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Melissa Ollevier
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77 Wellesley Street West, Floor 10
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Toronto, Ontario Rivers Alliance M7A 2T5

By Email: Melissa.Ollevier@ontario.ca

Re: EBR 012-5666 – Cap and Trade Program Design Options

Dear Ms. Ollevier:

Ontario Rivers Alliance (ORA) is a Not-for-Profit grassroots organization acting as a voice for several stewardships, associations, and private and First Nation citizens that have come together to protect, conserve and restore healthy river ecosystems.

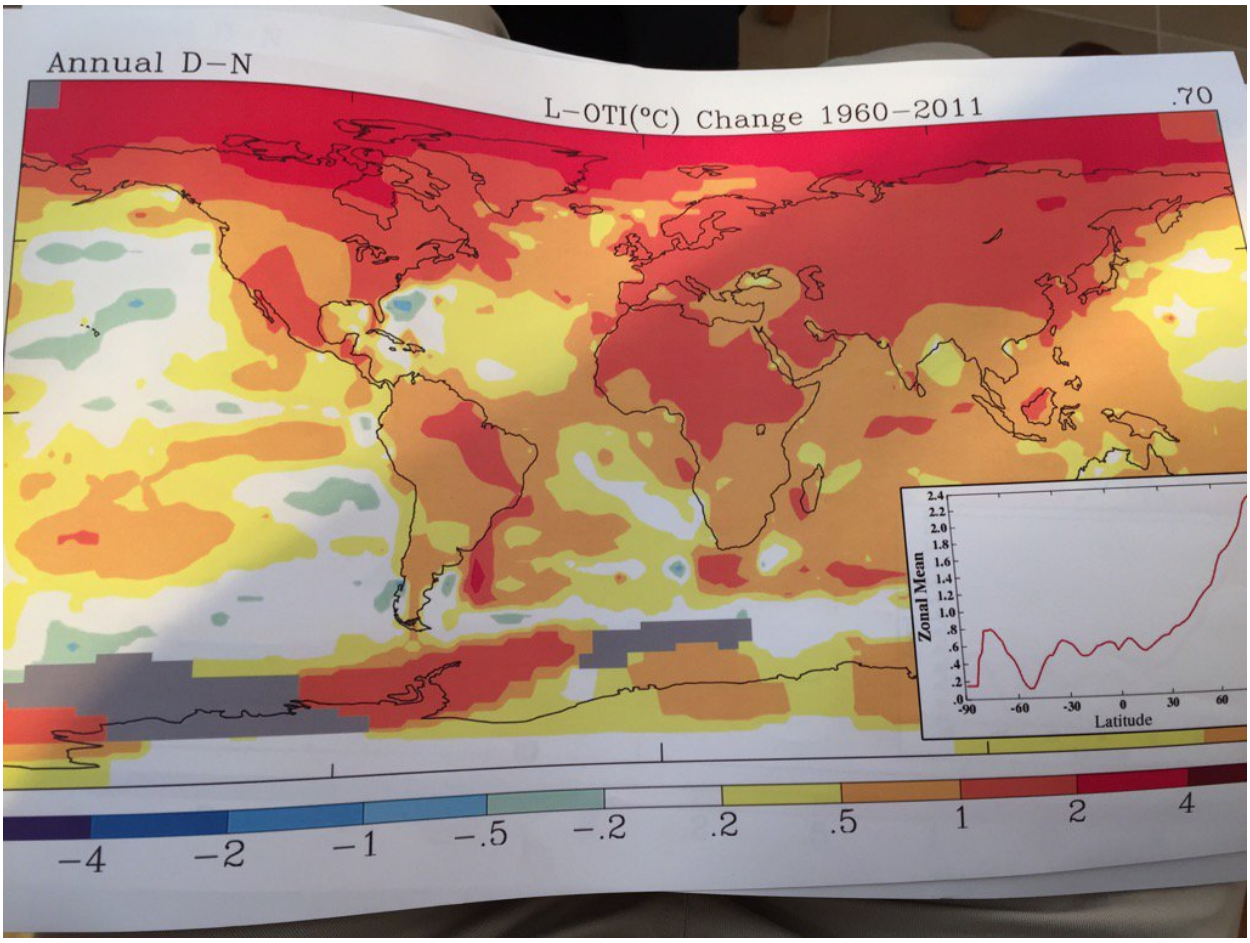
The World Economic Forum in its "Global Risks 2015" report lists "water crises" as its number one global risk in terms of impact – beating out the rapid spread of infectious disease, weapons of mass destruction, and failure of climate-change adaptation.[1]

Climate change will impose some of its greatest effects on both the long-term availability and the short-term variability of water resources in many regions of this province. These effects have already been felt in many areas through increased frequency and magnitude of droughts, extreme rain and flooding, duration of accumulated snowpack, and changes in soil moisture and runoff. These effects have also played havoc with municipal waste water treatment facilities that were never built to accommodate the extreme rain events that climate change has brought, and are a major contributor to the eutrophication of our lakes and rivers all across the province.

