ONTARIO POWER GENERATION

700 University Avenue

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BY EMAIL ONLY: Linda@OntarioRiversAlliance.ca

Dear Linda,

Thank you for your letter received by email on January 25th and for the opportunity to clarify our responses as follows:

ORA Question:

(Q1), you indicated that the new Calabogie GS is being designed for American Eel passage, but that "only certain components of it will be initially constructed". ORA submits that in the chance that Eels present themselves without notice, that the eel ladder and inclined screen rack should already be in place during those months that Eels are known to require passage.

Clarification for ORA's Question:

For your background, in 2011 correspondence between OPG and the Ministry of Natural Resources concluded that there were no known occurrences of American Eel, or areas of protected habitat at or in the immediate area of Calabogie Generating Station, the Stewartville Generating Station (downstream) or Mountain Chute Generating Station (upstream). OPG is not aware of any new documented occurrences of American eel since 2011, and the two barriers to eel movement downstream of Calabogie have not been altered (Arnprior and Stewartville GSs). In recent years, efforts to recover American Eel in the Ottawa River have been in play, including construction of an eel passage structure on the Ottawa River at Chaudière GS. OPG also complies with the Endangered Species Act for American Eel through its Mitigation Plan activities at Chats and Chenaux GS on the Ottawa River. All of this is to say that as circumstances continue to change and American eel recover further up the system, OPG will be prepared to further support its recovery up the Madawaska River.

The new Generating Station is designed for American Eel passage. At commissioning, the proposed GS will have an eel ladder/trap to facilitate upstream movement of eels. OPG will install a ladder in the tailrace of the proposed new station. The ladder will lead to a trap/tank where any eels can be counted and tagged prior to manually moving the fish upstream of the station. Since its unlikely eels would move up the North or South Channel at Calabogie due to the height and flows at the water control structures, any eels that come up the Madawaska River would be detected at the proposed ladder and trap.

Once eels are moved upstream of the station with the ladder/trap or if there is a documented presence of large eels upstream of the proposed station, OPG will install an inclined screen rack with spacing of no more than 19 mm. The inclined screen will lead to a bypass structure, which will be designed and built during the construction, that will allow eels to move downstream and prevent entrainment. When installed the inclined screen would be

deployed from July through September. The screen would be removed after September to minimize clogging from leaf debris in the fall and ice damage in the winter.

ORA Question:

(Q2), you indicated that "providing passage for species such as Walleye and River Redhorse was not deemed necessary". ORA submits that one of the most significant reasons for the decline in many iconic species of fish in Ontario is the almost total lack of fish passage at hydroelectric facilities, including the Calabogie GS and the other facilities on the Madawaska River. There are currently only three hydroelectric dams out of a total of 224 in Ontario that have installed fish passage. Without the provision of safe and suitable passage, fish are unable to move upstream to access critical habit and spawning beds; and during downstream migrations many fish pass through the turbines and are killed or injured.

Providing passage for species such as Walleye and River Redhorse was not deemed necessary. Unlike the migratory American Eel, the other species are able to complete their life histories as resident populations within the reach between the Calabogie GS and the Stewartville GS.

For downstream passage, the intake design proposed for the Calabogie GS offers a screened intake with specifically designed slow, fish friendly, approach velocities. These design characteristics prevent fish from becoming exposed to the risk of the turbines in the generating station and avoids the need for fish friendly turbines.

<u>Clarification for ORA's Question:</u>

Fish passage for walleye and suckers in Ontario has had limited success, typically there is less than 30% passage at various fish ladders or passage structures in Ontario (Bunt et al. 1999; OMNR 2010). The Madawaska River management plan also reviewed fisheries issues on the river and no mention of fish passage at the Calabogie GS is found in the document (OMNR 2009).

To help manage fishes on the Madawaska R. upstream and downstream of the Calabogie GS, OPG has worked with anglers and the OMNRF to manage flows (especially during the spring for spawners such as walleye and river redhorse suckers). At the existing Calabogie GS, OPG maintains minimum flows (5 cms) on the North Channel Spillway based on studies by OPG and OMNR for spring spawners (OMNR 2009). Since fish passage for walleye and suckers has not proven effective to maximize the spawning ability for these spring spawners OPG envisions that impacts from the station will be managed through habitat improvements and flow improvements. The proposed generating station will maintain the spring spawning flows at the North Channel. It is also envisioned that spawning shoals will be constructed downstream of the proposed generating station to offset habitat changes on the River, suitable flows and depths will be maintained over the spawning shoals to ensure they are productive for spring spawning fishes (e.g., walleye, suckers, etc.) .

OMNR has also conducted stocking of walleye on Calabogie Lake to enhance walleye population and offset for overfishing (OMNR 2009)

For spring spawners upstream of the existing Calabogie GS and proposed station, OPG has constructed spawning shoals downstream of the Barrett Chute GS (OMNR 2009); minimum flows are maintained over the spawning

shoal to ensure they are functional for spring spawners. At the High Falls spillway (the spillway adjacent to Barrett Chute GS), when spill occurs in the spring, and spring spawners have accessed and likely spawned in the spillway, OPG maintains a minimum flow to protect spring spawners and the development of eggs and larvae. When sufficient time has passed after spawning, OPG in consultation with OMNRF has developed a stepped decrease in flows to allow developing larvae to drift downstream. OPG also maintains a minimum year round flow to protect aquatic habitat in the High Falls spillway.

One of the reasons that there are so few fish ladders or fish passage around dams in Ontario is the ineffectiveness of fish passage for Percids (walleye) and Catostomids (suckers), since many of the dams and generating stations in Ontario are on river systems where these species are the dominant migratory fishes, passage is not a useful mitigation measure. However, these species respond favourably to habitat improvements and flow manipulation, based on the species present OPG proposes these offsets to mitigate impacts from the proposed station.

