Eleventh International Conference on the Remediation and Management of Contaminated Sediments

PRELIMINARY PROGRAM

January 9-12, 2023 | Austin, Texas

battelle.org/sedimentscon
#BattelleSediments23

BATTELLE

The Conference is organized and presented by Battelle.

Battelle's environmental engineers, scientists and professionals offer focused expertise to government and industrial clients in the U.S. and abroad. Combining sound science and engineering solutions with creative management strategies, Battelle works with clients to develop innovative, sustainable and cost-effective solutions to complex problems in site characterization, assessment, monitoring, remediation, restoration, and management. Every day, the people of Battelle apply science and technology to solving what matters most. At major technology centers and national laboratories around the world, Battelle conducts research and development, designs and manufactures products, and delivers critical services for government and commercial customers. Headquartered in Columbus, Ohio, since its founding in 1929, Battelle serves the national security, health and life sciences, and energy and environmental industries.

BATTELLE

battelle.org | Booth #116

Conference Sponsors

As the Conference organizer and presenter, Battelle gratefully acknowledges support of the following Conference Sponsors. Their financial contributions help defray general operating costs of planning and conducting the Conference. The corporate descriptions they provided appear on pages 60-64.

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Sevenson Environmental Services, Inc. Niagara Falls, USA | Established 1917
sevenson.com | Booth #308

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GENERAL INFORMATION

The **Eleventh International Conference on Remediation and Management of Contaminated Sediments** will be held January 9-12, 2023, at the JW Marriott Austin. The Conference is designed for and presented by scientists, engineers, regulators, remediation site owners, constructors, and other environmental professionals representing universities, government agencies, consultants, and R&D and service firms from around the world. The program will reflect the growing body of knowledge about better ways to manage contaminated sediment systems.

The 2023 Sediments Conference will be a forum for sharing research results, practical experiences, and opportunities associated with investigating, remediating, and restoring the environmental and economic vitality of waterways and aquatic systems. The Conference will gather a diverse group of stakeholders with environmental, economic, political, and social expertise, whose collaboration is integral to successfully managing complex sediment sites.

Location and Schedule

The **Eleventh International Conference on the Remediation and Management of Contaminated Sediments** will be held January 9-12, 2023, in Austin, Texas. Attendance is expected to be approximately 800-1,000 professionals representing universities, government agencies, consultants, and R&D and service firms from more than 20 countries.

Battelle has presented this premier international technical conference since 2001. Sponsors are public- and private-sector organizations active in environmental assessment, remediation, and management.

All Conference events will be held at the JW Marriott Austin (110 East 2nd St., Austin, TX, 78701). The JW Marriott Austin is located in the heart of downtown. Indulge in this upscale getaway which offers luxury comfort and sophisticated amenities situated just steps from the best attractions and entertainment options Austin has to offer. The urban resort features an on-site spa, room service, seven bars, three restaurants, Starbucks®, and the largest guest rooms in the city with floor-to-ceiling windows.

The 2023 Sediments Conference will be a forum for sharing research results, practical experiences, and innovative approaches to investigating, remediating, and restoring the environmental and economic vitality of waterways and aquatic systems. The program reflects the growing body of knowledge about better ways to manage contaminated sediment systems using state-of-the-science data collection, analysis, and visualization, along with novel approaches in remedy design and implementation.

Aquatic systems management requires engagement with a diverse group of stakeholders and includes environmental, economic, political, and social dimensions. The 2023 program includes sessions and panel discussions focused on emerging contaminants and critical considerations in sediment management and remediation, including characterization and management of PFAS, beneficial use of contaminated sediments, climate change, advanced data analytics to improve decision-making and remedy design, and incorporating environmental justice from project inception through completion stages.

Nine short courses are scheduled in 4- or 8-hour increments Monday, January 9. Short Course early-bird registration rates are available through November 18.

A Career Roundtable and Career KickStarter are also scheduled Monday afternoon to enhance networking and career development opportunities for students and young professionals.

The Conference will commence Monday evening when Conference Chairs, Jana Heisler White and Eliza Kaltenberg, both of Battelle, will conduct the Plenary Session. The Plenary Session will feature, Dr. Douglas McCauley, an Associate Professor at the University of California Santa Barbara (UCSB), an adjunct Professor at the University of California at Berkeley, and the Director of the Benioff Ocean Science Laboratory. The theme of his talk is, “An Industrial Revolution in the Ocean?” He will discuss harnessing the power of new insights, using environmental big data and new technology, to more intelligently manage and remedy early impacts of what may become the second major Industrial Revolution for our planet.

The Exhibit Hall, the Welcome Reception, and display of the Group 1 Posters will open Monday evening following the Plenary Session.

The technical program, to be held Tuesday morning, January 10, through Thursday afternoon, January 12, will feature more than 500 platform and poster presentations in 47 breakout sessions. Ten Learning Lab demonstrations and two Lunch & Learn presentations are scheduled. Five panel discussions will also be presented that will address critical contaminated sediment management issues.

Poster receptions will be conducted Tuesday and Wednesday evenings. Receptions and other meals offered throughout the Conference will afford attendees numerous opportunities to meet informally with one another.

On Thursday afternoon, the Conference will conclude with a reception and a wrap-up panel discussion.

Additional technical information will be provided by exhibits from nearly 70 companies and government agencies engaged in remediation-related activities.

Program Committee

Conference Chairs

- Jana Heisler White, Ph.D. (Battelle)
- Eliza Kaltenberg, Ph.D. (Battelle)

Steering Committee

- Bonnie Brooks (Washington State Department of Ecology)
- Peggy Derrick (EA Engineering)
- Paul Doody, PE (Anchor QEA, LLC)
- Espen Eek, Ph.D. (Norwegian Geotechnical Institute)
- Anne Fitzpatrick, LHG (Geosyntec)
- Upal Ghosh, Ph.D. (University of Maryland, Baltimore County)
- Helen Jones (USACE New England)
- Lisa Lefkovitz, PMP (Battelle)
- Michael Sivak (EPA Region 2)
- Jason Speicher, MBA (Navy NAVFAC Atlantic)

Program at a Glance

Monday, January 9, 2023

- 8:00 a.m.-5:00 p.m. All-Day Short Courses
- 8:00 a.m.-12:00 p.m. Morning Short Courses
- 12:30-2:30 p.m. Career Roundtable
- 2:00-8:30 p.m. Registration Desk Open
- 3:00-5:00 p.m. Career KickStarter
- 5:30-7:00 p.m. Plenary Session
- 7:00-8:30 p.m. Welcome Reception, Exhibits, Group 1 Poster Display

Tuesday, January 10, 2023

- 7:00 a.m.-7:00 p.m. Registration Desk Open
- 7:00-8:00 a.m. Continental Breakfast
- 8:00 a.m.-5:35 p.m. Platform Presentations
- 9:30-10:15 a.m. Morning Beverage Break
- 11:30 a.m.-1:00 p.m. General Lunch
- 3:00-3:45 p.m. Afternoon Beverage Break
- 5:45-7:00 p.m. Group 1 Poster Presentations and Reception

Wednesday, January 11, 2023

- 7:00 a.m.-7:00 p.m. Registration Desk Open
- 7:00-8:00 a.m. Continental Breakfast
- 8:00 a.m.-5:35 p.m. Platform Presentations
- 9:30-10:15 a.m. Morning Beverage Break
- 11:30 a.m.-1:00 p.m. General Lunch
- 3:00-3:45 p.m. Afternoon Beverage Break
- 5:45-7:00 p.m. Group 2 Poster Presentations and Reception

Thursday, January 12, 2023

- 7:00 a.m.-4:00 p.m. Registration Desk Open
- 7:00-8:00 a.m. Continental Breakfast
- 8:00 a.m.-2:40 p.m. Platform Presentations
- 9:30-10:15 a.m. Morning Beverage Break
- 11:30 a.m.-1:00 p.m. General Lunch
- 2:30-3:00 p.m. Closing Panel Refreshments
- 3:00-4:00 p.m. Closing Panel Wrap-Up Discussion

**All times are subject to change in the months leading up to the Conference.*

Exhibits & Internet Café

Exhibits. Exhibit booths will be provided by nearly 70 organizations that conduct remediation activities or supply equipment used in such work. Exhibits will be on display from 7:00 p.m. Monday evening through 1:00 p.m. Thursday afternoon.

Booth spaces are still available. Visit the **Conference Sponsors and Exhibitors** page to be directed to a list of current Exhibitors and the online booth registration form.

Internet Café. Computers and charging outlets are available to participants who wish to check email during Exhibit Hall hours Monday–Thursday in the Internet Café.

Learning Lab and Lunch & Learns

Learning Lab. The Learning Lab will consist of hands-on demonstrations highlighting specific technologies, tools, and software. Learning Lab presentations will be conducted in a dedicated room adjacent to the Exhibit Hall.

A schedule of planned demonstrations will be available in the Final Program. See pages 54-58 for an overview of Learning Lab descriptions.

Learning Lab Sponsor

RAMBOLL

ramboll.com | Booth #417

Lunch & Learn. Lunch & Learn presentations will be held in a session room during breaks. You may collect your lunch and then attend the presentation while you eat.

The participants and scope of Lunch & Learn presentations may be found on the pages cited below.

- Navigating the Water Treatment Design and Permitting Process (page 41)
- Update on Work Products from the 2018 Joint U.S. Army Corps (ERDC) and Sediment Management Work Group (SMWG) Workshop on Uncertainty in the Evaluation of Fish Consumption (pages 43-44)

Technical Program Overview

The technical program will be comprised of more than 500 platform and poster presentations in 47 sessions, along with five panel discussions.

The breakout sessions and panels are organized into the following concurrent, thematic tracks:

A. Characterization, Assessment, and Monitoring

B. Environmental Processes and Modeling

C. Management Approaches and Policy

D. Remediation and Restoration Planning

E. Remedy and Restoration Implementation

Platform and Poster Presentations. Platform sessions will begin Tuesday morning and conclude Thursday afternoon; poster sessions will be conducted on Tuesday and Wednesday evenings. Platform and poster presentations scheduled as of October 24, 2022, are listed by session on pages 14-46.

Program at a Glance. See page 65 for an overview of the days on which specific sessions will be conducted.

Panel Discussions. The participants and scope of the panel discussions can be found on the pages cited below.

- Will Sediment Caps Last Forever? And How Should We Address the Possibility that They Don't? (page 22)
- The Intersection of Environmental Justice and Contaminated Sediment Investigation and Remediation (page 28)
- Implementing Adaptive Management at Contaminated Sediment Sites (page 36)
- Beneficial Use of Contaminated Sediments: The Promise and the Challenge (page 38)
- Cost Drivers for Environmental Dredging and Capping Projects (page 44)

Proceedings. The proceedings will be made available online after the Conference to registrants who paid standard industry, government, or student rates. Past years' (2003-2019) proceedings are available on the Conference website under the **Publications** tab. Proceedings papers are no longer requested, however, all technical program abstracts will be included along with a PDF version of the PowerPoint presentation for most platform presentations and PDFs of some poster presentations.

Preliminary Program PDF. This Preliminary Program lists all presentations scheduled as of October 24, 2022. It is subject to revision (changes of presenters, withdrawals) in the months leading up to the Conference.

A PDF of the Final Program will be posted on the Conference website by December 30, 2022. A printed copy of the Final Program will be provided with onsite registration material. Due to the size of the program, it is recommended that participants review the online Final Program PDF prior to attending the Conference.

Conference Mobile App & Abstracts. To assist participants in planning their time at the Conference, a Conference mobile app will be available by December 30, 2022. Email notifications will be sent to all who have registered and paid by that date, providing instructions for downloading and using the app.

The app will include abstracts for all scheduled platform and poster presentations and may be used on all major smartphone operating systems and on the Web. It will enable registrants to create personal schedules, take notes on presentations, and enter a personal profile to enhance networking opportunities with other participants.

Short Courses. As of October 24, 2022, there are nine short courses scheduled for presentation. Courses will be offered on Monday morning and afternoon before the Conference begins. Courses are open to both Conference registrants and non-registrants.

Course titles and times are listed on page 48. See the **Short Courses** page for early-bird course registration information. Discounts apply for early registration and payment by November 18, 2022.

Education Sponsor

WEDA

Western Dredging Association

westerndredging.org

Meals and Receptions

For the convenience of Conference participants, the following meals, breaks, and light receptions, will be provided at no additional cost to program registrants and exhibit booth staff during the food service times listed on page 8. Food service for breakfasts, morning and afternoon beverage breaks, and receptions will be in the Exhibit Hall. Buffet lunches will be served in a separate ballroom to accommodate seating. Service times are subject to change in the months leading up to the Conference and the final schedule will be posted in the Final Program.

Guest Tickets. If registrants wish to bring guests to meals or receptions, guest tickets can be purchased at the Conference Registration Desk; guest tickets will be priced equal to the cost incurred by the Conference for each meal.

Food Service Times

Breaks between sessions may not directly correspond with food and beverage service times. If you wish to attend specific functions, please plan your schedule accordingly.

Continental Breakfast
Tuesday-Thursday, 7:00–8:00 a.m.

Morning Beverage Break
Tuesday-Thursday, 9:30–10:15 a.m.

Buffet Lunches
Tuesday-Thursday, 11:30 a.m.–1:00 p.m.

Afternoon Beverage Break
Tuesday-Wednesday, 3:00–3:45 p.m.

Welcome Reception
Monday, 7:00–8:30 p.m.

Group 1 Poster Presentations & Networking Reception
Tuesday, 5:45–7:00 p.m.

Group 2 Poster Presentations & Networking Reception
Wednesday, 5:45–7:00 p.m.

Closing Panel Refreshments
Thursday, 2:30–3:00 p.m.

Closing Panel. At the conclusion of the breakout sessions on Thursday afternoon a short closing reception will be held, after which all participants are invited to attend a closing wrap-up panel discussion.

Closing Reception Sponsors

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Student Participation

University students, up through Ph.D. candidates, are encouraged to attend the Conference and will find participation valuable to their career development. In addition to the technical information gained by attending presentations and visiting exhibits, students will be able to meet and talk with environmental professionals representing a wide range of work experience and employers. Recruitment is a major focus of many participating Exhibitors and Sponsors and the Conference will provide an unprecedented opportunity for student jobseekers.

Student Paper Competition. Papers received by the due date will be reviewed, and entrants will be notified of the results by November 30, 2022. The selected paper(s) will be scheduled for presentation at the Conference.

The student paper winner(s) will be recognized during the Plenary Session and, through the generosity of the Student Event Sponsors, will receive complimentary registration and a monetary award to help defray travel and related costs.

Reduced Student Registration Rate. The student rate is approximately half the university rate and provides full access to all technical sessions, exhibits, and meals. Full-time students are eligible; documentation of current enrollment is required.

Career Roundtable for Students and Young Professionals. A career roundtable will be held Monday afternoon from 12:30-2:30 p.m. for student and young professionals (less than 5-years in their field). This roundtable will provide an opportunity for students and early-career professionals to learn more about career paths in the contaminated sediments field. Representatives from academia, a regulatory agency, industry, consulting, and non-profit/NGO will provide brief career overviews, followed by question-and-answer and open discussion.

Learn more about getting your foot in the door, job qualifications, pros and cons of various fields, and more!

Career KickStarter. A Career Kickstarter, organized and hosted by Clemson University alumni, for students and young professionals is scheduled from 3:00-5:00 p.m. on Monday afternoon. It is a program designed to foster networking and mentorship within the environmental sector.

All participation is voluntary and there is no cost to attend, but **pre-registration is required to match mentors and mentees**. A target of 20-30 professionals is desired for successful implementation. See the **Student Participation** page to register.

New professionals will be matched with an experienced professional in a mentorship relationship, which both mentee and mentor are committed to sustaining for 1 year.

Mentors provide guidance and constructive criticism to students, actively engage their professional network on the student's behalf, educate the student on the ins-and-outs of their own profession, have regular meetings to ensure the student's goals are being met, and most importantly, provide encouragement.

Student Event Sponsors

Penn
Master of Science in Applied Geosciences
upenn.edu/MSAG | Booth #102

Windward environmental LLC
windwardenv.com

Sponsorship

As the Conference organizer and presenter, Battelle gratefully acknowledges support of the Conference Sponsors recognized on page 3 and the other Sponsors, recognized by category, throughout this document. Their financial contributions help defray general operating costs of planning and conducting the Conference.

For details about sponsorship opportunities, see the **Conference Sponsors and Exhibitors** page on the Conference website.

Conference Registration

The terms and conditions found below are an excerpt of the Registration Terms & Conditions; please see the **Registration** page on the Conference website for the full list. Please review the full list before registering. Terms and conditions are subject to change without notice and are applicable to all levels of registration, including booth staff and Sponsor/Exhibitor waived and discounted registrants.

Conference registration must be completed online, and payment is required to confirm registration. Registration discounts will apply only to payments received by the specified dates.

Technical Program Registration. The technical program fees cover admission to platform and poster sessions as well as exhibits and group food functions. In addition, each person registering at any of the following fees will receive the proceedings, which will be available in digital format after the Conference. No one under 18 years of age will be admitted to any Conference event unless registered as a student; valid college or university student ID required at check-in.

Attendee List Opt-In

When registering for the technical program, you must OPT-IN to be included in Conference attendee lists by checking the appropriate box on the registration form. Leaving the box unchecked will result in your name not being included in attendee lists.

	Paid by Nov. 18, 2022	Paid after Nov 18, 2022
Industry	US $1050	US $1125
Govt/Univ*	US $925	US $1025
Student**	US $450	US $500

Registration discounts apply only to payments received by the specified dates.

** The university fee applies to full-time faculty and other teaching and research staff, including post-doctoral students.*

*** The student fee is reserved for full-time students through Ph.D. candidates whose fees will be paid by their universities or who will not be reimbursed for out-of-pocket payment. Documentation of current enrollment is required.*

Payment. Payment is required to confirm registration and registration discounts apply only to payments received by the specified dates. Checks will be accepted for registrations made through November 18, 2022. Beginning November 19, 2022, payment may be made only by major credit card. Purchase orders will not be accepted at any time. Fees are not transferable to other Battelle Conferences. Conference information meant for attendees only (*e.g.*, links to mobile apps, abstracts, and registration lists) will only be sent to individuals that are paid in full.

Substitutions & Transfers. Substitutions or transfers for technical program registrants will be accepted at any time but will incur a $100 transfer fee. Substitutions/transfers are valid only for a registration that has not been used. For example, a full Conference registration (for all event days) may not be transferred between individuals for use on different days.

Non-U.S. Registrants. For registrants outside the United States, it is recommended that you wait until your visa application has been approved to register. Refunds will not be granted after the “no refund” date in the event your visa application is denied. If you require an invitation letter from the Conference Office, please email the request to **sedimentscon@battelle.org**.

Cancellations & Refunds. Registration cancellations and refund requests must be received in writing on or before the “cancellation requested date” below to qualify. Paid no-shows will receive all the materials covered by their registration fees. Refunds will be processed to the credit card used for payment if cancellation is requested within 30 days of payment, otherwise, the refund will be processed by check. A $150 service fee applies to each cancelled registration. By registering for the Activity, you agree to the following registration cancellation refund policy:

- Cancellation requested on or before November 18, 2022: 75% of the registration fee.
- Cancellation requested November 19, 2022, through December 15, 2022: 50% of the registration fee.
- After December 15, 2022: No refunds.

Identification & Badge Use. Attendee badges are the property of Battelle and are required for admittance to all Activity functions (*e.g.*, session rooms, Exhibit Hall) and must always be visible. By registering for the Activity, you agree not to sell, trade, modify, copy, tamper with, or share/swap your badge. This includes sharing/swapping Exhibitor and/or technical registrant badges to avoid paying the technical program registration fee. Badge fraud (*i.e.*, theft of services) is detrimental to the Conference and attendees found to be engaging in such conduct are subject to immediate ejection from the Activity, registration cancellation, without refund, and possible prosecution and/or ban from future Conferences.

Photo ID Required

A valid, government-issued PHOTO ID (driver's license/passport/student ID), that matches the name on the badge, will be required for verification upon check-in and/or to request a badge reprint for lost or forgotten badges. Only the attendee named on the badge may pick up his or her badge and registration materials.

Sponsor and Exhibitor Waived/Discounted Technical Program Registration. The links to register discounted sponsor/exhibitor technical registrants can be found on the **Registration** page on the Conference website. The Organization ID associated with the company's booth reservation will be required to register discounted sponsor/exhibitor technical registrants and can be found in the booth reservation confirmation email. Only those registered for the technical program will be admitted to technical sessions. **Anyone making a platform or poster presentation or chairing a session must be registered for the technical program.** Sponsor/Exhibitor Waived/Discounted staff and Booth staff are subject to all applicable registration terms and conditions. Technical program registrants may staff the exhibit booth as needed. Participation as a Conference Sponsor qualifies an organization to two waived technical program registrations and two discounted technical program registrations ($750/each). Participation as an Exhibitor qualifies an organization to two discounted technical program registrations ($750/each). All booth staff must be registered online by December 5, 2022. Any changes or additions after December 5, 2022, will incur a $35 charge.

Exhibits

Organizations that provide sediment assessment, remediation, and management services and products are invited to exhibit. Exhibitors will have the opportunity to present information to a focused audience of professionals who acquire and use environmental management products and services at industrial and government sites around the world.

Booth spaces are still available. Visit the **Conference Sponsors and Exhibitors** page to be directed to a list of current Exhibitors and the online booth registration form.

Program Participant Registration Required

No financial assistance is available to support registration or other costs of attending the Conference. All presenting authors (platform and poster), session chairs, and panel moderators/participants are expected to register and pay the applicable technical-program registration fees. This policy is necessary because registration fees are the major source of funding for the Conference and a significant percentage of registrants will make presentations or chair sessions. No exceptions are made to this policy. Exhibit space is still available.

Inquiries

Sediments Conference Office:

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Conference sponsorship, exhibits, registration:

Susie Warner (The Scientific Consulting Group)
sediments2023@scgcorp.com
phone: 301.670.4990 | fax: 301.670.3815

Conference Hotel and Group Room Block

The Conference will be held at the JW Marriott Austin (110 East 2nd St., Austin, TX, 78701).

The JW Marriott Austin is located in the heart of downtown Austin, Texas. Situated just steps from the best attractions and entertainment options Austin has to offer, indulge in this upscale getaway that offers luxury comfort and sophisticated amenities.

The urban resort features an on-site spa, room service, seven bars, three restaurants, Starbucks®, and the largest guest rooms in the city with floor-to-ceiling windows. Grab a bite at the ever-popular Burger Bar, a food truck concept without the wheels, or lounge on the rooftop at Edge Rooftop + Bar, with cocktails and picturesque views of the Texas State Capitol and Lady Bird Lake.

Online Reservations. Please use only the room block links listed on the **Venue: Hotel & City** page to book your hotel reservations.

Group Rate. The group rate at the JW Marriott Austin is $289 per night (single/double) plus applicable taxes, fees, and assessments. Subject to availability of rooms at the time reservations are made, the Conference group rate can be used for check-in as early as, Friday, January 6, and check-out as late as Sunday, January 15.

Hotel Booking Caution

The Sediments Conference has a group rate agreement with only the JW Marriott Austin. We have not partnered with any travel agency or third-party for travel/hotel discounts. If you receive a call or an email offering assistance in making hotel reservations or changing existing reservations, we advise caution. The Conference has no agreement with any organization to contact participants and offer reservation assistance, nor have we provided contact information to anyone for this purpose.

TECHNICAL PROGRAM

The technical program will begin on Monday evening, January 9, with the Plenary Session. It will continue Tuesday through Thursday with the 47 breakout sessions and five panel discussions and conclude with the closing roundtable panel discussion on Thursday afternoon. The breakout sessions and panels are organized into the following five concurrent, thematic tracks:

A. Characterization, Assessment, and Monitoring

B. Environmental Processes and Modeling

C. Management Approaches and Policy

D. Remediation and Restoration Planning

E. Remedy and Restoration Implementation

Plenary Session

Monday, January 9, 5:30 - 7:00 p.m.

All attendees, including Exhibitors, are invited to attend the Plenary Session.

Welcome and Opening Remarks
Conference Chairs:
Jana Heisler White, Ph.D. (Battelle)
Eliza Kaltenberg, Ph.D. (Battelle)

Presentation of Student Paper Awards

An Industrial Revolution in the Ocean?
Douglas McCauley, Ph.D.

Douglas McCauley is an Associate Professor at the University of California Santa Barbara (UCSB), an adjunct Professor at the University of California at Berkeley, and the Director of the Benioff Ocean Science Laboratory—an applied research center based at UCSB's Marine Science Institute that creates replicable, science-based solutions to improve ocean health. Dr. McCauley is a Sloan Research Fellow in the Ocean Sciences and member of World Economic Forum's Friends of Ocean Action.

He has degrees in political science and biology from the University of California at Berkeley and a Ph.D. in biology from Stanford and conducted postdoctoral research at Stanford, Princeton, and UC Berkeley. He has been published in leading research journals such as *Science, Nature*, and the *Proceedings of the National Academy of Sciences USA* and has been featured in outlets such as the New York Times, BBC, TIME, and US National Public Radio.

The Industrial Revolution ushered in profound change for people, industry—and the environment. While this period brought much good for society, the messiness of this industrialization created centuries of environmental challenge that are still being cleaned up. But environmental history has played out very differently on land and sea. To date, the influence of human industry has been less profound in most of the ocean than it has been on land. But many indications suggest that this may be changing. Emerging marine industries such as aquaculture, ocean energy, marine shipping, ocean mining, and marine power generation are all growing exponentially. These industries are creating transformative benefits for the global economy, global nutrition, and energy systems. However, if improperly managed, they could create significant negative impacts on ecosystem health on par with the damage observed during the first Industrial Revolution. This raises an important question: how can we learn from history on land to create a better future for our oceans and other aquatic ecosystems? And how will these new changes affect the health of an ocean already under stress from major threats, such as plastic pollution, climate change, and other sources of pollution?

One clear way forward is to embrace the power of a resource we have at our disposal today that we did not have during the first Industrial Revolution: environmental big data and new technology. Dr. McCauley will discuss how by harnessing the power of these new insights, we can more intelligently and justly manage and remedy early impacts of what may become the second major Industrial Revolution for our planet.

Poster Group Schedule

Poster sessions are divided into two groups for display and presentation as shown below. Presenters will be at their posters during the designated presentation times to discuss their work. Light refreshments will be provided during the poster presentations.

Poster Group 1
Display: Monday 7:00 p.m. – Tuesday 7:00 p.m.
Presentations: Tuesday 5:45–7:00 p.m.

A1. Innovative Characterization and Assessment Approaches

A2. Innovative Characterization and Assessment Tools

A3. Contaminant Forensics

A4. Risk Assessment

A5. Nanomaterials, Microplastics and Other Emerging Contaminants in the Environment

A6. Advances in Passive Sampling Methods

A7. Application of Passive Samplers

A8. Characterization and Remediation of PFAS-Contaminated Sediments

B1. PFAS Bioavailability, Bioaccumulation, and Risk Assessment

B2. Geospatial Data Evaluation and Data Visualization

B3. Contaminant Fate and Transport in Sediments

C1. NAPL and MGP Sites

C2. Restoration and Revitalization Strategies

C3. Great Lakes Legacy Act Successes and Challenges

C4. Remedial Cleanup Objectives and Approaches for Optimized Remedial Development

D1. Sustainability: Environmental Metrics, Stakeholder Values, Cost-Benefit

D2. Dredging, Dredged Material Dewatering and Disposal Design

D3. Monitored Natural Recovery (MNR) and Enhanced MNR

E1. Sediment Bioremediation

E2. Monitoring and Evaluating Remedy Implementation and Effectiveness

E3. Remediation of Ports, Harbors, and Urban Waterways

Poster Group 2
Display: Wednesday 7:00 a.m. – Thursday 1:00 p.m.
Presentations: Wednesday 5:45–7:00 p.m.

A9. Chemical/Toxicological/Biological Measurements and Monitoring

A10. Field Sampling Methods and Techniques

A11. Source ID, Loading Assessment, and Control

B4. Groundwater/Sediment/Surface Water Interactions

B5. Hydrodynamics and Sediment Transport

B6. Contaminant Bioavailability and Uptake

B7. Ebullition

B8. Advanced Data Analysis and Decision Tools

C5. Remedy Cost Allocation Considerations and Alternative Financial Models

C6. Communication and Facilitation with Stakeholders

C7. Site Management Decision Strategies

C8. Environmental Justice Considerations in Sediment Projects

C9. Adaptive Management Approaches

C10. Determining Background

C11. Climate Change, Coastal Adaptation, and Resiliency

D4. In Situ Treatment Amendments

D5. Long-Term Monitoring Strategies

D6. Cap Design

D7. Cap Modeling

D8. Beneficial Use of Contaminated Sediments

D9. Sediment Management in the Northwest Region

E4. Lessons Learned in Remedy Implementation

E5. Dredging Design and Operations

E6. Habitat Mitigation and Restoration

E7. Cap Construction and Operation

E8. In Situ Stabilization

Breakout Sessions and Panels

All presentations scheduled as of October 24, 2022, are listed below in alphabetic order by title. In each entry, the author list appears in italics, followed by the name and affiliation of the person scheduled to give the presentation. Each title beginning with an asterisk (*) is to be presented as a poster presentation.

The schedule is subject to revision (changes of presenters, withdrawals) in the months leading up to the Conference. To assist participants in planning their time at the Conference, the Final Program and abstracts will be made available approximately two weeks prior to the Conference. Everyone preregistered and paid will receive an email providing links to the resources.

