Pilon, Janet

Subject: PFAS and Endangered Species in Your Study Area

From: Joseph Minor
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Introductions: HORA Consultants, meet Hwy 6 Consultants. And vice versa.

Considering that both my Provincial and Federal tax dollars are paying for your work, I am hoping for some future tax savings by having you guys share the information I have been paying both of you to collect.

(And when you are done with your respective EA's, could you please make the data accessible to the public – ideally by posting it online?)

I am concerned that you may not be sharing this information, because I see no mention of the HORA consultants on the Hwy 6 consultants' web site.

This is odd, because the most contaminated portions of the area that the HORA consultants have been studying for more than 8 years have a large overlap with the Study Area of the Hwy 6 consultants.

On the Hwy 6 web site: I found no reference to the high level PFAS contamination that occurs within your study area.

Perhaps this is because the EA that is the underpinning of this current effort was done 36 years ago (1987).

1987 was so long ago that PFAS (principally PFOS) were still being sprayed at the Hamilton International Airport (immediately upstream of your study area). Even though the spraying of PFAS at the airport may have ceased in 1989 (as far as we have been told), the airport remains a significant source of PFAS contamination to the upper Welland River (including the Hwy 6 study area).

As far as we have been told, PFAS are still flowing off of the airport, down through your study area, and continue downstream to the Binbrook Conservation Area and the Port Davidson Conservation Areas.

Even 50km+ downstream of the airport the levels of PFAS contamination are still so high that children and women who are either pregnant or who may become pregnant should not be eating the majority of the fish at the Port Davidson Conservation Area. See: the Guide to Eating Ontario Fish, available online).

The 2017 PFAS standards still in use in the Guide are based on a 2016 assessment of the medical science. The key figure from 2016 was a RfD for PFAS of 60 ng/kg/d. (More about this below.)

A lot has been learned about PFAS in the last seven years.

Please read, thoughtfully consider, and incorporate into your respective EAs the findings of this current (2023) comprehensive review of the scientific literature:

"Toxicity Assessment and Proposed Maximum Contaminant Level Goal for Perfluorooctane Sulfonic Acid (PFOS) in Drinking Water". US EPA. March 2023.

This 500 page review was prepared by a team of more than 100 scientists and medical doctors who considered thousands of scientific papers. The science review's main conclusions were:

"Therefore, EPA has selected an overall RfD for PFOS of 1 x 10E-7 mg/kg/day."

"Based upon a consideration of the best available peer reviewed science and a consideration of an adequate margin of safety, EPA proposes a MCLG of zero for PFOS in drinking water."

Lets start with "a MCLG of zero":

The 2023 science review concluded that for an adequate margin of safety the MCLG (Maximum Contaminant Level Goal) for PFOS in drinking water should be ZERO. ZERO is an interesting number because the units no longer matter. ZERO means ZERO ppt, ZERO ng/L, ZERO ounces per tanker truck, ZERO drops per swimming pool, etc. ZERO means ZERO. Any amount of this man-made chemical is an unwanted contaminant.

(Hence the US EPA's 2022 proposal to list PFOS as a CERCLA hazardous substance. The CERCLA process is commonly known as "Superfund".)

(PFOS is the dominant PFAS in the Study Area. PFOS accounts for more than 97% of the PFAS in the fish downstream of your study area.)

Consider also: "overall RfD for PFOS of 1 x 10E-7 mg/kg/day".

The 2023 science review concluded that the RfD (Reference Dose) for PFOS should be 0.0000001 mg/kg/d. In overly simplified English, the current science indicates that on average you should avoid eating more than 0.1 ng of PFOS per kg of body weight per day. Since this RfD is 600 times lower than the 2016 Health Canada RfD used to set the amount of PFOS contaminated fish it is "advisable" to eat in the Guide to Eating Ontario Fish (2017 to present), the "advice" in the Guide is set way too high.

When the Guide is updated to reflect modern (2023) science, it is likely children and women who are either pregnant or who may become pregnant will be "advised" to NOT EAT any of these highly PFAS contaminated fish. This isn't due to some major scientific breakthrough – it is just the steady accumulation of facts that all support the commonsense notion I first proposed in 2011:

Children and women who are either pregnant or who may become pregnant should not eat the fish downstream of PFAS toxic hotspots (e.g., the Hamilton International Airport).

Corollary #1:

Children and women who are either pregnant or who may become pregnant should not eat the fish downstream of the Highway 6 Study Area.

But more importantly, the 2023 science review indicates that the levels of PFOS/PFAS that are a health concern are orders of magnitude lower than what we thought just a few years ago. In fact, the levels of concern are now way below the detection limits of just a few years ago. The areas of PFOS/PFAS contamination in your Study Area probably need to be remapped using testing with lower detection limits to be relevant to our current understanding of the risk.

We have been told that the spraying of PFOS at the Hamilton International Airport ended in 1989. 34 years later the airport (and your Study Area) remain as significant ongoing sources of PFAS contamination

downstream. This is despite three cleanup efforts that have apparently all failed to have a significant effect on the ongoing PFAS runoff from the airport (we have not been presented with any data that indicate otherwise).

