

Portland Harbor Superfund Site, Portland, OR

Managing Impacted Sediments Addressing Risk and Assessing Liability



Section 1 About Geosyntec

Section 1

About Geosyntec

Technical Excellence, Teamwork and A Generous Spirit

Recognized for technical project excellence and outstanding growth, Geosyntec excels in working with the private and public sectors on new ventures and complex problems involving the environment, natural resources, and civil infrastructure. Founded in 1983 as a specialized consulting and engineering firm, Geosyntec has a staff of approximately 1,000 engineers, scientists and related technical and project support staff located in 55 offices throughout the United States and select international locations.

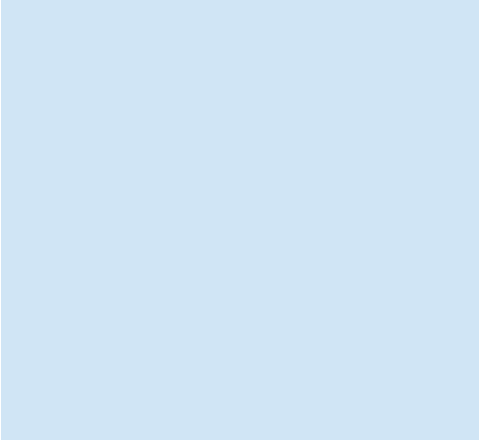
We are internationally known for our technology leadership, broad experience, and exceptional client service. Our professionals continue to develop new technology applications and capabilities that advance the state of the practice. Our applied research partnerships with leading universities, NASA, USEPA, Department of Defense and others are producing better methods for the *in situ* remediation of recalcitrant chemicals in the environment; management of urban watersheds to reduce pollutant loadings; protection of endangered species from the impacts of storm water runoff; design of industrial and municipal waste disposal facilities; and geotechnical and seismic analysis and design of earthen structures and other critical facilities.

Our private sector clients represent a variety of industrial and professional service sectors including chemical, aerospace, oil and gas, mining, pharmaceutical, diversified manufacturing, advanced technology, power and utility, real estate, law and environmental management. Our public sector clients include municipal, state/regional and national governments. We deliver solutions through Geosyntec and our wholly-owned, specialty affiliates: MMI Engineering, SiREM, and GSM Consultancy.



A destination workplace, Geosyntec is a repeat winner of the Pinnacle Award for the dual achievements of business excellence and as an employer of distinction, repeatedly named among the Best Firms to Work For by CE News.

Geosyntec is annually recognized by the Engineering News Record as a top global environmental firm and Zweig White for steady organic growth and profitability.



Geosyntec Practice Areas

Our Sediment Management Practice is among the firm's top tier specialty practices to meet our clients' needs in:

- Environmental studies and remediation
- Natural resources assessment and restoration
- Engineering and design for environmental, water resources, geotechnical, and structural infrastructures
- Safety and risk evaluation, planning, and mitigation

Specific practice areas are as follows:

Environmental Studies and Remediation

- Sediment Assessment and Remediation
- Site Investigation and Remediation
- Groundwater Assessment and Remediation
- Specialized *In situ* Treatment Technologies
- Risk Assessment and Applied Toxicology
- Subsurface Vapor Intrusion to Indoor Air
- Environmental Management Assessment and Systems
- Data Management, Visualization, and Analysis

Infrastructure Engineering and Design

- Industrial Water Supply and Treatment Planning and Design
- Waste Containment Facility Planning and Design
- Brownfields Redevelopment Planning and Design
- Geohazard/Earthquake Characterization and Mitigation
- Geotechnical Infrastructure/Foundation Engineering

Natural Resources Assessment and Restoration

- Watershed and Stormwater Management
- Water and Natural Resources Conservation and Restoration
- Surface Water/Groundwater Supply Studies and Development
- Erosion and Sediment Control

Geosyntec’s North America Office Locations



Geosyntec office locations in North America

United States

Albany	(518) 785-0800	Grand Rapids	(616) 277-1355
Ann Arbor	(734) 332-8004	Greenville	(864) 438-4900
Anchorage	(907)-433-0770	Houston	(281) 920-4601
Atlanta (Kennesaw)	(678) 202-9500	Huntington Beach	(714) 969-0800
Augusta (Maine)	(207) 622-2540	Huntington	(304) 522-0470
Austin	(512) 451-4003	Inland Empire	(951) 682-8576
Baton Rouge	(225) 929-7333	Jacksonville	(904) 858-1818
Boca Raton	(561) 995-0900	Knoxville	(865) 330-0037
Boston	(978) 263-9588	Los Angeles	(310) 957-6100
Brookline	(617) 734-4436	Macon	(478) 328-6181
Cape Canaveral	(321) 269-5880	Manchester	(603) 448-0071
Charlotte	(704) 227-0840	Milwaukee	(262) 377-9828
Chattanooga	(423) 385-2310	Minneapolis	(612) 253-8200
Chicago	(312) 658-0500	New York	(609) 895-1400
Clearwater	(813) 792-4820	Oak Brook	(630) 203-3340
Columbia (Missouri)	(573) 443-4100	Oakland	(510) 836-3034
Columbus	(614) 468-0415	Orlando	(407) 321-7030
Corporate Enterprise Center (Atlanta)	(404) 267-1101	Pasadena	(626) 449-0664
Denver South (Main Office)	(303) 790-1340	Pensacola	(850) 477-6547
Denver	(720) 494-2600	Philadelphia	(267) 464-2800
		Phoenix	(602) 513-5812

Offices in over 55 Principal Cities of the United States and Select International Locations

Portland	(503) 222-9518
Princeton	(609) 895-1400
Raleigh	(919) 870-0576
Richmond	(804) 767-2206
Sacramento	(916) 637-8048
San Diego/Old Town	(619) 297-1530
San Diego	(858) 674-6559
San Francisco	(415) 678-1988
Santa Barbara	(805) 897-3800
Seattle	(206) 496-1450
St. Louis	(636) 681-1372
Tampa	(813) 558-0990
Vero Beach	(772) 564-8717
Washington DC (Columbia)	(410) 381-4333
White Plains	(914) 705-4530

Canada

Kingston	(613) 542-0228
Toronto (Guelph)	(519) 822-2230



Section 2 Qualifications Overview



Section 2

Qualifications Overview

Offering a broad range of sediment management capabilities, Geosyntec specializes in designing and implementing remedies for sites with contaminated sediments and surface waters. We provide comprehensive and value-added solutions to the management of marine, estuarine, and riverine systems where sediments have been impacted by contaminants from multiple sources.

The expertise of our 1,000-member engineering and scientific staff in over 55 offices around the world brings together the resources to meet and resolve the most complex sediment projects. Geosyntec has extensive experience with all aspects of sediment site management including the following: remedial investigations, risk assessment, laboratory treatability and pilot testing, feasibility studies, remedy design, regulatory negotiations, and remedy implementation. We conduct these activities with the ultimate goal of developing a remedy that will provide risk reduction with minimal disruption and costs. We have experience in evaluating the overall environmental impacts of different remedies and conducting sustainability assessments as a key component in the evaluation of different remedies.