A1. Innovative Characterization and Assessment Approaches

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Michael Meyer (Battelle) and Jason Palmer (AECOM)

***A Case Study of Woodwaste Assessment and Cleanup in Washington**. *P. Wiescher, M. Pollock, E. Hess, and A. Hackett.*
Phil Wiescher (Maul Foster & Alongi, Inc./USA)

Determination of Contaminated Sludge Thickness in a Former Tidal Estuary Boat Harbour, Nova Scotia, Canada. *T. Bachiu and V. Banks.*
Tim Bachiu (WSP Canada Inc./Canada)

Incremental Sampling Methodology to Improve Characterization of PCBs in Wetland Sediment. *M. Meyer, C. Farragher, S. Moore, and S. Lee.*
Caitlyn Farragher (Battelle/USA)

Integrating Co-Occurrence of Multiple COCs with Facility Histories, Chemical Forensics, and Sediment Transport to Reconstruct 100 Years of Sediment Contamination. *L.S. McWilliams.*
Laura McWilliams (LM Consulting LLC/USA)

***Legacy Sediment Contamination Remedial Investigation and Remedial Approaches in Lower Rouge River Mainstem**. *A. Falkner, R. Ellison, S. Noffke, and K. Kowalk.*
Amber Falkner (U.S. EPA/USA)

***PAH Fingerprinting to Assess Creosote Treatment in Timber Pilings**. *G. Pagnozzi, A. Fitzpatrick, W. Hovel, and C. Bartlett.*
Giovanna Pagnozzi (Geosyntec Consultants, Inc./USA)

Porewater and Oxidation-Reduction Chemistry Assessment in a Complex Tidal Wetland for Remedial Design. *B. Johnson, B. Warner, J. DiMarzio, S. Greenfield, H. Ziaei, A. Alborzi, N. Shaghaghi, A. Deonarine, and D. Reible.*
Ben Johnson (GSI Water Solutions, Inc./USA)

***Reach-Wide Summaries for River Sediment Data Groupings following Optimized, Stratified Sampling**. *G. Horstmeier, C. Draper, E. Thomas, and J. Eykholt.*
Greg Horstmeier (Wood/USA)

***Sedimentation Dynamics a Key Element for a Remedial Investigation of a Reservoir Impacted by an Abandoned Mercury Mine**. *S. Dent, H. Young, and J. Silvertooth.*
Stephen Dent (CDM Smith Inc./USA)

Step-Outs and Objective Simulations of Bias Effects on SWAC. *J. Eykholt, D.C. Miller, and C. Draper.*
Jerry Eykholt (Wood/USA)

***Use of SPI Technology to Quantitatively Evaluate the Effects of Carp Removal on Surface Sediment Conditions in a Michigan Lake**. *G. Revelas, L. Venne, S. Wodzicki, G. Chang, P. Pauquette, and C. Draper.*
Gene Revelas (Integral Consulting, Inc./USA)

***Where Science and Cost Apportionment Collide: Contaminant Loading from Upland Soils to Sediments**. *M.J. Mao, N.C. Grasso, and J.T. Rominger.*
Matthew Mayo (Gradient/USA)

A2. Innovative Characterization and Assessment Tools

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: W. Andrew Jackson (Texas Tech University) and Jason Speicher (Naval Facilities Engineering Command Atlantic)

***An Alternate Application of the Ultraviolet Optical Screening Tool: The Underwater Delineation of a Dioxin and Furan Contaminated Sediment Layer**. *K. Davidson.*
Kirklyn B. Davidson (SCG Industries/Canada)

Assessment of Mercury Leaching from Sediments Subject to Inundation and Drainage Using Passive Samplers. *H. Ziaei Jam, T. Vrtlar, B. Rao, U. Garza Rubalcava, H. Zhou, A. Alborzi, A. Jackson, D. Reible, and N. Grosso.*
Hasti Ziaei Jam (Texas Tech University/USA)

Development and Implementation of an Innovative Field UV Screening Method for Identifying NAPL and Distinguishing Sources. *P. Kenny, M. Byker, E. Hritsuk, and E. Miyashita.*
Marcus Byker (Ramboll/USA)

Economical Innovations for Improved Chemical Mass Flux Quantification in Sediment. *M.J. Gefell, K. Russell, and D. Rosenberry.*
Michael Gefell (Anchor QEA, LLC/USA)

***Evaluation of a Rapid Biosensor Tool for Measuring PAH Availability in Sediment**. *J. Conder, M. Jalalizadeh, E. Luo, A. Bess, B. Pautler, M. Healey, and M. Unger.*
Jason Conder (Geosyntec Consultants, Inc./USA)

***In Situ Porewater and Sediment Sampler**. *J.L. McWilliams and L.S. McWilliams.*
Laura McWilliams (LM Consulting LLC/USA)

***Marine Streamer Electrical Resistivity Characterization of Riverbed Sediment Contamination: Coeur d'Alene River, Idaho**. *N. Crook, M. McNeill, and S. Calendine.*
Nigel Crook (hydroGEOPHYSICS Inc./USA)

***SPIDAR-WEB: A Web-Based Sediment Profile Imagery Data Analytics and Reporting Platform**. *B.S. Sackmann and I. Stupakoff.*
Brandon Sackmann (GSI Environmental Inc./USA)

Use of a Comprehensive Passive Profiler to Characterize Interactions between Sediments and Surface Water. *U. Garza-Rubalcava, A.V. Smith, D.D. Reible, W.A. Jackson, P.B. Hatzinger, and G. Lavorgna.*
Uriel Garza-Rubalcava (Texas Tech University/USA)

***Utilizing Technology to Allow Fieldwork to Continue at the Height of COVID-19 Restrictions**. *T. Fewless, M. Santos, and Z. Powers.*
Thomas Allen Fewless (GHD/USA)

A3. Contaminant Forensics

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Helder Costa (Haley & Aldrich, Inc.) and Mike Johns (Windward Environmental LLC)

***Aroclor Reconstruction and Identification: A Comparison of Statistical Methods Used at the Portland Harbor Superfund Site**. *J.G.D. Peale, J. Bernard, and B. Webb.*
James Peale (Geosyntec Consultants, Inc./USA)

***Biological and Chemical Contamination Source Tracking in Urban Sewersheds**. *A. Muller, Y. Burhan, J. Travis, and D. Pilat.*
Antoine Muller (Tetra Tech, Inc./USA)

Characteristic Furan Compositional Pattern from Chlorine Production Wastes Identifies Contamination Attributable to Historical Chemical Plant. *L.S. McWilliams and H.J. Costa.*
Laura McWilliams (LM Consulting LLC/USA)

***The Effect of Data Transformation Methods on the Interpretation of a Principal Components Analysis of Sediment Polycyclic Aromatic Hydrocarbons**. *A.E. Wilkes, S.P. Parker, J.R. Flanders, and G.R. Long.*
Austin Wilkes (EHS Support/USA)

***Environmental Forensics: Lessons Learned and Approaches toward Robust Data Analysis**. *Y. Wang, E. Garvey, S. Gbondo-Tugbawa, and J. Atmadja.*
Ying Wang (WSP USA, Inc./USA)

Evaluation of Generic PAH Profiles Used in Sediment Source Characterization Modeling. *K. O'Reilly, D. Athanasiou, M. Edwards, and S. Ahn.*
Kirk O'Reilly (Exponent, Inc./USA)

Evaluation of PCB Source and Transport in San Diego Bay Using Sediment Traps. *J. Parker, M. Johns, G. Douglas, and J. Hardenstine.*
Jennifer Parker (Windward Environmental LLC/USA)

***Fingerprinting Inherently Multivariate PAH Signatures in a Complex Sediment System**. *A. Lutgen, S. Sorsby, and A. Madison.*
Alyssa Lutgen (WSP Golder/USA)

Forensic Analysis of Obscure Chlorinated Compounds in Sediment Samples for Historic Source Identification. *J.G.D. Peale, L. Smith, J. Bernard, and B. Webb.*
James Peale (Geosyntec Consultants, Inc./USA)

***Forensic Analysis of PCDD/Fs and PCBs in the Lower 2 Miles of the Passaic River, New Jersey**. *M.J. Bock and N. Rose.*
Michael Bock (The Intelligence Group/USA)

Forensic Tools for the Analysis of PFAS in the Subsurface. *T.N. Thomas.*
Tiffany Thomas (Haley & Aldrich, Inc./USA)

***Identifying Byproduct (Also Known as "Inadvertently Generated") Polychlorinated Biphenyls in Waterbodies**. *J.T. Rominger, A.P. Tcaciuc, and K. Herman.*
Jeff Rominger (Gradient/USA)

***PCB Forensic Source Detection in San Diego Bay Sediments Using High Resolution GC/MS Congener Analysis**. *G. Douglas, J. Hardenstine, M. Johns, and J. Parker.*
Gregory S. Douglas (NewFields Environmental Forensics/USA)

***PFAS Signature® A Forensic Approach for PFAS Source Tracking Using High Resolution Mass Spectrometry Tools**. *K. Dasu, C. Orth, L. Mullins, D. Friedenberg, S. Dufek, B. Hill, and J. Thorn.*
Kavitha Dasu (Battelle/USA)

Straight Out of Austin: What a Long, Strange Trip It's Been. *A. LeHuray.*
Anne LeHuray (Chemical Management Associates LLC/USA)

*__Updating the PAH Forensics Toolbox with Site-Specific Diagnostics__. *D. Chiavelli, M. Mathew, C. Wright, D. Baker, M. Rury, and B. Covert.*
Deborah Chiavelli (Anchor QEA, LLC/USA)

*__Use of Non-Target Analysis for Matrix Mitigation and Accurate Quantification of Legacy PFAS__. *C.J. Neslund.*
Charles Neslund (Eurofins Environment Testing America/USA)

*__Using Multiple Lines of Evidence to Ascertain Long-Term Pb Leakage from Abandoned Mine Tailing Ponds to Klity Creek, Kanchanaburi Province, Thailand__. *T. Phenrat.*
Tanapon Phenrat (Naresuan University/Thailand)

*__Whose PFAS Is It? A Forensics Toolbox for a Defensible Identification of PFAS Sources in Sediments__. *J. Pietari.*
Jaana Pietari (Ramboll/USA)

A4. Risk Assessment

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Jana Heisler White (Battelle) and Katherine von Stackelberg (Harvard Center for Risk Analysis)

*__Augmenting and Refining Traditional Sediment Toxicity Identification Evaluations to Gain Clarity, Rigor, and Precision__. *P. Arth and K. Payne.*
Peter Arth (Enthalpy Analytical/USA)

Deconvoluting Thermodynamics from Biology in the Aquatic Food Web Model. *U. Ghosh, M. Bokare, and F. Gobas.*
Upal Ghosh (University of Maryland, Baltimore County/USA)

*__Optimized Remedy Development to Address Ecological Protectiveness in a Floodplain Setting__. *P.J. de Haven, R.A. Siebenmann, and C.J. Saranko.*
Peter de Haven (Geosyntec Consultants/USA)

Probabilistic Risk Assessment of Sustainable Fish Consumption at Portland Harbor Superfund Site. *B. Ruffle, D. Pfeiffer, E. Morrison, G. Kirkwood, and P.D. Anderson.*
Betsy Ruffle (AECOM/USA)

San Diego Bay PCB Bioaccumulation Model. *J. Toll, S. Replinger, J. Parker, K. Goffman, C. Hanson, M. Johns, A. Gibbs, and K. Croteau.*
John Toll (Windward Environmental LLC/USA)

*__Site-Specific Creel Angler Survey of the Anacostia River__. *B. Ruffle, R. Damera, K. Vosnakis, R. O'Haver, D. Cox, and T. Sanford.*
Betsy Ruffle (AECOM/USA)

*__Site-Specific Ecological Risk Assessment of Johnston Facility, Johnston Atoll, USA__. *M.A. Beauchemin.*
Melissa Beauchemin (EA Engineering, Science, and Technology, Inc., PBC/USA)

Target Lipid Model and Empirical K_{OC} Values to Predict PCB Sediment Toxicity to Invertebrates. *P.C. Fuchsman, A.E. O'Connor, and K.J. Fetters.*
Phyllis Fuchsman (Ramboll/USA)

*__Use of Population Concepts to Support CERCLA Remedy Selection__. *B. Anthony, C. Meyer, T. Walker, W. Stiteler, A. Fowler, J. Loper, T. Loper, G. Macolly, and J. Schell.*
Bonner Anthony (Arcadis/USA)

A5. Nanomaterials, Microplastics and Other Emerging Contaminants in the Environment

Platforms Wednesday | Posters (*) Tuesday Evening
Chairs: AmyMarie Accardi-Dey (Tetra Tech, Inc.) and Susan Kane Driscoll (Exponent)

*__Critical Data Gaps for Characterizing Sediment-Associated Microplastics__. *R. Zajac-Fay, J. Conder, T. Liu, and I. Drygiannaki.*
Rachel Zajac-Fay (Geosyntec Consultants/USA)

An Evaluation of Microplastics as Vectors for Contaminants in Sediments. *S. BinAhmed-Menzies, M. Ellis, T. Boom, and L. Carney.*
Sara BinAhmed-Menzies (Barr Engineering/USA)

Frameworks for Screening and Risk Management of Chemicals and Advanced Materials: A Review. *D.W. Moore, B. Ruffle, S. Thakali, A. McQueen, S.P. Hopkins, and T.A. Key.*
David W. Moore (U.S. Army Corps of Engineers, ERDC/USA)

*__How Clean Is Clean Enough for Plastic Pellet Remediation?__ *S.S. Patil, K. Maroo, S. Dunn, and D. Gerber.*
Sonal Patil (Arcadis U.S., Inc./USA)

Microplastic Contamination in Fish in the Tidal Freshwater Portions of the Anacostia and Potomac Rivers, Washington, DC. *R.F. Murphy, R.J. Woodland, and M. Criscuoli.*
Bob Murphy (Tetra Tech, Inc./USA)

*__Microplastics as Emerging Contaminants: Small Fry or Big Whale of a Problem?__ *J.K. Anderson, K. Whitehead, J. Wilhelm, and G.K. Ansell.*
Janet Anderson (GSI Environmental/USA)

*** = poster presentation**

*__Microplastics: From Source to Sediment, an Evaluation of Fate and Transport and the Future of Regulatory Actions__. *D. Metzler and J. Peters.*
Darcy Metzler (Haley & Aldrich, Inc./USA)

Not All Microplastics are Created Equal: Refining Depositional Footprints of Microplastics in Sediments of Puget Sound, Washington. *B.S. Sackmann, K. Whitehead, L. Premathilake, and T. Khangaonkar.*
Brandon Sackmann (GSI Environmental Inc./USA)

A6. Advances in Passive Sampling Methods

Platforms Wednesday | Posters (*) Tuesday Evening
Chairs: Meg Jalalizadeh (Exponent) and Magdalena Rakowska (Envirostatus, LLC and Texas Tech University)

Application of a Polymeric Equilibrium-Based Passive Sampler for Methylmercury to Measure a Sediment Porewater Depth Profile. *J.C. Damond, U. Ghosh, and C.C. Gilmour.*
Jada Damond (University of Maryland, Baltimore County/USA)

*__Assessing Bioavailability and Toxicity of Hydrocarbons and Other Nonpolar Organics in Contaminated Sediments Using Ex Situ Passive Sampling and GC-FID Analysis__. *T.F. Parkerton, D. Letinski, A. Redman, M. Rakowska, and D.D. Reible.*
Magdalena Rakowska (Envirostatus, LLC and Texas Tech University/USA)

*__Biomimetic Extraction with Polydimethylsiloxane as a Robust Method to Measure Potential Toxicity of Petroleum Mixtures in Sediments__. *A. Redman, T.F. Parkerton, D. Letinski, M. Rakowska, and D.D. Reible.*
Magdalena Rakowska (Envirostatus, LLC and Texas Tech University/USA)

*__Design Optimization of Passive Sampling Prototypes with Periodic Vibration for Porewater Measurements of Polychlorinated Biphenyls__. *O. Ghosh, L. Cheung, U. Ghosh, and M. Jalalizadeh.*
Oindrila Ghosh (University of Maryland, Baltimore County/USA)

Development of a Single Model to Estimate the Extent of Equilibrium of Different Families of Contaminants in Polymeric Passive Samplers. *A. Alborzi, U. Garza-Rubalcava, X. Shen, T. Hussain, A.V. Smith, R. Islam, and D. Reible.*
Ashkan Alborzi (Texas Tech University/USA)

*__The Development of Diffusive Equilibrium, High-Resolution Passive Samplers to Measure Perfluoroalkyl Substances (PFAS) in Groundwater__. *K.S. McDermett, W.A. Jackson, J. Guelfo, and T.A. Anderson.*
Kaylin McDermett (Geosyntec Consultants/USA)

*__Development of Site-Specific Partition Coefficients to Predict PCB Porewater Concentrations__. *S. McGroddy, K. Godtfredsen, S. Replinger, J. Flaherty, L. Erickson, J. Florer, D. Schuchardt, P.D. Rude, A. Crowley, J. Stern, and D. Williston.*
Susan McGroddy (Windward Environmental LLC/USA)

Improved Understanding of Contaminant Transport and Fate in Sediments Using High Resolution Multi-Parameter Passive Samplers. *W.A. Jackson, U. Garza-Rubalcava, D. Reible, P.B. Hatzinger, G. Lavorgna, and L. Lefkovitz.*
W. Andrew Jackson (Texas Tech University/USA)

Inter-Laboratory Study of Polyethylene and Polydimethylsiloxane Polymeric Samplers for Ex Situ Measurements of Freely-Dissolved Hydrophobic Organic Compounds in Sediment Porewater. *G.R. Lotufo, M.M. Michalsen, D.D. Reible, P.M. Gschwend, U. Ghosh, A.J. Kennedy, K.M. Kerns, M.I. Rakowska, A. Odetayo, J.K. MacFarlane, S. Yan, and M. Bokare.*
Kristen Kerns (U.S. Army Corps of Engineers/USA)

*__Optimization of Diffusive Gradient in Thin Film Devices for Methylmercury Recovery__. *T. Vrtlar, A. Schierz, and D. Reible.*
Tea Vrtlar (CDM Smith/USA)

*__Optimizing the Use of Peepers for Sediment Passive Sampling of Redox Sensitive Metals__. *I. Drygiannaki, F. Risacher, H. Schneider, J. Conder, B. Pautler, A. Sweett, and A.W. Jackson.*
Ilektra Drygiannaki (Geosyntec/USA)

*__PFAS INSIGHT™: A New Tool for Passive Sampling of PFAS__. *E.M. Kaltenberg, K. Dasu, S. Marconetto, and B. McDonald.*
Eliza Kaltenberg (Battelle/USA)

*__Re-Thinking the Kinetics of Metals in Sediment Passive Samplers Using Reverse Tracers__. *F.F. Risacher, I. Drygiannaki, J.M. Conder, B. Pautler, A. Sweett, and A.W. Jackson.*
Florent Risacher (Geosyntec Consultants, Inc./Canada)

Validation of a Rare Congener PCB Performance Reference Compound (PRC) Method and a PRC-Free Method for Equilibrium Concentration Determination of PCBs, PAHs and Dioxins and Furans in Sediment Porewater. *F. Salim, B.G. Pautler, M. Healey, A. Sweett, I. Ilina, J. Roberts, J. Thompson, J. Conder, P. McIsaac, R. Martrano, A. Patterson, and R. Mitzel.*
Faten Salim (SiREM/Canada)

A7. Application of Passive Samplers

Platforms Wednesday | Posters (*) Tuesday Evening
Chairs: Eliza Kaltenberg (Battelle) and Ludovica Silvani (Ramboll)

*__Advances and Applications of Passive Sampling in the Past 6 Years__. *M. Jalalizadeh, D. Athanasiou, S. Ahn, S.K. Driscoll, C. Menzie, and T. Thompson.*
Meg Jalalizadeh (Exponent/USA)

Application of Passive Samplers to Support Risk Assessment and Long-Term Monitoring. *W. Gardiner, K. Kerns, D. Moore, G. Lotufo, D. Reible, A. Smith, M.D.R. Islam, C. McCarthy, H. Rectenwald, and D. Lavoie.*
William W. Gardiner (U.S. Army Corps of Engineers/USA)

Application of Polyethylene Devices (PEDs) to Cap Design and Post-Cap Monitoring. *L.F. Lefkovitz, E.M. Kaltenberg, A. Rigassio Smith, D. Dickerson, and M. Esten.*
Lisa Lefkovitz (Battelle/USA)

Comparative Review of Passive Sampling to Conventional Metrics for Evaluating Sediment Remediation Efficacy. *J.S. Grundy, R.M. Burgess, and M.K. Lambert.*
James Grundy (ORISE Participant at U.S. EPA/USA)

*__Design of a Modular DGT Passive Sampling Array__. *E. Lazzarotto, K. Broadgate, and B.G. McDonald.*
Blair McDonald (WSP-Golder/Canada)

*__Diffusive Gradient Thin-Film Samplers: A Critical Line of Evidence in Ecological Risk Assessment__. *B.G. McDonald.*
Blair McDonald (WSP-Golder/Canada)

Groundwater/Surface Water Interactions at the Transition Zone: Utilizing an In Situ Passive Sampling Program to Evaluate Groundwater Upwelling. *M. Healey, B.G. Pautler, J. Roberts, J. Conder, D. Toler, L. Fontenot, and S. Aufdenkampe.*
Michael Healey (SiREM/Canada)

*__Multi-Phased Sampling Design to Quantify Naturally-Occurring Metals in Anoxic Sediment Using Passive Porewater Samplers__. *J. Arblaster, L. Smith, A. Fitzpatrick, F. Risacher, and L. Baker.*
Luke Smith (Geosyntec Consultants, Inc./USA)

*__Passive Sampling to Monitor Hydrophobic Organic Contaminant Concentration Changes across Seasons in the Anacostia River Watershed__. *N. Lombard, M. Bokare, D. Murali, and U. Ghosh.*
Nathalie Lombard (University of Maryland, Baltimore County/USA)

*__PCB Source Evaluation Using Passive Sampling Techniques at Orote Landfill, Naval Base Guam__. *W. Wen, B. Nagy, P. Gates, and J. Tamashiro.*
Wendell Wen (AECOM/USA)

*__Perspectives in Passive Sampling Technology for Contaminant Monitoring: Synthesis of Findings from a Multi-Stakeholder Expert Survey__. *M. Rakowska, A.V. Smith, T.F. Parkerton, and D.D. Reible.*
Magdalena Rakowska (Envirostatus, LLC and Texas Tech University/USA)

*__Pilot-Scale Demonstration of Innovative Approaches to Measure Freely Dissolved Polychlorinated Biphenyls in Choccolocco Creek__. *J. Conder, A. Fowler, C. Thomas, J. Loper, T. Loper, and E.G. Macolly.*
Jason Conder (Geosyntec Consultants, Inc./USA)

*__Sediment Passive Sampling Data Accurately Predicts Concentrations in Benthic Invertebrate Tissue__. *J. Conder, J. Arblaster, V. Magar, G. Heavner, L. Nelis, C. Whitmus, G. Revelas, D. Williston, J. Stern, L. Erickson, J. Flaherty, D. Schuchardt, P. Rude, A. Crowley, and J. Florer.*
Jason Conder (Geosyntec Consultants, Inc./USA)

A8. Characterization and Remediation of PFAS-Contaminated Sediments

Platforms Wednesday | Posters (*) Tuesday Evening
Chairs: Kavitha Dasu (Battelle) and Dan Griffiths (Parsons)

*__Controlling PFAS Discharge to Surface Water__. *J.M. Rice, S. Sellwood, J. Hull, and J. Collins.*
John Rice (TRC Companies, Inc./USA)

*__Drivers and Alternatives for Interim and Long-Term Remediation of PFAS-Impacted Sediments and Surface Water__. *A. Horneman, T. McWilliams, T. Guillette, J. Kirk, and N. Forsberg.*
Allan Horneman (Arcadis/USA)

An Enhanced Remediation of PFAS-Impacted Sediments Using a Treatment Train of Soil Washing and Adsorptive Media. *N. Pica, E. Coggin, and A. Thompson.*
Nasim Pica (Weston Solutions/USA)

*** = poster presentation**

*The Environmental Legacy of Disposable Paper Plates: PFAS Contamination in Tyrifjorden, Norway**. *G.A. Slinde, H.A. Langberg, S. Hale, A.A. Hoeisaeter, M. Jartun, J.T. Rundberget, E. Farmen, and B. Nordboe.*
Goeril Aasen Slinde (Norwegian Goetechnical Institute [NGI]/Norway)

*The EPA 1633 Draft PFAS Method: Key Features and Lessons Learned through Validation**. *B. Chandramouii, N. Farmer, and M.C. Hamilton.*
Bharat Chandramouli (SGS Canada/Canada)

*Extraction of Zwitterionic PFAS from Impacted Soils Using the "Nickerson" Method**. *S. Choyke, A. Nickerson, A. Borgo, T. Phomsopha, T. McKnight, and A. Patterson.*
Sarah Choyke (Eurofins Environment Testing America/USA)

Field Observations on Fate and Transport of PFAS in Contaminated Sediments. *A.R. Wadhawan, T. Guillette, S. Dunn, and M. Schnobrich.*
Theresa Guillette (Arcadis, Inc./USA)

*Geosynthetic Barriers for PFAS Containment: Current Options, Historical Precedents and New Materials**. *G. Martins, C. Cheah, and T. Walker.*
Gustavo Martins (HUESKER Australia Pty Ltd/Australia)

Laboratory Assessment of Capping Technologies for Remediation of PFAS-Contaminated Sediments. *P. Manwatkar, H.D. Atoufi, and D.J. Lampert.*
David Lampert (Illinois Institute of Technology/USA)

Large Full-Scale In Situ Remediation of PFAS in Groundwater Using Plume®. *J. Cuthbertson, R. Mora, J. Buzzell, S. Krenz, R. Moore, K. Gaskill, and A. Kavanaugh.*
John Cuthbertson (AECOM/USA)

*Passive Treatment of PFAS-Impacted Stormwater**. *J. Cuthbertson, J. McDermott, M. Shore, R. Mora, M. Ajemigbitse, and J. Collins.*
John Cuthbertson (AECOM/USA)

*PFAS Soil and Sediment Remediation**. *M. Welch and J. Foglio.*
Gary Rose (Sevenson Environmental Services/USA)

Reconstructing Temporal PFAS Trends from Sediment Cores with Multiple Approaches. *M.A. Cashman, M.G. Cantwell, A.R. Robuck, M. Morales-McDevitt, and J. Koelmel.*
Michaela A. Cashman (U.S. EPA/USA)

A Reliable Dataset from a PFAS Sediment Investigation near a Former (Confidential) Manufacturing Site in Michigan. *M. Westra, R. Beach, K. McDonald, and L. Nelson.*
Mark Westra (GZA/USA)

A9. Chemical/Toxicological/Biological Measurements and Monitoring

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Michael Ciarlo (EA Engineering, Science, and Technology, Inc., PBC) and LaRae Lehto (Minnesota Pollution Control Agency)

*The Benefits of Rapid Turn GC/MS/MS Measurement of 17 2,3,7,8-Substituted Tetra through OCTA-Chlorinated Dibenzo-p-Dioxins and Dibenzofurans in Sediment Samples for Enhanced Characterization at Contaminated Sediments Sites**. *P.B. Simon, S.L. Stubblefield, P.M. Simon, K. Craigie, and S. McGee.*
Philip Simon (Ann Arbor Technical Services, Inc./USA)

*Biocides in Marine Anti-Fouling Paints: A Concern for Small Craft Harbors?** *S.R. Seguin, B.G. McDonald, and A. Mylly.*
Shawn Seguin (Golder Associates Ltd./Canada)

*Biota Monitoring Program for the Anacostia River Sediment Project Using Stationary Forage Fish**. *A.E. Pinkney and E.S. Perry.*
Alfred Pinkney (U.S. Fish and Wildlife Service/USA)

Business Intelligence and Data Management Applied in Ecotoxicological Characterization of Sediment, Surface Water and Effluent in Brazil. *K. Guiguer, G. Silva, and B. Costa.*
Gustavo Cesar Santos Silva (Arcadis/Brazil)

Developing Hydrocarbon PRGs Using Passive Sampling, Porewater, and Bulk Sediment. *C. Nace, D. Cooke, R.M. Burgess, L.P. Burkhard, and D.R. Mount.*
Chuck Nace (U.S. Environmental Protection Agency/USA)

*Influence of Particle Size Distribution on Heavy Metal Geochemistry of Lagos Harbour, Nigeria**. *A. Bamanga, M. Fowler, and G. Mills.*
Awwal Bamanga (University of Portsmouth/United Kingdom)

PFAS Tracking in Surface Water and Fish Tissue following Multiple AFFF Releases to a River. *L.M. McIntosh, M. Jannitto, D. Bryant, and J. Steinglass.*
Lisa McIntosh (Woodard & Curran/USA)

Polychlorinated Biphenyl Quantification via Multiple Analytical Techniques. *D. Peabody, S. Ruhala, S. Kirchner, T. Burgesser, B. Bennett, and W. Azhar.*
Daniel Peabody (Michigan Department of Environment, Great Lakes, and Energy/USA)

*Polychlorinated Biphenyls: Case Studies in Measurement**. *B. Chandramouli and M.C. Hamilton.*
Bharat Chandramouli (SGS Canada/Canada)