PFOS and PFOA have been proposed as CERCLA (Superfund) hazardous substances. Please consider this when planning any construction, operations, or repair/rehabilitation in the area. PFAS are not old school engineering "dilution is the solution to pollution" substances. The usual "a few silt fences here and there" approach is grossly insufficient. Any amount of PFOS is a problem (ZERO means ZERO), and because PFAS are surfactants they can pop up unexpectantly in large concentrations when previously covered sediments or soils are reworked to the surface.

So the PFAS contamination in your Study Area is both significant and so persistent that it will remain a concern both for any construction that may occur soon, and for any repairs or rehabilitation that might occur in the future.

The EA needs to note that the PFAS toxic hotspot at the airport is at the headwaters of the upper Welland River, and your Study Area is so close to the source that there is not much dilution of the PFAS runoff as it crosses your Study Area.

As a result, it is likely that both the stream bed and the banks in the Study Area are highly contaminated with PFAS, and that any disturbance of these areas will likely mobilize pulses of PFAS downstream (toward the Binbrook and Port Davidson CAs).

Another area of concern that the public has not been given any information about is what happens during flooding events in your Study Area. Due to climate change, these events are becoming more frequent. In those cases the upper Welland River escapes its banks and spreads over the surrounding areas. If the flooding event is severe enough that it also causes bank erosion, PFAS contaminated sediments both from the stream bed and the banks are likely to be mobilized and spread over wider areas within your Study Area. Better mapping of the distribution of PFAS in the Study Area is warranted in order to reduce the chances that future work uncovers PFAS deposits – which would likely only be detected as spikes in PFAS downstream of the Study Area.

The EA needs to do some serious hydrology studies before construction is contemplated. Again, due to climate change flooding is becoming more frequent. The increased amount of impermeable surface being proposed by the EA will increase flooding in the highly PFAS contaminated Study Area. Even when the floodwaters make it back into the main stem of the upper Welland River, they will continue to mobilize PFAS downstream by scouring the bottom and banks of the highly PFAS contaminated upper Welland River. This flooding will likely result in the mobilization of highly PFAS contaminated sediments and soils, with resulting increased downstream movement of these hazardous substances towards the Binbrook and Port Davidson CAs.

While I initially had hopes that the PFOS toxic hotspot at the Hamilton International Airport would be cleaned up and that we might be seeing improvement downstream (including in the Hwy 6 Study Area), it has been 12 years since I pointed out the problem and it appears (from the limited data made available to the public) that the cleanup efforts (both at the airport and in downstream areas) have failed.

I am still hopeful that I will see improvements with respect to the PFAS contamination of the upper Welland River before I die. My fear is that unless both this EA and any resulting construction are done very carefully that things could actually get worse.

Please be very careful.

For something that is called an "Environmental" Assessment, this EA lacks balance. It is narrowly focused on the limited issue of optimizing a single "want" of a single species whose numbers are increasing. Meanwhile

the “needs” (for survival) of all of the other (99%+) species that actually live in the Study Area are largely ignored. Many of these species are suffering population declines due in no small part to past unbalanced “Environmental” Assessments. As a result, unless balance is restored in these EAs the numbers of many species will continue to dwindle until they are extirpated (made “locally extinct”).

This EA proposes to destroy the homes of many species so that a single species (that does not even live in the “Study Area”) can roll over the destroyed homes of the many resident species just a little bit faster.

A more balanced “Environmental” Assessment would include the following information:

Hamilton is in Ecoregion 7E (Lake Erie Lowland Ontario)

According to: Biodiversity and Conservation (2020) 29:3573–3590

“Lake Erie Lowland Ontario (Ecoregion 7E)

Only 14% of this ecoregion remains in natural cover and only 1% is within conserved/protected areas. The Lake Erie Lowlands ecoregion has experienced historic rates of habitat loss to agriculture and urban areas that are among the highest in Canada. Remaining habitat patches are generally small, highly fragmented and degraded. The total (human) population is 8,324,391 (2016), with a growth of just over 29% in the last 20 years.”

According to the OMNRF, “The flora and fauna in Ecoregion 7E are the most diverse in Canada”.

Environment Canada used to have on the web an interactive map that showed that Ecoregion 7E had the most Species At Risk of any Ecoregion in Canada (that map has since disappeared due to lack of funding).

The Study Area falls within the smaller subregion of 7E known as Ecodistrict 7E5. According to the OMNRF, “Less than 1% of the ecodistrict comprises protected areas.”

Page 68 of the September/October 2020 issue of Canadian Geographic shows a map of “Canadian Biodiversity Protection Hotspots”. On the map, protecting the green areas has “the greatest potential to stem biodiversity loss while protecting it for the future”. The Study Area is one of the green areas.