Assessing True Risk and Delivering Cost-Effective Solutions

Providing customized strategies, personal service, and consistently excellent results, we produce solutions that are practical, readily accepted by regulators, economically efficient and sustainable. Applying our significant experience in remedial investigations and feasibility studies (RI/FS) and rigorous risk assessment approach to projects, we excel in addressing the true risk to develop the appropriate remedial alternatives. At Geosyntec, we look beyond the conservative default assumptions to help identify realistic, cost-effective remedies. We work effectively with clients to help minimize long-term remediation cost exposure while sustaining productive relationships with regulators and other stakeholders.

Succeeding with Project Regulatory Matters

The complexity of sediment sites and the need to focus on risk requires specialized knowledge, experience with state and federal regulations, and effective working relationships with regulators. Our excellent regulatory relationships are a benefit to the success of our clients' projects. Nationwide, Geosyntec is well known to regulators because of our notable project work and development of guidance documents for USEPA, Federal Highway Administration, and other government and research organizations, including manuals on Monitored Natural Attenuation, Design of RCRA/CERCLA Final Cover Systems, Bioremediation, and urban, industrial and highway runoff stormwater monitoring, management and treatment.



Assessing Liability and Supporting Client Litigation

As a trusted technical resource, we work directly with legal counsel, providing sediment-related strategic technical support to assess potential liabilities and cost allocation. We provide RI/FS services that often include identifying possible contaminant sources, quantifying source contribution, and evaluating contribution assessments. Geosyntec also provides expertise in environmental management, compliance enforcement, toxic tort, and other litigation.

Managing Site Complexities

Sediment sites present complex challenges. Geosyntec offers the knowledge and experience of some of the nation's leading experts on site assessment methods and remediation technologies applicable to impacted sediments. Fostering innovation, our multidisciplinary approach brings together nationally recognized in-house specialists in engineering, ecology, water quality, risk assessment, applied toxicology, and geoenvironmental sciences to address the complex issues associated with sediment management.

Our Sediment Management Practice Group specializes in site characterization, engineering design, and construction-related services for remedial actions and site development.

Our practice area includes the following services:

- 1) site characterization
- 2) biological assessment and monitoring
- 3) risk assessment and National Resource Damage Assessment (NRDA)
- 4) feasibility/treatability studies and engineering design
- 5) permitting and regulatory support
- 6) geotechnical engineering
- 7) construction services, and
- 8) litigation support.

By combining technology leadership, customized strategies and personalized client service, we deliver consistently excellent results.

Approaching Remedial Projects Strategically

Having performed over 10,000 projects worldwide including some of the most challenging remediation projects in the U.S., our collective experience has shown that no one remedial approach is necessarily the most cost-effective and does not necessarily address the actual risk. At Geosyntec, we specialize in comprehensive remedial planning and negotiation, and develop a mitigation strategy through a combination of measures.

Representative Project Challenges

Geosyntec's innovative methods and strategies account for project success in the following areas:

- Streamlining removals to position properties for redevelopment
- Minimizing long-term cost exposure through alternative remedies
- Assessing actual risk levels
- Allocating costs and supporting client litigation
- Designing facilities for operational cost savings



Section 3 Sediment Management Services



Section 3

Sediment Management Services

Our sediment management practice's assessment, design, and remediation expertise has been utilized by Fortune 100 companies and government agencies on complex sites across the U.S. and in international locations. With proven technical capability in all aspects of sediment programs, Geosyntec offers clients the benefit of its comprehensive experience and core services to expedite the solution.

Service Areas

- **Site Characterization**
- **Biological Assessment and Monitoring**
- **Risk Assessment and NRDA**
- **Feasibility/Treatability Studies and Engineering Design**
- **Permitting and Regulatory Support**
- **Geotechnical Engineering**
- **Construction Services**
- **Litigation Support**

Site Characterization

Understanding your site is the first step

Sediment sites pose unique management challenges due to the breadth and complexity of sources, pathways and receptors. Sources may include discharge points, non-point sources, and groundwater/surface water interaction; pathways may include surface water, groundwater seepage, and biological uptake; and receptors involve human health and sensitive ecological species. The sheer scale of sediment sites compounds each of these factors.

The first step in managing complex sediment sites is a sound program of site characterization and Conceptual Site Model (CSM) development. We characterize not for the sake of science, but instead to specifically focus on (i) the characterization of relevant risk scenarios that are driven by site conditions as opposed to regional conditions, (ii) the identification of remedial needs for these scenarios, and (iii) the informed analysis of viable management alternatives.

Site characterization is rooted in the understanding of the site-specific physical, chemical and biological interactions that occur at a sediment site. At each stage in the process, we weigh the relevance of each data collection endeavor to determine a final management strategy. Prior to data collection activities, we perform a desktop review to better understand the physical



We have significant experience in the characterization of sites ranging from small creeks to large lakes, rivers and harbor systems where sediments have been impacted by a wide range of contaminants from multiple sources. These include heavy metals, crude oil and refined petroleum compounds, polynuclear aromatic hydrocarbons, pesticides, and PCBs.

Biological Monitoring Services

- Fish tissue collection for analysis of chemicals of concern
- Fish population and macroinvertebrate/plankton community studies
- Sediment infaunal invertebrate studies
- Habitat inventory and assessment
- Sediment and water quality toxicity testing
- Ecological risk assessment
- Natural Resource Damage Assessment
- National Environmental Policy Act (NEPA) – Environmental Impact Statements
- Fish kill investigations
- Sediment sampling and mapping
- Clean Water Act (CWA) Section 404 wetland permitting
- CWA Section 401 water quality certification
- Threatened and endangered species surveys and Section 7 consultation
- Stream relocation, permitting, engineering design, and construction oversight
- Complete inventory of boats and sampling equipment and established relationships with leading sampling support providers
- Data management, GIS, and GPS locating for sampling accuracy and year-over-year comparison capabilities

setting, including the hydrodynamic conditions, of the site; the constituents that would be expected to stem from both site and regional sources; and the human and ecological receptors of greatest likely interest. Our proposed studies include comparisons to regional conditions to place site impacts in the context of regional stressors that typically prevail in industrialized corridors.

Geosyntec characterizes the physical system through our in-house hydrodynamic characterization skills and equipment (Acoustic Doppler Current Profiling and water quality logging), specialized groundwater-surface water interaction toolkit, customized sampling methods for sediment geochronology, and our extensive skill set in computational fluid dynamics (CFD) modeling of both hydrodynamics and sediment transport. With a sound physical model, we can evaluate the stability of site conditions and the implications for future transport potential for site constituents. We characterize the chemical setting through a full suite of analytical sampling expertise, including biologically active zone and deep sediment coring, automated and manual surface water monitoring, groundwater flux evaluations, passive and active sediment pore water sampling, and biological residue sampling of benthic macroinvertebrates, insects, and fish tissue. Our chemical characterization also addresses critical geochemical factors, such as nutrients, redox conditions, and organic carbon degradability, so that we can explain not just what chemicals are there but also their significance and environmental fate. Lastly, we develop an understanding of the biological setting through habitat surveys, fish community studies, and specialized studies of watershed human use. This is the last critical piece in the puzzle of understanding the significance of site constituents to potential receptors.

