

Workshop Programme

WORKSHOP PROGRAMME (A)

18 June 2016 (Saturday)

Workshop on Derivation and Application of Water Quality Guidelines

Instructors:

Graham Merrington, Director, WCA Environment, Faringdon, UK
Adam Peter, Principal Scientist, WCA Environment, Faringdon, UK
Michael Warne, Senior Research Fellow, Centre for Agroecology, Water and
Resilience, Coventry University, UK

Venue: 3N01 Kadoorie Biological Sciences Building, HKU Main Campus

This workshop will provide an international perspective of the overall process of deriving water quality guidelines and related environmental quality standards. Key steps in the derivation process will be discussed in detail, while practical examples will be given. Attendees will undertake real-world activities within the workshop and additional activities will be available on-line for follow-up work. It is aimed at researchers, post-graduate students, environmental consultants, officers of environmental authorities, and regulators who do not yet have expertise in deriving water quality guidelines.

0830–0900 Registration

0900–1030 Preparation: Everything You Need to Know to Derive Water Quality Guidelines

1. What is an EQS or an WQG? What are the differences? Summary of what countries have.
 - a. Why derive one? What can they be used for?
 - b. What kinds of things should criteria be set for?
2. Bioavailability, does this need a different WQG?
 - a. What challenges are there?
 - b. What substances are affected?
 - c. Why are they different?
3. How can we derive an EQS-WQG (examples of PALs)
 - a. Similarities and differences in key regulatory approaches,
 - i. US, EU, Australia, Environment Canada etc...
 - ii. Different types of substances or pressures

- b. Data selection
 - i. Definitions of acute and chronic
 - ii. Trophic levels or taxonomic representation
 - iii. Minimum requirements for EQS-WQG derivation
 - iv. Other data, e.g. mode of action, fate and behaviour, QSARs
- c. Quality checking
 - i. Relevance and reliability
 - ii. Klimisch codes
 - iii. CRED system and others

1030–1100 Coffee Break

1100–1230 Lecture II: Deriving Water Quality Guidelines

- 1. Deriving an EQS
 - a. What are the suitable approaches for deriving an EQS-WQG and when are they suitable?
 - i. Deterministic and probabilistic approaches
 - ii. Chemicals with specific modes of action
 - iii. Effect of model used
 - iv. Region specific vs. generic data
 - v. Acute vs. chronic
 - b. Chemical examples
 - i. Non-specific mode of action (e.g. a polar narcotic)
 - ii. Specific mode of action (e.g. herbicide)
 - iii. Volatile, adsorbing, or degradable substances?
 - c. Ground-truthing/validation (see Session 4 – does it do what it says on the tin)
 - i. Microcosms and mesocosms
 - ii. Evidence from field monitoring
 - iii. Site specific information
 - d. Extrapolating from toxicity data to ecosystem protection
 - i. Precautionary principle and assessment factor based approaches
 - ii. Statistically based approaches

1230–1400 Lunch Break

1400–1530 Lecture III: Including Bioavailability into Water Quality Guidelines

1. Bioavailability – what does it mean? Key concepts.
 - a. Bioavailability definition
 - b. Specifics relating to EQS-WQG
 - i. BLMs and mechanisms
 - ii. Application to ecosystems
 - iii. Improving ecological relevance
2. Regulatory use of bioavailability
 - a. Historic applications (hardness based standards)
 - b. Risk assessment/PNECs EQS-WQG
3. Deriving a bioavailability based limit value
 - a. Bioavailability conditions in tests
 - b. Bioavailability normalisation models
 - c. Site specific EQS-WQG

1530–1600 Coffee Break

1600-1730 Lecture IV: Guideline Implementation and Application

1. Implementation requirements
 - a. Appropriate analytical method (sensitivity, reproducibility)
 - b. Sampling locations and sample collection infrastructure
 - c. Compliance assessment (confidence of failure?)
 - d. Mechanisms for taking remedial action and driving improvements
2. Implementing bioavailability
 - a. Full BLMs or user-friendly tools?
 - b. Advantages, disadvantages
 - c. Practical exercise with bio-met
3. Feasibility trials, data and resource needs?
 - a. Challenges in monitoring
 - b. Interpretation and the tiered approach
4. Summary and conclusions