* = poster presentation

*A Reimagined Overlying Water Renewal System for Whole Sediment Toxicity Tests**. *C.R. Davis, D. McCauley, and M. Garton.*
Craig Davis (Great Lakes Environmental Center, Inc. [GLEC]/USA)

*Restoration of Water Bodies Impacted by Mine Drainage: The GeoMaTre Project and Findings for Mercury Assessment at Caveira Mine, Portugal**. *R. Fonseca, T. Albuquerque, J. Araújo, and N. Silva.*
Rita Maria Ferreira Fonseca (University of Évora/Portugal)

*Smallmouth Bass as a Representative Resident Species at Portland Harbor Superfund Site**. *B. Ruffle, A. Clodfelter, H.A. Jones, and K. Vosnakis.*
Betsy Ruffle (AECOM/USA)

Water Quality Data Patterns as a Baseline to Evaluate a Novel Approach for Controlling Sediment Resuspension. *L. Venne, K. Merritt, M. Johnston, C. Draper, P. Pauquette, G. Chang, F. Spada, M. Medina, and K. Gustavson.*
Louise Venne (Wood/USA)

A10. Field Sampling Methods and Techniques

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Ernest Ashley (CDM Smith Inc.) and Caryn Kiehl-Simpson (EA Engineering, Science, and Technology, Inc., PBC)

*The Application of Soil Rhizon Samplers for Understanding Sediment Porewater Conditions in a Coastal Wetland**. *S.P. Parker, A.E. Wilkes, and G.R. Long.*
Samuel Parker (EHS Support/USA)

*The Benefits of High Frequency Sonic Sediment Coring for Improved Recovery on Contaminated Sediment Sites**. *P.M. Simon, P.B. Simon, and M.T. DeLong.*
Peter Simon (Ann Arbor Technical Services, Inc./USA)

Characterization of Proposed Dredged Material Using a Remotely-Operated, Under-Pier Sampling Vessel. *M. Surette, G. Roberts, B. Helland, M.K. Zamanpour, K. Matthews, S. Hinz, and P. Sargent.*
Mark Surette (WSP USA, Inc./USA)

Comparing and Optimizing Sampling Design Strategies to Assess Post-Dredging Conditions in the Hudson River. *K. Garvey, Y. Wang, J. Atmadja, S. Gbondo-Tugbawa, J.W. Kern, G. Klawinski, and M. Cheplowitz.*
Kailtin Garvey (WSP USA, Inc./USA)

Design and Implementation of a Sediment Facies-Specific Sampling Program. *K. Lundmark, J. Holder, and D.J. Abranovic.*
Kevin Lundmark (ERM/USA)

*Innovative Data Collection and Visualization Technology: Leveraged to Assess Sediment Accumulation and Evaluate Restoration of a Former Swimming Beach**. *E. Trumpatori.*
Evan Trumpatori (Woodard & Curran/USA)

*Measurement of Water and Gas-Mediated Contaminant Fluxes Using Benthic In Situ Methods**. *P. Frogner-Kockum, A-K. Dahlberg, A. Lehoux, and W. Zhu.*
Paul Frogner-Kockum (Swedish Geotechnical Institute/ Sweden)

*Multiple Sediment Coring Technique Application: Lower Passaic River**. *D.B. Richardson, H. Phelan, and G. Braun.*
Dave Richardson (Tetra Tech, Inc./USA)

*Novel Sediment Sampling Methods for Difficult Substrates on a Pacific Northwest River**. *K. Heffern, J. Keithly, and S. Hinz.*
James Keithly (ERM/USA)

A Practical Discussion on Sediment Sample Planning, Methods, and Processing. *P. Raymaker, P. Sweeney, and M. Schemmel.*
Paul Raymaker (Bay West, LLC/USA)

*Recovering Benthic Macroinvertebrates following Sediment Capping in an Urban System**. *A.L. Burnham, E.C. Glaza, M.A. Arrigo, and M.J. Kenward.*
Anne Burnham (Parsons/USA)

*Sediment Sampling in a Pandemic: A Case Study in Adaptive Planning**. *D. Metzler, H. Lee, N. Lee, and J. Galvin.*
Darcy Metzler (Haley & Aldrich, Inc./USA)

*X-Ray Fluorescence as a Screening Tool for Assisting in Prioritizing Ecological Exposures in Vernal Pool Sediments**. *J. Schaffer, C. Beers, G. Wissink, and M. Bradley.*
John Schaffer (Tetra Tech, Inc./USA)

A11. Source ID, Loading Assessment, and Control

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Erin Hughes (Foth Infrastructure & Environment, LLC) and Madi Novak (U.S. EPA)

Assessing PCB Mass Balance and Sources in an Urban Estuary by Combining Passive Sampling and Modeling. *P.H. Israelsson, I. Shrivastava, D.P. Prendergast, J.N. Apell, E.E. Adams, and P.M. Gschwend.*
Peter H. Israelsson (Synthesis Environmental LLC/USA)

* = poster presentation

*__DDT in the Willamette Basin, Impacts and Status of a Legacy Organochlorine Pesticide: Ramifications for Superfund Site Cleanup__. *D.G. Livermore and M. Greenblatt.*
David Livermore (Integral Consulting, Inc./USA)

Evaluating Source Control Sufficiency with TIGSED, a Small-Scale Sediment Contamination Model. *N.D. Rose, P. Spadaro, and J. Dittman.*
Nicholas Rose (TIG Environmental/USA)

*__Evaluation of Effectiveness and Performance of Stormwater Management Systems to Limit Sediment Recontamination of Polycyclic Aromatic Hydrocarbons (PAHs)__. *C. Gomez-Avila, B. Rao, H. Zhou, T. Hussain, and D.D. Reible.*
Cesar Gomez-Avila (Texas Tech University/USA)

*__The Good, the Bad, and the Confusing Parts of Coordinating a Sediment Remedial Investigation and Design with a Waterfront Brownfield Redevelopment__. *S. Weatherwax, K. Czajkowski, and S. Ueland.*
Sean Weatherwax (Langan/USA)

*__Identification of MS4 Control Measures to Address Diffuse Contamination in an Urbanized Stream__. *T. Sorell, C. Bell, T. Caputi, and J.V. Loperfido.*
Tamara Sorell (Brown and Caldwell/USA)

*__The Impacts of Source Control and Stormwater Regulations on Sediment Concentrations in Washington State__. *P.R. Hsieh and R.S. Webb.*
Patrick Hsieh (Dalton Olmsted & Fuglevand/USA)

A Longitudinal Dataset of Sediment Contamination with Dioxin and PCB in the Houston Ship Channel and Galveston Bay in Texas: Lessons Learned from 20 Years of Monitoring, Characterization, and Assessment. *H.S. Rifai, A. Govindarajan, and A. Kiaghadi.*
Hanadi S. Rifai (University of Houston/USA)

*__PCB Source Identification and Control: Munger Landing Sediment Remediation Area, Duluth, Minnesota__. *B. Leick, L. Lehto, and M. Elliott.*
Brad Leick (MPCA/USA)

*__Source Tracking of PCB Contamination Using Passive Samplers: The Baltimore Story__. *N. Lombard, S. Joshee, M. Bokare, L. Cheung, T. Neddham, E. Foss, E. Majcher, D. Griffith, W. Schmidt, K. Grove, and U. Ghosh.*
Nathalie Lombard (University of Maryland, Baltimore County/USA)

*__Time-Critical PCB Spill Response and Source Control Action to Protect Sediment__. *K. Kroeger, L. Smith, A. Fitzpatrick, P. Rude, and D. Schuchardt.*
Keith Kroeger (Geosyntec Consultants/USA)

Use of Surface Water Modeling to Support Source Control in an Upgradient Urban Watershed. *P. von Loewe, D. Murali, and M. Shupe.*
Peter von Loewe (Tetra Tech, Inc./USA)

Panel Discussion—Tuesday, Track B

Will Sediment Caps Last Forever? And How Should We Address the Possibility that They Don't?

Moderators
Steve Garbaciak (Foth Environment Solutions)
Philip Spadaro, RG (TIG Environmental)

Panelists
Jennifer Hagen (Ramboll)
Tim Havranek (Ramboll)
Victor Magar (Ramboll)
Helder Costa (Haley and Aldrich)
Garry Horvitz (Haley and Aldrich)
Andrew Timmis (J.F. Brennan Company)

Capping contaminated sediment has been a proven remedy for decades. EPA's 2005 Sediment Guidance recognizes sediment capping, along with dredging and monitored natural recovery, as an effective long-term sediment remedy. Caps can withstand many physical and hydrodynamic conditions, leading to long-term effectiveness and permanence. Establishing a reasonable cap design life requires understanding the long-term stability of cap structures and the environment within which they are constructed. Critical to understanding cap stability is the evaluation of technical factors, design features, monitoring requirements, and engineering controls to manage long-term effectiveness and risks. When capping is proposed, stakeholders need to quantify and control long-term risks. Additional institutional controls, insurance instruments, or financial assurance instruments are increasingly under consideration to address potential long-term risks. Estimates developed for alternatives analyses may use these considerations to help manage expectations and determine long-term maintenance costs (beyond design life), the potential for cap failures, and what constitutes failure under probabilistic events such as earthquakes. In some states, initiatives are under consideration or already exist to require financial instruments (trusts and insurance policies) to mitigate risks of cap damage and failure, or to finance long-term cap maintenance. The cost or complexity of these measures will possibly lead to different conclusions about the preference to cap when comparing long-term effectiveness and cost to overall costs of other remedial technologies for contaminated sediment management. Maintenance and monitoring practices can lead to increased confidence in cap longevity by reliably observing

*** = poster presentation**

problems in time to address long-term risks. For caps with a predictable design life, repair or replacement strategies can help avoid unanticipated failures. However, it is recognized that potentially responsible parties and regulatory agencies do not want endless project maintenance, which leads to the question: at what point, if any, is no further monitoring needed and what demonstrates adequate performance and permanence?

B1. PFAS Bioavailability, Bioaccumulation, and Risk Assessment

Platforms Tuesday| Posters (*) Tuesday Evening
Chairs: Jason Conder (Geosyntec Consultants, Inc.) and Phyllis Fuchsman (Ramboll)

Challenges Associated with the Analysis for PFAS in Sediments and Tissues. *C.J. Neslund.*
Charles Neslund (Eurofins Environment Testing America/USA)

*__Development of a Diffusion-Based Equilibrium Passive Sampler for PFAS Detection in Sediment Porewater and Surface Water__. *B.G. Pautler, F. Salim, M. Healey, A. Sweett, I. Ilina, J. Roberts, B. Medon, A. Pham, F. Risacher, L. D'Agostino, J. Conder, R. Zajac-Fay, J. Gautier, S. Mabury, A.O. De SIlva, P. McIsaac, A. Patterson, and R. Mitzel.*
Brent Pautler (SiREM/Canada)

*__Development of Novel Functionalized Polymeric Thin Films for Equilibrium Passive Sampling of PFAS Compounds in Surface and Groundwater__. *S. Yan, U. Ghosh, G. Foster, and B. Murtadh.*
Songjing Yan (University of Maryland, Baltimore County/USA)

Development of Novel Modeling Approaches for Rapid Risk Characterization of PFAS. *D.W. Moore and E.J. Perkins.*
David W. Moore (U.S. Army Corps of Engineers, ERDC/USA)

*__Getting from Here to There: Testing the Applicability of Bioaccumulation Factors for PFAS for Freshwater Fish__. *K. Whitehead, P.E. Goodrum, J. Wilhelm, E. Reátegui Zirena, and S. Hutton.*
Kenia Whitehead (GSI Environmental Inc./USA)

*__PFAS Exposure Study Design with *Chironomus Dilutus*__. *C.J. McCarthy, S.A. Roark, and C.J. Salice.*
Chris McCarthy (Jacobs/USA)

PFAS: Coming Soon to a Sediment Site near You. *J. Conder.*
Jason Conder (Geosyntec Consultants, Inc./USA)

*__Results of a Multigenerational Zebrafish PFOS Exposure__. *D.W. Moore, K. Gust, N. Vinas, M. Wilbanks, E. Mylroie, C. Cox, A. Kimble, J. Conder, and J. Arblaster.*
David W. Moore (U.S. Army Corps of Engineers, ERDC/USA)

The Role of PFAS in Sediments in Fish Recovery. *J. Benaman, J. Connolly, D. Glaser, B. Lamoureux, S. LaRoe, and D. Opdyke.*
Jennifer Benaman (Anchor QEA, LLC/USA)

B2. Geospatial Data Evaluation and Data Visualization

Platforms Tuesday| Posters (*) Tuesday Evening
Chairs: Juliana Atmadja (WSP USA, Inc.) and Alex Mansfield (Battelle)

Data Visualization: An Evolving Chapter in Scientific Story Telling. *K. Whitehead, H. Podzorski, and B. Sackmann.*
Hannah Podzorski (GSI Environmental Inc./USA)

*__From ROD to Refinement: Contaminated Sediment Delineation Using 3DVA at Portland Harbor__. *K.E. Vickstrom, H. Young, T.J. Cook, W. Azhar, and S.A. Sheldrake.*
Kyle Vickstrom (CDM Smith, Inc./USA)

Geospatial Data Visualization and Accessibility for Allocation Process Related to CERCLA Liability Cases. *B.S. Harvey and J.A. Breiner.*
Bernadette Harvey (FTI Consulting/USA)

Innovative 3-Dimensional Sediment Corrective Action Evaluation and Optimized Remedial Design. *T. Sattler, E. Dieck, S.M. Damon, S. Ueland, and M. Morris.*
Timothy M. Sattler (Langan/USA)

Integrating R, Power BI, and ArcGIS Online to Guide Sediment Investigations and Allocation toward Better Decision-Making. *T.L. Negley, J.C. Combes, and K. Ives.*
Tim Negley (TIG Environmental/USA)

*__Multiple Lines of Evidence Support 3-D Delineation of a Historical Dredge Prism__. *L. Uselman, C. Huynh, and D. Deetz Silva.*
Logan Uselman (Integral Consulting Inc/USA)

*__Paint Me a Picture/Tell Me a Story: Translating Data from a Database into Remedial Decisions__. *C. Draper, J. Abid, and E. Thomas.*
Cynthia Draper (Wood/USA)

*__Rapid Summaries of River Sediment Sampling from a Conditional Sample Density Analysis__. *J. Eykholt, S. Acker, E. Thomas, and C. Draper.*
Jerry Eykholt (Wood/USA)

*__Spatial Interpolation of Surface Sediment Concentrations to Establish Proposed Early Action Area Cleanup Boundaries__. *J. Cooper, M. Shupe, and D. Murali.*
Justin Cooper (Tetra Tech, Inc./USA)

Use of Geostatistical Methods to Delineate Active Remediation Areas in the Lower Duwamish Waterway, Seattle, Washington. *T. Thornburg, C. Hanson, M. Beuthe, and J. Stern.*
Todd Thornburg (Anchor QEA, LLC/USA)

*__Using Indicator Kriging for Lead Spatial Patterns Assessment in Sediments: The Caveira Mine Case Study, Portugal__. *T. Albuquerque, R. Fonseca, J. Araújo, and N. Silva.*
Teresa Albuquerque (Polytechnic Institute of Castelo Branco/Portugal)

B3. Contaminant Fate and Transport in Sediments

Platforms Tuesday| Posters (*) Tuesday Evening
Chairs: Solomon Gbondo-Tugbawa (WSP USA, Inc.) and Craig Jones (Integral Consulting, Inc.)

*__Arsenic Concentrations and Species Distribution in Historically Contaminated Estuarine Sediments in St. Helens, Oregon__. *N. Shaghaghi, H. Ziaei, A. Alborzi, D.D. Reible, A. Deonarine, B. Johnson, B. Warner, J. DiMarzio, and S. Greenfield.*
Negar Shaghaghi (Texas Tech University/USA)

Assessing Sediment Recontamination and Bioaccumulation by Stormwater Heavy Metals. *I. Drygiannaki, D.D. Reible, B. Rao, J.A. Dawson, M. Rakowska, M. Bejar, N.T. Hayman, G. Rosen, M.A. Colvin, B. Chadwick, R. Pitt, B. Steets, M. Otto, and J. Ervin.*
Ilektra Drygiannaki (Geosyntec/USA)

*__Environments of Deposition and Evolution of Hydrophobic Organic Compounds in Lake Sediment and Fish Tissue__. *E.L. McLinn and B.J. O'Neill.*
Eugene McLinn (Burns & McDonnell Engineering, Inc./USA)

*__Evaluating the Effects of Polychlorinated Biphenyls in Stormwater on Sediment Recontamination and Bioavailability__. *T. Hussain, B.A. Rao, M.I. Rakowska, D.D. Reible, D. Athanasiou, N.T. Hayman, G.H. Rosen, M.A. Colvin, D.B. Chadwick, R. Pitt, M. Otto, B. Steets, and J. Ervin.*
Tariq Hussain (Texas Tech University/USA)

*__Evaluation of Effectiveness and Performance of Stormwater Management Systems to Limit Sediment Recontamination of Heavy Metals__. *H. Zhou, B. Rao, C. Gomes-Avila, T. Hussain, D.D. Reible, N.T. Hayman, M.A. Colvin, and M. Demyers.*
Huayun Zhou (Texas Tech University/USA)

*__Evaluation of Mercury Fate and Transport from a Manufacturing Facility on the Ohio River__. *K.M. Groff, J.M. Nielsen, and V.S. Magar.*
Kim Groff (Ramboll/USA)

Impact of Coastal Storm Surge on Redistribution of Contaminated Sediments in Boston Harbor. *C. Perera.*
Chamil Perera (WSP USA, Inc./USA)

Impact of Dredging on River Sediment, Water, Aquatic Macroinvertebrate, and Riparian Spider PCB Concentrations. *R.O. Otter, D.M. Walters, J.M. Lazorchak, K. Fritz, and M.A. Mills.*
Ryan Otter (Middle Tennessee State University/USA)

Insights Gained from the Development and Calibration of an Innovative Contaminant Fate and Transport Model. *R. Makhlouf, L. Bateman, and K. Russell.*
Ramzy Makhlouf (Anchor QEA LLC/USA)

*__Leaching Rate of PCB from Marine Paint Chips__. *A.D. Uhler, J.H. Hardenstine, D.A. Edwards, and G.R. Lotufo.*
Allen Uhler (NewFields/USA)

Marsh-Waterway Exchange of Methylmercury at Berry's Creek Study Area, New Jersey. *G. Chang, C. Jones, T. Martin, and P. Brussock.*
Grace Chang (Integral Consulting, Inc./USA)

*__Real-Time Monitoring of the Fate and Transport in Sediments Using Microbial Potentiometric Sensors (MPSs)__. *S.R. Burge, R.G. Burge, and E.D. Taylor.*
Scott Burge (Burge Environmental, Inc./USA)

Remobilization of Mercury-Contaminated Sediments from Salt Pond Restoration, South San Francisco Bay, California. *B.E. Jaffe, A. Foxgrover, M. van der Wegen, F. Achete, M. Marvin-DiPasquale, and T. Fregoso.*
Bruce Jaffe (US Geological Survey/USA)

*__Successful Implementation of SWAC Method and Design to Remediate PCB-Contaminated Subtidal Sediments at the New Bedford Harbor Superfund Site__. *A. Rigassio Smith, C. Lu, J. Blount, and M.E. Esten.*
Anita Rigassio Smith (Jacobs/USA)

*** = poster presentation**

B4. Groundwater/Sediment/Surface Water Interactions

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Lisa Lefkovitz (Battelle) and
Bob Veenstra (Geosyntec Consultants, Inc.)

*__Application of Groundwater Transport Modeling to Examine Plume Mass Discharge and Natural Attenuation within Surface Water Sediments__. *M.G. Shupe and D.K. Burnell.*
Mark Shupe (Tetra Tech, Inc./USA)

Assessing Groundwater/Surface Water Interactions Using a Variety of High Resolution Tools and Traditional Methods. *C. Patterson, A. Gavaskar, S. Lee, A. Danko, L. Lefkovitz, E. Kaltenberg, J. Sminchak, and A. Jackson.*
Chris Patterson (U.S. Navy/USA)

*__Assessment of Groundwater Seepage within an Intertidal Mudflat to Inform an Ecological Risk Assessment__. *N. Thyer, E. Lazzarotto, K. Broadgate, Z. Terzic, J. Medd, and K. Mundle.*
Nicholas J. Thyer (WSP/Australia)

Establishing a Sediment Concentration Cleanup Goal for PCBs Using Sediment-Water Diffusive Flux. *N. Lombard, M. Bokare, D. Murali, and U. Ghosh.*
Nathalie Lombard (University of Maryland, Baltimore County/USA)

*__Fate and Transport of TNT and RDX in Multiple Media at the Group 1 Sites within Picatinny Arsenal__. *H. Williams, F. DeSantis, and T. Gabel.*
Hilary Williams (EA Engineering, Science, and Technology, Inc., PBC/USA)

*__Groundwater/Seawater Interface Migration during Extraction Well Pumping and Contaminant Fate and Transport on a Coastal Barrier Island__. *C.V. John and V. Kamath.*
Chandy John (AECOM/USA)

Intertidal Geophysics to Improve Characterization of Groundwater to Surface Water Contaminant Transport. *M. Meyer, S. Moore, A. Baird, and S. Lee.*
Michael Meyer (Battelle/USA)

Investigating Groundwater: Surface Water Interaction Using Distributed Temperature Sensing (DTS) Technology. *H. Tahon, D. Adilman, S.W. Lee, F. Selker, and C. Gabrielli.*
Heather Tahon (Geosyntec Consultants/USA)

*__A Novel Approach for Evaluating Optimal Groundwater-Surface Water Discharge Monitoring Periods for Source Control Evaluation in Portland Harbor__. *D.G. Livermore.*
David Livermore (Integral Consulting, Inc./USA)

Quantifying Flow and Contaminant Flux for Groundwater-Surface Water Interactions: Techniques for Different Site Conditions. *K.T. Russell, D. Reidy, G. Weatherford, and M. Gefell.*
Kevin Russell (Anchor QEA, LLC/USA)

*__Remedial Solutions for Addressing NAPL and Groundwater Impacts to a Creek from a Subsurface Crude Oil Plume__. *V. Tilotta, J. Schwartz, and C.D. Moody.*
Vincent Tilotta (Farallon Consulting/USA)

Use of Ultraseep Meters and Differential Pressure Piezometers to Measure Groundwater to Surface Water Discharge. *K. Craigie, J. Moore, and B. Chadwick.*
Keir Craigie (Tetra Tech, Inc./USA)

*__Using Drone-Mounted Thermal Cameras to Identify Groundwater Discharge__. *Z. Powers and W. Steinmann.*
Zachary Powers (GHD/USA)

*__Using Groundwater and Surface Water Interactions to Inform Conceptual Site Model and Remedy Selection for Benzene-Impacted Sediment__. *M. Kelley and T. Majer.*
Mark Kelley (Haley & Aldrich, Inc./USA)

B5. Hydrodynamics and Sediment Transport

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Kara Scheu (Integral Consulting, Inc.) and
James Wands (HDR, Inc.)

Anthropological Impacts on Morphology and Resulting Contamination Patterns on the Newark Bay Southwestern Sub-Tidal Shallows. *R. Mathew, R. Bubnyte, and E.J. Garland.*
Rooni Mathew (CDM Smith, Inc./USA)

*__Application of Sediment Erodibility Measurements in Site Characterization__. *S. McWilliams, C. Jones, and J. Magalen.*
Samuel McWilliams (Integral Consulting, Inc./USA)

*__Comprehensive Numerical Modeling of the Transport and Fate of Contaminated Sediments at Marine Terminals__. *A. Sharma and S.W. Fenical.*
Abhishek Sharma (Mott MacDonald/USA)

*** = poster presentation**

Development of a Dynamically-Coupled Near/Far Field Propeller Wash Scour Sediment Transport Model. *P.M. Craig, J.Y. Jung, L.A. Bastidas, A.J. Mausolff, P.F. Wang, D.W. Blue, and F.J. Messina.*
Paul Craig (DSI, LLC/USA)

*__Effects of Dam Removal Sediment Releases on Coastal Lagoon Dynamics and Ecosystems__. *C. Jones, K. Scheu, S. McWilliams, and D. Revell.*
Craig Jones (Integral Consulting, Inc./USA)

*__Evaluating the Importance of Wind-Induced Sediment Resuspension in Microtidal Coastal Environments__. *J.G. Booth.*
J. Greg Booth (Woodard & Curran/USA)

*__Influence of Periodic Water Level Changes on Sediment Dynamics and Chemical Fate and Transport__. *B. Sheets, C. Frias, J. Bankston, E. Dott, and E. Hedblom.*
Ben Sheets (Barr Engineering Co./USA)

*__A Multi-Scale Hydrodynamic and Sediment Transport Model of the Portland Harbor Superfund Site__. *J.Y. Jung, T.J. Mathis, P.M. Craig, B.M. Hoa, D.H. Pham, L.A. Bastidas, and A. Mishra.*
Jeffrey Jung (DSI, LLC/USA)

Real-Time Fluxes in a Riverine System Demonstrated through In Situ Optical Monitoring. *L. Venne, K. Merritt, M. Johnston, C. Draper, P. Pauquette, G. Chang, F. Spada, and K. Gustavson.*
Louise Venne (Wood/USA)

Simulated Dynamics of Dredge-Induced Sediment Transport in the Lower 8.3 Miles of the Passaic River. *J. Atkinson, H. Zhao, C. How, and M. Erickson.*
John Atkinson (Arcadis/USA)

*__What Do Data Snapshots Miss? The Case for Time-Series Measurements__. *K. Scheu, S. McWilliams, C. Jones, and L. Baker.*
Kara Scheu (Integral Consulting, Inc./USA)

B6. Contaminant Bioavailability and Uptake

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Guilherme Lotufo (U.S. Army Corps of Engineers) and Blair McDonald (WSP-Golder)

Assessing PCB Concentration in Fish from Passive Sampler Data Using a Thermodynamic Equilibrium Model: Upper Roanoke River Case Study. *N. Lombard, L. Cheung, J. Hill, L.A. Weitzenfeld, and U. Ghosh.*
Nathalie Lombard (University of Maryland, Baltimore County/USA)

*__Assessing PCB Concentration in Lower Trophic Aquatic Organisms from Passive Sampler Data Using Thermodynamic Equilibrium Model: Anacostia River Case Study__. *N. Lombard, M. Bokare, A. Pinkney, D. Murali, and U. Ghosh.*
Nathalie Lombard (University of Maryland, Baltimore County/USA)

*__Assessment of the Bioaccumulation Potential of PCB Associated with Paint Particles in the Presence of Sediment__. *G.R. Lotufo, P.T. Gidley, A.D. McQueen, D.W. Moore, J.H. Hardenstine, and A.D. Uhler.*
Guilherme Lotufo (U.S. Army Corps of Engineers/USA)

Comparative Bioaccumulation Study of Activated Carbon Amendments. *R. Damera, J. Bleiler, U. Ghosh, L. Cheung, and T. Sanford.*
Ravi Damera (AECOM/USA)

*__Degree of OPA Encapsulation in IDN Sediments: Evaluating Potential Toxicity and Bioavailability of Dissolved Petroleum Hydrocarbon Constituents for Benthic Organisms__. *C.E. Ruiz, P.R. Schroeder, D.J. Farrar, L.R. May, D.W. Moore, A.D. Redman, I. Mamonkina, D. Blue, and S.P. Hopkins.*
Carlos E. Ruiz (U.S. Army Corps of Engineers/USA)

*__Evaluation of the Relationship between Sediment, Porewater and Clam Tissue cPAH Concentrations in the LDW__. *S. Replinger, K. Godtfredsen, S. McGroddy, L. Read, J. Florer, D. Schuchardt, P.D. Rude, A. Crowley, J. Stern, D. Williston, J. Flaherty, and L. Erickson.*
Suzanne Replinger (Windward Environmental LLC/USA)

*__Is Activated Carbon an Effective In Situ Treatment for DDX in Floodplain Soils?__ *F.S. Dillon, A.D. Harwood, S.A. Nutile, T.M. Hutchinson, and T. Alcamo.*
Frank Dillon (Jacobs/USA)

Marine Sediments as a Source of Fukushima ^{137}Cs for Benthic Fish in Japan's Coastal Waters. *N.S. Fisher, C. Wang, and N. Volkenborn.*
Nicholas S. Fisher (Stony Brook University/USA)

Novel Mercury Sequestration Technology to Suppress the Methylmercury and Bioaccumulation in Sediment. *C. Stransky, K. Abusaba, C. Gerbig, A. Gabriel, K. Pingree, J. Miller, and D. Griffin.*
Chris Stransky (Wood/USA)

*__PCB Concentration Distribution in Collocated Bulk Sediment, Fish Tissue, and Porewater at the Apra Harbor Sediment Site__. *J. Tamashiro, W. Wen, B. Nagy, and J. Anthony.*
Jocelyn Tamashiro (U.S. Navy/USA)

*** = poster presentation**

Site-Specific Relationship between PCB Porewater Concentrations and Bioaccumulation at Penniman Lake, Virginia. *M.R. Islam, A. Smith, D. Reible, W. Gardiner, G. Lotufo, H. Rectenwald, C. McCarthy, and D. Lavoie.*
Rashedul Islam (Texas Tech University/USA)

B7. Ebullition

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Karl Rockne (University of Illinois at Chicago) and Priscilla Viana (Arcadis)

Bubble-Facilitated Mobilization of Non-Aqueous Phase Liquids at Residual Saturation from Sandy Sediments. *A. Nunez Garcia, J. Wu, and K.G. Mumford.*
Ariel Nunez Garcia (Queen's University/Canada)