Biological Assessment and Monitoring *Addressing the ecological endpoints*

Geosyntec's biological assessment and monitoring creates an accurate picture of the affected environment. Our services provide a reliable evaluation of the health of streams, rivers, lakes, and ocean environments and can offer a less expensive alternative to complex chemical testing programs. Geosyntec's team supplies a high degree of experience that can evaluate the ecological health of a given environment and show how organisms integrate the effects of varied stressors at your site over time. This means Geosyntec can characterize the long-term ecological issues and the status of highly valued biological communities. By examining a variety of species, their life stages, their survival, and their health, Geosyntec can decipher the complex relationships among habitat, bioregion, and ultimately water and sediment quality.

Geosyntec has experienced biologists who efficiently conduct fish and invertebrate collection for both site investigations and NPDES-permit compliance. We partner with industry-leading laboratories to perform sample analyses, compile all metric scores and data in a project database, and utilize Geographic Information Systems (GIS) capabilities to define spatial relationships and ensure data consistency and comparability.

For more than a dozen clients, Geosyntec has monitored the concentrations of chemicals found in fish tissue over a period of many years. Often, the fish community is exposed to chemicals via direct or indirect uptake from contaminated sediments. By monitoring the fish tissue concentrations over time, the effectiveness of a sediment remedy can be evaluated. Additionally, biota-sediment accumulation models can be developed and refined to support informed management decisions. This has been used for both active remedies (e.g., dredging) and passive remedies (e.g., MNR). These monitoring data provide our clients and the regulatory agencies with an accurate picture of the affected environment.

Risk Assessment and Natural Resource Damage Assessment

Clearing away assumptions and uncertainties with solid analysis

Sediment sites present complex challenges. By developing realistic estimates of risk, the uncertainty and conservatism of cleanup levels are reduced, resulting in more cost-effective remedial solutions. Our collective experience in sediment sites has shown that a “removal first” approach to addressing these sites is not always cost-effective, has often failed to address the actual risk from impacted sediments, and may ultimately result in more ecological harm to the environment. Geosyntec’s approach is to identify the risk and develop an adaptive management strategy to address this risk through a combination of monitored natural recovery (MNR), removal, capping, and institutional control measures.

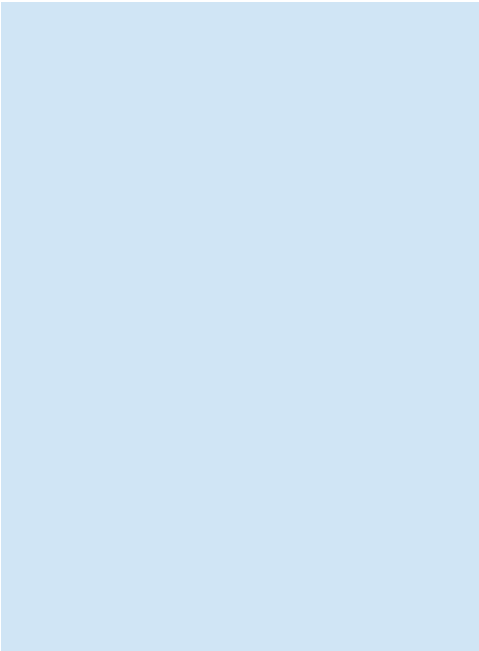
We also recognize the importance of restoration in addressing remedial impacts as well as providing value through the Natural Resource Damage Assessment (NRDA) process. This comprehensive approach provides a cost-effective solution and addresses the true risk, thereby resulting in effective remediation.

The complexity of these sites, and the need to focus on risk both to support investigation and selection of remedial methods as well as potential NRDA claims, requires an excellent technical reputation and working relationship with regulators. While USEPA’s mandate is to focus on risk mitigation, at the local level it is often a challenge to build the consensus for innovative remedies. Geosyntec personnel have the experience necessary to work with state regulators and the USEPA to develop logical and effective remedial approaches that cost-effectively and efficiently



Our Approach to Risk Assessment and NRDA

- Integration of the project’s investigation and remediation phases to ensure a pragmatic, risk-based approach
- Hands-on understanding of NRDA that addresses potential restoration opportunities during the remedial alternative evaluation phase
- The ability to tackle both common and emerging risk drivers, including microbial and radiological effects, chemicals, metals (lead, arsenic, etc.), and PAHs
- Expert capabilities that can address chemical-specific toxicological analyses for chemicals lacking regulatory values
- Conducting site-specific, multimedia risk assessments and developing site-specific cleanup target levels
- Evaluating less common exposure pathways critical to sediment evaluations such as recreational and angler exposures for humans
- Experienced practitioners that regularly conduct ecological risk assessments for both terrestrial and aquatic habitats, including extensive experience evaluating potential impacts to threatened and endangered species
- Characterizing ambient sediment and water concentrations in a water body; statistical and forensic evaluation of natural and anthropogenic chemical sources



mitigate current and future site risk. Our experience allows us to approach sediment sites with a proven approach that is acceptable to regulators.

Our experience in sediment site characterization provides our practitioners with a better understanding of the exposure potential in sediment environments, resulting in a more accurate characterization of potential risks.

Feasibility/Treatability Studies and Engineering Design *Defining the best solution to your sediment problems*

Geosyntec recognizes the environmental complexities and processes associated with sediment remediation, and we develop feasibility studies that are based on the unique, site-specific factors that need to be taken into account for successful remedy evaluation and implementation. We apply our expertise in the physical, biological, and chemical characterization of sediments, upland watersheds, surface waters, marshes, and biota to assess potential risks to ecological systems and human health; we evaluate remedies that meet the client and regulatory objectives for remediation and restoration. Our feasibility study experience spans a broad geographic range, including the east and west U.S. coasts, U.S. interior, and Australia, as well as estuarine, riverine, and lacustrine settings. Geosyntec feasibility study documents have addressed a range of contaminants, including mercury and other metals, PCBs, PAHs, and VOCs. The more complex feasibility study efforts performed by Geosyntec staff have included multiple alternatives addressing as many as eight sediment management units at one time. We maintain close relationships with university researchers and have on staff personnel experienced with U.S. Army Corps of Engineers to guide project strategy and provide peer review support.

Relatedly, Geosyntec has operated a treatability laboratory for over a decade. The results of site specific treatability studies provide important data to help our clients and Geosyntec design engineers better understand

physical, chemical, and biological processes that can help mitigate potential risks associated with chemicals in the environment, and advance remedy design. These studies are critical for understanding and demonstrating attenuation processes that can occur in sediment if: 1) natural conditions are maintained; 2) cap material is placed on top of sediment; or 3) enhancements are added to the sediment or cap material. Laboratory treatability testing can be used to screen a variety of different amendments to determine their ability to degrade or sequester contaminants and to provide site-specific data to support the design of full-scale remedies, or the design of larger-scale field mesocosms or pilot tests.

