

Workshop - 7

Title	Faster Better Cheaper: Introduction to Risk-Based Investigation Methods
Date and time	Thursday, 17 September 2026, 9:00 AM – 12:30 PM
Duration	Half Day
Venue	Adelaide Convention Centre*
Presenter	Roger Brewer, Senior Environmental Scientist, TOS Environmental (retired Hawaii Department of Health), USA
Registration Fees	\$ 375 incl GST (The workshop attendees will be provided with a morning tea)

About this workshop

This workshop provides an overview of modern environmental investigation and risk assessment approaches, highlighting the limitations of traditional practices introduced in the 1980s and 1990s that can increase project time, cost and uncertainty. Participants will be introduced to the fundamentals of toxicology, risk assessment, and systematic planning methods used to design efficient environmental investigations.

The session will cover the development of Investigation Questions, Decision Units (DUs), and Decision Statements to support targeted sampling, risk evaluation, and remediation decision-making. Practical application of Multi Increment (MI) sampling and Gy's Theory of Sampling will be discussed, including methods to improve data quality and reduce uncertainty.

Using industry case studies from mining and agriculture, the workshop will demonstrate how risk-based screening levels and data quality objectives can be applied to identify areas of concern and streamline site management decisions across various environmental media, including soil, sediment, water, air, and food. The workshop concludes with a discussion on the transition to more efficient and effective investigation and risk assessment practices adopted over the past two decades.

Why Attend?

- Understand how modern environmental investigation and risk assessment approaches reduce time, cost, and uncertainty
- Gain practical insights into systematic planning, Decision Units, and Multi-Increment sampling
- Learn from real-world case studies to support applied understanding
- Improve data quality through structured and defensible sampling approaches
- Strengthen risk-based decision-making for site assessment and remediation
- Build confidence in making faster and more informed environmental management decisions

Workshop attendees will receive

- 3.0 hrs of CPD point
- Presentation slides (as secured PDF) on USB
- A downloadable online resource folder on USB

Workshop Program

Time	Session – Key Topics and Activities
9:00 – 9:10 AM (10 minutes)	Welcome and Introduction Workshop objectives
9:10 – 10:00 AM (50 minutes)	<ul style="list-style-type: none">• The Early Search for Environmental Risk• Toxicology Basics• Development of Risk-Based Screening Levels
10:00 – 10:15 AM	Morning Tea
10:15 – 12:15 PM (120 minutes)	<ul style="list-style-type: none">• Development of Risk-Based Screening Levels Contd..• Design of Risk-Based Site Investigations• Assessment of Environmental Hazard Evaluation• Remediation and Long-Term
12:15 – 12:30 PM (15 minutes)	Key Takeaways and Q&A

References

- crcCARE, 2026, *Risk-Based Investigation of Environmental Contamination: Technical Report series, No. 48 May 2026.*
- crcCARE, 2026, *Risk-Based Investigation of Agricultural Fields and Food Crops Impacted by Contaminated Wastewater and Sludges: crcCARE, Technical Report series, No. 49, May 2026.*

Abstract

The workshop begins with a review of the background and shortcomings of environmental investigation and risk assessment practices introduced in the **1980s and 1990s** and how these practices can add unnecessary **time, cost and uncertainty** to field studies and academic research. Steps to understand and address these issues begin with an overview of **toxicology** and **risk assessment** basics and why the “mean” contaminant concentration is most commonly used to assess risk. A nine-step, **Systematic Planning** process is introduced to design and implement an environmental investigation. “**Investigation Questions**” specific to the project are prepared and used to identify the type of data to be collected and the design of the sampling plan. Risk assessment concepts and case studies are used to demonstrate how an area under investigation is divided into well-thought-out “**Decision Units (DUs)**” for assessment of risk or isolation of suspect heavy contamination and optimisation of remediation. “**Decision Statements**” specific to each DU are prepared *prior to the collection of samples* and used to direct follow-up actions as soon as sample data are available. Experience in the mining and agriculture industries is used to describe by a single “**Multi Increment (MI)**” sample is collected, processed and tested from each Decision Unit in accordance with “**Gy’s Theory of Sampling.**” Replicate MI samples are collected a portion of the DUs and used to assess the precision of the overall sampling method and determine if **Data Quality Objectives (DQOs)** have been adequately met. Sample data that meet DQOs are compared to pre-approved, “**Risk-Based Screening Levels**” or incorporated into a case-specific risk assessment to identify areas of potential environmental concern as well as quickly clear areas where no further action is warranted. Concepts introduced can be applied to all types of environmental media, including **soil, sediment, surface water, groundwater, air and food.** **Case studies** explored will include methods to investigate and assess the risk posed by **impacts to agricultural land and food crops by PFASs containing wastewater effluent and biosolids, and impacts to soil and groundwater associated with releases of AFFF.**

The workshop will conclude with a discussion of how environmental agencies have *successfully transitioned* from investigation and risk assessment practices introduced in the 1980s and 1990s to more efficient and effective methods that have gradually emerged in the past 20 years.

Presenter



Roger Brewer

Senior Environmental Scientist,
TOS Environmental (retired Hawaii Department of Health), USA

Dr. Brewer has over thirty years of experience in environmental site investigation and human health and ecological risk assessment. He retired after twenty years with the Hawai'i Department of Health in 2024 and currently works as a free-lance consultant (TOS Environmental LLC). His academic background includes a PhD in geology and post-doctoral research at Nanjing University in China. His environmental experience includes regulatory compliance audits; characterisation of contaminated soil, water and air; contaminant fate and transport; vapor intrusion and human health and ecological risk assessment. He has also worked as an environmental consultant in the US, Asia and South America and as a senior geologist and environmental risk assessment specialist for the California Environmental Protection Agency. He has given numerous formal and informal training classes on methods to identify and address environmental hazards at contaminated industrial sites and is actively involved in the continued development of state and federal environmental risk assessment programs. He is currently assisting various regulatory agencies and environmental institutes in preparation of guidance on the investigation and assessment of environmental risks posed by per- and polyfluoroalkyl substances (PFASs).

Notes:

(*) Workshop room details will be advised closer to the event date.

(+) Time slots suggested in the program are indicative and may vary slightly based on the final program.

- Delegates are required to bring their laptop to complete hands-on exercises and access workshop resources.
