearly prefers the methodology of utilizing UNIT PHOSPHORUS EXPORT COEFFICIENTS; they recommend other methodologies as a combination which we have mostly implemented (but HRM never carried that out and neither did the proponent's consultants in the case of Russell Lake).

In Nova Scotia, unit TP-export coefficients have been developed over the years and upgraded not long back based on more extensive sampling, in generally undisturbed representative watersheds, all over the Province! They have been summarized in the following year-2003 report prepared for the Nova Scotia Dept. of Environment & Labour (NSEL) by select researchers at Dalhousie University, ourselves (SWCSMH), and Acadia University; the citation is (it is lodged at the NSEL Library for public use):

Scott, R., Hart, W., Mandaville, S., and Lowe, J. 2003.
Selection of a Phosphorus Loading Model for Nova Scotia,
Phase I. For: Nova Scotia Water Quality Objective and Model
Development Steering Committee and Nova Scotia Dept. of
Environment and Labour. 85p.

**Aspect-III: Important note on HRM's
misinterpretation of the Mandaville models that
they are in possession of:**

The models developed by Mandaville are continually under revision and/or upgrades to incorporate any latest scientific literature which receive international peer consensus. HRM does not have legal access to these models yet. But HRM could revise the ones that Mandaville submitted to them in extensive MS Excel format which incorporate several macro-regressions; a certain familiarity with advanced statistics will be required to fully understand and utilize any of Mandaville's predictive models since it appears staff misinterpreted Mandaville's model on Russell Lake and reported partly erroneous results in their May 31, 2006 report, alas!

Appendix-A (a representative email from HRM's EMS department)

Date: Fri, 02 Jul 1999 18:08:44 -0300
From: "Renee Roberge" <robergr@region.halifax.ns.ca>
Subject: Morris and Russell Lakes

Shalom,

How are things going? I have not talked to you for so long... and I apologize, too many things to do. I have two questions for you. First, I should mention for your information that HRM has initiated a Master Planning Exercise with respect to development of the Morris and Russell Lakes areas. One goal is to protect the quality of the water and several policies were approved by Council to achieve that. The policies were mainly based on the report conducted by Griffiths Muecke Associates and Gordon Ratcliffe Landscape Architects in May of 1998.

I am unsure about certain issues and would like to have your opinion on these two points: My questions:

1) sampling is recommended into the lakes (mainly Morris Lake at this time) to establish background data before development proceeds. The developers would have to follow severe erosion and sediment control methods but still periodic monitoring is recommended in order to set a critical threshold level. Are you planning any monitoring of the lakes as part of your regular program?

2) The consultant also recommends methods that would maximize phosphorus removal. One idea that was talked about was to use wetlands. It seems now they will use the existing wetlands, i.e., direct stormwater to these wetlands.

I have some concerns with this and would like to have your views on this idea.

Nothing has been decided yet and I am looking for your opinion on these issues because I know you have a lot of experience in that field and you are quite knowledgeable of the study area.

Thank you.

Renée
490-6941

Appendix-B (cautions from a BIO-DFO report)

Total nitrogen and total phosphorous are plotted in Figures 18 and 19. On average, approximately one-half of the total nitrogen is nitrate while approximately one-quarter of the total phosphorous is phosphate. Surprisingly, there was a poor correlation ($r=-0.48$, $n=91$) between total phosphorous and chlorophyll, which suggests a problem with sample splitting or the analytical method for either chlorophyll or total phosphorous. Universally there is a strong positive correlation between these two variables (Vollenweider and Kerekes, 1981).

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(Keizer, Gordon, Rowell, McCurdy, Borgal, Clair, Taylor, Ogden, and Hall, 1993)

Due to the high levels of colour in some Metro Area lakes (Fig. 21), trophic status estimates based on Secchi disk are not always reliable. Those based on total phosphorous (Fig. 19) are also judged to be unreliable because of some question over the accuracy of this data set. Therefore, estimates of trophic status in this report are based solely on the chlorophyll data (Fig. 20). Also, this assessment is limited and should be viewed with some reservation because it is based on a single early-spring measurement and not an average growing season value.

Based on the TSIs calculated from chlorophyll concentrations, Oathill, Bissett, and Settle Lakes can be categorized as eutrophic, First Lake as borderline between eutrophic and mesotrophic, Russell, Parr, and Morris Lakes as mesotrophic, and Third, Powder Mill, Frog Pond, Anderson, and Frenchman Lakes as borderline between mesotrophic and oligotrophic (Fig. 23). The remaining lakes can be classified as oligotrophic or ultraoligotrophic.

TSIs based on chlorophyll were calculated from mean annual concentrations determined from multiple samples collected from selected Metro Area lakes during 1990 (Soil and Water Conservation Society of Metro Halifax 1991). While the absolute values were generally lower, the highest values were found in the same four lakes (Oathill, Bissett, Settle, and First). Although not technically classified as eutrophic, Bissett and Settle Lakes were judged as showing eutrophic tendencies.

(Keizer, Gordon, Rowell, McCurdy, Borgal, Clair, Taylor, Ogden, and Hall, 1993)