Professor Michael English, a Wilfrid Laurier University professor, reported on research which indicates that Canada's North is taking a serious hit from climate change.

> *In the very high latitudes, the changes are most pronounced on a global scale, so over [the past 51 years], you're getting a change of close to 4 degrees. It puts the question into what the future availability of freshwater resources is in these parts of Canada, especially considering it's also experiencing unprecedented rates of industrial expansion – and that brings with it unknown demands on water.*[2]

[1] *Global Risks 2015 – 10th Edition. Online:* *http://www3.weforum.org/docs/WEF_Global_Risks_2015_Report15.pdf*
[2] *Laurier panel: Climate change posing threat to Canada's North. Online:* *http://www.570news.com/2015/11/19/laurier-panel-climate-change-posing-threat-to-canadas-north/*



A look at temperature change over the last 50 years.

ORA is pleased to offer our comments as follows:

Eligible Sectors Must Include Hydroelectric

In consideration of the increasing risks to Ontario's freshwater resources, as well as the growing body of evidence that reservoirs in both temperate and tropical climates contribute significantly to global freshwater GHG emissions, ORA recommends that hydroelectric reservoirs be included within the scope of an eligible sector to cap or tax; and under no circumstances should hydroelectric with reservoirs be eligible for offset credits, as it is by no means a clean form of power generation.

Headponds or reservoirs are crucial to maximizing hydroelectric generation during peak demand hours, and must be factored in to pay the price for any cap or tax on resulting GHG emissions. The frequent claim by governments and industry that waterpower produces clean energy is understood in most circles to mean that it does not emit Greenhouse Gases (GHGs). The clean and green reputation of large dams has already been in question, but scientists are now reporting that millions of smaller dams on rivers around the world make an important contribution to total global GHG emissions.

For instance,

> *With smaller dams storage becomes increasingly important. Reservoirs silting up or becoming overloaded with nutrients are common problems with major reservoirs and could be at least as serious where shallower bodies of water are created – the shallower a water body, the more easily eutrophic it can become. Likewise, methane generation occurs largely where water and sediment meet, and this means that a shallower water body is likely to release more methane [CH_4] per unit area than a deeper water body. Shallow reservoirs are not unlike paddy fields which are known to contribute substantially to methane emissions…..* [3]

Whether the impoundment is large or small, flooding can destroy or significantly alter some of the most ecologically sensitive areas along the river, including wetlands, riparian zones, and spawning beds. Added together, the cumulative effects on the environment and ecology of a catchment can be substantial. Even with small waterpower projects, the headpond can flood many hectares of land, extend for several kilometers upstream, and impact many more kilometers of downstream riverine ecosystem. To further maximize the power production from a river, multiple cascading waterpower facilities are often constructed, and can involve additional upstream reservoirs.

Flooding landscapes to create reservoirs causes flooded vegetation and soils to decompose, and for sediment to accumulate behind the dam, resulting in net emissions of the GHGs, carbon dioxide (CO_2), and methane into the atmosphere for decades and possibly centuries following flooding.[4,5] New reservoir flooding also accelerates the bioaccumulation of methylmercury, and these effects can persist for 20 to 30 years or more.[6,7]

Methane is a potent greenhouse gas with a heat trapping capacity 34 times greater than that of carbon dioxide on a 100 year time scale.[8] Methane is generated in reservoirs from bacteria living in oxygen-starved environments. *"These microbes eat organic carbon from plants for energy, just like people and other animals, but instead of breathing out carbon dioxide, they breathe out methane."*[9] River networks with high nutrient and sediment loading from agricultural

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[3] *Abbasi, T. and Abbasi, S.A. 2011b. Small hydro could add up to big damage. SciDev.Net 20/06/11. Online: http://www.scidev.net/global/water/opinion/small-hydro-could-add-up-to-big-damage-1.html*