Treatability studies are often a critical component in feasibility evaluations of different sediment management approaches. Lab testing can assess natural and enhanced processes including: 1) biological transformations such as methylation of mercury and biodegradation of organic contaminants; 2) adsorption of contaminants on activated carbon amendments or natural organic matter; 3) precipitation of metals and other sequestration processes; and 4) redox shifts following sediment manipulation. Laboratory treatability testing can provide key analytical data on the impact of natural processes and amendments on the speciation of contaminants (such as total mercury versus methyl mercury), porewater concentrations of contaminants, total concentrations in sediments, and the uptake of contaminants in specific biota.

Geosyntec has demonstrated that laboratory treatability testing provides a scientific basis for the selection of a sediment remedy, and provides a means of reducing management costs by allowing for an optimal design that targets contaminants in the most effective manner possible.

Our experienced microbiologists, geochemists, marine biologists, and engineers can plan and conduct effective treatability testing programs and interpret and communicate the results to support optimal remedy design. Treatability testing is conducted by SiREM, a division of Geosyntec that is dedicated to providing laboratory services to support the design of effective remedies for challenging environmental problems. SiREM staff work closely with clients to design and conduct appropriate studies that address site-specific needs and challenges and yield the most useful data possible.

Permitting, Compliance and Regulatory Support *Negotiating the best solution and most economical remedy for our clients*

Geosyntec's engineering and environmental permitting teams have in-depth knowledge of federal, state, and local environmental laws and regulations pertaining to sediment management. We work extensively with various regulatory agencies at the federal level such as USEPA, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, as well as both state and local permitting agencies. We excel in keeping our clients' facilities and sites in compliance with the changing regulatory requirements, and we anticipate shifts in policy which could affect compliance, business operations, or strategic new projects.

Treatability Testing Supports Optimal Remediation and Reduces Management Costs

- Evaluating biodegradation of a complex mixture of chemicals in varying sediment conditions, including amendment addition and bioaugmentation
- Demonstrating the ability of an inexpensive reduced iron mineral (siderite) to buffer high-pH porewater upwelling into lake sediment
- Demonstrating the removal of dissolved metals from porewater with iron-based amendments to promote reduction and precipitation of metals
- Evaluating abiotic and biodegradation of chlorinated solvents upwelling into a tidal wetland in the presence of zero-valent iron, electron donor, and a bioaugmentation culture





We have been successful at limiting adverse permitting requirements for our clients and achieving favorable permit conditions by our proactive scientific-based research and data collection, environmental documentation, innovative engineering and one-on-one relationships with the agencies.

Geosyntec's staff has in-depth knowledge and understanding of the following federal and state permitting laws and regulations on sediment management:

- Clean Water Act (CWA) Section 304 (water quality standards), Section 401 (water quality certification), and Section 404 (dredge and fill);
- Section 10 of the Rivers and Harbors Act;
- Essential Fish Habitat Provisions of the Magnuson-Stevens Fisheries and Conservation Act;
- Endangered Species Act (ESA) Section 7 Biological Assessments;
- Marine Protection, Research, and Sanctuary Act;
- Fish and Wildlife Coordination Act;
- National Environmental Policy Act (NEPA) and related state laws;
- Section 106 of the National Historic Preservation Act; and
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA [aka Superfund]) of 1980, and Resource Conservation and Recovery Act (RCRA) of 1976.

With a detailed working knowledge and experience with the laws and regulations listed above, Geosyntec provides the following professional consulting services for our clients:

- CWA Section 10/404/401 permitting (maintenance dredging and/or fill-related projects);
- Federal and State agency consultation and negotiations;
- Wetland delineation and jurisdictional determination support;
- Protected species surveys;
- Water quality sampling and analysis, aquatic chemistry and biological surveys;
- Stream, wetland, and salt marsh mitigation assessment, design and permitting;
- NPDES and Land Disturbing Activity (LDA) permit applications;
- Sediment and sedimentation analyses;
- Shoreline protection maintenance; and
- Upland confined disposal facility (CDF) dike stability condition and mudline surveys.

Geotechnical Engineering

Stabilizing complex sediment sites

From our practical and research experience, we apply state-of-the-practice engineering design solutions that are tailored to addressing the unique challenges of complex sediment sites. We apply our expertise in geotechnical engineering design as part of sediment monitoring, containment, or removal remedies at subaqueous and upland sites to achieve measurable environmental benefits.

Geosyntec has long been recognized as a leader in the field of soft soil geotechnical design. We have demonstrated experience in site characterization and developing sound engineering solutions for sites with extremely soft foundations. We have applied this expertise to the evaluation of sediment stability in the assessment of capping and dredging. Our work at Onondaga Lake in Syracuse, New York encompassed sediment stability analysis and the design of a sediment consolidation area to hold more than 2.5 million cubic yards of dredged lake sediment containing heavy metals and other contaminants. This design also afforded significant cost savings opportunities.

Our geotechnical engineering professionals focus on difficult and challenging sites where the development of dependable, cost-effective foundations and other geotechnical solutions are critical to the success of the project. Our professionals have responded to the challenges of increasingly unfavorable site conditions such as those typically found in dredge disposal sites and soft sludge disposal sites by developing and applying sophisticated approaches to investigate and characterize sites; analyzing foundation behavior; altering the engineering characteristics of the soil and rock at a specific site through soil improvement; and environmentally remediating sites. Many of our practitioners are versed in the use of sophisticated soil structure interaction finite element models and routinely apply them to solve complex problems.

Geosyntec professionals have a unique combination of an advanced technical background and practical construction experience, which is needed when designing over weak foundations.

Construction Services

Saving time and money

Geosyntec was the first company to offer construction quality assurance (CQA) services for environmental projects in the United States. We have provided construction management or construction oversight on more than 750 projects nationwide, maintaining our position of industry leadership by developing many of the methods, standards, and procedures in use today. Our primary construction service areas include the following:

- Construction management
- Construction oversight
- Resident engineering
- CQA



Geotechnical Engineering Services

- Site investigations and characterizations
- Slope stability analyses and design of containment systems
- Slope stability analyses and design of sediment capping systems
- Confined disposal facility dike design and engineering
- Seismic and liquefaction analyses
- Seepage and consolidation water flow modeling
- Dredging and dewatering evaluations
- Shoring and cutoff wall designs
- Soft soils consolidation/stabilization and staged construction
- Ground improvement techniques
- Geosynthetic reinforcement systems
- Geotechnical instrumentation and monitoring
- Forensic investigations and remedial design



Construction Services:

- Bid document and contract document preparation
- Bid review and contractor selection assistance
- Construction materials submittal review and approval
- Work plan submittal review and approval
- Coordination of requests for information
- Coordination of design changes
- Change Order review, negotiation, and preliminary approval
- Procurement of client-purchased materials
- Schedule management, tracking, and project controls
- Resident field oversight

The technical expertise and reputation of our senior practitioners allows Geosyntec staff to be trusted technical resources for leading law firms throughout the United States.



Each of our senior level construction managers has at least 15 years of technical and practical experience in large-scale containment, environmental remediation, and/or geotechnical construction projects. Our construction personnel resources have served as design managers, construction oversight managers, and program managers on large, complex sediment projects.