The land in the Study Area that has not been paved is much more valuable wildlife habitat than the large areas of additional pavement that are being proposed in this allegedy “Environmental” Assessment. Due to the well documented phenomenon of “road kill”, the large areas of pavement proposed in this “Environmental” Assessment have significantly NEGATIVE value as wildlife habitat. This is because not only is wildlife habitat directly destroyed by the pavement proposed by this EA, but also because of the extra mortality that occurs when the remaining wildlife is killed while crossing the pavement desperately trying to reach the remaining fragmented unpaved wildlife habitat.

This EA needs to be more proactive about protecting wildlife habitat, both for the sake of the species that live there but also for the need for all species (including humans) to live in a world with intact ecosystems. Functioning ecosystems provide something known as ecosystem services – things that ecosystems do that help stabilize the conditions on planet Earth (and keep it habitable for everybody).

There are easy obvious examples, and probably other things that ecosystems do for us that we don’t even know about (but we might get a nasty surprise if they were gone).

The most obvious one is air purification. Plants that are photosynthesizing do many vital things for us. The most immediate need they provide is oxygen. They also remove carbon dioxide from the air, and they also purify the air by removing many other pollutants. Part of the problem we are having with global warming is that we have not preserved enough plants to absorb all of the carbon dioxide we are producing by burning too

much fossil fuels. In order to return the planet to a more healthy balance, we need both more area covered by plants and to burn less fossil fuels.

This EA proposes actions that will hurt us on both sides of this equation.

Another easy one is water purification (both surface and ground water), and flood protection. Having intact vegetated areas (including wetlands) both decreases the severity of flooding and helps purify water.

This EA proposes that we remove areas that mitigate flooding and replace them with pavement that exacerbates flooding.

Another ecosystem service (pollination) is discussed in a paper published this year: "Safeguarding pollinators requires specific habitat prescriptions and substantially more land area than suggested by current policy". Nature Portfolio Scientific Reports (2023) 13:104. (https://rdcu.be/din7i)

This paper is directly relevant to this EA because the Study Area for this EA falls smack dab in the middle of the area researched for the paper (Southern Ontario).

A significant portion of our food production depends on insect pollination. While we have traditionally leaned heavily on a single domesticated species of bee (the honey bee), there are dangers in putting too many eggs in one basket. Honey bee numbers are declining in the industrialized world (e.g., here). The point of the paper is that to increase the stability of pollination for the future, we also need to consider protecting habitat for wild bees. The paper notes that we are losing about 1000 ha of bee habitat per year, and that more consideration needs to be given to protecting more pollinator habitat.

This EA is proposing increased pavement and increased vehicular traffic at higher speeds. I was unable to find anything in the paper that indicated that this would be helpful.

One of the less predictable ecosystem services has to do with stability. Larger ecosystems tend to be more stable due to the fact that there are enough members of all of the species present so that none are lost due to chance fluctuations in numbers. If a lost species was a "keystone" species (e.g. a species that kept other species in check by eating them) then the remaining ecosystem might suffer plagues of overpopulations that a healthy ecosystem would have kept under control.

As far as we currently know, there is only one example of life existing anywhere in the universe. All life on Earth appears to have arisen from a shared common ancestor. It has continued to thrive for more than 3 billion years. Even though we know a lot about what keeps the system running, we cannot be certain that our understanding is complete. Until our understanding of the ecosystems that support life on earth improves, it would be prudent to curtail killing parts of the surface of the planet with pavement based on the patently misguided guess that in thirty years that our "want" for increased higher speed truck traffic will be more important than our "need" for food, water, and clean air.

The land in the Study Area that currently remains unpaved is of the highest quality in all of Ontario with respect to climate and soils. It can support either farming or wildlife better than most other land in Ontario. Paving any more of it should be the last option for any truly "Environmental" Assessment.

On a more positive note, in the past month I have spent a couple of hours each at 7 locations in the Ancaster Greenbelt area (with at least one of the locations being in the Study Area itself).

The area is a beautiful mix of farmland and wildlife habitat, and with minimal effort I observed 8 Endangered Species:

1) *Lasiurus borealis*. Declared an Endangered Species At Risk by COSEWIC – May 2023.
2) *Lasiurus cinereus*. Declared an Endangered Species At Risk by COSEWIC – May 2023.

3) *Lasionycteris noctivagans*. Declared an Endangered Species At Risk by COSEWIC – May 2023.
4) *Myotis leibii*. Declared an Endangered Species by Ontario Endangered Species Act.
5) *Myotis lucifugus*. Declared an Endangered Species by Ontario Endangered Species Act, Canada Species At Risk Act, COSEWIC.
6) *Myotis septentrionalis*. Declared an Endangered Species by Ontario Endangered Species Act, Canada Species At Risk Act, COSEWIC.
7) *Perimyotis subflavus*. Declared an Endangered Species by Ontario Endangered Species Act, Canada Species At Risk Act, COSEWIC.
8) *Danaus plexippus*. Declared an Endangered Species At Risk by COSEWIC – 2016.

Please be very careful what you do in the homes of these 8 Endangered Species, as well in the homes of all of the other species that live in the Study Area.