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Re: Springbank Dam Decommissioning

Dear Mayor Brown and City of London Councillors:

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 who have come together to protect, conserve and restore healthy river ecosystems.

ORA and those listed below are writing in response to the recent settlement of the lawsuit over the Springbank Dam. We request serious consideration of our comments and recommendations regarding the future of the Springbank Dam, and its potential effects on public health and safety, on water quality, climate change, fisheries, and on the natural environment of the Thames River, Lake St Claire and Lake Erie, should it be returned to service.

Recommendation:

We respectfully request that the City of London's Mayor and Council pass a motion to fully decommission the Springbank Dam at its earliest convenience.

Background:

The Springbank Dam was constructed on the Thames River in 1929 to create a reservoir to provide recreational opportunities for the local rowing club. When in operation, the dam held back water for six months of the year, from May until early November. The dam is owned by the City of London and is operated by the Upper Thames River Conservation Authority (UTRCA) for recreational purposes. It is our understanding that the dam does not function as a flood control structure.

When the dam was in operation, the gates were closed throughout the summer months, and the reservoir became a eutrophic and oxygen starved zone with elevated phosphorus and e-coli levels so high that rowing club members were instructed to shower with their clothes on if they fell into the reservoir. When the summer was over, the gates were opened to drain the reservoir and flush the contaminated brew downstream into the Thames, and ultimately into Lake St. Clair and Lake Erie.

Wastewater Bypasses:

A large contributor to the high phosphorus levels and pollution in the Thames River is due to the frequent bypassing of untreated and undertreated wastewater effluent from the Greenway, Vauxhall and Pottersburg wastewater treatment facilities into the Thames.

The City of London has been under intense scrutiny regarding its combined sewer and stormwater infrastructure - an antiquated system that is not equipped to adequately handle the extreme rain events that have been on the increase due to a warming climate.

According to the City of London's 2015 wastewater reports up to 28 June 2015, 55,060,000 liters of raw untreated wastewater and 199,464,000 liters of wastewater with only solid bio-mass removed, has bypassed treatment and been released directly into the Thames River.[1] Over the last 13 years, from 2002 to 2014, the average annual volume of Raw Bypass (untreated) sewage released into the Thames River was 181,000,000 litres, and in addition, 574,000,000 litres of Secondary Bypass (partially treated) sewage.[2]

The Thames River has experienced excess nutrient levels for decades, and this has resulted in extreme nutrient enrichment in the river system. In fact, a 2012 UTRCA Watershed Report indicated that phosphorus and E. Coli levels at Byron were registering at six times the provincial guideline.[3] Therefore, the Lake Erie Binational Nutrient Management Strategy, a product of the Lake Erie Lakewide Management Plan, identified the Thames River as one of the priority rivers delivering excess phosphorus to Lake Erie and a key Ontario watershed impacting on Lake Erie's West Basin.[4]

The City's wastewater treatment facilities release massive loads of nutrients and bacteria into the Thames River above the dam every year. Water impounded in a reservoir throughout the hot summer months would warm significantly, accumulating plant, algae and fecal matter, in an oxygen depleted environment, creating the perfect environment for harmful toxic algae to thrive and bloom.

The Thames River has been used as a conduit to jettison stormwater and wastewater for many years; however, it is a complex and diverse ecosystem that supports a highly valued fishery, mussels, caddis larvae, brook trout, reptiles, bald eagles, and many other bird and aquatic species listed as threatened, endangered or of special concern, including the Spiny Softshell Turtle.[5]

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[1] *City of London – 2015 Bypass and Overflow Data*
[2] *Thames River Water Quality 2014, City of London, Environment and Engineering Services, March 2015 – Purpose: To present information on the water quality of the Thames River for 2014.*
[3] *The Forks, 2012 Watershed Report Card.*
[4] Freshwater Research, Water Quality Assessment in the Thames River Watershed – Nutrient and Sediment Sources, Prepared by Gertrud Nurnberg, Ph.D., Bruce LaZerte, Ph.D., Freshwater Research. Prepared for The Upper Thames River Conservation Authority, London, Ontario, 30 March 2015.
[5] Trout Unlimited Canada Technical Report No. ON-020, April 2007, P-4.