1730 Adjourn

WORKSHOP PROGRAMME (B)

18 June 2016 (Saturday)

Workshop on Derivation and Application of Sediment Quality Guidelines

Instructors:

**Kevin Kwok, Research Assistant Professor, Department of Applied Biology and
Chemical Technology, Hong Kong Polytechnic University, Hong Kong, China**

**Stuart Simpson, Senior Principal Research Scientist, CSIRO Land and Water,
Australia**

**Richard Wenning, Principal Consultant, Ramboll Environ, San Francisco,
California, USA**

Venue: 6N11 Kadoorie Biological Sciences Building, HKU Main Campus

This workshop will provide an international perspective of the overall process of deriving and using sediment quality guidelines (SQGs) and related environmental quality standards. The presentation will describe a range of approaches for deriving SQGs and the uncertainties with the approaches. Sediments are more complex than waters, and the bioavailability of contaminants generally needs to be determined prior to assessing risks. Key aspects of SQG derivation processes, and how contaminant bioavailability is incorporated into assessments will be discussed, while practical examples will be given. It is aimed at researchers, post-graduate students, environmental consultants, officers of environmental authorities, and regulators who do not yet have expertise in the derivation and use of SQG.

0830–0900 Registration

**0900–1030 Lecture I: Introduction to Sediment Contaminants and Need for
Sediment Quality Guidelines [R.J. Wenning, USA]**

1. Contaminant accumulation in sediments and organism requiring protection
 - a. Sediment and benthic organism types
 - b. Contaminant exposure pathways and toxicity
2. Types of sediment quality guidelines
 - a. Derivation processes
 - b. Information requirements for setting site-specific guidelines
3. Application of sediment quality guidelines
 - a. SQGs as part of a weight of evidence environmental quality assessment
 - b. Use of SQGs in decision making
 - c. Use of SQGs in environmental monitoring strategies

1030–1100 Coffee Break

1100–1230 Lecture II: Bioavailability and Effects of Contaminants in Sediment [S. Simpson, Australia]

1. Principles of contaminant bioavailability
 - a. Differences between sediments and waters
 - b. Contaminant partitioning, stratification and exposure routes
 - c. Why does bioavailability matter?
2. Understanding metals in sediments
 - a. Exposure routes and metal binding phases
 - i. Partitioning to organic carbon metal binding phases
 - b. Methods for assessing metal bioavailability
 - i. Dilute-acid extractable metals
 - ii. Acid volatile sulfide (AVS)
 - iii. Metal bioavailability in oxidised sediments
 - iv. Use of passive samplers and other measurement methods
3. Understanding organic contaminants in sediment
 - a. Equilibrium partitioning methods
 - b. Non-exhaustive extraction methods
 - c. Use of passive samplers and other measurement methods

1230–1400 Lunch Break

1400–1530 Lecture III: Emerging Contaminants and the Need for Sediment Quality Guidelines [K.W.H. Kwok, China]

1. Overview of current understanding of emerging contaminants in sediments
 - a. Global surveys, patterns and trends in coastal areas, river, oceans and biota
 - b. New contaminants now and into the future
2. Example 1- Nanomaterials are a global concern in sediments
3. Example 2 - Plastics are a global concern in sediments
4. Methods for derivation of emerging contaminants
 - a. Deriving site-specific bioavailability for use in sediment management
 - b. Approaches to setting SQGs for new substances

1530–1600 Coffee Break

1600–1700 Lecture IV: Implementation of Sediment Quality Guidelines in North America, Australia, and China [R.J. Wenning, S. Simpson, K.W.H. Kwok]

1. SQGs in North America
 - a. Legal standing in regulations
 - b. Scientific and environmental monitoring requirements
 - c. Current practices and future changes

