



**ONTARIO
RIVERS
ALLIANCE**

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Kathy Hering
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Climate Change and Environmental Policy Division
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By Email: Kathy.Hering@Ontario.ca

**Re: EBR Registry 012-3452
Discussion Paper on Climate Change**

Dear Ms. Hering:

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

ORA applauds the Ministry of Environment and Climate Change (MOECC) in its commitment and leadership in addressing the climate change issue head on, and for providing the public with an opportunity to engage in a discussion on the best approach to managing, avoiding, and mitigating some of the more dire effects.

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.

Water is a renewable, but finite resource. 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 created havoc on municipal waste water treatment facilities that were never built with climate change in mind.

Climate change is recognized as a major threat to the integrity of our environment and the survival of our species. We must place just as much effort in protecting our water resources as we do in eliminating greenhouse gas emissions – after all, water is essential to life. To ensure successful long term protection and stewardship of water resources, wetlands, floodplains, forests and a diversity of habitat, we need stronger legislation and enforcement. Governments

“A World of Healthy River Ecosystems”



must set the protection and conservation of water and our environment as its "highest priority" to ensure that our children, grandchildren, and future generations have what they need to survive on this planet.

ORA offers the following recommendations for your consideration:

1. Carbon Fee and Dividend

Ontario should put a rising fee on carbon pollution and return that money equally to Ontario households. Carbon fee and dividend, advocated for by economists of all political stripes, puts a rising fee on fossil fuels at the point of extraction or sale, returns the fee equally to all citizens to protect from rising energy costs, and protects consumers (66% of us will break even or have more money in our pockets!). Carbon fee and dividend is easy to enact, and it benefits citizens not Wall Street (like cap and trade). 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, imposed as it comes out of the ground or when it is imported, and distributes the revenue directly to people 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.

2. Actions in Key Sectors

The Ontario government must ensure that all regulators, including MOECC and Ministry of Natural Resources and Forestry (MNR), use the United Nations Millennium Ecosystem Approach to undertake a comprehensive assessment of the net benefits versus the costs of the physical biological and socio-economic impacts of all development within a watershed.

This ecosystem services approach would assess the consequences of ecosystem change for human well-being and provide the scientific basis for action needed to enhance the conservation and sustainable use of those systems, and their contribution to human well-being.

Development that has the potential to seriously damage the environment must be assessed to reveal the true-cost, versus the benefit. A true-cost economy recognizes that healthy rivers and fisheries are vital economic assets for cities and towns, and would maintain policies that protect them from harm.

Environmental protection must take precedence so that development takes place in a balanced and eco-friendly manner. Specific areas where improvements must be made:

a. Hydroelectric

1. Hydroelectric operators must not be paid incentives that would encourage water to be held back in headponds.
2. Proponents that already use reservoirs and headponds for hydroelectric generation must also have to pay a carbon tax on their GHG emissions.



Flooding landscapes to create reservoirs or headponds causes vegetation and soils to decompose, resulting in net emissions of the GHGs, carbon dioxide (CO₂), and methane (CH₄) into the atmosphere for decades and possibly centuries following flooding.ⁱ

In the Flooded Upland Dynamics Experiment (FLUDEX) three boreal upland areas with differing amounts of organic carbon (OC) 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 CO₂ and CH₄ 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 CH₄ production increased [Matthews et al., 2005]. Ebullition added an increasing amount to net CH₄ production, from 0% to 5% in the first year to 50% to 145% and 130% to 175% in the second and third years. CO₂ ebullition was very small relative to net DIC productionⁱⁱ.ⁱⁱⁱ

Climate change is altering hydrological cycles, meaning that historic data may no longer be a reliable predictor of future hydrological patterns. Matthews (2011) has argued that the conventional method of building dams is fundamentally flawed. Looking at the available data, engineers decide on a flow rate that they feel will optimize the infrastructure project. The problem is that historical data is not a very good guide to the future of freshwater resources -- particularly now that extreme water conditions have been exacerbated by a rapidly changing climate.^{iv} Increased droughts will make many hydropower projects uneconomical, while more extreme rainfall will heighten the risk of dam failures and catastrophic flood releases.

Wetlands help to moderate the effects of flooding by reducing the influx to stream systems immediately following rainstorms. Overexploitation, inadequate wetland protection, and destruction of wetland habitats compound the problems generated by changes in seasonal rainfall.^v Inundation of wetlands to create a headpond can result in the loss of that critical buffer that would serve to mitigate the effects of flooding. A priority when making decisions that directly or indirectly influence wetlands is to ensure that information about the full range of benefits and values provided by different wetland ecosystem services is considered.^{vi}

Sustainable management of natural resources such as forests, soils, water, and fisheries are at the heart of conservation, and these resources are the building blocks for green cities, energy production, agriculture, and water supply and sanitation systems. Relatively stable ecosystems and species dynamics are indicative of sustainable resource use, and conservation science has been broadening this knowledge to buffer ecosystems and species from negative climate change impacts.^{vii,viii}

"Climate change is the critical issue of our time."^{ix} 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. One thing is for certain - it is the wrong climate for damming rivers.

b. Sustainable Forestry Management

That the province adopt the Forest Principles, the informal name given to the *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests* (1992), a document produced at the United Nations Conference on Environment and Development, informally known as the Earth Summit.