Impacts of Dams and Reservoirs:

Water quality and temperature are altered when river flow is held back in a reservoir. For example, a Grand River Water Quality report describes the impact of its seven major multi-purpose dams and associated reservoirs on water quality in the Grand River Watershed,

> "*…. water quality is commonly decreased down-stream of the dams. In particular, elevated total phosphorus, soluble reactive phosphorus (i.e. phosphate) and ammonia-nitrogen levels as well as low oxygen levels is apparent. Monitoring data of Belwood, Conestogo and Guelph reservoirs (Guildford 2006) confirm that the water bodies are thermally stratified in the summer and fall which creates oxygen depletion above the bottom sediment that subsequently releases phosphorus to the bottom waters of the reservoir. Because these reservoirs have bottom and mid-depth outlets, such accumulated substances are flushed downstream. Upon mixing events the internal phosphorus load fertilizes the photogenic zones leading to cyanobacterial or blue-green algae blooms in the reservoirs (Guildford 2006) and possibly the downstream river sections. Similarly, a study in the southern Grand River observed that algal biomass increase upon impounding and that sediment oxygen demand is high throughout the reach (Kuntz 2008). Consequently, the effect of reservoirs can probably explain several of the water quality issues in the downstream river sections and should be evaluated in more detail."*[6]

> *"On-line dams in Caledonia and Dunnville also play a role in the phosphorus dynamics in the river. More detailed assessment of the southern Grand for a Canada-Ontario Agreement sponsored project in 2004 illustrated the influence of the dams in which phosphorus levels tended to 'spike' just above the dams. A build-up of phosphorus-rich sediment; the lake-like behavior of the river behind these dams; and localized biogeochemical processes likely contributes to the increased phosphorus levels found in the lower river reaches."*[7]

Algae and blue-green algae are photosynthetic organisms that thrive and multiply in conditions of sufficient sunlight, nutrients, and appropriate water temperatures. Such conditions are exacerbated by the building of dams and the regulation of rivers, creating a more suitable habitat for these organisms when nutrients are trapped and retained in impoundments, and/or flows are impeded.[8,9]

Overproduction of algae (including blue-greens) leads to blooms which, at the very least, impair aesthetics, taste and odour of water, and at worse can threaten the health of humans and wildlife.

The Thames River has had a steady supply of nutrients from upstream wastewater treatment facilities, as well as major contributions from agricultural run-off, and trapping this water in a reservoir would create the perfect environment for algae to thrive. Allowing water to degrade behind the dam, and then periodically flushing it down into Lake St. Claire and Lake Erie would not make a positive contribution to the Lake Erie 40% Phosphorus Reduction targets suggested by the Federal government, nor would it be in alignment with the Great Lakes Water Quality Agreement.

Until the City of London's sewage bypass challenges are resolved, the heightened levels of contamination in the reservoir would place public health and safety at significant risk. The Thames River is also a primary source of drinking water for many private homeowners, and for municipal and First Nation communities. Ingesting blue-green algae toxins can result in acute gastroenteritis, liver and kidney

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[6] Water Quality in the Grand River Watershed: Current Conditions & Trends (2003-2008), H.A. Loomer and S.E. Cooke, Draft October 2011, Grand River Conservation Authority. P-168-169
[7] Ibid, P-5
[8] *Ontario's Climate Change Discussion Paper 2015, Minister's Message, Glen Murray, Minister of Environment and Climate Change. P-3.*
[9] *Winter, J.G. and H.C. Duthie. 1998. Effects of urbanization on water quality, periphyton and invertebrate communities in a southern Ontario stream. Canadian Water Resources Journal Vol. 23(3): 245-247*

toxicity and even death in humans[10,11], pets, livestock and wildlife.[12] Children are at greater risk than adults of developing serious liver damage should they ingest or be exposed to high levels of toxins because of their comparatively lower body weight.[13]

The serious health and safety risks to the public should be compelling enough reasons for removal of the dam.

Greenhouse Gas Emissions

The recent COP21 Conference on Climate Change resulted in the Paris Agreement, which is a global commitment to reduce greenhouse gas emissions in order to limit global temperature increase to less than 2 degrees Celsius, compared to pre-industrial levels. Achieving this goal will require the active engagement and cooperation of every level of government.

The contribution of greenhouse gases from large dams has long been known; however, scientists are now reporting that millions of smaller dams and reservoirs on rivers around the world make an important contribution to the greenhouse gases linked to global climate change. For instance,

> *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 it can become eutrophic. 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…..*[14]

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.[15] 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."* [16] River networks with high nutrient and sediment loading from agricultural or wastewater effluent provides microbial

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[10] *Teixera, M.G.L.C., Costa, M.C.N., Carvalho, V.L.P., Pereira, M.S. and Hage, E. 1993. Bulletin of the Pan American Health Organization. 27: 244-253.*
[11] *WHO. 1999. Toxic Cyanobacteria in Water: A guide to their public health consequences, monitoring and management. Edited by Ingrid Chorus and Jamie Bartram © 1999 WHO. C-4, P-3. Online: http://www.who.int/water_sanitation_health/resourcesquality/toxcyanbegin.pdf*
[12] *Huynh, M. and N. Serediak. 2006. Algae Identification Field Guide. Agriculture and Agri-Food Canada. 40 pp. P -9. Online: http://publications.gc.ca/collections/collection_2011/agr/A125-8-2-2011-eng.pdf*
[13] *Health Canada 2013. Environmental and Workplace Health, Blue-Green Algae… (See Ref. 59).*
[14] *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*
[15] *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 Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change; Stocker, T. F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S. K., Boschung, J., Nauels, A., Bex, V., Midgely, P. M., Eds.; Cambridge University Press: Cambridge, U.K. and New York, U.S.A., 2013.*
[16] *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.*