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2. SQGs in Australia
 - a. Legal standing in regulations
 - b. Scientific and environmental monitoring requirements
 - c. Current practices and future changes
3. SQGs in China
 - a. Legal standing in regulations
 - b. Scientific and environmental monitoring requirements
 - c. Current practices and future changes
4. SQGS elsewhere in the Asia Pacific Region
 - a. Current practices in different countries and regional authorities

1700 – 1730 Discussion and Summary of Workshop

1730 Adjourn

Conference Programme

*The 2nd International Conference on Deriving
Environmental Quality Standards for the
Protection of Aquatic Ecosystems (EQSPA-2016)*

PROGRAMME

19 June 2016 (Sunday) — Conference Day 1

Opening Ceremony

Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

0830-0900 **Registration**

0900-0925 **Opening Ceremony**

Masters of Ceremony

Miss. Katie W. Y. Yeung and Mr. Jason K. C. Yau

Postgraduate Students, The University of Hong Kong (HKU)

Welcoming Remarks

Prof. Pauline Chiu

Dean, Faculty of Science, HKU

Opening Remarks

Mr. Patrick C. K. Lei

Principal Environmental Protection Officer (Water Policy & Science)

Environmental Protection Department, the Government of the Hong

Kong Special Administrative Region, China

Conference Introduction

Prof. Kenneth M. Y. Leung

Chairman, Organizing Committee of the EQSPA 2016 Conference;

Associate Dean (Research & Graduate Studies), Faculty of Science,

HKU

0925 - 0930 **Group Photography**

PROGRAMME

19 June 2016 (Sunday) — Conference Day 1
Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

Session I — Chairpersons: Jenny Stauber and Adam Peters

- 0930-1000 **Keynote 01**
Environmental Quality Benchmarks - The Good, the Bad, the Ugly
Peter M. Chapman
Chapema Environmental Strategies, North Vancouver, British Columbia, Canada
- 1000-1030 **Keynote 02**
U.S. EPA's Current Approach to Developing Aquatic Life Ambient
Water Quality Criteria, Recent Successes, and Efforts to EPA's
Methodology for Deriving Criteria
Kathryn Gallagher
United States Environmental Protection Agency (U.S. EPA), Office of Water, Office
of Science and Technology, Washington, DC, USA
- 1030-1100 **Coffee Break and Poster Viewing**
- 1100-1130 **Keynote 03**
CRED - Criteria for Reporting and Evaluating Ecotoxicity Data
Marlene Ågerstrand
Department of Environmental Science and Analytical Chemistry, Stockholm
University, Sweden
- 1130-1200 **Keynote 04**
High-throughput Screening and Prioritization for Chemicals with
Hazard or Risk Potencies
Zi-jian Wang
State Key Laboratory of Environmental Aquatic Chemistry, Research Centre for Eco-
Environmental Science, Chinese Academy of Sciences, Beijing, China
- 1200-1220 **Invited Talk 01**
Screening of Priority Pollutants and Resident Test Organisms for
Development of Water Quality Criteria in China
Zhen-guang Yan
State Environmental Protection Key Laboratory of Ecological Effect and Risk
Assessment of Chemicals, Chinese Research Academy of Environmental Sciences,
Beijing, China
- 1220-1240 **Invited Talk 02**
Perspectives on Alternative Endpoints in Aquatic Toxicology and
Environmental Quality Criteria Derivation
Bryan W. Brooks
Department of Environmental Science, Baylor University, Waco, Texas, USA

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19 June 2016 (Sunday) — Conference Day 1
Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

