Section Outline:

*Working title: “profiling hydrochemical dynamics in a rain-dominated water supply area: characterizing the Leech watershed using passive sampling techniques”*

DRAFT – NSERC forWater Pacific Maritime Masters Thesis Project

Hannah J McSorley

2019-11-21

Table of Contents

[Acronyms 3](#_Toc25256967)

[Acknowledgements 5](#_Toc25256968)

[1. Introduction (extended) 7](#_Toc25256969)

[Literature Review (including:) 7](#_Toc25256970)

[Source water quality and rain events 7](#_Toc25256971)

[Stormflow and sampling (including passive sampling techniques and advantages) 7](#_Toc25256972)

[Dissolved organic carbon and water treatment 7](#_Toc25256973)

[Dissolved organic carbon correlated to other parameters 7](#_Toc25256974)

[protected watersheds 7](#_Toc25256975)

[Greater Victoria Regional Water Supply System 7](#_Toc25256976)

[Research area: Leech River Watershed 8](#_Toc25256977)

[Research Objectives 10](#_Toc25256978)

[Research sites 13](#_Toc25256979)

[2. Methods (extended) 21](#_Toc25256980)

[2.1 Vertical racks for passive water sampling on the rising limb of hydrograph 21](#_Toc25256981)

[Theory 21](#_Toc25256982)

[Design 21](#_Toc25256983)

[Benefits, challenges and assumptions 23](#_Toc25256984)

[Method QA/QC: rising limb sampler quality assurance and quality control 24](#_Toc25256985)

[2.2 Development of a passive water sampler design for the falling limb of hydrograph (falling limb sampler) 25](#_Toc25256986)

[Theory 25](#_Toc25256987)

[Design 25](#_Toc25256988)

[Benefits, challenges and assumptions 25](#_Toc25256989)

[Field protocol 25](#_Toc25256990)

[Method QA/QC: falling limb sampler quality assurance and quality control 25](#_Toc25256991)

[Gauging streamflow (? not yet completed) 25](#_Toc25256992)

[Cross-sectional area and velocity 25](#_Toc25256993)

[Manning’s equation 25](#_Toc25256994)

[Salt dilution 25](#_Toc25256995)

[Laboratory Analysis 26](#_Toc25256996)

[Quantitative analytical methods for dissolved organic carbon 26](#_Toc25256997)

[Qualitative analytical methods 26](#_Toc25256998)

[Ancillary data: contributions from partners 26](#_Toc25256999)

[3. Results & Discussion 27](#_Toc25257000)

[Spatial variability: DOC variability across the watershed 27](#_Toc25257001)

[Synoptic grab sampling at ten locations 27](#_Toc25257002)

[Stormflow samples: compare and contrast six sites 27](#_Toc25257003)

[Temporal variability: DOC variability over time and within stormflow 27](#_Toc25257004)

[Seasonal patterns over sixteen months of data 27](#_Toc25257005)

[Stormflow samples: variability within six sites 27](#_Toc25257006)

[5. Conculsions 28](#_Toc25257007)

[Characterizing the Leech Water Supply Area 28](#_Toc25257008)

[Understanding spatial and temporal variability in hydrochemical dynamics 28](#_Toc25257009)

[Future Directions 28](#_Toc25257010)

[APPENDIX 29](#_Toc25257011)

[forWater: NSERC Strategic Network for forested drinking water source protection technologies 29](#_Toc25257012)

[References 31](#_Toc25257013)