



Technical Memorandum

Date: October 13, 2022

To: Doug Hill

From: Joel Harrison and Brent Parsons (HESL)

Re: J220049 – Scoped Lake Eugenia Management Study – Review of Preliminary Water Quality Concerns

1. Introduction

Mr. Doug Hill has requested a brief summary of water quality concerns noted through the Scoped Lake Eugenia Management Study performed by HESL. The summary of water quality concerns provided is preliminary as the study is not yet complete.

2. Preliminary Summary of Concerns

- Lake Eugenia is a shallow naturalized reservoir lying in a largely agricultural/rural drainage basin.
- Lakeshore residents have expressed concern regarding macrophyte density and the lake's water quality (including algal blooms) since at least the 1970s (and possibly earlier).
- Historical water quality data were compared to results from HESL's August 2022 survey.
- Chloride concentrations have increased. This is not unexpected, as lakes across North America are becoming more saline due to road salt inputs. Chloride remains well below the CCME guideline of 120 mg/L.
- Nitrate concentrations have increased. This is likely due to a combination of catchment inputs and aerial deposition. In recent years, nitrate has occasionally exceeded the CCME guideline of 3 mg-N/L by a small amount.
- An algae bloom in July 2022 was dominated by *Microcystis aeruginosa* (a common blue-green algae) and one sample collected by MECP contained a microcystin concentration of 36.7 mg/L which is above Health Canada's recreational guidelines. The concentrations of chlorophyll-a, phosphorus, and nitrogen suggest that phytoplankton production is limited by the availability of phosphorus.
- Phosphorus concentrations are higher in the lake's outflowing water than in the inflowing water; this suggests that shoreline and in-lake processes (e.g., internal phosphorus loading) are potential contributors of phosphorus.
- Phosphorus release from anoxic sediments (internal phosphorus loading) is likely an important source of phosphorus to cyanobacteria ("bluegreen algae").
- Lake Eugenia is experiencing cumulative impacts through stressors associated with water level control, lake and watershed development, climate change and invasive mussels. Detailed study and remediation options are required to better both understand and control algae blooms in the lake.

We hope that this technical memorandum meets your current needs; please do not hesitate to contact us with any questions.