*__Controls on Gas Ebullition along a Vertical Sediment Profile in an Estuarine Urban Waterway__. *M. Khazraee Zamanpour and K.J. Rockne.*
Morvarid Khazraee Zamanpour (WSP/USA)

The Duration of Ebullition Processes in NAPL-Contaminated Sediments and Implications for Remedy Design. *D. Vlassopoulos, M. Carey, and R. Barth.*
Dimitri Vlassopoulos (Anchor QEA, LLC/USA)

Ebullition-Facilitated NAPL Transport: Case Studies where Screening Evaluations Changed the Remedial Path. *L.A. Reyenga.*
Lisa Reyenga (GEI Consultants, Inc./USA)

*__Evaluation of a Continuous Sediment Ebullition Monitor__. *C. Gosse, N. Nickerson, and M. Coleman.*
Colleen Gosse (Eosense Inc./Canada)

*__Field Investigation of Ebullition-Facilitated Coal Tar Transport in Sediment at a Former MGP Site__. *J.M. Rice, K.A. Vater, B. Hoffensetz, M. Friedman Hamm, D. Leitch, and R. Gill.*
John Rice (TRC Companies, Inc./USA)

Impact of Temperature, NAPLs Concentration, and Co-Substrate on NAPLs Biodegradation and Biogas Production in Sediment. *M. Khazraee Zamanpour and K.J. Rockne.*
Morvarid Khazraee Zamanpour (WSP/USA)

*__Long-Term Performance Monitoring of Two Full-Scale Sediment Caps to Control Ebullition-Facilitated Migration of MGP Tar from Sediment__. *E.L. McLinn.*
Eugene McLinn (Burns & McDonnell Engineering, Inc./USA)

*__Use of Unmanned Aerial Vehicles to Monitor Ebullition-Facilitated NAPL Transport__. *N. McNurlen, L. Reyenga, C. Carter, and B. Bjorkman.*
Nathan McNurlen (GEI Consultants/USA)

B8 Advanced Data Analysis and Decision Tools

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Philip E. Goodrum (GSI Environmental) and Tim Negley (TIG Environmental)

Application of Machine Learning to Inform Remedial Decision Making: A Case Study at a Mercury-Impacted River System. *S. Thakali, S. Durgan, J. Collins. M. Liberati, and N. Grosso.*
Sagar Thakali (AECOM/USA)

Automated Debris Classification Methods for Multibeam Sonar and Vessel-Mounted LiDAR. *D.B. Hericks, P.J.R. Steenstrup, and C.B. Kenyon.*
David Hericks (Tetra Tech/USA)

Comparison of Empirical and Machine Language Approaches to Predict Gas Ebullition Flux from Sediment Site Data. *M. Mansouri and K.J. Rockne.*
Karl Rockne (University of Illinois at Chicago/USA)

*__Comparison of SWAC Estimates, Uncertainty, and Interpolation Methods, Portland Harbor Pre-Remedial Design Investigation__. *A. Fitzpatrick, J. Conder, and J. Rosen.*
Anne Fitzpatrick (Geosyntec Consultants, Inc./USA)

Detecting Presence of LNAPL Using Artificial Neural Network Model and Sensor Data. *K. Karimi Askarani and T. Sale.*
Kayvan Karimi Askarani (Colorado State University/USA)

Development of a Web-Based Geospatial Support System for Long-Term Soil Management Activities at the Anniston PCB Site. *R. Siebenmann, A. Fowler, J. Loper, T. Loper, E.G. Macolly, and M. Price.*
Raphael Siebenmann (Geosyntec Consultants/USA)

*__Digitizing the Haystack: Streamlined Techniques to Pinpoint PRPs__. *M.J. Mayo, J.W. Rice, and S. Zhao.*
Matthew Mayo (Gradient/USA)

*__A Framework for Evaluating Legacy Sediment Quality behind Dams to Prioritize Proactive Sediment Assessment and Management__. *G.R. Long, J.K. Decker, S.P. Parker, N.W.E. Goulding, and A. Patz.*
Gary Long (EHS Support/USA)

*** = poster presentation**

*__Improving Data Collection and Management Workflows at Sediment Remediation Sites Using ESRI's ArcGIS Field Applications__. *B. Schrotenboer and D. Richardson.*
Brad Schrotenboer (Tetra Tech/USA)

Information Management Systems for Dredging Projects. *A. Higgins, J. Daniel, S. Liu, B. Patel, and J. Rosen.*
Andrew Higgins (Geosyntec Consultants, Inc./Canada)

*__Integrating High-Resolution Acoustic Data with Machine Learning for Improved Benthic Sediment Mapping and Characterization__. *J.T. McClinton.*
Tim McClinton (David Evans and Associates, Inc./USA)

*__Intensive Historical Evaluation and Sampling Campaigns to Validate Potential Sediment Contamination Hotspots Related with (Former) Risk Activities__. *D. Gorteman, J. Dewilde, K. Van Geert, and K. Van De Wiele.*
Dorien Gorteman (Arcadis/Belgium)

Power Analyses to Determine Sample Count and Frequency for Statistically Relevant Trending. *L. Venne, C. Draper, and J. Wolfe.*
Louise Venne (Wood/USA)

*__Predicting Gas Ebullition Based on Readily Obtainable Data Using Machine Learning Approaches__. *K. Rockne and M. Mansouri.*
Marzieh Mansouri (University of Illinois Chicago/USA)

*__Through Murky Waters to Clear Insights: How Data Science and Machine Learning Can Contribute to Sediments Research__. *N. Babayan.*
Nelli Babayan (Microsoft Federal/USA)

Use of Bathymetry and GIS in Long-Term Risk Management to Monitor Effectiveness and Permanence of Residuals Management Cover. *S.R. Seguin, B.G. McDonald, and A. Mylly.*
Shawn Seguin (Golder Associates Ltd./Canada)

Panel Discussion—Thursday, Track B

The Intersection of Environmental Justice and Contaminated Sediment Investigation and Remediation

Moderator

Miranda Henning, BCES (Integral Consulting Inc.)

Panelists

Matthew Tejada (U.S. EPA)
Roger Santiago (Environment and Climate Change Canada)
Bridgette DeShields (Integral Consulting Inc.)
Jeffrey Talbert, J.D. (PretiFlaherty)
Tokesha Collins Wright (Louisiana Chemical Association)
Mary Kelly, MES (Agnico Eagle Mines)

Since the start of 2021, the White House and U.S. Environmental Protection Agency have placed Environmental Justice (EJ) at the center of U.S. federal strategy. The recent focus follows decades of activism and engagement at the local and state levels prompted by a long history of unequal treatment, opportunity, and engagement among communities throughout the United States and Canada. This panel discussion will explore opportunities and successes to apply EJ principles in the investigation and remediation of contaminated sediment sites in the U.S. and Canada, from the perspectives of consultants, regulators, industry, and legal counsel, all of whom have been working on sites in close proximity to communities with EJ concerns.

C1. NAPL and MGP Sites

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Sean Carroll (Haley & Aldrich, Inc.) and Michael D. Crystal (Sevenson Environmental Services, Inc.)

Concepts Relative to OPA Encapsulation and IDN Sediments. *J.A. Johnson, I. Mamonkina, C.E. Ruiz, P.R. Schroeder, and D. Blue.*
Irina Mamonkina (NewFields/USA)

*__Conceptual Models for NAPL Emplacement in Sediments__. *J.A. Johnson, I. Mamonkina, D. Blue, E.M. Snyder, and T. Fischer.*
Irina Mamonkina (NewFields/USA)

*Degree of OPA Encapsulation in IDN Sediments: Effects on Pore Scale NAPL Mobility and Aqueous Phase Mass Transport of Dissolved Petroleum Hydrocarbon Constituents**. *C.E. Ruiz, P.R. Schroeder, J.A. Johnson, I. Mamonkina, A.D. Redman, D. Blue, and S.P. Hopkins.*
Carlos E. Ruiz (U.S. Army Corps of Engineers/USA)

Installation of Amended Composite Geotextiles for Sheen Control and Bank Stabilization. *S. Crawford.*
Samuel Thomas Crawford (J.F. Brennan Company, Inc./USA)

Manistee Sediment Remediation. *G. Zellmer, E. Dievendorf, N. Gensky, and A. Santini.*
Eric Dievendorf (Arcadis/USA)

NAPL Mobility at the Newtown Creek Superfund Site: Multi-Stage Testing Results and Data Evaluation. *M.J. Gefell, T. Gross, and S. Messur.*
Michael Gefell (Anchor QEA, LLC/USA)

*Opportunities for Cost Savings and More Sustainable Remedies in Sediment: Implications of the New ASTM Standards on NAPL Mobility**. *L.A. Reyenga.*
Lisa Reyenga (GEI Consultants, Inc./USA)

*Visual Display of Quantitative Data for Sample Selection for NAPL Mobility Testing in Sediment**. *F.C. Harris, L.A. Reyenga, and J.M. Hawthorne.*
F. Claire Harris (GEI Consultants/USA)

West Station Former MGP: Evaluations of Wall Reinforcement and Extension Technologies in a Complex System to Facilitate Sediment Removals. *K. Brooks, R.D. D'Hollander, A. Ayoubian, A. Roueenfar, and A. Burnham.*
Anne Burnham (Parsons/USA)

C2. Restoration and Revitalization Strategies

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Marc Mills (U.S. Environmental Protection Agency) and Troy Naperala (AECOM)

Approaches to Sediment Management for Dam Removal Projects. *T.R. Naperala and J. McDermott.*
Troy Naperala (AECOM/USA)

The Conowingo Pilot Project: Findings and Implications. *S.B. Merrill, J. Deni Chambers, A. Demorest, and S. Bedosky.*
Sam Merrill (Northgate Environmental Management/USA)

If You Clean It, They Will Come: Combining Sediment Remediation with Revitalization and Redevelopment. *S. Inman, S. Murphy, K. Powell, P. Doody, and M. Conese.*
Kim Powell (Anchor QEA, LLC/USA)

*Naturalizing and Relocating the Don River within a Contaminated Landscape: The Port Lands, Toronto, Ontario**. *J. Kusa and M. Melchior.*
Jonathon Kusa (Inter-Fluve, Inc./USA)

C3. Great Lakes Legacy Act Successes and Challenges

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Steven Nadeau (Sediment Management Work Group) and Steven Shaw (Sevenson Environmental Services, Inc.)

*Clean Sediments and Clear Channels for Howards Bay and Fraser Shipyards: Combined Navigation and Remediation Dredging**. *M. Erickson, M. Gravelding, E. Dievendorf, L. Tomlinson, S. Hill, and P. Viana.*
Eric Dievendorf (Arcadis/USA)

*Developing and Implementing a Quality Control and Quality Assurance Program for the Spirit Lake Project**. *M.C. Ciarlo, C. Kiehl-Simpson, J. Beaver, M. Loomis, and D. Bauman.*
Michael Ciarlo (EA Engineering, Science, and Technology, Inc., PBC/USA)

*Estimating PCB Background Concentrations in the Great Lakes Using Great Lakes Legacy Act Data**. *M. Loomis, L. Blume, A. Haas, K. Miller, and P. Goovaerts.*
Mark Loomis (U.S. Environmental Protection Agency/USA)

Milwaukee Estuary Area of Concern (AOC): A Creative Great Lakes Legacy Act Partnership to Address Contamination on a Massive Scale. *H. Williams, M. O'Brien, and C. White.*
Heather Williams (U.S. Environmental Protection Agency/USA)

*Quality Assurance Considerations for Great Lakes Legacy Act Projects**. *M. Loomis, L. Blume, M. Galloway, J. Schofield, and Z. Rahim.*
Mark Loomis (U.S. Environmental Protection Agency/USA)

*Review of Quality Documentation for GLLA Remedial Construction Projects: How to "Right-Size" Submittals to Meet QA/QC Requirements**. *M. Loomis, L. Blume, M. Galloway, T. Lewis, Z. Rahim, and M. Davis.*
Mark Loomis (U.S. Environmental Protection Agency/USA)

Rouge River AOC: Partnering to Clean up the Old Channel of the Lower Rouge River Increases Redevelopment Interest and Triggers Cleanup of Former Industrial Area. *E. Stieber, L. Stirban, N. Langlais, J. Caryl, C. Geadelmann, J. Telano, and R. Ellison.*
Elizabeth Stieber (Wood/USA)

Ryerson Creek Outfall: Designing a Collaborative Project under the Great Lakes Legacy Act Using Public-Private Partnerships. *J. Sirk, D. Meric, G. Gibbons, M. Loomis, H. Williams, E. Bertaut, H. Hopkins, and L. Schoen.*
Jed Sirk (Geosyntec Consultants, Inc./USA)

Scanlon Reservoir Remediation: An R&D Pilot Study for In Situ Remediation of PCDDF in an Active Operating Hydroelectric Reservoir. *S. Bagnull, R.K. Mohan, E. Patmont, K. Powell, A. Brunton, M. Kern, C. Nigrelli, S. Siegan, S. Schoff, and L. Lehto.*
Steven Bagnull (Anchor QEA/USA)

Sediment Remediation and Habitat Restoration at Spirit Lake, Duluth, Minnesota. *M. Loomis, M.C. Ciarlo, J. Beaver, and M. Bowman.*
Mark Loomis (U.S. Environmental Protection Agency/USA)

*__Torch Lake: GLLA Project in the Hubbell Processing Area and Lake Linden Recreation Area__. *D. Amber, J.L. Telano, H.A. Williams, S.L. Swart, P.T. LaRosa, and L. Stirban.*
Danielle Amber (Ramboll/USA)

USEPA's Great Lakes Legacy Act: Past, Present, and Future. *S.E. Cieniawski and M.L. Tuchman.*
Scott Cieniawski (U.S. Environmental Protection Agency/USA)

*__Winter is Coming: Successful Completion of a Great Lakes Legacy Act (GLLA) Remedial Capping Project in the St. Louis River Area of Concern (AOC) in Duluth, Minnesota__. *M. Kern, L. Lehto, N. Patterson, D. Mally, and M. Elliot.*
LaRae Lehto (Minnesota Pollution Control Agency/USA)

C4. Remedial Cleanup Objectives and Approaches for Optimized Remedial Development

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Aaron Frantz (CDM Smith) and Michael Spera (AECOM)

*__Addressing Sediment Contamination under the LSRP Program in New Jersey: Challenges and Potential Improvements__. *D. Winslow, S. Huber, R. Beach, and T. Briggs.*
David Winslow (GZA GeoEnvironmental, Inc./USA)

Application of California Sediment Quality Objectives at Small Sites: Challenges and Potential Modifications. *W.R. Hovel and B. Hitchens.*
Wendy Hovel (Geosyntec Consultants, Inc./USA)

*__Circular Economy and Sediment Management in European and Italian Legislation__. *F. Peres.*
Federico Peres (B&P Avvocati Law Firm, University of Padua/Italy)

CSM-Based Sediment Remediation Strategies without Published State Standards. *N. Hastings, J. Port, D. Wolfram, L. Hellerich, J. Robinson, L. McIntosh, and J. Hamel.*
Nicholas Hastings (Woodard & Curran/USA)

*__Data Processing and Management of Heterogenous PCB Contamination at the Former Adirondack Steel Site__. *E. Cummings, K. Thapa, and R. Conden.*
Emily Cummings (EA Engineering, Science, and Technology, Inc., PBC/USA)

Establishment of an Area-Wide Proposed Early Action Cleanup Level for the Anacostia River Sediment Project. *R. Zvoleff, M. Shupe, P. Song, J. Cooper, and D. Murali.*
Rebecca Zvoleff (Tetra Tech, Inc./USA)

*__European Approaches to Sediment: Update__. *S.E. Apitz.*
Sabine Apitz (SEA Environmental Decisions, Ltd./United Kingdom)

*__Impacts of the Characterization and Evaluation of Wood Wastes on Remedial Design in a Tidal Wetland__. *B. Johnson, B. Warner, J. DiMarzio, and S. Greenfield.*
Braedon Warner (GSI Water Solutions, Inc./USA)

*__Keeping an Eye on Reopeners: A Legal Evaluation of Risks Posed by Emerging Contaminants__. *L. Dyble.*
Louise Dyble (Sheppard Mullin Richter & Hampton/USA)

Linked PCB Mass Balance and Food Web Model to Assess Effectiveness of Source Control and Sediment Remediation in the Anacostia River. *U. Ghosh, M. Bokare, A. Pinkney, and D. Murali.*
Upal Ghosh (University of Maryland, Baltimore County/USA)

*__The Old Upper Mountain Road Site: Sediment Remediation and On-Site Consolidation in the New York State Superfund Program__. *M. Smith, D. Conan, T. Midgley, B. Scharf, S. Saucier, and M. Cruden.*
Matt Smith (EA Engineering, Science, and Technology, Inc., PBC/USA)

*__Permitting Constraints and Their Influence on Remedy Design__. *B. Deshields and K. Purcell.*
Bridgette DeShields (Integral Consulting Inc./USA)

*__San Diego Bay: Technical and Legal Challenges Due to New Sediment Regulations__. *M. Palmer, K. King, K. Richardson, and B. Gibson.*
Mike Palmer (de maximis, inc./USA)

*__Use of Multiple Lines of Evidence to Assess Risk, Develop Remedial Alternatives, and Select a Preferred Remedy for the Lower Genesee River__. *L. Gorton, M. Vetter, T. Drachenberg, E. Glaza, K. Brooks, W. Long, L. Brussel, A. Ruta, M. Rondinelli, and T. Towey.*
Matthew Vetter (Parsons/USA)

*** = poster presentation**

Using the Clean Water Act to Achieve Better Sediment Cleanups. *S.A. Sheldrake.*
Sean Sheldrake (CDM Smith Inc./USA)

C5. Remedy Cost Allocation Considerations and Alternative Financial Models

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Kate Lasseter (TIG Environmental) and Larry Silver (Langsam Stevens Silver & Hollaender)

Allocating the Costs of Complex Sediment Mega-Sites: Who's Going to Pay for That Three Billion Dollar Remedy? *J.C. Raffetto, L.S. Kirsch, and J.F. Visser.*
Jack Raffetto (Sidley Austin LLP/USA)

Alternative Approaches for Funding Cleanup of Contaminated Sediments. *P. Spadaro and L. Rosenthal.*
Philip Spadaro (TIG Environmental/USA)

Calculation of Contaminant Mass in Sediments for Use in Cost Allocation. *J.M. Kneeland, R.H. Mozumder, and E.L. Butler.*
Jessie Kneeland (Gradient/USA)

***Cost-Effectiveness Defined: The Mystery of Proportionality under CERCLA's National Contingency Plan (NCP) Solved**. *S.C. Nadeau.*
Steven Nadeau (Sediment Management Work Group/USA)

Determining Equitable Shares of Responsibility Pursuant to CERCLA for Discharges from Municipal Sanitary Sewer Systems. *J. Manley.*
Judy Manley (TechLaw Consultants, Inc./USA)

***Identifying and Managing Uncertainty in Environmental Response Costs at Sediment Sites**. *K. Herman, M. Pollock, S. Zhao, and N. Slagowski.*
Kurt Herman (Gradient/USA)

***Use of Probabilistic Estimating Techniques to Quantify Long-Term Sediment Cap Monitoring and Maintenance Costs**. *A. Ricciardelli and C. Toll.*
Albert Ricciardelli (GZA GeoEnvironmental, Inc./USA)

C6. Communication and Facilitation with Stakeholders

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Nicholas van Aelstyn (Shepard Mullin Richter and Hampton) and Len Warner (WSP USA)

***Advancing Sediment Remediation at a NJDEP LSRP Site Using the Goals of the Superfund Task Force**. *K.A. Czajkowski and S. Ueland.*
KariAnne Czajkowski (Langan/USA)

***Community Participation in the Decision-Making Framework for Natural Resource Damages Assessment and Restoration Project Implementation**. *M. Arrigo, C. Milburn, S. Blauvelt, and K. Dziubek.*
Mark Arrigo (Parsons Corporation/USA)

***Development of a Programmatic Institutional Controls and Data Management Plan for the Portland Harbor Superfund Site**. *R. McDermott, K. Roush, and D. Sanders.*
Rachel McDermott (GSI Water Solutions, Inc./USA)

***Effective and Successful Stakeholder Communication: A Contractor's Perspective**. *A. Callaway and W. Simons.*
Angela Callaway (J.F. Brennan Company, Inc./USA)

Efficient and Effective Community and Stakeholder Engagement at Superfund Sites. *E. O'Connell, J. Dittman, K. Lasseter, and P. Spadaro.*
Erin E. O'Connell (TIG Environmental/USA)

Engaging Audiences: Interactive Websites for a Common Site Narrative. *J. Oliver and J. Quinley.*
Jill Oliver (Anchor QEA/USA)

Incorporating First Nations' Knowledge and Priorities into Remedy Selection. *E. Crawford, F. Wong, A. Corp, A. Blanc, and M. Larsen.*
Eric Crawford (Transport Canada/Canada)

***Integration of Remediation, Restoration and Revitalization: A Case Study on the Mercury-Impacted South River, Virginia**. *J. Collins, D. Kennedy, C. Dixon, N.R. Grosso, and M. Liberati.*
Joshua Collins (AECOM/USA)

More Than Just Volunteering. *G. Mikeska and T. Sherard.*
Gretchen Mikeska (District of Columbia Department of Energy & Environment/USA)

Soil Sediment Sites: Navigating the Liability and Site Closure Gauntlet. *C.L. Hein, J.W. Ring, and H. Cumberland.*
Christine L. Hein (Ring Bender LLP/USA)

*** = poster presentation**

Stakeholder and Regulatory Agency Coordination at Portland Harbor: Remedial Design Guidelines and Considerations. *W. Azhar, H. Young, M. Novak, J. Clark, L. Orr, and S. Sheldrake.*
Wardah Azhar (CDM Smith, Inc./USA)

C7. Site Management Decision Strategies

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Nicolette Andrzejczyk (U.S. Navy) and Andrew Bullard (CDM Smith Inc.)

Developing a River-Wide Cleanup in a Complicated Jurisdictional Setting. *G. Mikeska and D. Murali.*
Gretchen Mikeska (District of Columbia Department of Energy & Environment/USA)

Evaluating Site-Specific Background Including Ongoing Sources to Develop Realistic Cleanup Goals for the Newtown Creek Superfund Site. *A. Shellenberger, D. Haury, P. LaRosa, and K. Russell.*
Amanda Shellenberger (Anchor QEA, LLC/USA)

Forever and a Day: CERCLA Interpretation of Unlimited Use and Unrestricted Exposure. *S. Dunn, F. Payne, and G. King.*
Shannon Dunn (Arcadis/USA)

*__Identification of Environmental Constraint Windows for Dredging in the Lower Passaic River__. *J. Schaffer and L. Waskom.*
John Schaffer (Tetra Tech, Inc./USA)

Implementing a Resilient Wetland Sediment Remediation Project Considering Elevated Climate Activity. *L. Hellerich, N. Hastings, J. Port, B. DePascale, and J. Markey.*
Lucas Hellerich (Woodard & Curran/USA)

*__An In-Depth Examination of the Border Wall: Threats and Challenges to the Security of a Waterfront Park and the Advancement of Sediment Remediation Needs in a Navigational Waterway__. *K.A. Czajkowski, S. Weatherwax, and S. Ueland.*
KariAnne Czajkowski (Langan/USA)

*__Non-Dredging Remediation at the New Bedford Harbor Superfund Site__. *A. Rigassio Smith, M.E. Esten, and D.J. Dickerson.*
Anita Rigassio Smith (Jacobs/USA)

*__Potential Impact of the Changing Regulatory Climate on Fish Consumption Advisories for PFAS__. *L.D. Dell and H.J. Clewell.*
Linda D. Dell (Ramboll/USA)

C8. Environmental Justice Considerations in Sediment Projects

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Miranda Henning (Integral Consulting, Inc.) and Roger Santiago (Environment and Climate Change Canada)

*__Advancing Environmental Justice through Inclusive Approaches to Holistic Project Planning and Execution__. *M. Kelly.*
Mary Kelly (Wood Environment & Infrastructure Solutions/Canada)

Canadian Experience with Environmental Justice in Managing Contaminated Sediment Sites. *R. Santiago and J. Peters.*
Roger Santiago (ECCC/Canada)

*__Environmental Justice Screening Tools: Powerful Platforms with Potential Pitfalls__. *J. Zadra, H. Summers, and D. Anning.*
Jonathan Zadra (Integral Consulting Inc./USA)

Environmental Justice: Background and Recent Guidance and Action Regarding Contaminated Sites. *J.B. King.*
John King (Breazeale, Sachse & Wilson, LLP/USA)

Intersection of Environmental Justice and Contaminated Sediment Sites. *A. León-Grossmann.*
Andrea Leon-Grossmann (Azul/USA)

The Intersection of Risk Assessment, Risk Communication and Environmental Justice. *B. DeShields and M. Pattanayek.*
Bridgette DeShields (Integral Consulting Inc./USA)

*__Remedial Alternative Sustainability Evaluation during Feasibility Study__. *E. Hritsuk, S. Goetz, M. Byker, and G. Luke.*
Eric Hritsuk (Ramboll/USA)

What Lies Beneath: Examining the Equity Implications of Assessment Approaches, and a Path Forward. *S.E. Apitz.*
Sabine Apitz (SEA Environmental Decisions, Ltd./United Kingdom)

*** = poster presentation**

C9. Adaptive Management Approaches

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Jens Laugesen (DNV) and
Michael Sivak (U.S. Environmental Protection Agency)

Adaptive Management at Large, Complex Contaminated Sediment Sites: Application throughout the Project Life Cycle. *A. Bullard, S. Kirchner, K. Roberts, and J. Wands.*
Andrew Bullard (CDM Smith Inc./USA)

Adaptively Managing Cleanup of the Anacostia River in Washington, DC. *D. Murali, M. Shupe, and R. Zvoleff.*
Dev Murali (District of Columbia Department of Energy & Environment/USA)

Berry's Creek Study Area Adaptive Site Management Approach. *D. Tomchuk and P. Brussock.*
Doug Tomchuk (U.S. Environmental Protection Agency/USA)

Considerations for Phased Remedy Implementation: A Case Study on Key Learnings from the South River Program. *B. Reese, J. Collins, N.R. Grosso, and M. Liberati.*
Bill Reese (AECOM/USA)

Remedy Modification from Comprehensive Dredging to Focused Erosion-Resistant Cover for Mercury-Contaminated Sediment in the St. Clair River. *E. Glaza and B. Henry.*
Edward Glaza (Parsons/USA)

C10. Determining Background

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Anne Fitzpatrick (Geosyntec Consultants, Inc.) and Allison Geiselbrecht (Floyd|Snider)

*__Determination of Sediment Background Concentrations for an Industrial Urban Site__. *S. Rouhani, K. Thorbjornsen, A. Uhler, E. Litman, L. Shams, D. Blue, and F. Messina.*
Shahrokh Rouhani (NewFields/USA)

*__Determining Representative Sediment Background Concentrations: Overview of ASTM Guidance__. *A. Geiselbrecht, S. Rouhani, A. Uhler, K. Thorbjornsen, T. Fisher, D. Blue, and S.P. Hopkins.*
Allison Geiselbrecht (Floyd|Snider/USA)

Development of Sediment Anthropogenic Background for the East Waterway Using Upstream Suspended Sediments. *D. Berlin, R. Sanga, B. Spangler, J. Florer, D. Williston, J. Stern, P. Rude, and A. Crowley.*
Dan Berlin (Anchor QEA, LLC/USA)

Estimating Long-Term Equilibrium in a Complex Urban Tidal Estuary Using a Simple Spreadsheet Model. *L. Bateman, K. Russell, R. Makhlouf, and D. Haury.*
Laura Bateman (Anchor QEA LLC/USA)

A Modeling Approach for Estimating Background Concentrations in Large Urban Contaminated Sediment Sites. *N.D. Rose and M. Bock.*
Nicholas Rose (TIG Environmental/USA)

Multiple Lines of Evidence for Upstream Background Sediment Concentrations at the Portland Harbor Superfund Site. *W.R. Hovel, A. Fitzpatrick, J. Arblaster, J. Conder, L. Smith, B. Ruffle, and K. Durocher.*
Wendy Hovel (Geosyntec Consultants, Inc./USA)

*__A Multivariate Methodology to Characterize Sediments Representative of Background in a Complex Watershed__. *J. Holder, J. Zhao, K. Heffern, and N. Hausmann.*
Jennifer Holder (ERM/USA)

PCBs in Market Basket Fish from Washington, DC Area. *B. Ruffle, R. Damera, K. Vosnakis, R. Kennedy, Q. Huang, and T. Sanford.*
Betsy Ruffle (AECOM/USA)

C11. Climate Change, Coastal Adaptation, and Resiliency

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Amy Hawkins (U.S. Navy) and
Susan Nilson (Foth)

*__Climate Resilience at Fort Monroe Dog Beach Landfill: Shoreline Stabilization Pilot Study to Support Remedial Design__. *C. Calabretta, M. Kidder, V. Peterson, and V. Passaro.*
Christopher Calabretta (Leidos/USA)

Contaminated Sediment and Climate Change: Sediment Desiccation, the Unthought About Hazard for Caps and MNR. *J. Dittman and P. Spadaro.*
Jason Dittman (TIG Environmental/USA)

Integrating Resiliency into Contaminated Site Remedies. *R. Gardner, R. Mohan, and R. Sturgeon.*
Rebecca Gardner (Anchor QEA, LLC/USA)

*__Predicting Coastal Bridge Scour under Future Sea Level Rise Conditions__. *Y. Zhang, C.M. Drennan, and J. Skerker.*
Yan Zhang (AECOM/USA)

Preserving Flood Conveyance with Resiliency to Climate Change in Design of the Cap Surface for the Lower 8.3 Miles of the Passaic River. *J. Atkinson, M. Novak, C. How, R. Faber, M. Erickson, and T. Blackmar.*
John Atkinson (Arcadis/USA)

* = poster presentation

*__Sediments as a Crucial Part of Critical Infrastructure: Adaptive Management and Resilience__. *I. Linkov.*
Igor Linkov (U.S. Army Corps of Engineers/USA)

D1. Sustainability: Environmental Metrics, Stakeholder Values, Cost-Benefit

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Bob Beinstein (AECOM) and Stephanie Fiorenza (Arcadis)

*__Exploring the Remediation of Contaminated Sediment__. *W. Clymans, K. Vermeiren, S. Broekx, B. Notebaert, K. Van de Wiele, W. De Cooman, and M. Van Damme.*
Wim Clymans (VITO NV/Belgium)

GLNPO Saves the Day by "Rescuing" Two Detroit Riverfront Conservancy (DRFC) RiverWalk Construction Projects Requiring Sediment Caps by Utilizing Great Lakes Legacy Act Funding in Record-Breaking Speed. *S.C. Nadeau and A. Corbin.*
Steven Nadeau (Sediment Management Work Group/USA)

*__Quantitative Evaluation and Optimization of an Existing Remedy to Align with Green Remediation Goals and Guidance in New York State__. *N. Sarawat, M. Smith, D. Conan, B. Scharf, S. Saucier, and M. Cruden.*
Nazifa Sarawat (EA Engineering, Science, and Technology, Inc., PBC/USA)

Sustainability Conceptual Site Model (SustCSM) and the Project Cycle: Linking Management, Restoration, Reuse and Resilience in a Changing World. *S.E. Apitz.*
Sabine Apitz (SEA Environmental Decisions, Ltd./United Kingdom)

Sustainable Dredging and Contaminated Sediment Re-Use at the Port of Kokkola, Finland. *M. Mengelt, T. Marjamäki, J. Forsman, and V. Magar.*
Michael Mengelt (Ramboll/Finland)

Tiered Approach to Sustainability Analysis in Sediment Remediation Decision Making. *A.D. McNally, S.E. Apitz, A.G. Fitzpatrick, and D. Harrison.*
Amanda McNally (Geosyntec Consultants, Inc./USA)

D2. Dredging, Dredged Material Dewatering and Disposal Design

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Jamie Beaver (EA Engineering, Science, and Technology, Inc., PBC) and Randy Pit (Infrastructure Alternatives, Inc.)