Geosyntec has a track record of saving our clients time and money during construction. For example, on one project, when steel prices rose unexpectedly, we saved our client hundreds of thousands of dollars during construction by quickly re-engineering the design from a steel sheetpile cutoff wall to a geomembrane cutoff. On another project, inconsistencies in the construction documents prepared by others had resulted in several potential change orders; Geosyntec negotiated on behalf of our client to reduce the potential costs of the change order claims by over 33%.

Litigation Support Services

Providing the legal community with reliable results

As a trusted technical resource to leading law firms throughout the United States, our professionals provide the specialized expertise necessary for lawyers to counsel their clients and advocate for client interests on a wide range of matters related to environmental management, compliance and enforcement, toxic tort, and general litigation matters. Our staff are valued members of litigation support teams due to our sensitivity to the legal process and our ability to develop strategies that respond to legal, public relations, and business concerns.

We offer comprehensive qualifications and capabilities to address the most challenging problems related to the sediment management practice, including sediment assessment, remediation, and restoration of natural and man-made waterways, marshes and wetland sites. Such sites may be impacted by a wide range of contaminants, including metals, crude oil and refined

petroleum compounds, polynuclear aromatic hydrocarbons, pesticides, and PCBs. As a trusted technical resource for sediment management matters, Geosyntec works directly with legal counsel, providing sediment-related strategic technical support to assess potential liabilities and cost allocation. We provide remedial investigations and feasibility studies that often include identifying possible contaminated sources, quantifying source contribution, and evaluating contribution assessments. Our practitioners are adept at quickly grasping the scope and nuances of key issues and developing sound, defensible, technical insight for clients. Our senior staff includes engineers and scientists who are recognized authorities in their fields.

Our testifying experts prepare Expert Reports and are available to testify both in deposition and at trial. They are familiar with the nuances of civil trials in both State and Federal court. Staff understand that the communication, technical analyses, and supporting materials used in developing the testifying experts' opinions are subject to discovery, which must be carefully considered during the work product preparation.

Geosyntec technical experts also serve as technical consultants to counsel, without being listed as a testifying expert. Our litigation consultants provide privileged and confidential technical analyses, strategy development, and work products for exclusive use by counsel, which is generally not considered discoverable. We maintain strict separation between communication and work produced by testifying experts (discoverable) and litigation consultants (confidential). Geosyntec is often retained prior to the filing of litigation as a confidential litigation consultant to help the plaintiff client develop a case or to assist the defendant client in preparing for the onset of litigation.

Litigation Support Services

- Technical issue valuation
- Technical support during discovery
- Strategy identification and implementation
- Cost estimates in support of litigation
- Cost allocation
- Trial Preparation support services
- Sediment negotiations
- Deposition and trial testimony



We bring recognized expertise in valuing environmental liabilities, investigations, and advanced remediation solutions to the most challenging sites.



Section 4

Experience

Representative Projects

RI/FS at the Berry's Creek Superfund Site

Bergen County, NJ

Geosyntec's work is ongoing at the Berry's Creek Study Area, a sediment "mega site" in the New Jersey Meadowlands, just across the Hudson River from New York City. Berry's Creek is a tidal tributary of the Hackensack River, and with its watershed, encompasses 12 square miles and 22 river miles. The site has been contaminated by various point and non-point sources. The results of Geosyntec's comprehensive RI/FS will be used by USEPA to prepare a Record of Decision. The Berry's Creek Study Area is one of the first in the country to be addressed as an entire watershed, and there is little guidance or precedent for this work. Given the magnitude and complexity of the site, Geosyntec is applying an adaptive site management strategy with three phases of RI/FS. This creative approach provides the flexibility to allow ongoing data collection and interpretation to be used in adjusting the next phase of investigation, rather than rigidly following a pre-determined work scope. Similarly, the RI and FS are interactive and are being conducted in parallel. This ensures that RI field investigations and analyses are focused on providing data that are meaningful to the development of remedial alternatives in the FS. The FS, in turn, informs the RI data needs and scope of any necessary treatability studies. The RI is identifying the nature and extent of contamination in the Berry's Creek watershed and the potential human and ecological risks posed by the contaminants of potential concern (COPCs). The adjacent marshes are included in the study to evaluate the ecological relationships and exchanges of COPCs between these areas.

The scope of work includes the following: characterization of the physical template; development of the water budget and conceptual site model; sediment, surface water, interflow, biota, and hydrodynamic sampling; cultural resource assessment; hydrodynamic and sediment modeling; and a human health and ecological risk assessment. Geosyntec applies rigorous oversight to maintain quality in the large number of analytical samples. The FS is assessing possible remedies that address the identified remedial action objectives within the context of the specific nature of the site (an urbanized environment with large, unused channels) and planned future uses. The FS is built on the site knowledge gained in each phase of the RI, ensuring that the feasibility evaluations reflect risk mitigation needs and are effective for the specific conditions within the Berry's Creek watershed. Few remedies have been attempted in such complex settings, and any remedy must overcome a variety of technical, physical, chemical, and biological challenges. The remedy must mitigate risks to human health and biological receptors, while preserving the inherent stability of the marsh and waterways and preventing the potential for adverse impacts from major physical alterations to the system. Geosyntec's ultimate work product will be a scientifically defensible remedial plan that cost-effectively addresses the potential pathways of human health and ecological risk.



Project Elements

Marsh and waterway Investigation

Adaptive site management

*Remedial investigation/
feasibility study*

Human/ecological risk assessment

Conceptual site model

Treatability studies

Pilot studies

Baseline monitoring

Long term monitoring

Fate and transport/modeling

Hydrodynamic and sediment modeling

Data management and validation

Fish community studies

Food web studies

Marsh invertebrate and insect studies

Benthic toxicity testing





Gowanus Canal Superfund Site Brooklyn, New York

Geosyntec has been retained by National Grid as the prime technical consultant to conduct the remedial design, lead regulatory negotiations related to the design, and provide overall technical direction for this Superfund site located in a canal in a major urban center. The canal is a large, sediment mega-site regulated by EPA Region 2 under CERCLA with an existing Record of Decision (ROD).

The Superfund site is a man-made waterway almost 2 miles long whose construction dates back to the 1860s. The adjacent waterfront is primarily commercial and industrial, and currently includes concrete plants, warehouses, and parking lots. The Site is near several current and planned residential neighborhoods. Multiple manufactured gas plants (MGPs) operated along the Canal dating back to the 18th century. In addition, the canal receives discharges from several combined sewer overflows (CSOs) from local stormwater and wastewater collection systems, and from a variety of permitted and non-permitted point sources.