[4] *Venkiteswaran, J.J., Schiff, S.L., St. Louis,V.L., Matthews, C.J.D., Boudreau, N.M., Joyce, E.M., Beaty, K.G., and Bodaly, R.A.(2013), Processes affecting greenhouse gas production in experimental boreal reservoirs, Global Biogeochem. Cycles, 27, doi:10.1002/gbc.20046*

[5] *Maeck, A., DelSontro, T., McGinnis, D.F, Fischer, H., Flury, S., Schmidt, M., Fietzek, P. and Lorke, A., 2013. Sediment Trapping by Dams Creates Methane Emission Hot Spots, Environmental Science and Technology, 8130-8137, Online: http://www.dx.doi.org/10.1021/es4003907*

[6] *Rosenberg, D.M., et al. 1997. Large-scale impacts of hydroelectric development. Environmental Reviews. 5: 27-54.*

[7] *World Commission on Dams. 2000. In Dams and development: A new framework for decision-making; Earthscan Publications: London.*

[8] *Myhre, G., Shindell, D, Breon, F.-M., Collins, W., Fuglestvedt, J., Huang, J., Koch, D., Lamarque, J.F., Lee, D., Mendoza, B., Nakajima, T., Robock, A., Stephens, G., Takemura, T., Zhang, H., Anthropogenic and natural radiative forcing. In Climate Change 2013: The Physical Science Basis. Contribution of*

[9] *Beaulieu, J.J., Smolenski, R. L., Nietch, C.T., Townsend-Small, A., and Elovitz, M.S., 2014. High Methane Emissions from a Midlatitude Reservoir Draining an Agricultural Watershed. United States Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Cincinnati, Ohio 45268, United States.*

or wastewater effluent provides microbial communities with a large source of carbon that can deplete sediment oxygen and fuel methane production. Algal blooms from excessive nutrient loading can further enrich reservoir sediments.[10]

The effect of damming on methane emissions conducted in a central European impounded river revealed that sediment accumulation correlates with methane production and subsequent ebullitive release rates.

> *Direct comparison of riverine and reservoir reaches, where sedimentation in the latter is increased due to trapping by dams, revealed that reservoir reaches are the major source of methane emissions (0.23 mmol CH4 m–2 d–1 vs 19.7 mmol CH4 m–2 d–1, respectively) and that areal emission rates far exceed previous estimates for temperate reservoirs or rivers. Our results suggested that sedimentation-driven methane emissions from dammed river hot spot sites can potentially increase global freshwater emissions by up to 7%.*[11]

In the Flooded Upland Dynamics Experiment (FLUDEX) three boreal upland areas with differing amounts of organic carbon stores in vegetation and soils were experimentally flooded for five consecutive years at the Experimental Lakes Area (ELA) in north western Ontario.

> *During the first 3 years of flooding, Matthews et al. [2005] found that forests and soils that had been net sinks of CO_2 and CH_4 became net sources of both GHGs to the atmosphere. Net dissolved inorganic carbon (DIC) production declined markedly from the first to third years of flooding, while net CH_4 production increased [Matthews et al., 2005]. Ebullition added an increasing amount to net CH_4 production, from 0% to 5% in the first year to 50% to 145% and 130% to 175% in the second and third years. CO_2 ebullition was very small relative to net DIC production*[12].[13]

Carbon Fee and Dividend Instead of Cap and Trade

ORA recommends that Ontario's current favoured method of placing a limit on greenhouse gas (GHG) emissions be reconsidered. Instead of a Cap and Trade system, which is long on government bureaucracy and short on effectiveness, Ontario should put a rising fee on carbon pollution and return that money equally to Ontario households. Carbon fee and dividend, is strongly advocated for by eminent scientists and economists of all political stripes.[14] It would put a rising fee on fossil fuels at the point of extraction or sale, returns the fee equally to all

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[10] *West, W.E., Coloso, J.J., Jones, S.E. Effects of algal and terrestrial carbon on methane production rates and methanogen community structure in a temperate lake sediment. Freshw. Biol. 2012, 57 (5), 949−955.*

[11] *Maeck, A., DelSontro, T., McGinnis, D.F, Fischer, H., Flury, S., Schmidt, M., Fietzek, P. and Lorke, A., 2013. Sediment Trapping by Dams Creates Methane Emission Hot Spots, Environmental Science and Technology, 8130-8137, Online: http://www.dx.doi.org/10.1021/es4003907*

[12] *Matthews, C.J.D., Joyce, E.M., St. Louis, V.L., Schiff, S. L., Venkiteswaran, J.J., Hall, B.D., Bodaly, R.A., and Beaty, K.G. (2005), Carbon dioxide and methane production in small reservoirs flooding upland boreal forest, Ecosystems, 8(3), 267–285, doi:10.1007/s10021-005-0005-x.*