Sustainable forest management practices are essential to any climate change strategy. Healthy forests absorb carbon dioxide during photosynthesis, which purifies our air and infuses the atmosphere with life-sustaining oxygen. Clear-cutting of our forests must be stopped, and instead we must have strong policy in place to prescribe the practices of selective harvesting, and replanting of mixed forests to ensure the biodiversity and sustainability of healthy forests.

c. Crude Oil Transport

There must be no more spills or explosions of crude oil that send fuel and black smoke into the Ontario environment. The transport of oil by rail is proving to be extremely risky and hazardous to the environment and to public health and safety. There have been four train disasters in the north so far in 2015. The Ontario government must take strong action before a catastrophe on the scale of the Lac-Mégantic rail disaster occurs here. The last train derailment was only 4 kilometers away from Gogama, and should be a wake-up call.

Rail transport, along with the Line 9 and Energy East pipelines place our citizens and water resources at great risk, and would only enable further development of the Alberta tar sands, and place our survival and planet at further risk.

The government of Ontario needs to send the Federal government and the fossil fuel industry a strong and clear message that we do not want their polluting crude oil transported through our province.

3. First Nation Traditional Knowledge

A Climate Change Task Force must be created to make informed recommendations on policy and best practices to effectively meet climate change challenges. This task force should be made up of climate scientists, First Nation elders, environmental organizations, and dedicated Ontario citizens. Traditional Knowledge and climate science should be the backbone of climate change policy.

4. Communities & Built Form

Development decisions must be based on the best interests of communities, and the environment – not on corporate lobbying and for-profit agendas.



a. Smart Wastewater Management:

Waste discharge and wastewater treatment are sources of greenhouse gas emissions. Although carbon dioxide (CO₂) and methane (CH₄) have been the main focus in climate change calculations and discussions, the potential impact of nitrous oxide (N₂O), which is also generated from wastewater treatment plants (WWTPs) is now gaining increased prominence. N₂O is one of the radiatively important gases considered by the Intergovernmental Panel on Climate Change (IPCC) for its greenhouse gas emission scenarios. This is understandable given that the greenhouse impact of N₂O is about three hundred times that of CO₂.

Municipalities are increasingly being forced to release untreated and undertreated sewage into receiving streams in order to protect public infrastructure and private homes; and treated wastewater is being released into our lakes, streams and rivers on an ongoing basis. Degraded water quality can result in eutrophication and algae blooms, and blue-green algae blooms are an increasing occurrence on many of our lakes and rivers. Wastewater treatment facilities must have much more rigorous nutrient removal standards that take climate change and the myriad of challenges it presents into account.

Government is long overdue for a public policy discussion in Ontario on improved approaches to wastewater management.

b. Green Infrastructure for Stormwater Management

California has just entered the fourth year of a devastating drought, with predictions that it could be an ongoing problem for many years. Los Angeles has invested in a water conservation project, the Elmer Avenue Neighborhood Retrofit, designed to channel precious water into storm drains that have no concrete bottom so it allows the water to dribble and percolate through and soak into the ground. Another part of this retrofit is shallow ditches or bioswales that act as filters to clean the water before it re-enters the aquifer. Even the sidewalks are permeable, allowing the water to pool underground instead of just running off into storm drains.^x

Stormwater runoff is also known to be a major source of pollution for lakes, rivers and creeks in urban watersheds. Rain gardens, low impact development, infiltration galleries, and protecting and conserving wetlands, all help to protect surface water quality.

Ontario needs to initiate policy that mandates the incorporation of green infrastructure and protection of wetlands into all new development, to ensure climate resilient communities.

5. Science & Technology

a. Battery Storage Technology:

With the advancements made in wind and rooftop solar, investments in leading edge battery technology for the large and small-scale storage of electricity must be pursued.



There must be a way to store energy produced from renewables, as solar and wind are intermittent and unreliable. Storage is the necessary piece of the puzzle that must be in place if we want to eliminate our reliance on fossil fuels, and curb GHG emissions – for both household and transportation use.

Investment in research and development of battery storage is essential.

b. Sustainable Agriculture:

Sustainable climate-smart agricultural practices that reduce nutrient and chemical run-off and protect the environment must be a high priority.

All development or redevelopment proposals must strategically align with climate change mitigation efforts.

ORA is very grateful for this opportunity to comment.

Respectfully,

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ⁱ 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

ⁱⁱ 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.

ⁱⁱⁱ 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

^{iv} Matthews, J. 2011. *Scientific American*, *World's Dams Unprepared for Climate Change Conditions*. *PLoS Biology*.

^v Schindler, D.W., 2001. The cumulative effects of climate warming and other human stresses on Canadian freshwaters in the new millennium. *Canadian Journal of Fisheries and Aquatic Sciences*. 58: 18-29.

^{vi} Millennium Ecosystem Assessment. 2005. *Ecosystem and Human Well-Being: Wetland and Water Synthesis*. World Resources Institute, Washington, D.C. Sec1:ii

^{vii} Walther G-R, Post E, Convey P, Menzel A, Parmesan C, et al 2002. *Ecological responses to recent climate change*. *Nature* 416: 389-395. Doi: 10.1038/416389a.

^{viii} Parmesan C. 2006. *Ecological and evolutionary responses to recent climate change*. *Annual Review of Ecology and Evolution* 37: 637-669.



^{ix} *Ontario's Climate Change Discussion Paper 2015, Minister's Message, Glen Murray, Minister of Environment and Climate Change. P-3.*

^x *Drought-ravaged L.A. looking to 'sponge-up' every bit of rainwater*