1240-1400 **Lunch Break and Poster Viewing**

Session II — Chairpersons: Peter Chapman and Bryan Brooks

- 1400-1430 **Keynote 05**
Application of QSAR in Deriving Water Quality Criteria for Metals
Feng-chang Wu
State Key Laboratory of Environmental Criteria and Risk Assessment, Chinese
Research Academy of Environmental Sciences, Beijing, China
- 1430-1500 **Keynote 06**
Development of Water Quality Guidelines for Metals in Tropical
Ecosystems
Jenny L. Stauber
CSIRO Land and Water, Sydney, New South Wales, Australia
- 1500-1530 **Keynote 07**
Study of Environmental Criteria of Heavy Metals (Cr(VI), Pb and Cd)
in China
Zheng-tao Liu
State Environmental Protection Key Laboratory of Ecological Effects and Risk
Assessment of Chemicals, Chinese Research Academy of Environmental Sciences,
Beijing, China
- 1530-1550 **Invited Talk 03**
How Specific is Site-Specific? Proposed Guidance for Deriving
Location-Specific Water Quality Guideline Values
Rick A. van Dam
Environmental Research Institute of the Supervising Scientist, Australian
Government Department of the Environment, Australia
- 1550-1610 **Invited Talk 04**
WQC Derivation and Ecological Risk Assessment for Bisphenol A
Considering its Endocrine Disrupting Features
Zheng-yan Li
College of Environmental Science and Engineering, Ocean University of China,
Qingdao, China
- 1610-1630 **Coffee Break and Poster Viewing**

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19 June 2016 (Sunday) — Conference Day 1
Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

Session III — Chairpersons: Kenneth Leung and Uwe Schneider

1630-1700 **Keynote 08**
Current Status of Water Quality Standards for the Protection of
Human Health and Aquatic Ecosystems in Korea
Youn-Joo An
Department of Environmental Health Science, Konkuk University, Seoul, Korea

1700-1730 **Keynote 09**
Recent Developments in the Derivation and Implementation of
Environmental Quality Standards for Chemicals in the UK
Graham Merrington
WCA Environment Limited, Faringdon, Oxfordshire, UK

1730-1800 **Keynote 10**
Recent Development of Water Quality Guidelines in Australia and
New Zealand
Michael St J. Warne
Centre for Agroecology, Water and Resilience (CAWR), Coventry University, UK

1800-1830 ***Roundtable Discussion***
*Panellists: Y. J. An (Korea), P. M. Chapman (Canada), K. Gallagher (USA),
Z. J. Wang (China) and M. St J. Warne (Australia)*

1830-2230 ***Conference Dinner***
19 June (Sunday) — Conference Day 1
Lamma Rainbow Restaurant, Lamma Island, Hong Kong

Taking Shuttle Bus to the Aberdeen Pier
Assembling Point: LG2, K. K. Leung Building, HKU main campus

PROGRAMME

20 June 2016 (Monday) — Conference Day 2
Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

Session IV — Chairpersons: Youn Joo An and Rick van Dam

- 0900-0930 **Keynote 11**
Water Quality Criteria in the 21st Century
John P. Giesy
Department of Veterinary Biomedical Sciences, the University of Saskatchewan,
Saskatoon, Canada
- 0930-1000 **Keynote 12**
Challenges in Derivation of Water Quality Guidelines for Dissolved
Oxygen, the Alien
Rudolf S. S. Wu
Department of Science and Environmental Studies, The Hong Kong Institute of
Education, Tai Po, Hong Kong, China
- 1000-1030 **Keynote 13**
Breaking from Tradition: Establishing More Realistic Sediment Quality
Guidelines
Jr. G. Allen Burton
University of Michigan, USA
- 1030-1100 **Coffee Break and Poster Viewing**

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20 June 2016 (Monday) — Conference Day 2

Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

- 1100-1130 **Keynote 14**
The Scientific Foundation for Derivation of Sediment Quality
Guidelines in Mainland China
Ju-ying Wang
National Marine Environmental Monitoring Centre, State Oceanic Administration,
Dalian, China
- 1130-1200 **Keynote 15**
Incorporating Bioavailability within Environmental Quality Standards:
Use of *in situ* Fluxes of Contaminants from Sediments
Stuart L. Simpson
CSIRO Land and Water, Lucas Heights, NSW, Australia
- 1200-1220 **Invited Talk 05**
Development of Sediment Quality Guidelines Using Multivariate
Modelling and Comparison to Single-Chemical Approaches
Teresa C. Michelsen
Farallon Consulting, LLC., Issaquah, WA, USA
- 1220-1240 **Invited Talk 06**
Sediment Toxicity Identification Evaluation: A Case Study in
Guangzhou
Jing You
State Key Laboratory of Organic Geochemistry, Guangzhou Institute of
Geochemistry, Chinese Academy of Sciences, China
- 1240-1300 **Invited Talk 07**
Assessment and Management Implication of the Long-term
Anthropogenic Influences on Coastal Seawaters Based on Quantitative
Methods
K. Chen¹, Y. Liu² & M. G. Cai^{1,3}
¹Coastal and Ocean Management Institute, Xiamen University, Xiamen, China;
²Department of Finance, Ocean University of China, Qingdao, China;
³College of Ocean and Earth Sciences, Xiamen University, Xiamen, China
- 1300-1400 **Lunch Break and Poster Viewing**

PROGRAMME

20 June 2016 (Monday) — Conference Day 2
Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

Session V — Chairpersons: Allen Burton and Xiao-wei Zhang

- 1400-1430 **Keynote 16**
A Peptide Identification-Free Shotgun Proteomics Workflow to Differentiate *Escherichia coli* Isolates by Faecal Sources
Stanley Lau
Division of Environment and Division of Life Science, the Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong, China
- 1430-1500 **Keynote 17**
Critical Review of Mercury Sediment Quality Values
Richard J. Wenning
Ramboll Environ, Portland, Maine, USA
- 1500-1520 **Invited Talk 08**
Sediment Quality Criteria Development: A Roadmap for Switzerland
M. Carmen Casado-Martinez
Swiss Centre for Applied Ecotoxicology Eawag-EPFL, Switzerland
- 1520-1540 **Invited Talk 09**
Development and Validation of Freshwater Sediment Quality Guidelines for Metals in Korea
J. H. Lee
Research Institute of Environmental Health and Safety (RIEHS), EH R&C Co. Ltd., Bucheon, Korea
- 1540-1600 **Invited Talk 10**
Emerging Persistent Organic Pollutants (POPs) in Marine Mammals from South China
James C. W. Lam
Department of Science and Environmental Studies, The Education University of Hong Kong, Tai Po, Hong Kong, China; State Key Laboratory in Marine Pollution (SKLMP) and Department of Biology and Chemistry, City University of Hong Kong, Kowloon Tong, Hong Kong, China
- 1600-1630 **Coffee Break and Poster Viewing**

PROGRAMME

20 June 2016 (Monday) — Conference Day 2

Lecture Theatre KKL202, K. K. Leung Building, HKU Main Campus

Session VI — Chairpersons: Michael Warne and Graham Merrington

- 1630-1700 **Keynote 18**
Understanding the Influence of Multiple Stressors on Chemical Effect
Thresholds Is a Prerequisite of the Quest for the “Holy Grail”
Kenneth M. Y. Leung
The Swire Institute of Marine Science and School of Biological Sciences, The
University of Hong Kong, Hong Kong, China
- 1700-1730 **Keynote 19**
Field-Based Approaches to Derive Environmental Quality Standards
Adam Peters
WCA Environment Limited, Faringdon, Oxfordshire, UK
- 1730-1800 **Keynote 20**
Metagenomic Profiling of Zooplankton Community Reveals
Environmental Threshold of Ammonia in Eutrophic Aquatic
Ecosystem: A Case Study on Tai Lake, China
Xiao-wei Zhang
State Key Laboratory of Pollution Control & Resource Reuse, School of the
Environment, Nanjing University, Nanjing, China

1800-1830

Roundtable Discussion

*Panellists: Jr G.A. Burton (USA), M.C. Casado-Martinez (Switzerland),
Uwe Schneider (Canada), S. L. Simpson (Australia), J.W. Wang (China) and
R.S.S. Wu (Hong Kong)*

Closing Ceremony

Kenneth M. Y. Leung
Chairman of the Organizing Committee of EQSPA-E-2016