Project Elements

Strategic Project Optimization

Database integration and management

4-dimensional CSM visualization and modeling

Groundwater modelling

Hydrodynamic and sediment transport modeling

Bulkhead assessment and design
Dredging evaluation and design

Active cap design

Evaluation of NAPL mobility and transport potential

In situ stabilization assessment

Treatability studies

Pilot Studies

Dredged material management and
Regulatory communications and workshops

Permitting

Geotechnical evaluations of dredging and capping

Project controls and scheduling

Geosyntec's role as the primary technical consultant for National Grid has encompassed the following:

- Refining the conceptual site model by compiling several data sources into a single, integrated, and comprehensive data visualization package;
- Developing and implementing pre-design investigations to assess groundwater to surface water discharge, NAPL mobility in the sediments, bulkhead structural integrity, and debris management;
- Leading regulatory interactions on all technical matters;
- Providing project optimization and strategic technical direction for National Grid under dynamic circumstances;
- Overseeing hydrodynamic and sediment transport model refinements; and
- Performing detailed evaluation and preliminary design of remedial components that are described only conceptually in the ROD.

In the nearly one year that Geosyntec has been involved in the project, we have submitted two major deliverables to EPA on behalf of National Grid: a Pre-Design Work Plan (PDWP) and a Remedial Design Work Plan (RDWP). Both the PDWP and the RDWP have over 25 separate work elements that are essential to establishing a remedial design that is constructible, sustainable, cost-effective, and permanent. In addition to the many work elements contained in the two deliverables, Geosyntec has developed or continues to develop:

- Master Project Schedule;
- Real-time cost projections and spend curves for the anticipated lifetime of the project;

- Comprehensive Quality Assurance Project Plan (QAPP) fully compliant with Uniform Federal Policy (UFP);
- Refined and expanded database integrating several data sources into a 4-dimensional visualization of NAPL and COPC distribution in distinct sediment layers; and
- Detailed evaluations and construction recommendations for the geotechnical stability of all potentially impacted bulkheads and similar waterfront structures as part of source control requirements of the ROD.

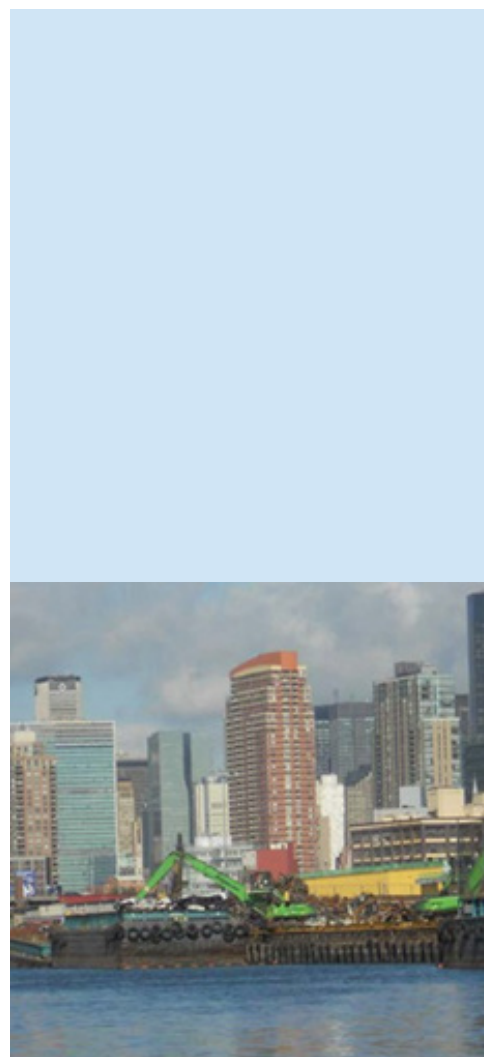
The duration of the remedial design is anticipated to be more than 5 years. As described in Section A of this proposal, Geosyntec is making an unwavering commitment to dedicate its core project team to the Gowanus Canal RD for the duration. We will continue to leverage our experience and expertise in managing sediment mega-sites, geotechnical engineering, design of dredging and capping remedies, and hydrodynamic modeling to provide superior services for the challenging Site on an accelerated schedule.

Newtown Creek Superfund Site Brooklyn, New York

Geosyntec has been retained by National Grid to provide professional engineering services, technical expertise, and creative strategies related to the Newtown Creek Superfund Site for which Grid has been listed as a Potentially Responsible Party (PRP). This Superfund site is a large sediment mega-site, and is regulated by EPA Region 2 under CERCLA. The Site is currently in the RI/FS stage of the CERCLA process, and Geosyntec serves as the primary Technical Consultant for National Grid, directly supporting their efforts as part of the larger PRP group in the development of field investigation programs, data analyses, data interpretation, and development of project and remedial strategies.

The Site is almost 4 miles long and was one of the busiest hubs of industrial activity in the area in the mid-1800s. More than 50 industrial facilities were located along its banks, including oil refineries, petrochemical plants, fertilizer and glue factories, sawmills, and lumber and coal yards. Numerous industrial facilities still operate along the Creek. As a result of the extensive historical industrial activity along the Creek, the Site is currently considered one of the nation's most polluted waterways.

Phase 1 field investigations have been completed, and a Work Plan for the Phase 2 field investigation is currently under development. The Phase 2 RI is expected to be initiated in 2014 and is anticipated to last one year. Major elements of the Phase 2 field effort will include: additional surface water and sediment sampling, sampling of point source discharges (storm sewers, combined sewers, and other discharges), groundwater sampling, sampling and toxicity testing of ecological resources such as fish and crab, and sampling in selected background areas outside of the Site. The completed RI will identify the nature and extent of contamination throughout the Site and the potential human and ecological risks posed by the contaminants of potential concern (COPCs). The FS will then evaluate reasonable remedial alternatives to address the identified risks. Geosyntec is National Grid's technical representative on all aspects of the Phase 2 RI, as well as the future elements of the FS.



Project Elements

Remedial Strategy Development

Remedial Investigations for Contaminated sediment

Hydrodynamic and sediment transport modeling

Data management, validation and visualization

Refinement of Conceptual Site Model (CSM) for contaminant migration



Project Elements

Sediment characterization and remediation

Technical feasibility analysis

Geotechnical performance evaluation

Sediment containment design

Critical regulatory support



Project Elements

Contaminated sediment assessment

Environmental liability valuation

Natural resource damages

Litigation support

Geosyntec is providing extensive technical review and analysis of existing datasets for the Site. We are also evaluating approaches for optimizing future investigations to assure that essential information is collected in a cost-effective, efficient, and safe manner. The benefit of Geosyntec's efforts on behalf of National Grid is expected to be the issuance of a comprehensive RI/FS that will be used by EPA to prepare a Record of Decision that incorporates a well-thought-out, constructible, sustainable, cost-effective, and permanent remedy for the Site.

Onondaga Lake Sediment Remediation

Syracuse, New York

Geosyntec is providing technical expertise and creative strategies to support remediation of Onondaga Lake, a sediment mega-site in upstate New York. The selected remedy combines targeted dredging of more than 2.5 million cubic yards of sediment contaminated with heavy metals and organic contaminants, placement of dredge materials in a sediment consolidation area (SCA), thin layer isolation capping, and monitored natural recovery (MNR). Geosyntec designed an innovative sealed sheet pile barrier wall, nearly 1½ miles long, to cut off migration of contaminated groundwater from an upland site. The barrier wall is essential to limiting sediment recontamination after lake dredging and capping. Geosyntec's extensive geotechnical analyses demonstrated the technical feasibility of constructing an SCA over the soft materials of a former Solvay wastebed. Geosyntec spearheaded stakeholder and regulatory discussions that ultimately allowed the SCA to be considered equivalent in status to a nonmixed waste landfill. This critical strategy eliminated the need for costly subgrade stabilization and gave more design flexibility, resulting in significant construction cost savings.