*__Comparison between Two Treatability Studies for Dewatering of Fine, Highly Organic Sediments__. *L. Zeng, M. Wenrick, S. Abrams, S. Weatherwax, K. Czajkowski, and S. Ueland.*
Matthew Wenrick (Langan/USA)

*__Dredge Footprint Delineation by Estimating Total PCB Congener Concentration with an Expedited Laboratory Procedure__. *A. Accardi-Dey, M. Shupe, R. Zvoleff, D. Murali, and E. Redman.*
AmyMarie Accardi-Dey (Tetra Tech, Inc./USA)

Effective Fill Management at the New Bedford, MA Lower Harbor CAD Cell. *S.A. Taylor, J. Cummings, M. Beaudoin, D. Ferguson, J. Lally, D. Lederer, and T. Rezendes.*
Shane Taylor (Jacobs/USA)

*__Environmental Dredging, Dewatering, and Water Treatment of Metals-Impacted Sediment__. *B.E. Culp.*
Barrett Culp (TRC Environmental Corporation/USA)

*__Evaluating PCBs in Dredge Residuals: Setting Expectations, Managing Risk, and Meeting Goals — Case Study__. *M. Prytula, C. Draper, C. Gerbig, and J. Hansen.*
Mark Prytula (Wood/USA)

The Impact of Treatability Testing on Full-Scale Projects. *C. McNeely.*
Connor McNeely (Infrastructure Alternatives, Inc./USA)

*__Important Factors for On-Site Placement of Contaminated Dredged Material in Confined Disposal Facilities__. *J. Beaver, M. Bowman, J. Trombino, L. Rief, M. Gutberlet, and T. Midgley.*
Jamie Beaver (EA Engineering, Science, and Technology, Inc., PBC/USA)

Innovative Blending of Large Volume Dredged Materials to Reduce Pollutant Risk and Enable Sustainable Reuse. *S. Yan, L. Cheung, and U. Ghosh.*
Songjing Yan (University of Maryland, Baltimore County/USA)

Innovative Remedy Design for Cost-Effective Dredging and Disposal of Contaminated Sediments. *J. Hutchens, K.S. Bell, and V. Magar.*
James Hutchens (Ramboll/USA)

* = poster presentation

Key Considerations for Managing Debris for Environmental Dredging Projects. *D. Hayes, M. Palermo, J. Beaver, M. Bowman, and M. Ciarlo.*
Donald Hayes (The Dredging Professor LLC/USA)

*__Options for Disposal of Dioxin-Laden Sediment: A Comprehensive Laboratory Treatability Study__. *S. Dore, D. Pope, K. Jaglal, C. Skirth, and S. Kemp.*
Kendrick Jaglal (GHD/USA)

*__Overview of Engineered Turf Landfill Capping Technology and Its Application to Sediment Management Area Closure__. *M. Zhu.*
Ming Zhu (Watershed Geosynthetics/USA)

*__Pb-Contaminated Sediment Dispersion and Associated Risk Due to Improper Sediment Dredging and Dewatering Operation in Klity Creek, Kanchanaburi Province, Thailand__. *T. Phenrat.*
Tanapon Phenrat (Naresuan University/Thailand)

*__PFAS-Impacted Solids: How Lessons Learned from the Wastewater Industry Can Apply to Sediments Projects__. *B. Vermace, E. Lund, A. McCabe, K. Wolohan, and M. Ellis.*
Mike Ellis (Barr Engineering Co./USA)

Pilot Testing of Contaminated Sludge Consolidation at the Ralston Street Lagoon Provides Disposal Site for River Sediments. *M.S. Schultz, J. Jathal, M.L. Passaro, and D. Vicari.*
Michael Schultz (CDM Smith, Inc./USA)

*__Potential Impacts of Sediment Dredging on a Contaminated Stream in an Abandoned Sulfide Metal Mining Area in Southern Portugal__. *J. Araújo, R. Fonseca, N. Silva, and T. Albuquerque.*
Joana Araújo (University of Évora | ICT/Portugal)

*__Practical Considerations for Treatment, Transport, Disposal, and Reuse of Dredged Material__. *W. Simons.*
William Simons (J.F. Brennan Company, Inc./USA)

*__Remedy Effectiveness of Voluntary Early Removal of Sediments Completed at Former Green Bay MGP__. *E. Hritsuk, S. Goetz, J. Hagen, and G. Luke.*
Eric Hritsuk (Ramboll/USA)

*__Sediment Treatability Testing and Multiple Accounts Analysis for Mill Lake, Rayrock Remediation Project in Yellowknife, NT, Canada__. *B.M. Mastin, J. Nolin, R. McCullough, M. Sanborn, and R. Studer-Halbach.*
Brian Mastin (AECOM/USA)

*__Use of 3-D Modeling and Precision Dredging Equipment to Optimize Sediment Remediation__. *J. Schindler.*
Jason Schindler (Weston Solutions, Inc./USA)

D3. Monitored Natural Recovery (MNR) and Enhanced MNR

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Paul Bireta (Chevron) and
Michael Werth (Anchor QEA, LLC)

Activated Carbon-Amended Enhanced Natural Recovery (ENR): Results of a Three-Year Pilot Study in the Lower Duwamish Waterway. *V.S. Magar, J. Conder, L. Nelis, G. Heavner, C. Whitmus, G. Revelas, D. Williston, J. Stern, L. Erickson, J. Flaherty, D. Schuchardt, P. Rude, A. Crowley, J. Florer, and K. Bahnick.*
Victor Magar (Ramboll/USA)

*__Assessment of Monitored Natural Recovery Using Multiple Lines of Evidence__. *W. Azhar, R. Mathew, K. Roberts, D. Peabody, and S. Ruhala.*
Wardah Azhar (CDM Smith, Inc./USA)

A Case Study of Thin Cover Placement Pilot Application in Brunswick Estuary Wetlands, Georgia, USA. *M. Reemts, R. Mohan, P. Gupta, R. Galloway, T. Johnson, and R. Brown.*
Mark Reemts (Anchor QEA, LLC/USA)

*__Demonstration of Monitored Natural Recovery of Chlorinated Benzene-Impacted Sediments in a Freshwater Canal__. *G.R. Long, J. Collins, S.A. Morgan, and S. Norcross.*
Gary Long (EHS Support/USA)

*__Effectiveness of Early Actions in Accelerating a Harbor-Wide Monitored Natural Recovery Remedy in Esquimalt Harbour__. *K. Ritchot, A. Corp, D. Ormerod, M. Bodman, and T. Wang.*
Kristen Ritchot (PWGSC/Canada)

*__First Monitored Natural Recovery (MNR) Study Conducted on the Palos Verdes Shelf Superfund Site, California, USA__. *C.L. Tang, T. Petry, and C. McDonald.*
Chi-Li Tang (Sanitation Districts of Los Angeles County/USA)

Large-Scale MNR and Enhanced MNR Remedy in Western Port Angeles Harbor. *A. Geiselbrecht, M. King, C. Patmont, R. Gardner, M. Johns, and L. Baker.*
Allison Geiselbrecht (Floyd|Snider/USA)

Regulatory Perspective on Remedy Selection for Contaminated Sediments at a Former Paper Mill. *J.K. Schatz, E.K. McDonnell, and K. Parrett.*
Jeffrey Schatz (Oregon Department of Environmental Quality/USA)

Seeking Innovation: Common Carp Removal for PCB Reduction and Habitat Restoration. *K.E. Gustavson, M. Basler, J. Abid, P. Bajer, and L. Venne.*
Karl Gustavson (U.S. Environmental Protection Agency/USA)

*** = poster presentation**

Panel Discussion—Tuesday, Track D

Implementing Adaptive Management at Contaminated Sediment Sites

Moderator
Betsy Henry, Ph.D. (Anchor QEA, LLC)

Panelists
Doug Tomchuk (U.S. EPA)
Karl Gustavson (U.S. EPA)
Katherine Garufi, PE (HDR, Inc.)
Peter Brussock, Ph.D. (The ELM Group)
Robert Wyatt (Northwest Natural)

Adaptive management is being considered or implemented at several large and complex contaminated sediment Superfund sites. The approach is particularly relevant for sites where predicted project outcomes are uncertain, time and expense to reduce uncertainty are significant, and, as a result, site progress is very slow. Adaptive management strategies at complex sites have the potential to address these delays with incremental steps that advance cleanups. This panel will explore the concept of adaptive management along with key elements including defining site or project objectives, establishing site models (e.g., conceptual site model and predictive model), identifying potential actions (e.g., site investigations to address data gaps, treatability or pilot studies, and evaluation and selection of response actions), monitoring and evaluting outcomes, incorporating learning into future decisions, and participation by stakeholders. Early Superfund remedial or removal actions will be discussed as a possible response action within an adaptive management strategy to control sources, expedite risk reduction, and return portions of a site to beneficial use. Panelists will include consultants and agency and responsible party representatives to provide diverse perspectives on potential benefits and challenges. Examples of projects where this approach has been applied or is being considered will be discussed. Panelists will identify key attributes of projects where adaptive management can be successfully implemented and how management decisions can be documented transparently. How adaptive management can be used to streamline decision-making, facilitate site progress, and control costs will also be discussed.

D4. In Situ Treatment Amendments

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Moses Ajemigbitse (AquaBlok, Ltd.) and
Upal Ghosh (University of Maryland, Baltimore County)

*__A Case Study Evaluating Reactive Cap Effectiveness in Reducing Total Mercury Flux__. *T. Vrtlar, X. Shen, and D. Reible.*
Tea Vrtlar (CDM Smith/USA)

*__Activated Carbon Amendments Reduce Bioavailability of Dioxins and Furans in Surface Sediment__. *G. Pagnozzi, J. Conder, B. Pautler, B. Love, and L. Jorstad.*
Giovanna Pagnozzi (Geosyntec Consultants, Inc./USA)

*__Amended Capping for Metals, Results of a Bench-Scale Treatability Study__. *J. Nemesh and R. Carbonaro.*
Joseph Nemesh (Tetra Tech, Inc./USA)

*__Effect of Bioturbation on Contaminated Sediment Deposited over Remediated Sediment__. *A.S. Knox.*
Anna Knox (Savannah River National Laboratory/USA)

Effectiveness of Reactive Amendments to Reduce Porewater Sulphide in Esquimalt Harbour Wood Waste-Impacted Sediments. *T. Sorensen, B. Lamoureux, D. Berlin, K. Ritchot, R. Thomas, and M. Bodman.*
Tasha Sorensen (Anchor QEA/USA)

*__Evaluation of Activated Carbon for Environmental Remediation Applications__. *A.J. Harris.*
Andrew Harris (Calgon Carbon Corporation/USA)

Evaluation of Capping Amendments: Laboratory Columns Evaluation. *C.E. Ruiz, P.R. Schroeder, D.W. Moore, J.A. Johnson, and I. Mamonkina.*
Carlos E. Ruiz (U.S. Army Corps of Engineers/USA)

*__Evaluation of Ferrous Sulfide and Activated Carbon as Reactive Cap Amendments for Treatment of Mercury in Sediments__. *G.J. Meyer, T.P. McCullough, J. Mazzoccoli, and R.A. Mimna.*
Gary Meyer (Redox Solutions/USA)

Measurement of Sediment and Cap Material Partition Coefficients for Use in Cap Design for the Lower 8.3 Miles of the Passaic River. *H. Fadaei, P. Viana, D. Liles, D. Profusek, M. Gravelding, N. Gensky, and U. Ghosh.*
Hilda Fadaei (Arcadis/USA)

*__Mercury Mine Remediation Pilot Study of a New Amendment Technology__. *J.E. Miller, K.S.H. Pingree, S.A. McCord, G.J. Reller, and D. Griffin.*
Jon Miller (Albemarle Corp./USA)

*** = poster presentation**

Modeling the Sorption Kinetics of PCBs in Activated Carbon of Various Particle Sizes. *X. Shen, D. Reible, M. Mitchek, and J. Wong.*
Danny Reible (Texas Tech University/USA)

*__New Amendment Materials for Effective Sequestration of Commingled Organics and Heavy Metals Contamination in Sediments__. *G. Rosen, J. Guerrero, N. Hayman, M. Colvin, J. Leather, M. Ajemigbitse, and J. Collins.*
Gunther Rosen (Naval Information Warfare Center [NIWC] Pacific/USA)

Spirit Lake Case Study: Field Investigation and Design Evaluation to Support Chemical Isolation Cap Design. *C. Kiehl-Simpson, M. Ciarlo, J. Beaver, and M. Loomis.*
Caryn Kiehl-Simpson (EA Engineering, Science, and Technology, Inc., PBC/USA)

Using SEDflume to Assess Sediment Amendment Stability. *S. McWilliams, K. Carbonneau, C. Jones, and R. Damera.*
Samuel McWilliams (Integral Consulting, Inc./USA)

D5. Long-Term Monitoring Strategies

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Wardah Azhar (CDM Smith, Inc.) and Sonal Patil (Arcadis U.S., Inc.)

*__Equivalence Testing and the Reverse Null Hypothesis: Assessing Progress towards Cleanup Levels at Portland Harbor__. *K.E. Vickstrom, J.R. Silvertooth, J.W. Kern, S.A. Sheldrake, and M. Novak.*
Kyle Vickstrom (CDM Smith, Inc./USA)

Evaluating Natural Recovery Timeframes: The Importance of Unbiased Sampling Designs at Portland Harbor. *K.E. Vickstrom, J.W. Kern, S.A. Sheldrake, and M. Novak.*
Kyle Vickstrom (CDM Smith, Inc./USA)

*__Hart-Miller Island Exterior Monitoring: Examination of Spatial and Temporal Trends in Sediment Metals Chemistry__. *M.W. Powell, H. Miller, G. Harman, A. Penafiel, and P. Derrick.*
Michael Powell (EA Engineering, Science, and Technology, Inc., PBC/USA)

Lessons Learned from Fish and Surface Water Long-Term Monitoring. *J. Abid, L. Venne, E. Curtis, and C. Draper.*
Joseph Abid (Wood/USA)

*__Long-Term Ecological Monitoring of New Bedford Harbor over 28 Years__. *B. Barra, H. Jones, and M. Welsch.*
Briley K. Barra (AECOM/USA)

*__Long-Term Monitoring of PCB Transport in the Upper Hudson River: Development of a Rating Curve Model for Estimating Post-Remedy PCB Load__. *K. Takagi, S. Gbondo-Tugbawa, E.A. Garvey, Y. Zou, J. Atmadja, J. Wolfe, G. Klawinski, and M. Cheplowitz.*
Kenneth Takagi (WSP USA, Inc./USA)

Long-Term Monitoring Program Design and Early Results for the Former Portland Gas Manufacturing Site, Portland, Oregon. *T. Thornburg, R. Wyatt, K. Skellenger, and S. Norwood.*
Todd Thornburg (Anchor QEA, LLC/USA)

*__What Is It Going to Take? It Has Been 5 Years__. *M. Gravelding, B. Orchard Aragon, L. Putnam, and K. Toth.*
Mark Gravelding (Arcadis/USA)

D6. Cap Design

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: John Collins (AquaBlok, Ltd.) and Espen Eek (Norwegian Geotechnical Institute)

CapSim 5: Modeling the Fate and Transport of Redox-Sensitive Contaminants for Sediment Assessment and In Situ Remedial Design. *X. Shen and D. Reible.*
Xiaolong Shen (Texas Tech University/USA)

*__Effect of Activated Carbon Amendments on Seepage Velocity__. *U. Ghosh, L. Cheung, R. Damera, S. Drummond, and T. Sanford.*
Ravi Damera (AECOM/USA)

*__Environmental Risk Management Measures in the Interim Sediment and Debris Area of a Future Water Lot in Toronto__. *I. Drygiannaki, D. Meric, C. Robb, D. Yu, D. Thorson, H. Cumberland, M. Janes, S. Karam, and S. Desrocher.*
Ilektra Drygiannaki (Geosyntec/USA)

*__Evaluation of Capping Amendments: A Laboratory Study__. *C.E. Ruiz. P.R. Schroeder, D.W. Moore, J.A. Johnson, and I. Mamonkina.*
Carlos E. Ruiz (U.S. Army Corps of Engineers/USA)

Installation and Monitoring of Pilot Sediment Capping with Activated Biochar. *C. Maurice, G. Dublet-Adli, E. Flodin, E. Eek, and G. Cornelissen.*
Christian Maurice (Luleå University of Technology/Sweden)

*** = poster presentation**

Measurement and Evaluation of Darcy Velocity for Use in Cap Design for the Lower 8.3 Miles of the Passaic River. *M. Erickson, N. Gensky, and P. Viana.*
Michael Erickson (Arcadis/USA)

*__New Data Address Treatability and Modelling Performance Assumptions for GAC-Based Sediment Remedies__. *M.A. Ajemigbitse, J. Collins, and J. Hull.*
Moses Ajemigbitse (AquaBlok, Ltd./USA)

Port Lands Toronto: Case Study of Cost-Effective Application of Powder Activated Carbon for a Reactive Treatment Layer at a Brownfield Remediation Site. *N. Doucette, J. Herrington, J.A. Collins, and M. Ajemigbitse.*
Nicholas Doucette (QM Environmental/Canada)

*__Subaqueuous Capping Remediation with Innovative Geocomposite for Placing Activated Carbon__. *G. Martins, C. Cheah, and T. Walker.*
Gustavo Martins (HUESKER Australia Pty Ltd/Australia)

The Use of Cap Modeling in an Adaptive Management Approach for the Life of a Project: Design, Construction, and Long-Term Monitoring. *D. Reidy, K. Russell, and P. LaRosa.*
Deirdre Reidy (Anchor QEA, LLC/USA)

*__Using Multivariate Analyses and Metals Bioavailability Models to Understand Causes of Seasonal Sublethal Toxicity in Discharge from a Former Mine Pit__. *S.A. Roark, M. Powers, A. Wilson Fallon, J.M. Rigsby, R.E. Lockwood, and S.S. Brown.*
Shaun Roark (Jacobs/USA)

D7. Cap Modeling

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Danny Reible (Texas Tech University) and Deirdre Reidy (Anchor QEA, LLC)

Balancing Conservatism and Uncertainty in the Lower Passaic River Sediment Cap Chemical Isolation Layer Design. *P. Viana, M. Erickson, B. Orchard Aragon, and D. Reible.*
Priscilla Viana (Arcadis/USA)

*__Cocoa Beach Golf Muck Dredging and Capping Alternatives Assessment and Remedial Design with Thin Layer Capping Technology__. *J. Raimondi, D. Himmelheber, and J. Langenbach.*
Jason Raimondi (Geosyntec Consultants, Inc./USA)

Comprehensive Erosion Protection Assessment for the Cap Design for the Lower 8.3 Miles of the Passaic River. *B. Orchard Aragon, C. Becker, M. Erickson, J. Atkinson, R. Faber, and T. Blackmar.*
Barbara Orchard Aragon (Arcadis/USA)

*__DNAPL-Adsorbing Cap for Sediments at a Former Creosote Plant__. *P. Song, C. Christian, M. Jones, S. Delhomme, and C. Reece.*
Peter Song (Tetra Tech/USA)

Evaluation of Impact of Modeling Assumptions in Chemical Isolation Assessment on Subaqueous Sediment Cap Design. *Y. Zou, S. Gbondo-Tugbawa, M. Bilimoria, E. Garvey, and S. Bailey.*
Yonghong Zou (WSP USA, Inc./USA)

RECOVERY Application in Three Great Lakes Slips to Validate Three Engineered Sub-Aqueous Caps. *C.E. Ruiz, P.R. Schroeder, M.A. Royal, and V.B. Person.*
Carlos E. Ruiz (U.S. Army Corps of Engineers/USA)

San Francisco Bay Mud: A Case for Estimating Site-Specific Partitioning Values in Cap Modeling. *T. Holden, T. Cridge, J. Ripley, and M. Mann-Stadt.*
Thomas Holden (Haley & Aldrich, Inc./USA)

Panel Discussion—Thursday, Track D

Beneficial Use of Contaminated Sediments: The Promise and the Challenge

Moderators
Steven Nadeau (Sediment Management Work Group)
Philip Spadaro (TIG Environmental)

Panelists
Eric Hedblom (Barr Engineering Co.)
Claire Detering, MS (Windward Environmental LLC)
David Moore, PhD (USACE - Environmental Research and Development Center [ERDC])
Steven Brown, PhD (The Dow Chemical Company)
Eric Stern (Tipping Point Resources Group, LLC)
Larry Rosenthal, JD, MPP, PhD (Goldman School of Public Policy, University of California Berkeley)

Contaminated sediments hold both promise and challenge for practitioners trying to find innovative beneficial use opportunities and make beneficial use of contaminated sediments the norm, not the exception. The current state of the practice for most contaminated sediment is to remediate by removal (dredging), containment (capping, possibly with reactive amendments), or leaving in place (monitored natural recovery) to reduce risks. Conventional dredged material management approaches typically involve transport and transfer of sediment to an upland staging area, preprocessing to prepare sediment for dewatering, sediment dewatering and water treatment, followed by off-site transport for landfill disposal. These labor- and energy-intensive processes are likely to become increasingly unsustainable. Furthermore,

* = poster presentation

these sediments are typically managed on a project-by-project basis, without the benefit of a more comprehensible, sustainable strategy to gain potential efficiencies (e.g., reduced costs and improved environmental benefits). Using contaminated sediment as a resource, while reducing the risks posed by exposure to in situ sediment contaminants, offers environmental and economic advantages over managing contaminated sediment as a waste.

Considerable barriers exist to finding uses for contaminated sediment. While some of those barriers are technical, the most challenging barriers to integrating circular economy goals into managing contaminated sediments are financial (e.g., treatment and reuse technologies can be very costly), social (e.g., public resistance to contaminated sediment reuse), environmental (e.g., ensuring long-term sequestration and stability of contaminants), and regulatory (e.g., globally, regulatory agencies have yet to embrace the reuse of contaminated media). The panel discussion will discuss practical ideas, creative possibilities, and examples. In particular, members of the panel will present a recently completed literature review on beneficial use of sediments in North America and Europe, specifically regarding uses of contaminated sediments.

The possibility of and the need for success draws much attention from multiple stakeholders, including technological and corporate investors, to find solutions for better and more sustainable sediment management. This panel will explore the possibilities for beneficial use of contaminated sediments and the possible application of circular economy principles to the field of contaminated sediment remediation and management. The focus will be on finding ex situ and in situ, environmentally protective, beneficial use alternatives for sustainable contaminated sediment management.

D8. Beneficial Use of Contaminated Sediments

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Rebecca Gardner (Anchor QEA, LLC) and Jason Guenther (Tetra Tech, Inc.)

*__Beneficial Reuse Options for Dredged Sediments from Lake Mattamuskeet, North Carolina__. *S. Volkoff, A. Berky, B. Weyer, L. Wellborn, and A. Braswell.*
Savannah Volkoff (Geosyntec Consultants/USA)

Beneficial Use of Contaminated Sediments. *E. Hedblom, J. Toll, L. Sittoni, E. Dott, C. Detering, and C. Gustafson.*
John Toll (Windward Environmental LLC/USA)

*__Beneficial Use of Contaminated Sediments: Cities, Polluters, Ports, Developers, and "Circularity" Economics__. *P. Spadaro and L. Rosenthal.*
Philip Spadaro (TIG Environmental/USA)

Beneficial Use of Dredged Material in the District of Columbia. *D. Murali, R. Zvoleff, and S. Delhomme.*
Dev Murali (District of Columbia Department of Energy & Environment/USA)

*__Coal in Sediments behind a Dam Poses Unique Challenges and Opportunities for Beneficial Use__. *L. Cheung and U. Ghosh.*
Louis Cheung (University of Maryland Balitmore County/USA)

*__Formulation of Cementitious Ecobinders and Geopolymers Using Flash-Calcined Materials__. *M. Amar, M. Benzerzour, and N.E. Abriak.*
Mouhamadou Amar (IMT Nord Europe/France)

Grassy Point Habitat Restoration: Innovative Use of Sawmill Waste and Nuisance Sediment to Remove Beneficial Use Impairments. *G. Partch, R. Olah, M. Sjolund, and A. Vandenhouten.*
Guy Partch (Barr Engineering Co./USA)

*__Massachusetts Bay Industrial Waste Site Restoration: Beneficial Use of Boston Harbor Dredged Material__. *A. Hopkins, S. Wolf, K. Sylvester, B. Barra, and C. Wright.*
Aaron Hopkins (U.S. Army Corps of Engineers/USA)

*__Overcoming Barriers to Beneficial Use of Dredged Material in the United States__. *K.S. Bell, S. Goetz, V. Magar, S. Copp Franz, R. Mandel, B.M. Boyd, D.F. Hayes, J. King, and B. Suedel.*
Kristin Searcy Bell (Ramboll/USA)

Reduce, Reuse, Recycle: A Story of Contaminated Material. *I. Gladstone, R.J. Titmuss, M. Sabulis, J. Englehart, N. Hoang, and C.H. Myers.*
Ileen Gladstone (GEI Consultants/USA)

*__Stamp Sands Beneficial Use Screening Evaluation__. *P.R. Schroeder and C.E. Ruiz.*
Paul Schroeder (U.S. Army Corps of Engineers/USA)

*__Stormwater Management Pond Sediment: Valuable Resource or Costly Waste?__ *F. Kelly-Hooper and G. Pike.*
Francine T. Kelly-Hooper (GHD/Canada)

*** = poster presentation**

D9. Sediment Management in the Northwest Region

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Reid Carscadden (CRETE Consulting, Inc.) and Susan McGroddy (Windward Environmental LLC)

***'And the Turtles...' Considering Ecological Functions at Sediment Sites**. *S. Miller, H. Nelson, and K. Parrett.*
Sarah Miller (Oregon Department of Environmental Quality/USA)

***Application of Confined Disposal Technology Could Reduce Cost and Accelerate Schedule in the Cleanup of the Portland Harbor Superfund Site**. *M. Palermo, P. Spadaro, and J. Glenn.*
Michael Palermo (Mike Palermo Consulting, Inc./USA)

Background Characterization of PAHs in Bedded Sediment for the Bremerton Gas Works Superfund Site. *N.W. Soccorsy and K.K. Godel.*
Kalle Godel (Cascade Natural Gas | Montana Dakota Utilities/USA)

***Considerations for Implementing In-Water Construction Projects within the Footprint of a Sediment Megasite**. *B. Starr, K. Kroeger, K. Carbonneau, and A. Clodfelter.*
Ben Starr (Geosyntec/USA)

Demonstrating Sediment Recovery in Portland Harbor through PCB Temporal Trends. *K. Ridolfi, N. Ott, L. Baker, M. Edwards, E. Pendleton, and D. Silva.*
Kat Ridolfi (Integral Consulting, Inc./USA)

***Deposition and Erosion Patterns Supporting a Road to Recovery: A Portland Harbor Story**. *K. Kroeger, L. Smith, and A. Fitzpatrick.*
Luke Smith (Geosyntec Consultants, Inc./USA)

***Enhanced Monitored Natural Recovery Sand in a Tidal Wetland Using a Thin Layer Placement Approach**. *E. Bakkom, C. Gokcora, and G. Kalmeta.*
Erik Bakkom (Maul Foster & Alongi, Inc./USA)

***The First Remedial Design in the Portland Harbor Superfund Site**. *R.J. Wyatt, M.D. Crystal, and R. Barth.*
Robert Wyatt (NW Natural/USA)

Intertidal Sediment Remediation in Lower Columbia River: Challenges, Challenges and More Challenges (Location, Location, Poor Location). *R.S. Webb, M.T. Otten, A. St. John, and J. Wetzsteon.*
Robert Webb (Dalton, Olmsted & Fuglevand, Inc./USA)

Remedial Decision Making at a Complex Contaminated Sediment Site: A State Perspective. *B. Paulik, H. Nelson, and P. Seidel.*
Blair Paulik (Oregon Department of Environmental Quality/USA)

Remediating a Former Burn Pit on a Dike, How Hard Can It Be? Section 408 Authorization, Global Pandemic, and Oregon Wildfires. *E. Bakkom, C. Gokcora, and G. Kalmeta.*
Erik Bakkom (Maul Foster & Alongi, Inc./USA)

***Riverbank Cap Repairs on the Lower Willamette River**. *E. Bakkom, J. Faust, J. Elliott, and G. Kalmeta.*
Erik Bakkom (Maul Foster & Alongi, Inc./USA)

E1. Sediment Bioremediation

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Arul Ayyaswami (Tetra Tech, Inc.) and Amar Wadhawan (Arcadis)

***Active Bacterial Formula (ABF) for Crude Oil Waste Sludge Degradation**. *O. Ubani and H.I. Atagana.*
Onyedikachi Ubani (University of South Africa/South Africa)

***Aerobic Bioaugmentation to Decrease Polychlorinated Biphenyl (PCB) Emissions from Contaminated Sediments to Air**. *C.M. Bako, A. Martinez, J.M. Ewald, J.B.X. Hua, D. Ramotowski, Q. Dong, J.L. Schnoor, and T.E. Mattes.*
Christian M. Bako (U.S. EPA/USA)

***Anaerobic Degradation of Hexachlorocyclohexane by Newly Developed Desulfomicrobium-Dominant Microbial Consortia**. *M.I. Khan, K. Yoo, C. Vogt, and I. Nijenhuis.*
Muhammad Imran Khan (Helmholtz Center for Environmental Research-UFZ/Germany)

Bench-Scale and Pilot Test Studies on Bioremediation of 1,4-Dioxane and Chlorinated Solvents in Sediments and Soils. *V. Ramalingam, J. Neuhaus, and A.M. Cupples.*
Vidhya Ramalingam (Tetra Tech/USA)

Bioremediation and Phytoremediation of an Oil-Contaminated Salt Marsh in South Louisiana. *L. Fontenot, M. Abbene, C. Nguyen, and C. Sanfilippo.*
Lance Fontenot (Integral Consulting Inc./USA)

***Dehalobium* Species Implicated in 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin Dechlorination in the Contaminated Sediments of Sydney Harbour Estuary**. *M.J. Lee, G. Liang, S.I. Holland, M.J. Manefield, C. O'Farrell, and K. Osborne.*
Matthew Lee (University of New South Wales/Australia)

*__In Situ Treatment of PCBs in a Former Industrial Cooling Pond with Bioamended Activated Carbon__. *K.R. Sowers, U. Ghosh, and T. Chadeayne.*
Kevin Sowers (University of Maryland, Baltimore County/USA)

PAH Biodegradation in Sediment Cap Environments: Evaluating How Performance Varies with Materials and Redox Zones. *G. Pagnozzi, K. Millerick, D. Reible, and S. Carroll.*
Giovanna Pagnozzi (Geosyntec Consultants, Inc./USA)

*__Sediment Bioremediation for Maintaining Wetland Ecosystem Health, Tamil Nadu, India__. *S. Kanmani, D. Srivastava, and U. Ramachandran.*
Sellappa Kanmani (Anna University/India)

E2. Monitoring and Evaluating Remedy Implementation and Effectiveness

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Keir Craigie (Tetra Tech, Inc.) and George Hicks (Haley & Aldrich, Inc.)

