

"Developing and Evaluating Water Quality Benchmarks for the Protection of Aquatic Life"

21. – 24. April 2015

Day 1	Tuesday am	9:00 – 12:00	Session 1 A and B	1 A: Introduction and Overview of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
	Tuesday pm	13:00 – 17:00	Session 2 A	1 B: Introduction into the Development and Implementation of Site-Specific Water Quality Benchmarks for the Protection of Aquatic Life 2 A: The Details of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
Day 2	Wednesday am	9:00 – 12:00	Session 2 B	2 B: The Derivation Protocol for the Canadian Water Quality Guidelines for the Protection of Aquatic Life
	Wednesday pm	13:00 – 17:00	Session 3	3: Aquatic Toxicity Testing for Contaminants of Concern: interpretation, uses, limitations, and critical evaluation
Day 3	Thursday am	9:00 – 12:00	Session 4	4: Overview and Use of the Species Sensitivity Distribution Approach in CWQG-PAL
	Thursday pm	13:00 – 17:00	Session 5	5: Development Methods and Critical Review Tools for a Site-Specific Water Quality Benchmark
Day 4	Friday am	9:00 – 12:00	Session 6	6: Q&A Session; Study Period and Self-Analysis of Case Study; Group discussion on Case Study
	Friday pm	13:00 – 17:00	Session 7	7: Critical Review and Assessment of a Proponent-Submitted Site-Specific Water Quality Benchmark; (Case Study Analysis)

Session 1 A: Introduction and Overview of the Canadian Water Quality Guidelines for the Protection of Aquatic Life

Target Course Participants:

Environmental experts (managers (non-scientists), and scientists) handling water quality issues in Canada. Session designed to provide familiarity and comfort in discussing water quality benchmarks in general terms (i.e., "management-level").

Duration: Quarter-day (1.5 hrs) -

Session Outline:

The short session will provide an historic overview and understanding of how the Canadian Water Quality Guidelines for the Protection of Aquatic Life are developed, and should be applied. Participants will learn the general principles involved in the derivation, the purpose, application area and use of the national water quality guidelines. Their advantages, challenges, and limitations, and some comparison to select provincial, federal, and non-Canadian (international) benchmarks are given. Topics

like the CCME Non-degradation Policy with regards to water quality, the intended protection level of the CWQGs, and exceedance of a guideline value are discussed. Numerical and narrative benchmarks will be examined. Participants will become better informed in when and how to use national, provincial, and federal (and foreign) water quality guidelines for decision-making. The session will also provide some cursory insight into the factors that could modify the toxicity of a substance, and thereby could influence or alter the national guideline value. Resulting issues concerning interpretation will also be introduced.

This session is designed as an introduction into the world of water quality benchmarks, and will be generally non-technical. Participants will be better informed in how to use national water quality guidelines for decision-making. It will also provide the necessary background to better understand the subsequent sessions.

Session1 B: Introduction into the Development and Implementation of Site-Specific Water Quality Benchmarks for the Protection of Aquatic Life

Target Course Participants:

[as above].

Duration: Quarter-day (1.5 hrs) - .

Session Outline:

This session builds on the previous part, and focuses on the development and implementation of site-specific water quality guidelines for the protection of aquatic life. The reasons for developing a site-specific WQB (e.g. presence/absence of species, toxicity modifying factors) will be presented. This includes an overview of the common modifiers in general terms (such as temperature, chemical water composition {i.e., pH, organic matter, hardness, dissolved salts, etc.}, and their impact to various contaminants of concern (mainly some metals, and some organics) on select target species. The important site-specific derivation methods, ranging from the scientifically simple to the complex, are introduced. These methods include the water effects ratio, background concentration, re-calculation, and resident species approaches, among others. Participants will learn the advantages and disadvantages to each approach, its data requirements, and its most appropriate application.

This session is an introduction into the issues involved with site-specific water quality benchmarks, and will be mostly non-technical. Participants will gain an understanding of the difference between using a national versus a site-specific water quality benchmark for decision-making, and the issues involved in developing a site-specific benchmark.

Session 2 A: The Details of the Canadian Water Quality Guidelines for the Protection of Aquatic Life

Target Course Participants:

Environmental managers and scientists involved in the decision-making and handling of water quality issues in Canada, Evaluators of proponent-derived site-specific water quality benchmarks.

Duration: 1/2 Day (3 hrs)

Session Outline:

This session deepens the important issues introduced in the Introductory CWQG Session, such as the use of the Canadian Environmental Quality Guidelines Compendium binder, the respective derivation protocols, obtaining additional information on a CWQG, assessing and evaluating aquatic toxicity tests suitable for the derivation and modification of water quality guidelines. The meaning and use of aquatic toxicity test results will be discussed. Particular emphasis will be placed on pointing out proper and improper ways of conducting aquatic toxicity tests, and common errors done in toxicity testing which make the results unsuitable for water quality guideline derivation or environmental risk assessment. The participants will learn to evaluate the suitability and acceptability of toxicity tests for deriving water quality benchmarks. Participants will learn insights into the two common methods of deriving water quality benchmark values (safety factor approach and species sensitivity distribution approach), and their advantages and disadvantages and associated problems. While both methods seem simple and straight forward, they are actually complex and can be easily “manipulated” or done wrong. Participants will learn about some of these “manipulation techniques” and mistakes. As a result, the participants will be better able to evaluate WQ guidelines and objectives (generic and site-specific) generated by third parties.