In addition to the geotechnical engineering support, Geosyntec conducted extensive biodegradation treatability testing to better understand the natural biodegradation of organic contaminants that will take place in the sediment and sediment cap. This information was critical in demonstrating the design of the reactive cap and MNA for the site.

Portland Harbor Superfund Site Studies

Portland, Oregon

Portland Harbor is a 12 mile-long industrial stretch of the Willamette River that has been impacted by multiple sources of contamination from over 100 PRPs. Geosyntec is assessing potential CERCLA Superfund liabilities related to historical shipyard operations, with a focus on impacts to sediment, water quality, and ecological resources. Our work on this complex sediment mega-site will help develop a predictor of potential liabilities and allocation of costs for the potential remediation. We are also assessing natural resource damages (NRD) in the Willamette River, working with legal counsel to evaluate the potential allocation of NRD liabilities and develop the technical case to negotiate with the Natural Resource Trustees. Geosyntec has been leading the evaluation and defensibility

of the Habitat Equivalency Analysis (HEA) and the DSAY credit and debit calculations, as well as evaluation of Trustee-proposed restoration sites based in implementability, cost, scale, and long-term viability for species improvements. Furthermore, Geosyntec developed a three dimensional Environmental Visualization System and Hydrodynamic models to identify and visualize historic and current contaminant sources, transport pathways, and contaminant distribution within sediments to support a contribution analysis from the client's site activities and other potentially responsible parties.

Terry and Dupree Creek Sediment Remediation

Brunswick, GA

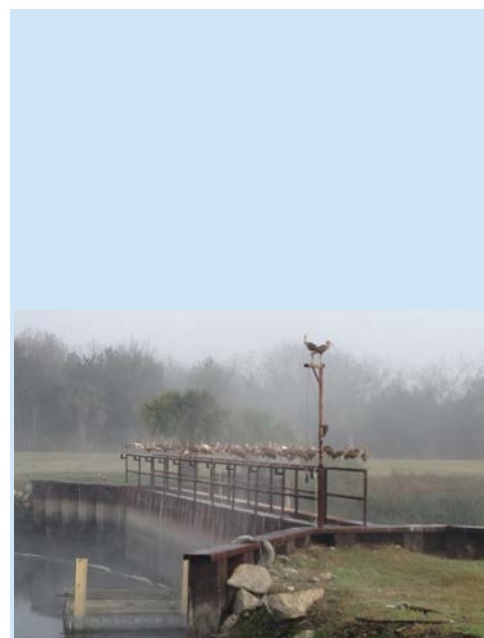
Through detailed site investigation and close delineation of contamination, Geosyntec implemented a streamlined and effective sediment remediation program while safeguarding sensitive receptors along the creeks. The site includes four source areas, three dredge spoil disposal areas (the largest about 70 acres), and an outfall ditch all impacted by toxaphene from years of nearby industrial discharge. Our removal action work plan included sediment excavation and dredging of 35,000 cubic yards, steel sheet pile to delineate and stabilize dredge areas, and sediment dewatering and stabilization for offsite disposal. Geosyntec prepared the bid package and provided construction management, construction quality assurance, and GIS data management services during removal operations. Geosyntec developed customized sampling devices using vacuum extraction and a real-time, statistically-driven tracker of removal goal attainment to guide construction decision-making. Geosyntec continues to provide biannual fish tissue sampling to monitor remedy effectiveness

Hunter River Sediment Remediation

New South Wales, Australia

Geosyntec staff performed engineering, environmental, and regulatory negotiation and permitting services for the Hunter River Sediment Remediation program on a site adjacent to the former BHP Billiton Newcastle Steel Mill. The project encompassed the dredging, treatment, and disposal of 1.5 million cubic yards of sediment, of which 960,000 cubic yards were contaminated with polynuclear aromatic hydrocarbons (PAHs).

The remedial design had five major elements: mechanical dredging using environmental clamshell buckets; landside development for offloading, dewatering, storage, and handling; sediment treatment with cement to stabilize and solidify the PAHs; transport of treated sediments for nearby offsite disposal; and landfill design. The process design included installation of sheet pile walls to stabilize the river bank and prevent contaminant migration to the river.



Project Elements

Site characterization and remediation

Remedial design

Construction management and CQA



Project Elements

Sediment characterization and remediation

Optimization of dredging operations

Sediment treatment design

Stabilization/solidification of contaminated sediments



Project Elements

Site characterization

Sediment transport modeling

*Conceptual site model
development*

Geotechnical stability analysis

Remedial design

Houston Ship Channel Remedial Design

Greens Bayou, Houston, Texas

Greens Bayou, a part of the Houston Ship Channel system, and its tributaries have been contaminated through decades of industrial discharge. Geosyntec initially evaluated the site conditions and dynamics of this complex system. Our comprehensive data review employed advanced geostatistics, environmental chemistry and forensics, and data visualization techniques to construct a geographic information system (GIS). We then created a detailed CSM to characterize soil, sediment, and groundwater conditions and describe site-specific mechanisms for sediment transport and for contaminant transport via groundwater and stormwater runoff. We also conducted extensive geotechnical analyses related to planned remedial dredging of the bayou to evaluate the stability of waterfront structures and a dredge spoil disposal area during and after dredging. Using the CSM, Geosyntec developed practical soil, sediment, and groundwater remediation plans focused on preventing recontamination of the bayou after dredging. Methods included excavation and containment of impacted upland soils, hydraulic containment cutoff walls, groundwater extraction and treatment, and sediment excavation and capping. Our remedial design became part of a court-ordered remedy to restore water quality in the bayou, remediate contaminated sediment, and prevent recontamination of sediment by groundwater.



Project Elements

Site characterization

Geotechnical analysis and design

*Innovative dredged material
management*

*Construction management and
CQA*

Solutions for Navigation and Dredged Material Management

Elba Island, Savannah Harbor, GA

At the Southern Liquid Natural Gas (SLNG) terminal at Elba Island, Geosyntec designed a ship turning basin that involved dredging of 4 million cubic yards of material and placement of 4,500 linear feet of shore protection to control erosion. We also designed subgrade improvement measures for relocation of a dike over soft marsh and dredge spoils. The basin enables Southern Liquefied Natural Gas (SLNG) ships to turn adjacent to their own docks, eliminating the need to go farther into the busy Savannah Harbor. Geosyntec also developed an innovative long-term dredged material management plan, a critical issue for continued operation of the terminal. The plan incorporated dredging quantities based on river sedimentation studies, modeling of the desiccation and consolidation of the dredged sediment, measures to promote dewatering, and a schedule of periodic dike raisings using in-place dredged sediments as fill material. This plan optimizes storage capacity and design life of the confined disposal facility, providing capacity for the next 30 years of operation, and resulted in significant ongoing operational cost savings.