Activated Carbon-Amended Enhanced Natural Recovery (ENR): Biological Lines of Evidence from a Pilot Study in the Lower Duwamish Waterway. *J. Conder, G. Revelas, V. Magar, G. Heavner, L. Nelis, C. Whitmus, D. Williston, J. Stern, L. Erickson, J. Flaherty, D. Schuchardt, P. Rude, A. Crowley, and J. Florer.*
Jason Conder (Geosyntec Consultants, Inc./USA)

Assessing the Effectiveness of the Completed Lower Fox River Remedy. *T. Van Hoof, S. Lehrke, J. Wolfe, P. Montney, and P. LaRosa.*
Tara Van Hoof (Foth/USA)

*__Empirical Sediment and Fish Tissue Recovery Trends Since 2002 in the Portland Harbor Superfund Site__. *A. Fitzpatrick, J. Conder, B. Ruffle, J. Arblaster, and K. Kroeger.*
Anne Fitzpatrick (Geosyntec Consultants, Inc./USA)

*__Evaluation of a Shoreline Revetment Reactive Core Mat Nine Years after Deployment__. *R. Scott, S. Carroll, H. Costa, and M. Owens.*
Ryan Scott (Haley & Aldrich, Inc./USA)

Head of the Thea Foss Waterway: 18 Years of Capping Remedy Effectiveness Monitoring. *G. Braun, S. Ozkan, J. Wetzsteon, and L. Goldstein.*
Gary Braun (Tetra Tech, Inc./USA)

*__Is There More to Remedy Metrics Than Fish?__
A.S. Fowler, J.R. Loper, T.B. Loper, E.G. Macolly, J.D. Schell, C.L. Thomas, and M.P. Price.
Alan Fowler (Geosyntec Consultants/USA)

*__Managing Mercury Sediment Contamination in Juneau, Alaska: Are Aquatic Sediment Caps Working in Douglas Harbor and Gastineau Channel?__ *J. Nakayama, P. Martin, and D. West.*
John Nakayama (NewFields/USA)

*__Onondaga Lake Remediation: Post-Construction Monitoring for Second Five-Year Review__. *M.L. Spera, R. Montione, and M. O'Neill.*
Michael Spera (AECOM/USA)

Post-Remediation Verification Monitoring of the Buffalo River, New York. *K.S. Bell, V.S. Magar, M. Sorensen, K. Leigh, S. Bagnull, M. Reemts, and R. Galloway.*
Kristin Searcy Bell (Ramboll/USA)

*__Preliminary Environmental Assessment of Contaminated Sediment Dredging in an Urban River, New Jersey, USA__. *O.G. Soetan, J. Nie, and H. Feng.*
Oluwafemi Soetan (Montclair State University/USA)

*__Recontamination Evaluation at an Early Action Site, the Lower Duwamish Waterway: Inferences why Post-Construction Results Remained Elevated__. *C.D. Moody, P. Cordell, and A.E. Desai.*
Chris Moody (Farallon Consulting/USA)

Sediment PCB Cleanup Remedy Effectiveness: Case Study Synthesis. *C. Patmont, P. Doody, B. Henry, and S. Replinger.*
Clayton Patmont (Anchor QEA, LLC/USA)

Videoprobing as an Innovative Method to Avoid Underestimating Cap Thicknesses as Part of the Onondaga Lake Cap Monitoring Program. *E. Glaza, M. Vetter, P. Scharfschwert, and D. Browning.*
Edward Glaza (Parsons/USA)

Lunch & Learn—Tuesday, Track E

Navigating the Water Treatment Design and Permitting Process

Presented by

Peggy Derrick (EA Engineering, Science, and Technology, Inc., PBC)
Amber Wilson (Infrastructure Alternatives, Inc.)

Dredging of impacted sediments produces contact water, which requires treatment, to prevent contaminants from being returned to the water body. This Lunch & Learn will explore treated water discharge permitting considerations during the design and bid process, as well as associated cost drivers, to include the sharing and management of risk. The designer's and contractor's perspectives will be compared. Data requirements, types of permits, how permits are obtained, and adaptive management strategies for maintaining permit compliance will be discussed.

E3. Remediation of Ports, Harbors, and Urban Waterways

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Philip Spadaro (TIG Environmental) and Amber Wilson (Infrastructure Alternatives, Inc.)

Bringing It Back Home on the Cuyahoga: Gorge Dam Sediment Removal, Innovative Processing, and Beneficial Use Design. *L. Iacobucci, E.A. Stern, A. Kovalik, J. Wiens, M. Kalisz, W. Andrae, and R. Miskewitz.*
Lauren Iacobucci (Tipping Point Resources Group/USA)

*__Cooperative Sediment Cleanup and Waterfront District Revitalization__. *B. Gouran, L. Scholten, M. Woltman, M. Larsen, and L. McInerney.*
Brian Gouran (Port of Bellingham/USA)

Designing an Evolving Urban Sediment Project: A Component of the Milwaukee Estuary AOC. *E.E. Englund, J.M. Trast, J.W. Caryl, and P.F. Kenny.*
Eric Englund (GEI Consultants, Inc/USA)

*__Development of a Sediment Capping Remedy in an Urban Waterway__. *J. Nemesh.*
Robert Schellberg (Tetra Tech, Inc./USA)

*__History of a 21-Year Remedial Investigation: Area-Wide Petroleum Project in Astoria, Oregon__. *A.L. Coates, M. Pugh, and P. Seidel.*
Anna Coates (Oregon Department of Environmental Quality/USA)

*__Installation and Tracking of Risk Management Measures as Part of the Construction of a New River Valley__. *D. Thorson, A. Higgins, B. Patel, D. Bertrand, D.J. Bonnett, H. Cumberland, D. Forbes, and L. Solano.*
Danielle Thorson (Geosyntec Consultants/Canada)

Lessons Learned on an Urban Waterway: Holistic Solution for Long-Term Benefit of Multiple Stakeholders. *M. Walter, L. Parsons, J. Hagen, D. Engbring, S. Schlichtholz, and P. Elliott.*
Mark Walter (Ramboll/USA)

*__Leveraging Enhancement of Remedy Provisions to Optimize Environmental Cleanup and Navigation Dredging Benefits at New Bedford Harbor__. *S. Nilson, P. Rezendes, and C. Duarte.*
Susan Nilson (Foth/USA)

Maximizing Efficiency during Remediation and Restoration of an Asbestos-Impacted Urban Waterway. *K. Apigian, E. Hultstrom, R. Smith, and P. Leofanti.*
Kyle Apigian (Woodard & Curran/USA)

Multi-Use Application of In Situ Solidification (ISS) to Support Construction of New Deep-Water Berth in Boston, Massachusetts. *I. Gladstone, R.J. Titmuss, M. Sabulis, J. Englehart, P. Jansen, N. Hoang, and C.H. Myers.*
Ileen Gladstone (GEI Consultants/USA)

*__Navigation and Sediment Cleanup for the Anacostia River__. *G. Mikeska and B. Peterson.*
Gretchen Mikeska (District of Columbia Department of Energy & Environment/USA)

Operational Considerations for Implementing a Harbor-Wide Remedy in an Active Naval Harbor. *M. Woltman, M. Bodman, T. Wang, S. Rodriguez, and R. Pickering.*
Matt Woltman (Anchor QEA, LLC/USA)

An Overview and Update on the Randle Reef Sediment Remediation Project. *R. Joyner, R. Santiago, and M. Graham.*
Rupert Joyner (Environment Canada/Canada)

*__Randle Reef Sediment Remediation Project Stage 2: Methodologies Utilized for Contaminated Sediment Dredging, Water Treatment and Isolation and Thin Layer Capping__. *W. Harris and T.M. Walker.*
Wayne D. Harris (Milestone Environmental Contracting Inc./Canada)

*__Remediation of Pearl Harbor Sediments: Dredging in an Active Navy Harbor with Potential Explosive Hazards__. *K. Markillie, J. Anderson, M. Greenwald, and S. Sahetapy-Engel.*
Kimberly Markillie (U.S. Navy/USA)

Use of a CAD Cell for Disposal of PCB-Contaminated Sediments at the New Bedford Harbor, MA Superfund Site. *D.J. Dickerson.*
David Dickerson (U.S. Environmental Protection Agency/USA)

*__Waterfront Toronto Environmental Risk Management Measures for a New River Valley__. *D. Thorson, C. Robb, P. Andonyadis, D. Bertrand, A. Nasseri-Moghaddam, M. Janes, H. Cumberland, D.J. Bonnett, D. Forbes, and L. Solano.*
Danielle Thorson (Geosyntec Consultants/Canada)

*** = poster presentation**

E4. Lessons Learned in Remedy Implementation

Platforms Wednesday | Posters (*) Wednesday Evening
Chairs: Steve Garbaciak (Foth) and
Andrew Timmis (J.F. Brennan Company, Inc.)

Challenges in Site Investigations, Design, Remedy Implementation, and Monitoring in Shorelines with Shallow Bedrock. *M. Bodman, K. Ritchot, A. Corp, M. Woltman, and T. Wang.*
Michael Bodman (National Defence/Canada)

*__Construction Management Challenges and Lessons Learned in a Multi-Stakeholder Remediation Project__. *K. Thapa, D. Conan, and F. DeSantis, Jr.*
Kritika Thapa (EA Engineering, P.C. and Its Affiliate EA Science and Technology/USA)

*__Design and Implementation Challenges of the Great Lakes Legacy Act Sediment Remediation Project of the Ponds behind Erie Pier in the St. Louis River Area of Concern in Duluth, Minnesota__. *M. Kern, L. Lehto, V. Person, M. Royal, K. Meyer, C. Weston, and C. Cruz.*
Meaghan Kern (U.S. Environmental Protection Agency/USA)

Design Approaches for Cost Effective Remediation of Large Sediment Sites. *T. Blackmar, R. Feeney, and R. Chozick.*
Terri Blackmar (Tetra Tech, Inc./USA)

Dredging Contaminated Sediments Mixed with Large Building Demolition Debris, Artifacts, and Munitions. *K. Skellenger, T. Thornburg, R. Wyatt, and M. Crystal.*
Kendra Skellenger (Anchor QEA, LLC/USA)

*__Implementation of Combined Remedial Actions at the Pearl Harbor Sediment Site, Pearl Harbor, Hawaii__. *K. Markillie, J. Anderson, and S. Sahetapy-Engel.*
Kimberly Markillie (U.S. Navy/USA)

*__Lessons from the Remediation of 1000 ha of Hydrocarbon-Impacted Mangrove Sediments in Bodo, Nigeria__. *O.I. Iroakasi, V.O. Nwabueze, E.R. Gundlach, and N.I. Story.*
Ogonnaya I. Iroakasi (The Shell Petroleum Development Company of Nigeria Limited/Nigeria)

Lessons Learned during Capping an Urban Canal and Installation of a Base for a Planned Urban Wetland. *M. Walter and N. Wyrowski.*
Mark Walter (Ramboll/USA)

Lessons Learned: Design and Implementation of Sediment Remediation Projects. *J. Raimondi.*
Jason Raimondi (Geosyntec Consultants, Inc./USA)

A New and Noteworthy Capping Option. *D. Wibralski.*
Dan Wibralski (J.F. Brennan Company, Inc./USA)

*__Tidal Creek System Hydraulic Dredging and Subaqueous Capping Lessons Learned__. *T. Sattler, S.M. Damon, S. Ueland, and T. Donegan.*
Timothy M. Sattler (Langan/USA)

*__Upward NAPL Seepage during Reactive Cap Construction, and Post-Installation Strategy to Identify and Address Problem Spots__. *M. Mann-Stadt, S. Carroll, W. Haswell, and D. Sullivan.*
Maris Mann-Stadt (Haley & Aldrich, Inc./USA)

Wetland Habitat Area Remedial Construction. *B. Orchard Aragon, E.J. Suardini, and C. Elmendorf.*
Barbara Orchard Aragon (Arcadis/USA)

What I Failed to Learn at the Sediment Conferences: Lessons from the Atlantic Wood Industries Superfund Site River Cleanup. *R. Sturgeon.*
Randy Sturgeon (U.S. Environmental Protection Agency/USA)

When Unknown Unknowns Become Known: Lessons Learned at the Ashland Lakefront MGP Suuperfund Site. *D. Roznowski, K. Aukerman, T. Lee, and A. Buell.*
Denis Roznowski (Foth/USA)

Lunch & Learn—Wednesday, Track E

Update on Work Products from the 2018 Joint U.S. Army Corps (ERDC) and Sediment Management Work Group (SMWG) Workshop on Uncertainty in the Evaluation of Fish Consumption

Presented By

Steven C. Nadeau (Sediment Management Work Group [SMWG])
David A. Moore (U.S. Army Corps/ERDC)
Betsy Ruffle (AECOM)
Jason Conder (Geosyntec)
Deborah Edwards (NewFields)
Danielle Pfeiffer (Arcadis)
Katherine von Stackelberg

In 2018, the Army Corps of Engineers Engineering Research and Development Center (ERDC) and the Sediment Management Work Group (SMWG) co-sponsored a workshop to address the key exposure scenario that drives risk and cleanup goals at sediment sites—the consumption of impacted fish by human receptors. Attendees at this workshop were equally represented by industry (potentially responsible parties), government (federal, state, county, and some international representatives),

* = poster presentation

consulting firms and academia. The goal of the workshop was to evaluate all aspects of the current risk paradigm for human fish consumption in order to (1) determine the key areas of uncertainty, (2) prioritize these areas of uncertainty, and (3) develop scopes of work and cost estimates to find solutions to reduce the uncertainty in these areas. The hope was to include all stakeholders in order to develop consensus/buy in and thereby facilitate improvement of risk assessments and cleanups at sediment sites. In 2019, the results of the workshop were presented at the Battelle sediments conference in Jacksonville, Florida. Feedback received at that meeting has been used to update the information for this Lunch and Learn. The research continues but currently includes work on per- and polyfluoroalkyl substances (PFAS) toxicity in zebrafish, sustainable fish consumption rates, probabilistic evaluations of fish consumption (including application of the NCI method), systematic review of the evidence for associations between fish consumption and human body burdens for PFAS and fish tracking and risk reduction through adaptive management.

E5. Dredging Design and Operations

Platforms Tuesday | Posters (*) Tuesday Evening
Chairs: Paul Doody (Anchor QEA, LLC) and Jason Raimondi (Geosyntec Consultants, Inc.)

Diver-Assisted Dredging under Structures to Protect Manatees and Minimize Ecological Impacts while Dredging in Sensitive Habitats: Design Build Services for Wagner Creek/Seybold Canal, Miami, Florida. *B. Madabhushi, D. Levy, T. Donegan, M.D. Crystal, and R. Fenton.*
Babu Madabhushi (AECOM/USA)

*__Navigation Channel Dredging in San Pablo Bay National Wildlife Refuge for PG&E Emergency Transmission Towers Replacement Project__. *C.D. Moody and P. Cordell.*
Chris Moody (Farallon Consulting/USA)

New Bedford Harbor Superfund Site Dredging Design and Technology Initiatives for Cleanup Success. *J. Lally, N.W. Mangelson, D. Lederer, S. Taylor, and M.D. Crystal.*
John Lally (Lally Consulting, LLC/USA)

*__Passive Sampling for Dredged Material Decisions: Defining the Science to Support Policy__. *S.E. Apitz.*
Sabine Apitz (SEA Environmental Decisions, Ltd./United Kingdom)

*__Recent Developments in Resuspension Control Acceptance__. *M. Gravelding, E. Dievendorf, and K. Toth.*
Eric Dievendorf (Arcadis/USA)

Shoreline Dredging Risk Mitigation: Consider "The Zone of Influence." *S. Ozkan, R. LamaTamang, S. Ernst, T. Blackmar, and M. Ahmed.*
Senda Ozkan (Tetra Tech, Inc./USA)

Water Quality Impacts Associated with Bucket Dredging. *D.F. Hayes and D.E. James.*
Donald Hayes (The Dredging Professor LLC/USA)

When Designing a Dredge Prism, Geostatistical Models Are Important But Must be Tempered by Sound Engineering Principles. *C.R. Pray and J.L. Englehart.*
Chris Pray (GEI Consultants/USA)

Panel Discussion—Wednesday, Track E

Cost Drivers for Environmental Dredging and Capping Projects

Moderator
Andrew Timmis (J.F. Brennan Company, Inc.)

Panelists
Paul LaRosa, PE (Anchor QEA)
Chris Greene, PE (Geosyntec Consultants, Inc.)
Scott Cieniawski (U.S. EPA – Great Lakes National Program Office)
Robert Rule, PE (de maximis, Inc.)
Tim Donegan, PE (Sevenson Environmental, Inc.)
Greg Smith (J.F. Brennan Company, Inc.)

Sediment remediation projects are often lengthy and complex, in some cases taking decades to implement from the time the first sampling data identify ecological impacts to full remediation of the project area. Based on experience at several Superfund sediment mega-sites over the past 15 years, these complexities can drive dredging and capping project costs to well over a billion dollars. Regardless of a project's scope or size, these costs are driven by several major factors, including project design, regulatory and stakeholder requirements, and construction and implementation. As more sites are completed, a better understanding of these factors can be gained, and in sharing this institutional knowledge, more refined estimates, advanced planning, scheduling, and cost conscience design approaches are enabled. Project design requirements accommodate both owner and regulatory agency needs and can add costs beyond those normally associated with routine construction projects. Cost drivers start with regulatory requirements and include standards for clean-up and environmental compliance and even time-of-year restrictions. Stakeholder requirements may also drive additional project costs through contract requirements, risk mitigation and often include protection requirements such as replacement or improvement of waterbody infrastructure, including shoreline stability and potential upland availability and space restrictions. Many of these additional requirements are independent of remedial construction elements which include implementation costs driven by dredge selection, cap material composition and availability, allowable hours of operation, dewatering and disposal requirements, and operational monitoring needs. This panel will discuss these major cost drivers associated with the final project remedy from a regulatory agency's, owner's, engineer's, and contractors' perspectives. The panel will also review how each of these factors is driven, including, but not limited to, regulatory requirements, local and global economy, disposal criteria, investigation, design, and construction.

E6. Habitat Mitigation and Restoration

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: Ryan Davis (Anchor QEA, LLC) and Anthony St. Aubin (Cardno, Inc.)

Combining Habitat Restoration with Cleanup: Successful Case Studies. *C. Patmont.*
Clayton Patmont (Anchor QEA, LLC/USA)

*__The Evolving Programmatic Biological Assessment__. *S.A. Sheldrake and J.M. Jones.*
Sean Sheldrake (CDM Smith Inc./USA)

Four Years Post Remediation and Restoration for a Time Critical Removal Action: Bank Stability, New Habitat, and Increased Recreational Use. *B. Strzalka, A. Emery-DeVisser, C. Draper, and J. Caryl.*
Bonnie Strazlka (Wood/USA)

Lessons Learned from an Urban Restoration Project within a Sediment Superfund Site. *M. Havighorst, R. Marinai, P. Cordell, and C. Moody.*
Mark Havighorst (Farallon Consulting/USA)

*__Measuring Success of the First Wetland Mitigation Bank in New York City with Sediment and Biota Monitoring__. *X. Wang, P. McBrien, T. Stewart, T. Shinskey, R. Wachter III, M. Bounkhay, A. Wolfson, M. Taffet, and S. Murphy.*
Xiulan Wang (WSP USA Solutions Inc./USA)

*__Restoration of Severely Degraded Custom Plywood Mill Industrial Waterfront Back to Productive Nearshore and Upland Habitat__. *J. Blanchette, J. Bingham, J. Shannon, S. Edwards, J. Morman, A. Fernandez, and H.S. Park.*
Jessica Blanchette (Haley & Aldrich/USA)

*__Restoration of Valuable Habitats in the Lower Passaic River/Northern Newark Bay Integrated with Sediment Cap Design__. *B. Orchard Aragon, D. Partridge, and M. Erickson.*
Barbara Orchard Aragon (Arcadis/USA)

Strategies for Establishing Submersed Aquatic Vegetation in Freshwater Environments Post-Dredging. *R. Allison and J. Allison.*
Ryan Allison (Cardno, Inc./USA)

*__Water Level Elevation Monitoring to Inform Remedial Design in a Tidal Wetland__. *S. Greenfield, B. Johnson, B. Warner, and J. DiMarzio.*
Sarah Greenfield (DEQ/USA)

E7. Cap Construction and Operation

Platforms Thursday | Posters (*) WednesdayEvening
Chairs: Timothy Donegan (Sevenson Environmental Services, Inc.) and Tyler Lee (J.F. Brennan Company, Inc.)

*__Activated Carbon Application Approaches__. *S. Miller, H. Nelson, and K. Parrett.*
Sarah Miller (Oregon Department of Environmental Quality/USA)

*__Application of SediMite™ by Helicopter: Cost-Effective Remedy Implementation for Contaminated Sediment__. *B. Jones-Stanley, P. Burnet, F.S. Dillon, and M. Guebert.*
Frank Dillon (Jacobs/USA)

*__Evaluation of In Situ Sediment Treatment Effectiveness for PCBs__. *K. Craigie, G. Braun, M. Bowersox, J. Roberts, and E. Ashley.*
Keir Craigie (Tetra Tech, Inc./USA)

*__Full-Scale Implementation of Carbon-Enhanced Natural Recovery Resulting in No Further Action__. *B. Hitchens and J. Conder.*
Brian Hitchens (Geosyntec Consultants, Inc./USA)

Hydraulic and Mechanical Dredging in Soft Sediment, Geotextile Tube Dewatering, and Multi-Layer Sediment Cap Installation. *T.M. Donegan and T. Sattler.*
Timothy Donegan (Sevenson Environmental Services, Inc./USA)

* = poster presentation

Hydraulic Cap Placement of a Deepwater Sediment Cover. *M.J. Crystal, J.F Strunk Jr., and K. Mehigh.*
Michael J. Crystal (Sevenson Environmental/USA)

***In Situ Treatment of PCB-Impacted Sediments with Bioamended Activated Carbon**. *K.R. Sowers and U. Ghosh.*
Kevin Sowers (University of Maryland, Baltimore County/USA)

***Large-Scale In Situ Remediation and Restoration of Paradise Creek: First In-Lieu Fee Mitigation Fund Cleanup on the Elizabeth River in Portsmouth, Virginia**. *T. Merritts, D. Koubsky, R. Ram, D. Wagner, E. Patmont, U. Ghosh, D. Hartnett, and J. Vance.*
Travis Merritts (Anchor QEA, LLC/USA)

Optimizing Full-Scale Activated Carbon Placement and Cost-Effectiveness. *P. LaRosa, U. Ghosh, J. Collins, and C. Patmont.*
Paul LaRosa (Anchor QEA, LLC/USA)

***PPB-PAC Treatment for In Situ Capping**. *A. Dahmani, F. Dahan, M. Begag, and J. Mulqueen.*
M. Amine Dahmani (SESI Consulting Engineers/USA)

Remedial Cap Construction at Four Industrial Slip Sites in the St. Louis River Area of Concern. *L. Lehto, S. Schoff, M. Elliott, A. Meyer, V. Person, M. Royal, and M. Kern.*
LaRae Lehto (Minnesota Pollution Control Agency/USA)

Subaqeous Cap Engineering and Placement Performance. *J. Lally, E. Eliason, and J. Linthorst.*
John Lally (Lally Consulting, LLC/USA)

E8. In Situ Stabilization

Platforms Thursday | Posters (*) Wednesday Evening
Chairs: John Hull (AquaBlok, Ltd.) and Wendell Wen (AECOM)

***Analysis of Gowanus Canal ISS Sample Crusts Formed during EPA 1315M Long-Term Leach Testing under Simulated Brackish Water Conditions**. *D.G. Grubb, D.R.V. Berggren, J. Hess, and C.D. Tsiamis.*
Dennis Grubb (Jacobs/USA)

***Enhancing In Situ Stabilization and Solidification (ISS) in Sediments by Adding Sodium Persulfate**. *P. Lindh, P. Elander, K. Bernstén, M. Arner, and B. Smith.*
Per Lindh (Trafikverket/Sweden)

***EPA LEAF Testing of Untreated and ISS-Treated Thixotropic Silica Fume Sediments**. *D.G. Grubb, D.R.V. Berggren, C.S. Toburen, M.T. Powers, and J.F. Strunk, Jr.*
Dennis Grubb (Jacobs/USA)

First to Field Mass Mixing In Situ Stabilization/Solidification Remediation in Uncharted Waters of Kendall Bay. *D. Meric, C.A. Robb, P. Hutson, J. Gaul, A. Garland, M. Clutterham, and N. Sparke.*
Dogus Meric (Geosyntec Consultants, Inc./USA)

Hybrid Remedial Approach Using Subaqueous In Situ Stabilization and Dredging Results in a Stable and Cost-Effective Sediment Remedy. *D. Lowry and M. Gardner.*
Dave Lowry (AECOM/USA)

***ISS with Chemical Fixation at a Former Power Generating Station**. *P.R. Lear.*
Paul Lear (Forgen/USA)

Manistee In-River ISS Remediation. *G. Zellmer, M. Williams, M. Giampaolo, E. Dievendorf, N. Gensky, and A. Santini.*
Eric Dievendorf (Arcadis/USA)