References

Bunt, C.M., C. Katapodis and R.S. McKinley. 1999. Attraction and passage efficiency of white suckers and smallmouth bass by two denil fishways. N. American Journal of Fisheries Management. 19: 793 – 803.

Kerr, S.J. 2010. Fishways in Ontario. Fisheries Policy Section. Biodiversity Branch. Ontario Ministry of Natural Resources. Peterborough. ON. 34 pages.

Ontario Ministry of Natural resources. 2009. Madawaska River Water Management Plan. 254 pages.

ORA Question:

Climate Change:

In your response you also addressed ORA's Comment 8 (Q9), in which you seem to have missed our point. ORA is not implying that you should remove the dam or drain the reservoir; we were simply pointing out that greenhouse gas emissions (GHG) resulting from the operation of this facility must be acknowledged and considered as an environmental impact.

OPG's response to ORA provided a link to "readily available research from Hydro Quebec on reservoirs and greenhouse gas emissions"; however, the lead scientist in all of their studies is Alain Tremblay, PhD., Environmental Sciences, Hydro Quebec. Studies are highly suspect when a corporation uses their own in-house scientists rather than relying on independent arms-length scientists.

ORA submits that Hydro Quebec's studies are biased in favour of its own profit-based self-interests. As you well know, the "emission free" label is used to great benefit as a sales pitch for waterpower producers. As a matter of fact, the link you provided in your response to ORA indicates that one of the payoffs is the "potential C02 emission credits in the future Canadian carbon market", and another is the sale of "low GHG emissions"12 power to other jurisdictions.

Additionally, OPG's ER reports that "the generation of hydroelectric power is a sustainable source of power that does not produce greenhouse gases and therefore is an important component of Ontario's climate change plan"13. Even Hydro Quebec doesn't claim that hydroelectric does not produce greenhouse gases.

Their bogus claim is that “net GHG emissions from Québec hydropower are significantly lower than electricity generation from natural gas and coal, and on par with wind”14.

Contrary to OPG’s claims, there are a multitude of independent studies indicating that when sediment builds up behind a dam it releases net emissions of carbon dioxide and methane into the atmosphere for decades and possibly centuries following flooding.15, 16

In contrast to the widespread assumption (e.g., in Intergovernmental Panel on Climate Change scenarios) that GHGs emitted from reservoirs are negligible, measurements made in boreal and tropical regions indicate they can be substantial 17, 18. 19

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.20 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."21

The assessment of GHG emissions produced from new and older hydroelectric reservoirs is complex and variable, depending on the amount of upstream erosion, wastewater effluent, agriculture run-off, depth of the reservoir, amount of sediment build-up behind the dam, and the cumulative effects of all these combined influences.

River networks with high nutrient and sediment loading from erosion, agricultural or wastewater effluent, or hard shorelines in residential/industrial/commercial development areas, provides microbial communities with a large source of carbon that can deplete oxygen and fuel methane production. Algal blooms from excessive nutrient loading can further enrich reservoir sediments.22

“With the “green” reputation of large hydroelectric dams already in question, scientists are reporting that millions of smaller dams on rivers around the world make an important contribution to the greenhouse gases linked to global climate change. Their study, showing that more methane than previously believed bubbles out of the water behind small dams….”23. 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 [CH4] per unit area than a deeper water body. Shallow reservoirs are not unlike paddy fields which are known to contribute substantially to methane emissions…24

Clearly dams and waterpower reservoirs (small and large) contribute to world GHG emissions and these emissions must be carefully assessed and reported in a transparent and authentic attempt to address climate change.

In any event it is clear that a full accounting of greenhouse gas emissions must be carried out before we can be assured that a decision to construct and/or operate waterpower facilities will be a positive or negative contribution to climate change.25. This ER does not address this aspect of GHG emissions that could be produced by this facility, and is therefore misleading.

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ORA recommends that OPG undertake a full assessment of the GHG emissions resulting from the operation of the Calabogie GS, taking into account the cumulative effects of all other upstream influences, and include those results as an important consideration in the ER.

Conclusion:

Ontario rivers are facing very challenging times, when the deregulation and streamlining of the regulatory process is taking place at break-neck speed! Most of the 224 hydroelectric facilities in Ontario were built in the late 1800s to early 1900s when very little attention was paid to the environmental costs. Since then the American Eel, Lake Sturgeon and Atlantic Salmon have been decimated – largely due to hydroelectric facilities fragmenting aquatic habitat and a gauntlet of turbines slicing and dicing these iconic fish. We are also experiencing Climate Change in real time, and it's placing increasing pressure on water quantity, water quality and species decline in Ontario rivers. Instead of increasing freshwater resilience and protection, OPG and the Ontario Waterpower Association are lobbying our legislators for additional gutting of the environmental regulatory process26.

OPG has an opportunity to acknowledge these errors and to instead advocate for strengthened environmental protection and resiliency and to right the wrongs of the past.

Clarification for ORA's Question:

We acknowledge your concerns noted in your recent correspondence. We would like to distinguish between a redevelopment project and a greenfield project. With a redevelopment project such as Calabogie, the reservoir was built 100 years ago. As the Calabogie Project is not changing the existing reservoir area, there will no change in greenhouse gas emissions at this site, and therefore there is no incremental impact with respect to the environmental assessment. However, you are correct that for new hydroelectric developments that involve the creation of new reservoirs, we would quantify new emissions as part of an environmental assessment process.

We trust that these clarifications help to address your questions. Please feel fee to contact me should you wish to discuss further. My cell is the best if you wish to call, 416 528 967 or alternatively my email is also reliable – Gillian.macleod@opg.com

All the best,

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