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Subject: Barriers to Managing Nutrient Targets: IJC March 28th deadline

Message:

Presentation on Barriers to Managing Nutrient Targets:

International Joint Commission on Red River Watershed Management

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As the IJC strives to keep informed of basin activities that affect barriers to achieving nutrient targets in transboundary river flows, water quality, and ecosystem health in the Red River and its tributaries, please accept this presentation which is motivated to prevent further eutrophication of Joubert Creek, the Red and Lake Winnipeg, and to preserve marsh forest in SE Manitoba. These marsh forests assist with reducing water flow, mitigating downstream flooding. This submission is also motivated by the goal to improve adherence to the provincial manure management and drainage regulations in the municipalities of Hanover and La Broquerie, Manitoba, to ensure watershed health.

Since 1991, I have lived and farmed at SW9-5-6e Hanover, 17 km south of Steinbach. In my neighbourhood, I have watched the impact of the burgeoning Manitoba hog industry. A creek, now called the Pansy Drain crosses our land. I have watched it change from a living stream, where we once could fish, to a eutrophied, duckweed-choked drainage ditch. A local Conservation Officer, to whom I have reported observations of illegal manure management, is a member of a family who own a large, industrial hog production company that spreads manure in our area. This sort of nepotism impacts actions against improper manure applications when they are reported. On paper, the MB Manure Management and Mortalities regulations look good, but I have seen no political will to enforce them consistently in the last 20 years, under different political party management. Many of the hog industry executives used to work for the provincial government so know well how to manipulate the regulatory system. This SE area of Hanover now has the highest density of hog production in western Canada (highest number of hogs per hectare). I have seen marsh forest stands bulldozed to make way for spread acres for the manure from the 26 Pro Vista barns built in this swampy marsh. This is a recharge area for Lake Winnipeg which is not suitable for much agriculture other than grazing, has a low human population density and is being used as a toilet by local corporations. Hogs eat more than humans, such that it has been estimated that the 8 million hogs alive at any one time in Manitoba, are producing the equivalence of manure from 25 million human beings; most untreated and containing antibiotic resistant bacteria being injected into fields in more Manitoban communities. The Manitoba departments of agriculture and conservation are suffering from regulatory capture, as regulators have come to be dominated by the corporate interests they are charged with regulating. This illogical dynamic is a severe threat to achieving watershed nutrient goals. This conclusion is based on my experience and that of many of my neighbours. We are concerned for the long-term health and wellbeing of the community water quality and downstream water bodies. When, as neighbours, we do fight for responsible action

and clean water practices through the Justice Department, the fines imposed on these barns are so small as to be completely ineffective deterrents, seen as a cost of doing business. The paltry fines do nothing to replace short-term goals with more resilient manure and drainage management practices needed to achieve nutrient goals.

As another example, a local waste management company owner reported to me that he was threatened with losing his municipal contract if he did not stop reporting illegal drainage ditches being built. Land in my area that is too wet for agriculture is being cleared of willows and marsh forest (with dozers getting stuck in winter) to serve as manure spread acres and, in some cases, farmed for crop insurance payments for flood damage. I have read Hanover Technical Review reports that state manure may be applied to meet crop nutrient needs on the fields identified in the reports, but when I inspected those fields, the most visible plants were bull rushes. I know of no market that considers bull rushes a crop. These practices lead to excess N and P entering ditches, creeks and rivers in La Broquerie and Hanover, where there appears to be insufficient run off testing. The following quote is from a paper which built on Dr. Eva Pip's Lake Winnipeg work on algal toxins and confirms that BOTH N AND P affect BLOOMS IN LAKE WINNIPEG. P is not always the main factor triggering algal blooms and the addition of N can increase these blooms. "The dominance of diazotrophs ... would suggest that N limitation is a common feature of this lake at its present trophic state. Based on the environmental data we have presented, Lake Winnipeg blooms are strongly affected by N and P concentrations, light intensity through water turbidity, and prevailing wind direction."

A Multiplex Analysis of Potentially Toxic Cyanobacteria in Lake Winnipeg during the 2013 Bloom Season by Katelyn M. McKindles 1, Paul V. Zimba 2, Alexander S. Chiu 3, Susan B. Watson 4, Danielle B. Gutierrez 5, Judy Westrick 6, Hedy Kling 7 and Timothy W. Davis 1,*

"Lake Winnipeg (Manitoba, Canada), the world's 12th largest lake by area, is host to yearly cyanobacterial harmful algal blooms (cHABs) dominated by *Aphanizomenon* and *Dolichospermum*. cHABs in Lake Winnipeg are primarily a result of eutrophication but may be exacerbated by the recent introduction of dreissenid mussels. Through multiple methods to monitor the potential for toxin production in Lake Winnipeg in conjunction with environmental measures, this study defined the baseline composition of a Lake Winnipeg cHAB to measure potential changes because of dreissenid colonization. Surface water samples were collected in 2013 from 23 sites during summer and from 18 sites in fall. Genetic data and mass spectrometry cyanotoxin profiles identified microcystins (MC) as the most abundant cyanotoxin across all stations, with MC concentrations highest in the north basin. In the fall, *mcyA* genes were sequenced to determine which species had the potential to produce MCs, and 12 of the 18 sites were a mix of both *Planktothrix* and *Microcystis*. Current blooms in Lake Winnipeg produce low levels of MCs, but the capacity to produce cyanotoxins is widespread across both basins. If dreissenid mussels continue to colonize Lake Winnipeg, a shift in physicochemical properties of the lake because of faster water column clearance rates may yield more toxic blooms potentially dominated by microcystin producers." Less nitrogen favours only those blue-green algae that can fix nitrogen from the air, and this ability is enhanced when oxygen is low. However, many other blue-green algae do not have this ability, nor do all the other eukaryote (non-blue green) algae. (There are blooms that survive taking nitrates from the air, and there are blooms in water that need soluble nitrates to survive.) Studies such as the one referenced above have determined discharge of nitrogen into bodies of water has been linked to eutrophication, along with excess P. Treatment plants that only reduce phosphorus from sewage, will give an advantage to all the algae that need nitrogen as well as phosphorus, and there will

still be blooms. Therefore, it is imperative that both phosphorus and nitrogen be addressed and removed during water treatment, if Lake Winnipeg is to be saved from increased eutrophication.

Christine Melnick, past MB Water Stewardship Minister, supported the removal of more nitrogen from the water treated at Winnipeg's north end water treatment plant. The cost was higher, but there was scientific agreement on the importance of nitrogen removal. The decision was to be frugal in the short term, and she lost her case. Lake Winnipeg is at a crisis stage and needs all the support that can be provided! Flooding appears to be increasing in SE Manitoba and we need to increase responsible management to prevent it. The marsh recharge area needed for our local water quality in SE Manitoba and the health of Lake Winnipeg is seriously damaged and needs protection and remediation. Clear cutting and bulldozing of marsh forest for inappropriate manure spread acres continues unabated but needs to be addressed to achieve watershed nutrient load goals.