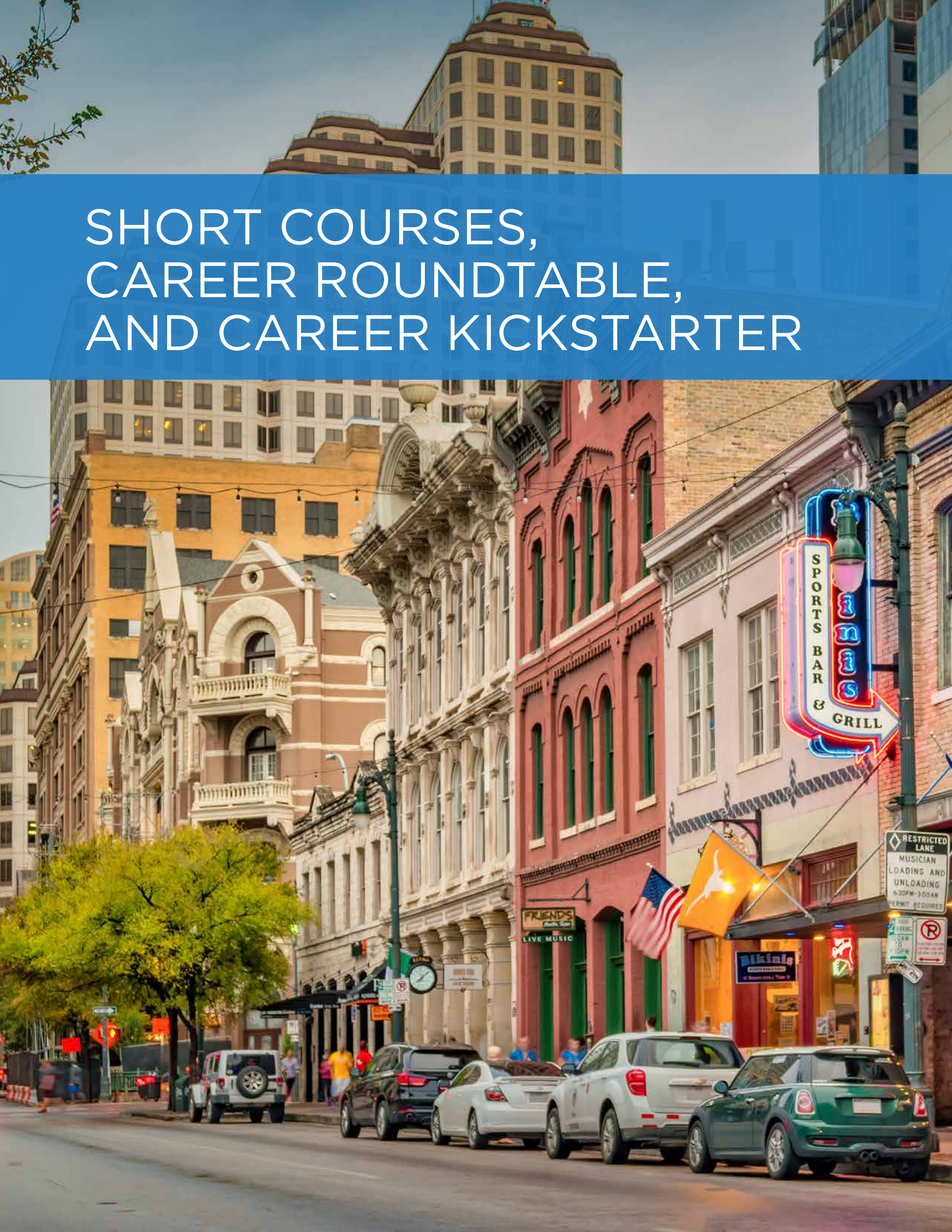
The Many Challenges Stabilizing a Thixotropic Silica Fume Slurry Lagoon. *D.G. Grubb, D.R.V. Berggren, C.S. Toburen, M.T. Powers, and J.F. Strunk, Jr.*
Dennis Grubb (Jacobs/USA)

***Material Solutions and Applications for Addressing Coal Ash-Impacted Basins**. *J.A. Collins, J.H. Hull, and M.A. Ajemigbitse.*
John Collins (AquaBlok, Ltd./USA)

***New Modified Minerals for Remediation of Long Chain and Short Chain PFAS Compounds in Water**. *M.S. Donovan, R. Gorakhki, D. Wind, J. Liu, and C. Bellona.*
Michael Donovan (CETCO/USA)

* = poster presentation

SHORT COURSES, CAREER ROUNDTABLE, AND CAREER KICKSTARTER



Short Courses, Career Roundtable, and Career KickStarter

Short Courses

Short Course early-bird registration rates are available through November 18, 2022. Limited onsite registration may be available, however, courses that do not meet the required 6 minimum attendees by the early-bird date may be cancelled. Please register as soon as possible to ensure your preferred course continues.

The link to register can be found on the **Short Course** page.

Student & Young Professional Events

The following events are open to all student and early-career/young professional attendees (5 years or less in the field). There is no additional cost to attend.

- The **Career Roundtable** discussion **does not require pre-registration**.
- The **Career KickStarter does require pre-registration** in order to match mentors and mentees. See the **Student Participation** page to register as a mentor or mentee.

Monday, January 9, 8:00 a.m.-5:00 p.m. (all-day)

- Evaluating Sediment Transport: Best Practices, Tools, Techniques, and Application to Site Management

Monday, January 9, 8:00 a.m.-12:00 noon (morning half-day)

- *Capping Design: The Art of Designing Isolation Layers to Reduce Environmental Risk Associated with Contaminated Sediments
- Expanding the Use of In Situ Solidification/Stabilization to Provide Additional Tools for the Management of Impacted Sediments
- Environmental Forensics: Where Did That Contaminant Originate and Is It Degrading?
- Per- and Polyfluoroalkyl Substances (PFAS) Site Characterization and Assessment Tools

Monday, January 9, 12:30-2:30 p.m.

- Career Roundtable

Monday, January 9, 1:00 a.m.-5:00 p.m. (afternoon half-day)

- Dredging 201: Introduction to Sediment Remediation
- Application of Activated Carbon to Sediment Remediation: Design to Installation to Monitoring Reactive Capping and In Situ Treatment
- Emerging Contaminant: Microplastics and Their Presence in Waterways, Effects and Potential Solutions
- Developing Representative Sediment Background Concentrations

Monday, January 9, 3:00-5:00 p.m.

- Career KickStarter

***Indicates a laptop is required for this course.**

Short Course Descriptions

Monday, January 9

8:00 a.m.-5:00 p.m.

Evaluating Sediment Transport: Best Practices, Tools, Techniques, and Application to Site Management

Instructors: Grace Chang (Integral Consulting, Inc.) and Craig Jones (Integral Consulting, Inc.)

Course Objective: This short course will present some common contaminated sediment site management questions that rely on sediment transport or stability information and discuss how to address these questions. The session will begin with a general overview of best management practices where the importance of understanding the dominant physical processes will be presented as well as coupling CSMs with field studies and numerical models. The course will elaborate on focusing on critical information, choosing the type and amount of data, and the numerical accuracy required to answer specific questions.

Course Overview: This course will focus on common site management questions that require information on sediment erosion, deposition and stability to enable planning and design of measures or interventions. These questions will be presented in the context of a "generic" CSM for sediment transport to illustrate how sediment stability relates to overall site management. The most commonly employed devices and techniques for characterizing sediment beds will be presented, as well as highlighting specific features of each method. The focus will move onto a more detailed description of site-specific measurements. How the common field and analytic tools and techniques can be integrated to provide information that is of direct use in answering site management questions will be discussed. The second half of the course will focus on quantitative numerical modeling. The afternoon will cover model selection based on problem specification, model development, reliability and application and focus on developing a technically rigorous hydrodynamic and sediment transport modeling effort that minimizes uncertainty while maximizing efficiency in addressing sediment management related questions.

Laptops are ***not required*** for this course.

Monday, January 9
8:00 a.m.-12:00 noon

Capping Design: The Art of Designing Isolation Layers to Reduce Environmental Risk Associated with Contaminated Sediments

Instructors: Espen Eek and Goril Aasen Slinde (Norwegian Geotechnical Institute), Danny Reible and Xiaolong Shen (Texas Tech University)

Course Objective: The objective of the course will be to present the current state of the art in design of capping solutions for remediation of contaminated sediments. The course will also explain how cap design can be adapted to different situations with different contaminants and contaminant transport mechanisms. The course will present options for cap construction and available methods of monitoring the cap during placement as well as after installation. Environmental professionals in research or consultancy, contractors, and regulators will benefit from this course.

Course Overview: This course will present up-to-date knowledge on the following topics:

1. The purpose of capping.
2. The variety of situations where capping can be used such as harbors, rivers, and estuaries.
3. Contaminant distribution in sediment and transport mechanisms that the cap aims to abate.
4. Different functional layers in the cap, how they work, when they are needed and how to design their thicknesses and composition (e.g., erosion protection, bioturbation layer, advection protection, active sorption layer).
5. Discussion of available tools for modelling the effectiveness of a cap: analytical equations, analytical models, numerical models, diffusion and advection modelling. How these tools can assist in cap design and to help demonstrate the effectiveness before implementation.
6. Important stability considerations for the cap design: slope stability, bearing capacity and erosional stability. The course will aim to provide an overview of the challenges and potential tools to solve these.
7. Cap construction.
8. Monitoring cap construction and effectiveness: an overview of the different methods that are available to monitor a cap during and after construction (e.g., bathymetric monitoring, Sediment profile imaging (SPI), remotely-operated vehicles (ROVs), passive samplers, and flux chambers). The course will use real-world examples to illustrate the different topics.

Laptops ***are required*** for this course.

Monday, January 9
8:00 a.m.-12:00 noon

Expanding the Use of In Situ Solidifcation/Stabilization to Provide Additional Tools for the Managment of Impacted Sediments

Instructors: Paul Jansen (GEI Consultants), Tim Olean (Ramboll), Darin Payne (Geo-Solutions, Inc.), and Chris Robb (Geosyntec Consultants, Inc.)

Course Objective: This course will impress upon the attendees the importance of clear written communication and provide tools and practical advice with which they can improve their technical work product. The potential audience includes all environmental professionals, even those at senior levels, who prepare and review technical work products as well as academicians who write research papers.

Course Overview: The remediation of sediments, especially those in urban waterways, can be complex and expensive. Traditionally, remedies at these sites have centered on dredging impacted sediments with upland treatment or disposal. More recently capping of impacted sediments, often with active treatment layers, has seen increasing use. However, the range of remedial technologies available to manage impacted sediments has not been as broad as the range of tools available for upland site remediation. ISS has seen increasing use on upland sites, originally for treatment of metals and more recently for treatment of organics and nonaqueous phase liquid. ISS is a technology that treats soils and sediments in place by mixing with admixtures or reagents intended to alter the physical or chemical characteristics of soil/sediment. Over the past several years an effort has been made to adapt ISS technology for the in-place treatment of sediments. While the use of ISS is not appropriate under all conditions, the development of this technology will provide another tool that can effectively manage sediments. The use of ISS may allow for less community disruption, less waste placement in landfills and less impact on infrastructure, avoiding the need to replace or support bulkheads, bridges and piers. This short course will describe the current state of the practice for ISS in sediments and discuss the methodologies currently used to convert upland ISS approaches for use with sediments. The course will address when ISS should be considered as a potential remedy and the treatability, design and eventual implementation of full-scale ISS in sediments. Designers and contractors with real-world experience in selecting, developing and utilizing this technology will provide input based on actual projects. Additionally, an update on the state of the technology since this course was first presented in early 2019 will be provided along with new project case studies.

Laptops ***not required*** for this course.

Monday, January 9
8:00 a.m.-12:00 noon

Environmental Forensics: Where Did That Contaminant Originate and Is It Degrading?

Instructor: Paul Philp (University of Oklahoma)

Course Objective: The presence of contaminants in sediments requires determination of source, age, composition and extent of weathering. This course will discuss forensic approaches to investigate answers to these issues and discuss possible problems with data interpretation. Potential audience includes regulators, site managers, engineers, hydrogeologists, and environmental scientists.

Course Overview: Contaminants in sediments may range from volatile compounds, such as light hydrocarbons from gasoline or chlorinated hydrocarbons, to heavy semivolatile components such as residual lubricating oil. Forensic investigations initially need to characterize the product(s) using a variety of sophisticated analytical techniques. Secondly, investigations need to determine whether the products have been weathered, hence changing their original composition and possibly producing more toxic degradation products. Thirdly, how long have the products been in the environment? Fourthly, can the contaminants be related back to a point of release or source? These are complex questions and not only require a detailed knowledge of analytical chemistry and the ability to interpret the resulting data but a knowledge of the way in which the contaminants are manufactured, changes in manufacturing processes, feedstocks and impurities to possibly obtain clues as to the time the contaminant has been in the environment. This course will discuss the techniques available to generate the data needed for a successful forensic investigation and discuss possible pitfalls in the interpretation of the data obtained from the various fingerprint techniques. Case histories will be discussed including those where, for example, a background knowledge of how changes in composition of a product, such as gasoline, have changed over time providing useful age dating information. It is important to realize forensic investigations are very different from the standard EPA monitoring methods. In forensic investigations a compound present in trace amounts and possibly not even on an EPA target compound list or below their minimum detection limits may provide a critical clue in differentiating two possible points of release. Environmental forensics is an integrated approach using a variety of techniques and information from many different sources to determine parties responsible for sediment contamination. It may not provide a unique answer in every case but should narrow the number of possibilities.

Laptops are ***not required*** for this course.

Monday, January 9
8:00 a.m.-12:00 noon

Per- and Polyfluoroalkyl Substances (PFAS) Site Characterization and Assessment Tools

Instructors: Kavitha Dasu (Battelle), Rainer Lohmann (University of Rhode Island), and Marc Mills (U.S. Environmental Protection Agency)

Course Objective: This course will provide current state of knowledge on PFAS sampling and analytical techniques for site characterizations. The potential audience includes environmental professionals, consultants, and state and federal regulators involved with PFAS-impacted site characterization or cleanup.

Course Overview: Over the years, widespread detections of PFAS in different environmental and biological matrices has gained global attention. PFAS are extensively studied due to the concerns of human health effects, bioaccumulation potential, and persistence of particularly the long-chain perfluorinated chemicals including perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). In June 2022, U.S. EPA released health advisories for four PFAS, including interim updated lifetime drinking water health advisories for PFOA (0.004 parts per trillion [ppt]) and PFOS (0.02 ppt), and final health advisories for GenX chemicals (10 ppt) and perfluorobutane sulfonic acid (PFBS) (2,000 ppt). Given such low levels of quantitation, there are many concerns on the potential cross contamination during sampling and analytical procedures. Historical use of PFAS chemicals for fire-fighting and training operations, commercial applications, manufacturing facilities, and wastewater discharges has contributed to the major PFAS contamination in the environment. Many of the PFAS plumes are commingled with other co-contaminants such as fuels and chlorinated solvents. As the number of PFAS-contaminated sites is growing rapidly, there is a need for better understanding of the fate and transport of these chemicals. This knowledge will be helpful for an efficient site characterization and assessment to understand the extent of contamination and devise appropriate remedial action. The short course provides an overview of the current information available on the sampling techniques including passive samplers for measuring PFAS in surface water, groundwater and porewater, and analytical approaches, challenges and applicability of different sampling methods to contaminated site monitoring and assessment.

Laptops are ***not required*** for this course.

Monday, January 9
12:30-2:30 p.m.

Career Roundtable

Moderators: Upal Ghosh (University of Maryland Baltimore County), Helen Jones (USACE), and Karl Rockne (University of Illinois at Chicago)

Students and early-career professionals (less than 5 years post graduation) will learn more about career paths in the contaminated sediments field.

Representatives from academia, a regulatory agency, industry, consulting, and non-profit/non-government organizations will provide brief career overviews, followed by Q&A and open discussion.

Learn more about getting your foot in the door, job qualifications, pros and cons of various fields, and more!

This event **does not require pre-registration** and there is no cost to attend.

Monday, January 9
1:00-5:00 p.m.

Dredging 201: Introduction to Sediment Remediation

Instructor: Don Hayes (Engineer Research and Development Center)

Course Objective: This course will provide a broad overview of strategies and tools for remediating contaminated sediment sites from site investigations to site solutions.

Course Overview: Most contaminated sediment sites involve a complex set of engineering and construction challenges intermixed with wide ranges of ecological, environmental, permitting, and social constraints. Conflicting information and different perspectives on remedial alternatives further complicate matters. High costs and perception of high risk makes a productive path forward difficult to identify. This course presents an inclusive, open approach to managing contaminated sediment sites intended to help all parties understand how different remedial strategies can help achieve project goals along with their associated risks and relative costs. The course will start with site assessment approaches and limitations. It will focus on the importance of understanding contaminant pathways and resulting ecological and environmental exposures, and then use those to develop a robust conceptual site model (CSM). Remedial alternatives including monitored natural attenuation (MNR), in situ treatment, dredging, and capping will be discussed in detail, focusing on how each is able to arrest or modify exposures in the CSM. Advantages and disadvantages of each remedial approach will be discussed, focusing on conditions where each has the most and least potential to be successful. Sediment resuspension and residual sediments associated with environmental dredging will be described in detail. Debris considerations for all remedial alternatives will also be discussed. The course will focus on project and ecological risks associated with different remedial strategies. Although the course will not deal directly with costs, comparative costs and risks of remedial alternatives will be addressed individually and collectively. The primary focus of the course is to provide participants with a technically sound basis for comparing remedial alternatives and combining them to form a constructable remedial solution. The course will be interactive, and participants will be encouraged to discuss specific projects they are engaged in.

Laptops are ***not required*** for this course.

Monday, January 9
1:00-5:00 p.m.

Application of Activated Carbon to Sediment Remediation: Design to Installation to Monitoring Reactive Capping and In Situ Treatment

Instructors: Moses Ajemigbitse (AquaBlok, Ltd.), Gary Braun (Tetra Tech, Inc.), John Collins (AquaBlok, Ltd.), Upal Ghosh (Sedimite Solutions), John Hull (AquaBlok, Ltd.), Danny Reible (Texas Tech University), and Joe Wong (Advanced Emissions Solutions, Inc.)

Course Objective: This short course will provide the participant with a full-range of information from basic material and conceptual knowledge to application and monitoring of activated carbon as it is applied to reactive capping and in situ treatment.

Course Overview: The short course will cover key topics ranging from activated carbon source materials, how to evaluate the anticipated performance of the amendments, how to implement the most protective design, and how to ensure a verifiable implementation of the design. Finally, the importance of post-installation quality control will be discussed as well as applying long-term monitoring best practices to confirm the desired/expected performance of the remedy.

Laptops are ***not required*** for this course.

Monday, January 9
1:00-5:00 p.m.

Emerging Contaminant: Microplastics and Their Presence in Waterways, Effects and Potential Solutions

Instructors: Alia Enright (TRC), Jenny Phillips (TRC), John Rice (TRC) , Victor Medina (TRC)

Course Objective: This workshop is designed to provide a comprehensive understanding and the most up-to-date information associated with microplastics, including: major sources, fate and transport; exposure, health effects, and toxicity; sampling and analytical challenges and options; remediation options and challenges; regulatory status and future industrial/legal implications and ongoing research efforts, with a focus on the sediment/aquatic environment.

Course Overview: The durability, stability, and affordability of plastics led to its status as a wonder product in the mid-1900s and its application in countless everyday products. Unfortunately, these same properties have resulted in an ever-increasing amount of plastics in the environment, as plastic production grows exponentially, and plastic wastes do not readily degrade in the environment. Discarded plastic products of many forms and sizes can be found throughout the world; yet even more ubiquitous are the small nano/microplastic particles formed from the degradation of these larger plastic products and wastes. Significant quantities of nano/microplastic particles have been found in such disparate regions as Arctic snow, deep ocean waters, Alps air, and drinking water. Health effects and toxicity are only beginning to be understood. The demand for microplastics testing and analysis has increased, and because of their ubiquitous nature, microplastics present both a sampling challenge and an important consideration in source attribution by regulators. Microplastics are emerging as an environmental issue that industry and local/state municipalities will be increasingly focusing on in the coming years.

*Laptops are **not required** for this course.*

Monday, January 9
1:00-5:00 p.m.

Developing Representative Sediment Background Concentrations

Instructors: Meghan Conan (ASTM International), Allison Geiselbrecht (Floyd|Snider), Eric Litman (NewFields), and Leyla Shams (NewFields)

Course Objective: The course will cover the ASTM's E3242 Standard Guide for Determination of Representative Sediment Background Concentrations, with supporting elements from E3164 Standard Guide for Sediment Corrective Action-Monitoring, Standard Guide for Selection of Background Reference Areas for Determination of Representative Background Concentrations (in final balloting process), and Standard Guide for Understanding Important Factors (or Considerations) Used for Determining Representative Sediment Background Concentrations for Corrective Action Decision Making (in development). The course will review the importance of background in corrective measures and educate the attendees on methods to derive a technically defensible sediment background following sound scientific practices.

Course Overview: The course will address the overall process of deriving background and walk through the following topics in depth, using case studies to engage the attendees. These topics include:

- Statistical considerations in selecting, collecting, and evaluating background data sets
- Chemical and geochemical considerations relevant to developing background concentrations
- How to select background reference areas. Case studies will illustrate how to apply these approaches.

If desired, you may purchase the ASTM documents using the link below, however, purchase **is not** required to attend the course.

ASTM Standards for Sediment-Field, Laboratory, Environmental Assessment and Risk

Laptops are ***not required*** for this course.

Monday, January 9
3:00-5:00 p.m.

Career KickStarter

Organized and hosted by Clemson University alumni, the Career KickStarter is a program designed to foster networking and mentorship within the environmental sector.

New professionals will be matched with an experienced professional in a mentorship relationship, which both mentee and mentor are committed to sustaining for 1 year.

Mentors provide guidance and constructive criticism to students, actively engage their professional network on the student's behalf, educate the student on the ins-and-outs of their own profession, have regular meetings to ensure the student's goals are being met, and most importantly, provide encouragement.

All participation is voluntary and there is no cost to attend, however, **pre-registration is required to match mentors and mentees**. A target of 20-30 professionals is desired for successful implementation.

See the **Student Participation** page to register as a mentor or mentee.

LEARNING LABS

Learning Lab Schedule

The Learning Lab will consist of hands-on demonstrations highlighting specific technologies, tools, and software. Each Learning Lab is scheduled twice, once on Tuesday and once on Wednesday. See the schedule below for specific times. Learning Lab demonstrations will be held in a room adjacent to the Exhibit Hall.

Two Lunch & Learn presentations are also scheduled. Lunch & Learn presentations will be held in a session room.

Tuesday, January 10

- 8:00-8:25 a.m.—3-D Visualization and Analysis Software Demonstration
- 8:50-9:15 a.m.—Benthic Flux Chamber to Monitor Contaminant Flux from Sediments
- 9:40-10:05 a.m.—Selecting Sustainable Remediation Options Using the SURE Toolbox for Contaminated Land Management: Hands on Training
- 10:30-10:55 a.m.—Designing a Robust, Spatially Representative, Long-Term Sediment Monitoring Program: Application of Power Analysis and a Generalized Random Tessellation Sampling (GRTS) Algorithm in R
- 1:00-1:25 p.m.—Demonstration of the FishRand Probabilistic, Spatially-Explicit Bioaccumulation Model
- 1:50-2:15 p.m.—Application of Passive Sampling Methods to Long-Term Monitoring and Remediation Effectiveness Assessment
- 2:40-3:05 p.m.—Quantifying Aqueous Concentrations in Direct Contact with NAPL-Containing Sediment Using Porous Ceramic Samplers
- 3:30-3:55 p.m.—Modeling Propeller Wash-Induced Sediment Transport Using EFDC+
- 4:20-4:45 p.m.—First Utilization of Computational Fluid Dynamics (CFD) Technology for High Performance Environmental Dredging
- 5:10-5:35 p.m.—Digital Data Collection with QNOPY

Wednesday, January 11

- 8:00-8:25 a.m.—Designing a Robust, Spatially Representative, Long-Term Sediment Monitoring Program: Application of Power Analysis and a Generalized Random Tessellation Sampling (GRTS) Algorithm in R
- 8:50-9:15 a.m.—Digital Data Collection with QNOPY
- 9:40-10:05 a.m.—Modeling Propeller Wash-Induced Sediment Transport Using EFDC+
- 10:30-10:55 a.m.—Demonstration of the FishRand Probabilistic, Spatially-Explicit Bioaccumulation Model
- 1:00-1:25 p.m.—Selecting Sustainable Remediation Options Using the SURE Toolbox for Contaminated Land Management: Hands on Training
- 1:50-2:15 p.m.—Application of Passive Sampling Methods to Long-Term Monitoring and Remediation Effectiveness Assessment
- 2:40-3:05 p.m.—Quantifying Aqueous Concentrations in Direct Contact with NAPL-Containing Sediment Using Porous Ceramic Samplers
- 3:30-3:55 p.m.— First Utilization of Computational Fluid Dynamics (CFD) Technology for High Performance Environmental Dredging
- 4:20-4:45 p.m.—Benthic Flux Chamber to Monitor Contaminant Flux from Sediments
- 5:10-5:35 p.m.—3-D Visualization and Analysis Software Demonstration

3-D Visualization and Analysis Software Demonstration

Instructor: Thomas Cook (CDM Smith Inc.)

Tuesday, January 10
8:00-8:25 a.m.

Wednesday, January 11
5:10-5:35 p.m.

Objective: This presentation will demonstrate the latest features of the Leapfrog Works 3-D visualization and analysis (3DVA) software used to support the investigation, evaluation, and remediation of contaminated soil, groundwater, and sediment.

Description: Through the innovative use of 3DVA software, complex contaminated sediment, soil, and groundwater remediation challenges can be resolved faster and more efficiently than ever before. By incorporating all of the available site data into a 3DVA model, the project team is able to better understand the distribution of contamination in the subsurface, evaluate the nature and extent of contamination, and more efficiently perform other activities such as remedial investigations, contaminant transport evaluations, feasibility studies and remedial design. The latest 3DVA software enables the entire project team to explore the 3-D model on their own by using either the free model viewing desktop software or a web browser. The desktop software and web browser provide access to the full 3-D (and sometimes 4-D) datasets for project geologists, engineers, risk assessors, and decision makers to evaluate the contaminant distribution and possible remediation options. In addition to internal use, the 3DVA software provides powerful presentation visuals for sharing site results and project team conclusions with the client, regulators, and the public. The 3DVA software can also be used by the remediation engineers to make better remedial design decisions and then present the designs to project stakeholders to facilitate consensus on site cleanup decisions. This Learning Lab will demonstrate some of the latest features of the 3DVA software tools using real-world site examples with an emphasis on demonstrating how the use of the 3DVA software enabled the project team to resolve complex contaminant challenges by effectively incorporating all available site data including lithology, analytical results, historic reports and cross sections, and borehole and surface geophysics into a comprehensive 3-D conceptual site model.

Benthic Flux Chamber to Monitor Contaminant Flux from Sediments

Instructor: Goeril Aasen Slinde (Norwegian Goetechnical Institute [NGI])

Tuesday, January 10
8:50-9:15 a.m.

Wednesday, January 11
4:20-4:45 p.m.

Objective: This demonstration will show how benthic flux chambers can be used for in situ monitoring of flux of different contaminants from sediments to the overlying water.

Description: Benthic flux chambers are used to monitor the flux of various contaminants from sediments to the overlying water. The chamber is made to enclose a fixed volume of water above the sediment water. In the water volume, an infinite sink passive sampler device is installed. The passive sampler will trap the freely dissolved contaminants that fluctuate from the contaminated sediments to the water phase. In a risk assessment, the freely dissolved contaminants will be those that can be taken up by organisms that live on the sediments or in the water column. The flux chamber is particularly suitable to monitor contaminant flux before and after sediment remediation by capping. The Learning Lab will focus on how to use benthic flux chambers in the field, when to use benthic flux chambers, and also possible infinite sink passive sampler devices that can be used inside the benthic flux chambers.

Selecting Sustainable Remediation Options Using the SURE Toolbox for Contaminated Land Management: Hands on Training

Instructors: Victor Magar (Ramboll), J. Mark Nielsen (Ramboll), and Christine Redfern (Ramboll)

Tuesday, January 10
9:40-10:05 a.m.

Wednesday, January 11
1:00-1:25 p.m.

Objective: This session will demonstrate the use of a new on-line decision analysis tool for evaluating the sustainability and potential resiliency of remediation approaches to manage contaminated sites. This hands-on instruction will provide participants an opportunity to learn how to complete a sustainability assessment of a contaminated site for potential remedial options based on various sustainability indicator parameters, and where necessary, engage in virtual (i.e., due to potential continuing COVID restrictions) stakeholder dialogue. The demonstration is appropriate for regulators, project managers, scientists, engineers, and field personnel.

Description: Ramboll has developed a dialogue tool that provides an on-line comparative assessment of remedial options for contaminated sites. Embodied with information and approaches from various international guidance documents, including Sustainable Remediation ISO Standard 18504, Sustainable Remediation Forum-UK (SuRF-UK) guidance and ITRC's Green and Sustainable Remediation guidance, Ramboll's Sustainable Remediation Evaluation (SURE) Tool, the dialogue tool is intended to facilitate a discussion among site owners, regulators, remediation practitioners, and/or public stakeholders to compare and contrast remedial options for a site using sustainability evaluation criteria. While risk management remains the overarching objective for any site, being able to quantitatively appraise, then describe the resulting evaluation of remediation sustainability (and resiliency) in a straight-forward, transparent, and concise report is a new development that SURE by Ramboll has been developed to achieve. Ramboll's SURE tool utilizes a variety of weighting indicators to screen remediation approaches based on an integration of appraiser/consultant experience with remedy technical specifications and site characterization details. This learning lab will include the following facets: An introduction to sustainable and resilient remediation approaches; summary of sustainability metrics and weighting indicators used to assess site and remedy information; overview and instruction on the use of the SURE tool; site practice examples using the SURE tool; and discussion on participant results and open forum on the objectives of sustainable remediation and potential future uses of SURE.