[13] *Venkiteswaran, J.J., Schiff, S.L., St. Louis,V.L., Matthews, C.J.D., Boudreau, N.M., Joyce, E.M., Beaty, K.G., and Bodaly, R.A.(2013), Processes affecting greenhouse gas production in experimental boreal reservoirs, Global Biogeochem. Cycles, 27, doi:10.1002/gbc.20046*

[14] *Science & economics experts: Carbon Tax needed NOT Carbon Trading. Online: https://sites.google.com/site/300orgsite/sciennce-economics-experts-carbon-tax-needed-not-carbon-trading*

citizens to protect from rising energy costs, and protects consumers. Carbon fee and dividend is easy to enact, and it benefits citizens, not Wall Street (as cap and trade would). We all want clean water, clean air, and a stable climate for our children and grandchildren.

A revenue neutral carbon fee and dividend is a progressive carbon levy. It puts a price on carbon pollution by charging a fee on carbon-based fuels and energy, imposed as it comes out of the ground or when it is imported, and distributes the revenue directly to citizens through a dividend cheque. It rewards carbon-conscious consumers and protects people living on lower incomes as we transition away from a high carbon economy.

The British Columbia Carbon Fee and Dividend model has been well received by its citizens and very effective in reducing emissions.[15] Ontario should come into alignment with this proven model, instead of with Quebec and California.

Point of Regulation

ORA recommends that all GHG emissions from electricity generation, are regulated at the point of emission, or at the point where the electricity enters the province.

Other Design Options

ORA is concerned that the current proposal provides free pollution permits to almost all industries. This would make the program less efficient and effective. For cap and trade to be effective, it must be designed so that polluters are forced to pay to pollute. Although some free permits are justified in order to avoid leakage, Ontario's draft design appears to be far too generous in issuing free permits and, to be effective, must cover a broad range of sectors.

Industry exemptions and free permits have weakened the effectiveness of the European Union cap and trade systems; therefore, it is imperative that there are no special deals given out.

Additionally, there must be

1. Full auctioning of pollution permits;
2. An annually decreasing cap to meet targets and a strong floor price with predictable increases;
3. Price protection for low income individuals and households;
4. A simple, transparent pricing system that does not include pollution offsets, or limits them to a small proportion of pollution reductions and ensures that they meet high standards;
5. Revenue neutrality and/or a dedicated fund for revenue to be used to help people reduce their carbon footprint. Cap and trade revenues should not go into general funds; and
6. An arms' length, independent management of the program, with annual reports on revenues, expenditures, administrative costs and effectiveness in reducing GHG pollution.

[15] *British Columbia Enacted the Most Significant Carbon Tax in the Western Hemisphere. What Happened Next Is it Worked.*

Compliance

The world is in crisis mode on many levels, largely because of the effects of climate change; therefore, the compliance obligation for new and upgraded facilities should be immediate. Ontario's cap program must start no later than January 1, 2017. We cannot afford to drag our feet any longer on climate action.

Conclusion

"*Climate change is the critical issue of our time*."[16] There is an urgent need to integrate climate change into waterpower strategies and policies. Healthy rivers are the key to successful adaptation to the extremes of climate change. It is essential that we pursue sustainable forms of power generation in order to conserve our life-giving freshwater resources, and that hydroelectric reservoirs are counted for their substantial contribution to world GHG emissions.

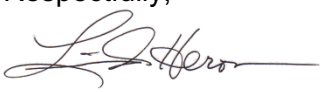
Hydroelectric is not the answer to our climate change dilemma – it is the absolute wrong prescription for a changing climate with increasing intensity of droughts and flooding. In October of this year nine dams were breached, and or failed, in South Carolina as a result of extreme rain caused by Hurricane Joaquin.

Protecting our freshwater must be recognized as an issue of national security – it is essential to our children's survival on this planet. Water is a renewable, but finite resource.

Finally, at COP21, the United Nations reported that, "*Adaptation to climate change is closely linked to water and its role in sustainable development"*.[17]

Thank you for this opportunity to comment!

Respectfully,



Linda Heron
Chair, Ontario Rivers Alliance

[16] *Ontario's Climate Change Discussion Paper 2015, Minister's Message, Glen Murray, Minister of Environment and Climate Change. P-3.*
[17] *http://www.unwater.org/topics/water-and-climate-change/en/*