Emerging contaminants (ECs) have recently gained notoriety due to their potential toxicity to wildlife and humans. ECs are continuously released via point sources (e.g. MWWE) and diffuse sources (e.g. runoff), and thus, are ubiquitous in the aquatic environment. There is a lack of data regarding the chronic toxicity of ECs to aquatic wildlife, particularly to early life stages of native fish species living in environments of concern. Because rainbow trout are native to North America and introduced extensively elsewhere, as well as their high trophic level, they may be at particular risk to ECs. Some of the ECs of concern that are frequently found in MWWE include hexabromocyclododecane (HBCD), silver (Ag) nanoparticles, short-chain chlorinated paraffins (SCCP), 17α-ethynylestradiol (EE2), and Prozac™ (FLX). Many rural Canadian municipalities discharge MWWE with little to no treatment, resulting in elevated exposures to these ECs in receiving waterbodies.

**Objectives**

To investigate the sub-chronic effects of ECs on early life stages of Rainbow Trout by:

- Characterizing effects of ECs on fertilization success, embryonic development, and hatchability of *Oncorhynchus mykiss*
- Identifying the potential impact of ECs on fry survival, transition to exogenous feeding, and sexual differentiation
- Comparing sensitivity of *Oncorhynchus mykiss* to selected ECs relative to standard laboratory fish species

**Hypothesis**

- Exposure to MWWE will lead to adverse effects on early life stages of *O. mykiss*
- Chronic exposures of *O. mykiss* to selected ECs will have life stage specific toxic effects
- Responses to chronic exposures of *O. mykiss* to selected ECs will differ from acute effects of the same chemicals
- Toxic effects on native Canadian fish species will differ to those of model laboratory species

**Methods and Procedures**

- *O. mykiss* gametes will purchased from TroutLodge, WA, USA and fertilized and immediately transferred to exposure solutions (EE2, FLX, MWWE, Ag nanoparticle) and sediments (HBCD, SCCP).
- For each chemical, the lowest doses were selected based on environmental relevance and increased incrementally thereafter.
- Fish will be exposed under continuous flow-through conditions, and subsamples will be collected at critical development stages (hatching, swim-up, sexual differentiation).
- Endpoints will include hatching success, time to hatch, survival, time to swim-up, and success of sexual differentiation, and morphological and histological defects, as well as endpoint specific rates of development.
- Fish will be reared according to Environment Canada guidelines (1).

**Background**

- Emerging contaminants (ECs) have recently gained notoriety due to their potential toxicity to wildlife and humans.
- ECs are continuously released via point sources (e.g. MWWE) and diffuse sources (e.g. runoff), and thus, are ubiquitous in the aquatic environment.
- There is a lack of data regarding the chronic toxicity of ECs to aquatic wildlife, particularly to early life stages of native fish species living in environments of concern.
- Because rainbow trout are native to North America and introduced extensively elsewhere, as well as their high trophic level, they may be at particular risk to ECs.
- Some of the ECs of concern that are frequently found in MWWE include hexabromocyclododecane (HBCD), silver (Ag) nanoparticles, short-chain chlorinated paraffins (SCCP), 17α-ethynylestradiol (EE2), and Prozac™ (FLX).
- Many rural Canadian municipalities discharge MWWE with little to no treatment, resulting in elevated exposures to these ECs in receiving waterbodies.

**Preliminary Results**

- It appears that high doses of AgNP (30 nM) have the potential to increase incubation time and decrease hatching success in *O. mykiss*.
- There seems to be no relationship between MWWE, Prozac, or EE2 on incubation times or hatching success in *O. mykiss*.
- Future research will aim to further characterize the effects of these emerging chemicals to other native species, in order to aid in the development of more appropriate environmental risk assessment strategies for receptors of concern.

**References**


**Acknowledgments**

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