Designing a Robust, Spatially Representative, Long-Term Sediment Monitoring Program: Application of Power Analysis and a Generalized Random Tessellation Sampling (GRTS) Algorithm in R

Instructors: John Kern (Kern Statistical Services, Inc.), Kenneth Takagi (WSP USA, Inc.), and Ying Wang (WSP USA, Inc.)

Tuesday, January 10
10:30-10:55 a.m.

Wednesday, January 11
8:00-8:25 a.m.

Objective: Learn how to perform a power analysis to determine the required number of samples with a goal of detecting a long-term trend. Learn how to distribute samples using the GRTS algorithm that generates spatially balanced samples and has flexibility to add and remove locations while maintaining spatial representativeness.

Description: Determining the number of samples required and allocating these samples in a spatially representative manner are critical components of the design of any long-term contaminated sediment monitoring program. For example, to maximize project cost savings for a client, it would be advantageous to determine the minimum number of samples required to detect an anticipated long-term rate of decline in sediment concentrations (e.g., 8%/yr) at a desired power and confidence level (e.g., 80% and 95%, respectively). The first part of this Learning Lab will present a procedure developed in R that performs a power analysis to determine the minimum number of samples required per sampling event to achieve a specific design goal. The procedure is easily adapted to address different design goals (e.g., a different anticipated rate of decline), and can efficiently evaluate different sampling frequencies (e.g., annual, biannual, triannual). Power analysis procedures available in most commercial programs only address the changes in concentrations between two discrete time periods, while ignoring the need to evaluate different sampling frequencies and the additional power they may provide. The inputs to the power analysis can usually be derived from existing site data and include the standard deviation of concentrations, possible sampling frequencies, desired rate of decline to detect, and overall sampling duration. The second part will illustrate how to apply the GRTS algorithm in R to distribute samples in a spatially representative manner for a stratified random sampling design. A particularly favorable feature of GRTS is the ability to dynamically add new sample locations as some become inaccessible or fail to yield sediment, while still maintaining a spatially representative sampling design. Another advantage of GRTS is that it yields more spatially balanced sample placement than simple random sampling design, especially at small sample sizes. The input to the GRTS program includes GIS shapefiles and the number of required samples.

Demonstration of the FishRand Probabilistic, Spatially-Explicit Bioaccumulation Model

Instructor: Katherine von Stackelberg (Harvard Center for Risk Analysis)

Tuesday, January 10
1:00-1:25 p.m.

Wednesday, January 11
10:30-10:55 a.m.

Objective: The objective of this Learning Lab is to demonstrate the use of a newly reprogrammed, updated and publicly available probabilistic and spatially-explicit bioaccumulation model known as FishRand. The model predicts the uptake of sediment-associated contaminants in aquatic food webs.

Description: The updated probabilistic and spatially-explicit FishRand bioaccumulation model has been reprogrammed in Python and is publicly-available through GitHub. The model predicts the uptake of sediment-associated contaminants in aquatic food webs, and unlike the previous version of the model, which was based on the mathematical algorithms from Gobas (1993), this version has been updated to reflect Arnot and Gobas (2004). In addition, the model now allows for the direct input of passive sampler exposure data in addition to bulk dry weight sediment and overlying water exposure concentrations. The model also allows users to calculate site-specific, temperature-dependent Log Koc values. As with the earlier model, the probabilistic framework allows users to predict population distributions and associated uncertainty bounds of contaminant uptake throughout aquatic food web species. A basic kriging algorithm has been added to generate geographic information system (GIS)-based exposure data maps and specify preferential habitat areas relative to areas of contamination. A demonstration of the model features will be presented as well as information on several model applications to support regulatory decision-making.

Application of Passive Sampling Methods to Long-Term Monitoring and Remediation Effectiveness Assessment

Instructor: Eliza Kaltenberg (Battelle)

Tuesday, January 10
1:50-2:15 p.m.

Wednesday, January 11
1:50-2:15 p.m.

Objective: The presentation will begin with a summary on how passive sampling works and what types of data are produced. Examples of passive sampler applications will then be presented. Participants will have an opportunity to see and examine some of the passive samplers currently used in sampling for PFAS and hydrophobic organic contaminants such as PCBs and PAHs.

Description: Passive samplers can provide an excellent addition or alternative to conventional water and sediment sampling; however, certain logistical and regulatory challenges exist. The goal of this presentation is to provide participants with a general knowledge on what passive sampling is and to showcase some real-life applications. The presentation will begin with a summary of the science behind passive sampling as well as an overview of the most common types of passive samplers used and the target analytes (e.g., metals, PAHs, PCBs, and other hydrophobic organic contaminants, and PFAS). The advantages and limitations of passive sampling will be discussed, including aspects related to the science of passive sampling itself, technical aspects (e.g., deployment options or hardware construction for challenging sites), and regulatory acceptance. Finally, real-life examples of applications of passive samplers to problems such as source tracking, site assessment, cap effectiveness monitoring, bioavailability/food chain modeling, and long-term monitoring will be presented.

Quantifying Aqueous Concentrations in Direct Contact with NAPL-Containing Sediment Using Porous Ceramic Samplers

Instructors: Michael Gefell (Anchor QEA, LLC), Masa Kanematsu (Anchor QEA, LLC), and Dimitri Vlassopoulos (Anchor QEA, LLC)

Tuesday, January 10
2:40-3:05 p.m.

Wednesday, January 11
2:40-3:05 p.m.

Objective: Learn the applicable theory and multiple "hands-on" methods to use hydrophilic, porous ceramic samplers to collect representative aqueous samples in sediments containing non-aqueous-phase liquids (NAPLs), including lessons learned at several field sites. This Learning Lab will be useful for anyone involved in characterizing sites with NAPL in sediment.

Description: Ecological risk from contaminated sediments is often driven by dissolved contaminant concentrations in sediment porewater, which directly influence remedy selection, design, and performance evaluation. Where present in sediment, NAPLs can interfere with—and result in extreme overestimates of—dissolved organic chemical concentrations. Sampling devices that collect "whole-water" samples such as Trident, push point samplers, and short-screen monitoring wells can inadvertently entrain NAPLs in water samples. Passive sampling devices such as solid-phase microextraction (SPME) fibers and polyethylene samplers are hydrophobic and can become fouled by NAPLs, imparting significant contaminant mass that is not from the dissolved phase. Anchor QEA developed multiple new porewater sampling methods that use hydrophilic, porous ceramic tubes to exclude NAPL entry while collecting aqueous-phase samples in sediment via pumping or diffusion-based equilibration. Micron-size ceramic pores have NAPL entry pressures well above capillary pressures that can exist in shallow sediment. However, the high porosity allows chemical concentrations in water inside the sampler to equilibrate with surrounding sediment porewater within a reasonable timeframe via diffusion. Representative porewater samples can also be collected by pumping, using the porous ceramic as a NAPL exclusion barrier. This demonstration will present theory, multiple water sampling methods involving porous ceramics, and lessons learned from several field sites where ceramic samplers have been successfully used to collect representative porewater and groundwater samples in direct contact with NAPL—by passive diffusion and/or active pumping—with no NAPL or sheen in the resulting aqueous samples.

Modeling Propeller Wash-Induced Sediment Transport Using EFDC+

Instructors: Paul Craig (DSI, LLC), and Jeffrey Jung (DSI, LLC)

Tuesday, January 10
3:30-3:55 p.m.

Wednesday, January 11
9:40-10:05 a.m.

Objective: This Learning Lab will demonstrate modeling propeller wash-induced sediment transport using Environmental Fluid Dynamics Code Plus (EFDC+). With materials provided in this Learning Lab, attendees will be able to (1) build a propeller wash model using Automatic Identification System (AIS) vessel tracking data and (2) analyze the model results using post-processing tools (e.g., map visualization, animation, time series plot).

Description: Propeller wash is the high-velocity jet flow generated behind a rotating propeller. In areas of substantial vessel traffic, sediment bed materials can be resuspended and redistributed by the propeller wash, which may significantly impact aquatic ecosystems at contaminated sediment sites. The propeller wash has also been identified as the primary cause of scour around quay structures; such scour may result in structural instability or even failure. Computational modeling of flow and sediment transport patterns induced by propeller wash will benefit researchers, engineers, and regulators in contaminant remediation planning, engineered channel designing, and long-term port management. Environmental Fluid Dynamics Code Plus (EFDC+) offers a dynamically-linked simulation of hydrodynamics, sediment transport, and propeller wash incorporating vessel traffic data. This session will briefly introduce theoretical and algorithmic concepts applied to the EFDC+ propeller wash simulation and demonstrate propeller wash model development using the EFDC+ Explorer Modeling System (EEMS) software with vessel tracking data. A one-month free license of the EEMS software and hands-on practice materials will be provided to the attendees.

First Utilization of Computational Fluid Dynamics (CFD) Technology for High Performance Environmental Dredging

Instructor: John Lally (Lally Consulting, LLC)

Tuesday, January 10
4:20-4:45 a.m.

Wednesday, January 11
3:30-3:55 p.m.

Objective: The objective of this course is to share a breakthrough development in advancing sediment remediation performance—a new 3-D computational fluid dynamics (CFD) model system capable of accurately simulating the complex interactions of dredging tools and other marine remediation equipment with the seabed. The audience that would benefit from this demonstration potentially includes parties interested in achieving more efficient sediment removal actions including project owners, regulators, remediation engineers and scientists, contractors, and equipment manufacturers.

Description: Beginning with projects at Bayou Bonfouca and New Bedford Harbor Superfund Sites in the 1990s, precision mechanical (excavator) dredges integrating real-time kinematic global positioning system (RTK-GPS) and electronic dredge and bucket positioning systems (DBPS) have become the preferred means of contaminated sediment removal in North America. Adopting the methods from these two projects, precision excavator dredging with sealed, level-cut clamshell buckets and correlative dredge prisms have since been applied at most USEPA Superfund sediment remediation sites, including New Bedford Harbor, Hudson River, Commencement Bay / Nearshore Tideflats, Passaic River, Gowanus Canal, Newtown Creek, Lower Duwamish Waterway, Portland Harbor and other sites. The principal benefits of precision mechanical dredging; accurate removal of contaminated inventory with minimal overdredge into clean substrate; reduced process water volumes, contaminant release and residuals; and increased production rates across a range of materials, are well proven. Performance can vary, however, and as with all sediment removal technologies, opportunities remain for greater cleanup efficiency in the context of improved project formulation, equipment design and construction practices. With ongoing advancement of precision dredge capabilities, project engineering and implementation since the 1990s, Lally EC has established an experience-based research and development program to foster next-level sediment remediation performance. Heavily influencing the key metrics of production, residuals, and cleanup efficiency, but unseen and unexplored, an ongoing effort has been to develop an understanding of the complex interactions of operating environmental dredging tools with the seabed. After much work, Lally EC has developed a high-resolution CFD modeling system to accurately simulate dredge tool and seabed interactions. Model runs yield a greater understanding of pressure and flow regimes inside and outside the tool, sediment release and transport (residuals), and other physical data having impact on environmental dredging performance. These initial results and model utilities will be shared with the Learning Lab audience.

Digital Data Collection with QNOPY

Instructor: Emily Dryden (QNOPY)

Tuesday, January 10
5:10-5:35 p.m.

Wednesday, January 11
8:50-9:15 a.m.

Objective: Field personnel and project managers will learn how to harness cutting edge mobile and cloud technology to add efficiency to environmental projects through digital data collection.

Description: As the industry shifts towards the complete digitization of projects, the use of mobile data collection and cloud technology has become critical. QNOPY is a cutting edge mobile and cloud technology that streamlines field data collection and delivery for the environmental industry. With a mobile app for field data collection and a web portal for reporting, QNOPY eliminates time used for data transcription. Digital field forms allow for cleaner data collection, minimizing errors and typos while improving consistency across team members. The platform uses geospatial data combined with intuitive visualization to provide better insights into project data. The demonstration will run through a real life example of digital data collection and show each step: collecting data in the mobile app with a relevant field form (e.g., sediment sampling, groundwater sampling, soil sampling, etc), submitting data, viewing data in the web portal, and exporting reports as PDFs, excels, database EDDs, etc. Participants will be able to follow along and try out the app on their own. Field personnel will learn how to collect and upload data straight from the field, eliminating post field work data management, while project managers will learn how to instantly view data and export formatted, client-ready reports. By the end of the presentation, attendees will understand how to customize and use digital field forms to optimize time in the field and streamline reporting to align with their clients' needs.

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AECOM is a premier, fully integrated infrastructure and support services firm with a leading sediment management and remediation practice. Our scientists and engineers work on a wide variety of development, cleanup, and restoration projects, including some of the most complex sediment management problems. Our expertise includes sediment site assessment under a variety of regulatory programs, strategic Superfund consulting, dredging and dredged material disposal programs, restoration of water bodies and watersheds, shoreline and site development, natural resource damage assessment support, risk analysis, and design and implementation of complex remediation projects. AECOM has been a key participant in technical consortia (including the Sediment Management Workgroup and the Sustainable Remediation Forum) involving private industry, utility companies, and government organizations. We are playing a leadership role on a number of complex ecological restoration programs in North and South America, Asia, and Australia. Ranked the #1 in Environmental Engineering/Design by Engineering News Record, AECOM works around the globe and in your local neighborhood. We connect knowledge and experience across our global expert network to solve our clients' most complex challenges. A Fortune 500 firm, AECOM has 47,000 employees and revenue of approximately $13.3 billion during fiscal year 2021. **aecom.com**

Anchor QEA is an environmental consulting firm that specializes in all aspects of contaminated sediment cleanup as well as aquatic, shoreline, and water resource projects, including coastal engineering and flood risk management. We have a reputation for collaborating with project partners to successfully and cost-effectively meet remedial goals at even the most challenging sites. Our multidisciplinary teams work alongside clients to strategically formulate, design, and implement solutions to assess, remediate, restore, redevelop, and improve the resiliency of communities. We integrate climate change and other investment liabilities when developing sound engineering solutions; navigate multi-faceted regulatory approval processes, including challenges encountered during remedial design; and implement an efficient procurement process and optimal program management approaches. We embrace environmental, social, and governance elements while passionately solving our clients' challenges with integrity and unmatched service. **anchorqea.com**

AquaBlok Ltd. supplies a full range of materials that provide engineers with options to implement lower cost and more protective contaminated sediment remediation solutions. Treatment/amendment materials are supplied under the AquaGate name and our low-permeability thin capping materials in all forms are called AquaBlok. Solutions for PFAS contamination in soil, groundwater and surface water are also offered. Key benefits of AquaGate and AquaBlok products include; extensive quality control and assurance of material supplied, the use of high-performance powder materials (higher adsorption than granular materials), uniform mixing and documented placement with sand or other materials and finally, the confidence that comes with a history of successful project applications. **aquablok.com**

Arcadis is the world's leading company delivering sustainable design, engineering, and consultancy solutions for natural and built assets. We are more than 29,000 people, in over 70 countries, dedicated to improving quality of life. **arcadis.com**

CDM Smith is a privately owned engineering and construction firm providing legendary client service and smart solutions in sediments, water, environment, transportation, energy and facilities. Passionate about our work and invested in each other, we are inspired to think and driven to solve the world's environmental and infrastructure challenges. A national leader in environmental remediation, CDM Smith has completed more than 100 sediment projects across the United States for industrial and public sector clients. CDM Smith's services for contaminated sediment remediation span the entire project life cycle, from characterization and assessment of sediments, surface water, and biota, through the selection, design and construction of sediment cleanups. **cdmsmith.com**

EA's scientists, geologists, engineers, and technical experts work collaboratively to assess sediment management challenges, apply today's most advanced technologies, and provide cost-effective and sustainable project designs and solutions. Our goal is to develop contaminated sediment remedies that are technically sound and defensible, achieve client objectives, satisfy regulatory goals, and benefit local business and residential communities and the environment. Over the past 20 years, EA has completed more than $200 million in contaminated sediment investigation, design, and construction oversight under CERCLA, RCRA, and the Great Lakes Legacy Act. Our scientists and engineers have provided remedies for more than 1.3 million cubic yards of contaminated sediment for multiple EPA regions, state environmental agencies, and private entities. Our project teams have demonstrated experience addressing the unique challenges associated with characterization and remediation of contaminated sediment sites in lakes, streams, rivers, estuaries, and wetland environments. Today, EA is a 100% employee-owned public benefit corporation with an industry-leading Corporate Social Responsibility program and a culture embedded in the values of openness, prudence, balance, and challenge. The company employs more than 575 professionals through a network of commercial offices. Founded in 1973, EA has earned an outstanding reputation for technical expertise, responsive service, and judicious use of client resources. **eaest.com**

For more than 80 years, Foth has been combining science, engineering, and technology with a true collaborative spirit to deliver innovative solutions to our clients' toughest challenges. Our history has been shaped by the evolving needs of our clients – expanding our services, locations, and membership to provide client-centered service. While the challenges we solve and the way in which we solve them have evolved over the years, our commitment to our clients, members, and our communities, as well as our focus on health, safety, and quality, has never wavered. Whether developing and implementing innovative solutions to the management and remediation of contaminated sediment sites or dredging, designing, and constructing marine infrastructure Foth is there to help meet the challenge with sustainable solutions. For each unique solution, we commit to understanding and building trust with stakeholders, and agreeing on the goals, best approach, and appropriate risk levels. Foth's innovative project delivery options provide value where it counts – saving management time and increasing speed to solutions – enabling our clients to focus on customers, stakeholders, and operations. **foth.com**

GEI focuses on strategic, client-centered support for the evaluation and remediation of contaminated sediments sites, large and small. Our integrated team of nationally recognized scientists and engineers excels at developing site-specific practical solutions considering land use, environmental drivers, and regulatory needs to ensure success for our clients. GEI specializes in creating cost-effective solutions that are protective, defensible, and scaled to local conditions and project endpoints. Our extensive project experience includes a broad range of solutions including natural attenuation, ecological restoration, in-situ solidification/stabilization, dredging, capping, ecological risk assessment, NAPL mobility in sediment, expert services and more. GEI is an employee-owned firm with a national reach that consists of more than 1000 dedicated people at 46 offices coast to coast. **geiconsultants.com**

Geosyntec is a consulting and engineering firm that works with private and public sector clients to address new ventures and complex problems involving our environment, natural resources, and civil infrastructure. With a combined staff exceeding 1,850 engineers, scientists, and related technical and project support personnel, we serve our clients from more than 90 offices in the United States, Canada, the United Kingdom, Ireland, Sweden, the United Arab Emirates, and Australia. **geosyntec.com**

Haley & Aldrich Inc. is committed to delivering the value our clients need from their capital, operations, and environmental projects. Our one-team approach allows us to draw from our 800 engineers, scientists, and constructors in 33 offices for creative collaboration and expert perspectives. Since our founding in 1957, we have one goal in all we do: deliver long-term value efficiently, no matter how straightforward or complex the challenge. In 2020, Haley & Aldrich acquired Hart Crowser, an engineering and environmental consultancy with extensive expertise in the Pacific Northwest and recognized for its cutting-edge performance-based seismic design methods. **haleyaldrich.com**

Infrastructure Alternatives, Inc. (IAI) provides Clean Water Solutions for environmental remediation projects. IAI supports contaminated sediment cleanup operations with design, installation and operation of dredged material dewatering and water treatment systems. These systems are sized to handle high production dredge flows and produce clean water for regulations-compliant discharge. Our employee-owned, small business finds innovative solutions and works through challenges, to deliver complex projects, on time and on budget. We specialize in contaminated sediments and NPDES permit compliance, from maintaining waste streams segregation, to conditioning, dewatering, and stabilizing dredged material, and clarifying, filtering and discharging clean water. **iaiwater.com**

J.F. Brennan Company, Inc. (Brennan) is a fourth-generation, family-owned, marine construction firm that specializes in environmental remediation, dam construction, commercial dive, harbor management, and submarine cable services. Working with public and private owners of water-based infrastructure since 1919, Brennan operates throughout coastal and inland waterways nationwide, maintaining a large fleet of marine equipment backed by more than 600 maritime professionals. **jfbrennan.com**

Parsons (NYSE: PSN) is a leading technology firm driving the future of global security, intelligence, and critical infrastructure. By combining unique technologies with deep domain expertise across cybersecurity, missile defense, space, connected infrastructure, and smart cities, we're providing tomorrow's solutions today. With a history of disruption beginning in 1944, we apply our distinct perspective to help our customers confront the issues of tomorrow in every domain—land, sea, air, space, and cyber. Our range of capabilities and our global network of resources lets us layer and integrate solutions to respond to any challenge with unmatched agility. In a time of rapid change, we see infinite sources of inspiration to fuel our creativity and enable the innovation necessary to accomplish our quest of delivering a better world. **parsons.com**

Sediment Solutions LLC is the leading innovator in the use of sediment amendments for in-situ sediment remediation. Our key product, SediMite, offers a low-impact approach for delivering treatment materials to sediment for in-situ remediation. Activated carbon delivered by SediMite is used to treat sediments contaminated with PCBs, mercury, dioxins, furans, PAHs, DDT and other hydrophobic chemicals. Sediment Solutions LLC provides this technology under license from the holders of two US patents and has the exclusive license for the pelletized delivery of activated carbon to sediments. Our three partners combined have nearly a century of experience in the fields of environmental science and engineering focused on risk assessment and sediment remediation. Through collaborations with Government, academic, and industry partners, Sediment Solutions has demonstrated the efficacy of activated carbon in treating contaminated sediments, helping advance the technology into full commercial applications. Sediment Solutions has successfully delivered SediMite for several large sediment projects and looks forward to provide the unique technology at other sites. We also continue pursue additional development opportunities to advance the evaluation and remediation of contaminated sediments, including the use of passive sampling devices and the use of tailored sediment amendments. **sedimite.com**

Sevenson Environmental is a national leader in remedial construction and environmental dredging. The company has been actively involved in site remediation and restoration since 1979 when we were selected as the principal contractor at the Love Canal site in Niagara Falls, NY. For more than 40 years Sevenson has successfully worked with Federal, State, and local government, and with private clients to address challenging sediment design and construction issues for remedial projects. **sevenson.com**

Tetra Tech is a leading, global provider of consulting and engineering services. We are differentiated by Leading with Science® to provide innovative technical solutions to our clients. We support global commercial and government clients focused on water, environment, sustainable infrastructure, renewable energy, and international development. Tetra Tech provides clear solutions to complex problems. Tetra Tech has offices and operational infrastructure throughout the United States, Canada, and abroad. With 21,000 associates in more than 450 offices in more than 120 countries on seven continents, Tetra Tech's technical knowledge and hands-on site work is broad and deep. Our staff is supported by a uniform administrative and management system that project teams can access immediately to ensure work is completed effectively. Tetra Tech is a global leader in providing engineering and technical services. The company is acknowledged for its cutting-edge expertise in sophisticated environmental analysis, modeling, and design and for delivering this expertise effectively across an entire project life cycle. **tetratech.com**

WSP USA is the U.S. operating company of WSP, one of the world's leading engineering and professional services firms. Dedicated to serving local communities, we are engineers, planners, technical experts, strategic advisors and construction management professionals. WSP USA designs lasting solutions in the buildings, transportation, energy, water and environment markets. With more than 12,000 employees in over 200 offices across the U.S., we partner with our clients to help communities prosper. **wsp.com**

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MONDAY, January 9 7:00-8:00 a.m. —Morning Course Check-In 12:00-1:00 p.m. —Afternoon Course Check-In 12:30-2:30 p.m. —Career Roundtable 2:00-8:30 p.m. —Conference Registration Open 3:00-5:00 p.m. —Career KickStarter	**TUESDAY, January 10** 7:00 a.m.-7:00 p.m.—Registration, Exhibits, Poster Group 1 Display 7:00-8:00 a.m.—Breakfast 9:30-10:15 a.m.—AM Beverage Break 11:30 a.m.-1:00 p.m.—Lunch 3:00-3:45 p.m.—PM Beverage Break	**WEDNESDAY, January 11** 7:00 a.m.-7:00 p.m.—Registration, Exhibits, Poster Group 2 Display 7:00-8:00 a.m.—Breakfast 9:30-10:15 a.m.—AM Beverage Break 11:30 a.m.-1:00 p.m.—Lunch 3:00-3:45 p.m.—PM Beverage Break	**THURSDAY, January 12** 7:00 a.m.-4:00 p.m.—Registration, Exhibits, Poster Group 2 Display 7:00-8:00 a.m. —Breakfast 9:30-10:15 a.m.—AM Beverage Break 11:30 a.m.-1:00 p.m.—Lunch 2:40-3:00—Closing Panel Refreshments
8:00 a.m.-5:00 p.m. Short Courses	**8:00 a.m.-5:35 p.m. Platform Sessions**	**8:00 a.m.-5:35 p.m. Platform Sessions**	**8:00 a.m.-2:40 p.m. Platform Sessions**
See pages 48-52 for short course descriptions. **8:00 a.m.-5:00 p.m. (all-day)** • Evaluating Sediment Transport: Best Practices, Tools, Techniques, and Application to Site Management **8:00 a.m.-12:00 noon (half-day)** • *Capping Design: The Art of Designing Isolation Layers to Reduce Environmental Risk Associated with Contaminated Sediments • Expanding the Use of In Situ Solidification/ Stabilization to Provide Additional Tools for the Management of Impacted Sediments • Environmental Forensics: Where Did That Contaminant Originate and Is It Degrading? • Per- and Polyfluoroalkyl Substances (PFAS) Site Characterization and Assessment Tools **12:30-2:30 p.m.** • Career Roundtable f **1:00-5:00 p.m. (half-day)** • Dredging 201: Introduction to Sediment Remediation • Application of Activated Carbon to Sediment Remediation: Design to Installation to Monitoring Reactive Capping and In Situ Treatment • Emerging Contaminant: Microplastics and Their Presence in Waterways, Effects and Potential Solutions • Developing Representative Sediment Background Concentrations **3:00-5:00 p.m.** • Career KickStarter **Indicates a "**laptop-required**" course.*	A1. Innovative Characterization and Assessment Approaches A2. Innovative Characterization and Assessment Tools A3. Contaminant Forensics A4. Risk Assessment	A5. Nanomaterials, Microplastics and Other Emerging Contaminants in the Environment A6. Advances in Passive Sampling Methods A7. Application of Passive Samplers A8. Characterization and Remediation of PFAS-Contaminated Sediments	A9. Chemical/Toxicological/Biological Measurements and Monitoring A10. Field Sampling Methods and Techniques A11. Source ID, Loading Assessment, and Control
	PANEL: Will Sediment Caps Last Forever? And How Should We Address the Possibility that They Don't? B1. PFAS Bioavailability, Bioaccumulation, and Risk Assessment B2. Geospatial Data Evaluation and Data Visualization B3. Contaminant Fate and Transport in Sediments	B4. Groundwater/Sediment/Surface Water Interactions B5. Hydrodynamics and Sediment Transport B6. Contaminant Bioavailability and Uptake B7. Ebullition	B8. Advanced Data Analysis and Decision Tools **PANEL:** The Intersection of Environmental Justice and Contaminated Sediment Investigation and Remediation
	C1. NAPL and MGP Sites C2. Restoration and Revitalization Strategies C3. Great Lakes Legacy Act Successes and Challenges C4. Remedial Cleanup Objectives and Approaches for Optimized Remedial Development	C5. Remedy Cost Allocation Considerations and Alternative Financial Models C6. Communication and Facilitation with Stakeholders C7. Site Management Decision Strategies C8. Environmental Justice Considerations in Sediment Projects	C9. Adaptive Management Approaches C10. Determining Background C11. Climate Change, Coastal Adaptation, and Resiliency
	D1. Sustainability: Environmental Metrics, Stakeholder Values, Cost-Benefit D2. Dredging, Dredged Material Dewatering and Disposal Design D3. Monitored Natural Recovery (MNR) and Enhanced MNR **PANEL:** Implementing Adaptive Management at Contaminated Sediment Site	D4. In Situ Treatment Amendments D5. Long-Term Monitoring Strategies D6. Cap Design D7. Cap Modeling	**PANEL:** Beneficial Use of Contaminated Sediments: The Promise and the Challenge D8. Beneficial Use of Contaminated Sediments D9. Sediment Management in the Northwest Region
	E1. Sediment Bioremediation E2. Monitoring and Evaluating Remedy Implementation and Effectiveness E3. Remediation of Ports, Harbors, and Urban Waterways	E4. Lessons Learned in Remedy Implementation E5. Dredging Design and Operations **PANEL:** Cost Drivers for Environmental Dredging and Capping Projects	E6. Habitat Mitigation and Restoration E7. Cap Construction and Operation E8. In Situ Stabilization
5:30-7:00 p.m. Plenary Session **7:00-8:30 p.m. Welcome Reception, Exhibits, Poster Group 1 Display**	**5:45-7:00 p.m. Poster Group 1 Presentations and Reception** **See page 14 for sessions in Poster Group 1.**	**5:45-7:00 p.m. Poster Group 2 Presentations and Reception** **See page 14 for sessions in Poster Group 2**	**3:00 p.m. Closing Panel Discussion** **4:00 p.m. Conference adjourns**

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