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.[17]

The effect of damming on methane emissions conducted in a central European impounded river revealed that the reservoir reaches are a major source of methane emissions and that areal emission rates far exceed previous estimates for temperate reservoirs or rivers. It showed that sediment accumulation correlates with methane production and subsequent ebullitive release rates. Results suggested that sedimentation-driven methane emissions from dammed river hot spot sites can potentially increase global freshwater emissions by up to 7%.[18]

Re-establishing a reservoir at Springbank Dam would create the ideal environment for increased greenhouse gas emissions.

Impacts on Fisheries:

A dam can significantly alter the flow regime of a river, dramatically affecting habitat for many native aquatic species. The effects of dams on fisheries has been very well documented over the past century, and includes the loss or serious decline of many iconic fish species that are of importance to Ontario's economy, biodiversity, and natural and cultural heritage.

Springbank Dam placed back into service would create a barrier to fish migration, preventing access to critical habitat (e.g. spawning and rearing areas), and would result in changes to water temperature and water quality, resulting in conditions that are unsuitable for many native fish species.

Many would attest to the tremendous improvements in the Thames River fishery during the last decade, both in quality and the greater variety of fish species, as well as how much more enjoyable it is to be in or near the water. This is very good news for recreation and tourism in the London area, as it has drawn naturalists and fishermen back to the river. In the summer of 2015, London was host to the SOTTO Provincial Fly Fishing Championship – the Angling Sports Thames River Open.[19] This is as a direct result of these significant improvements.

Conclusion:

The Thames River is a nationally designated Heritage River, and is one of the most species rich rivers in Ontario, supporting over 90 species of fish and many aquatic species which are listed as threatened, endangered or of special concern.[20]

Lake Erie relies on its tributaries as spawning and feeding grounds for the numerous fish species that move throughout its region, and contributes to a multi-billion-dollar commercial and recreational fishery. It is again in a crisis with its frequent and troubling blue-green algae blooms, and governments are working collaboratively to reduce phosphorus inputs. It is imperative that the City of London work with all levels of

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[17] *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.*

[18] *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*

[19] *SFFC 2015 Ontario Provincial Fly Fishing Championship - Angling Sports Thames River Open, August 15th, 2015, London, Ontario*

[20] Trout Unlimited Canada Technical Report No. ON-020, April 2007, P-4.

government, and to act in the best interests of the many who rely on Lake St. Claire, Lake Erie, and the Thames River for their drinking water.

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.[21]

"*Climate change is the critical issue of our time.*"[22] Healthy rivers are the key to successful adaptation to the extremes of climate change. There is an urgent need to integrate climate change into water protection strategies and policies. Protecting our freshwater must be recognized as an issue of national security – it is essential to our children's survival on this planet.

It has been more than a decade since the Environmental Assessment (EA) for the Springbank Dam was completed, and all the necessary permits will have expired. MNRF has also confirmed that the City of London was informed that an updated EA is recommended to allow for community consultation and reassessment of potential social, economic and environmental impacts, and to look at alternatives. It is expected that there will be strict requirements for any dam works as a result of the government's proposed Lake Erie Phosphorus Reduction Strategy, the Great Lakes Water Quality Agreement, and the fact that there are several Species at Risk present in and around the Thames River. Consequently, the cost of the necessary studies and dam repair requirements will undoubtedly far exceed the settlement amount of $3.7 million, if it is allowed to proceed.

We thank you for your consideration, and request that the City of London accept our recommendation for a full decommissioning of the Springbank Dam.

We also recommend that any settlement claim dollars left over from decommissioning be assigned to upgrading wastewater treatment capacity to reduce bypass events, and to protect the recovery of the Thames River.

We fully support the Thames River Anglers' Association submission, and look forward to your response.

Respectfully,

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Ontario Federation of Anglers and Hunters (24,000 members)
Brian Moore, Zone J Chair

[21] *Global Risks 2015 – 10th Edition. Online: http://www3.weforum.org/docs/WEF_Global_Risks_2015_Report15.pdf*
[22] *Ontario's Climate Change Discussion Paper 2015, Minister's Message, Glen Murray, Minister of Environment and Climate Change. P-3.*

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