Session 2 B: The Derivation Protocol for the Canadian Water Quality Guidelines for the Protection of Aquatic Life

Duration: 1/2 Day (4 hrs)

Session Outline:

In this session, the current Derivation Protocol for the CWQG-PAL (published in 2007) will be discussed and analysed in detail. This will give participants the necessary understanding and tool to determine if a WQB under consideration (e.g., a provincial, international, site-specific, etc.) is comparable and acceptable for Canadian purposes.

Session 3: Aquatic Toxicity Testing for Contaminants of Concern: interpretation, uses, limitations, and critical evaluation

Target Course Participants:

Environmental managers and scientists involved in the decision-making and handling of water quality issues in Canada, Evaluators of proponent-derived site-specific water quality benchmarks.

Duration: Half-day (4 hrs); - Wednesday pm,.

This session will focus on the most important aquatic toxicity test for WQB derivation, the single-species single-substance laboratory toxicity test. Particular emphasis will be placed on pointing out its strong aspects and weak points, the type of chemicals it is suited for, the results it yields, and proper and improper ways of conducting it. Furthermore, common errors done in toxicity testing which make the results unsuitable for water quality guideline derivation or environmental risk assessment will be pointed out. The course participants will learn important tools to evaluate and interpret published test results for reliability and acceptability in environmental management. These tools help to evaluate the suitability and acceptability of toxicity tests for water quality benchmark derivation.

During the session, we will examine and analyse an actual toxicity testing laboratory report for a sample contaminant of concern. As a result, the participants will be better able to evaluate WQ guidelines and objectives (generic and site-specific) generated by third parties.

Session 4: Overview and Use of the Species Sensitivity Distribution Approach in CWQG-PAL

Target Course Participants:

Environmental managers and scientists involved in the decision-making and handling of water quality issues in Canada, Evaluators of proponent-derived site-specific water quality benchmarks.

Duration: Half-day (3 hrs) - Thursday am,.

This session will provide an examination of the details involved in creating a Species Sensitivity Distribution evaluation, the data requirements, and the interpretation of the results. The "SSD Master" spreadsheet / software is being discussed and explored.

Session 5: Development Methods and Critical Review Tools for a Site-Specific Water Quality Benchmark

Target Course Participants:

Environmental managers and scientists involved in the decision-making and handling of water quality issues in Canada, Evaluators of proponent-derived site-specific water quality benchmarks.

Duration: Half-day (4 hrs) - Thursday pm,.

The session focuses on the details of the various derivation methods available to create a site-specific water quality benchmark for the protection of aquatic life. Several methods, ranging from the scientifically simple to the complex, are available for modifying existing generic (i.e., national or provincial) guidelines or deriving new site-specific benchmarks. These methods include the water effects ratio, background concentration, re-calculation, and resident species approaches, among others. Participants will learn the advantages and disadvantages to each approach, its data requirements, and its most appropriate application.

In addition, the participants will be presented with examination tools to critically review and assess a proponent-submitted site-specific WQB for scientific validity and defensibility, and for acceptance as an appropriate site-specific management tool.

Session 6: Q&A Session; Study Period, Self-Analysis of Case Study, Group Discussion on Case Study

Duration 1 to 3 hrs - Friday am, .

The session will start with a Q&A and Discussion section covering the material of the previous three days (and other issues of interest). The participants will then have time to re-examine the provided case study again and apply the newly-acquired skills and tools in preparation for the afternoon session.

We will then start discussing the pros and cons of the Case Study as a group. The detailed analysis will follow in the afternoon session.

Session 7: Critical Review and Assessment of a Proponent-Submitted Site-Specific Water Quality Benchmark

Target Course Participants:

Environmental managers and scientists involved in the decision-making and handling of water quality issues in Canada, Evaluators of proponent-derived site-specific water quality benchmarks.

Duration: Half-day (3 hrs) - Friday pm,

This session is best given after the participants had a self-directed time period to independently assess a sample case study and apply the newly acquired tools presented in the previous sessions

In this session, we will examine in detail and as a team a proponent-derived (or consultant-derived) SS-WQB for acceptability by the regulatory authority. The course participants will have received the sample (fictitious) proponent-derived case study before the course, with the task to examine it for potential mistakes, analyse it, and evaluate it prior to the course. We will share our results, and assess the case study step-by-step as a team. The gravity and implications of detected short-comings and errors will be discussed in detail. The impact of certain corrections and improvements on the final SS-WQB value will be presented.