Feasibility Evaluation of a Subaqueous Sediment Cap

Palos Verdes Peninsula, CA

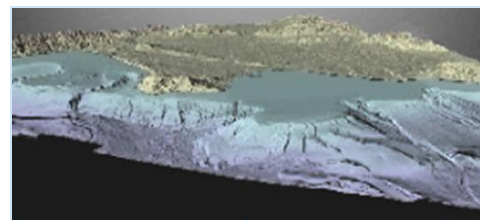
As a result of Geosyntec's risk assessment and the implementation of an alternative method of remediation, a joint defense group saved millions of dollars in addition to meeting their goal of mitigating the impact of DDT and PCB-contaminated ocean floor sediment. USEPA had proposed in situ capping of a 37-square-mile area of the sea floor, 130 to 170 feet deep, off Palos Verdes Peninsula in Southern California. The cap was to be placed by dumping dredged sand or crushed rock from hopper barges. Geosyntec applied technical expertise and experience to evaluate the geotechnical feasibility of the plan. Our scope of evaluations for implementation of the capping remedy included slope stability, consolidation settlement, potential resuspension of impacted sediment, and seismically-induced sediment and cap liquefaction. We also analyzed geotechnical challenges which might occur during the placement process, including the segregation of cap materials, bearing failure of the underlying sediment, turbidity flows, and squeezing of the sediment into the cap. Given the uncertainties associated with construction of the remedy and the potential environmental impacts of its implementation, the team suggested instead the implementation of institutional controls together with monitored natural recovery.

As a result of Geosyntec's detailed evaluation of all of the factors that would make the construction of the cap feasible or infeasible, we were able to convince the regulators involved that a more effective and realistic method of remediation would be "institutional controls" such as a prohibition on fishing in the area. Our scientists and engineers demonstrated effectively that the more intensive and far more expensive capping method of remediation would do more damage than good to the DDT-impacted sediments, habitats, and other surrounding natural communities. Through implementation of the "institutional controls" that Geosyntec recommended, the group was able to save several million dollars in addition to meeting their goal of mitigating the impact of the DDT contaminated sediments.

PCB-Impacted Sediment Remediation

San Diego, CA

The stormwater conveyance system at a former manufacturing site was contaminated by PCB-impacted sediments. Geosyntec delineated the extent of contamination on the surface and within the system, and completely cleaned the system, including appropriate disposal of decontamination wastewater and solids. This remediation minimized the potential for mobilization of the sediments into the nearby bay. Our stormwater pollution prevention plan included installation of BMPs and routine stormwater compliance sampling. Long term monitoring of BMP performance indicated the BMPs performed as designed and were successful at preventing further migration of impacted sediments into the stormwater system.



Project Elements

Sophisticated geotechnical analysis

Seismic hazard evaluation

Technical feasibility evaluation



Project Elements

Delineation of sediment contamination

Decontamination of PCB-impacted sediment

Development of SWPPP



Project Elements

Site characterization

*Finite element, settlement, and
liquefaction analysis*

Levee design

Sediment remediation

Construction management / CQA

Bolsa Chica Wetlands Restoration

Huntington Beach, CA

Geosyntec provided “total project solutions” with a wide range of investigation, technical evaluation and modeling, design, and construction services to support restoration of wetland ecosystems to the Bolsa Chica Lowlands, as well as the engineered systems needed to protect ongoing oil production infrastructure. The site encompasses 1,250 acres of degraded coastal wetland that has been affected by oil field activities for over 80 years. As part of the investigation and remediation phase, Geosyntec planned and implemented remediation of oil-impacted sediments across nearly 1,000 acres. To date, there have been more than 100 individual excavation sites, with excavation volumes of 100 to 10,000 cubic yards, and three excavation crews working simultaneously. Impacted materials consisted of crude oil, refined products, metals and PCBs. Geosyntec oversaw and managed all operations, and developed a unique field database tool to centralize detailed tracking of volumes, progress, and other data. This tool allowed streamlined regulatory reviews; certain areas received closure within days of submitting the site documentation.

The wetlands restoration involved massive amounts of excavation and construction to establish a direct connection with the Pacific Ocean and build full tidal and muted tidal habitats. Geosyntec’s detailed geotechnical and hydrogeological investigations supported the design of levees, tidal basins, culverts, and a 5,000-foot-long subsurface shallow groundwater barrier and saltwater intrusion control system to protect the existing neighborhood from restoration impacts. We provided construction CQA for nearly 3 million cubic yards of sediment excavation, construction of 4 miles of reinforced levees, 1.5 miles of Pacific Coast Highway realignment, and placement of 370,000 cubic yards of disposed sediments to build nesting habitats. Geosyntec planned and designed the operations to be extremely responsive to the needs of the client and other stakeholders in this high profile project. Significantly, oil production was able to continue during the sediment remediation, enabling the client to continue generating revenue. The nesting habitats were constructed over a core of disposed oil-impacted sediments, saving millions of dollars in off-site disposal costs.

Marsh Sediment Removal Action and Risk Assessment

Brunswick, GA

One of the most complex CERCLA remediation projects in U.S. EPA Region 4, the LCP Chemicals Site, is adjacent to an ecologically-sensitive estuarine marsh in coastal Georgia. Geosyntec applied technical expertise and advanced analytical methods to support a two-tiered sediment remedy. For a Time-Critical Removal Action in the 450-acre saltwater marsh, we used a mass removal efficiency approach to demonstrate that a far less costly sediment removal program (13 acres) than originally conceived would meet the short-term remedial objectives and quickly restore local fisheries. Next, Geosyntec's baseline ecological risk assessment entailed geostatistical and other specialized analyses of data from 700 sampling locations. Area-weighted averaging was performed across five study domains defined by hydrologic boundaries to provide representative exposure point concentrations. Monte Carlo simulations and Selective Sequential Extraction analyses for mercury speciation were deployed to provide additional, and more realistic, inputs of contaminant loading and biological exposure to the assessment. We provided support in negotiations with federal and state regulatory agencies which ultimately agreed that a marsh monitoring program would be more appropriate than additional sediment removal in the estuary. The monitoring program, currently in its thirteenth year since the completion of removal activities, allowed the Georgia Department of Natural Resources to significantly relax fish consumption advisories.



Project Elements

Site characterization

Time-critical sediment removal action

Ecological risk assessment

Regulatory support

Passive Bioremediation at Aberdeen Proving Ground

Aberdeen, MD

Geosyntec partnered with the US Geological Survey (USGS) to develop and install a new treatment technology to biodegrade solvents in high velocity groundwater seeps into tidal wetlands. The team worked collaboratively to devise a passive treatment system that could be installed with minimum disruption to the wetland and no maintenance requirements. The system, a thin mat bioaugmented with a dehalogenating microbial consortium, involved several technical innovations: development of the bioaugmentation culture; design and lab testing of the bioreactive mat matrix; invention of a solid state hydrogen detection device to measure environmentally significant concentrations of dissolved hydrogen; and modification of techniques to sample water within and below the mat. Geosyntec installed the first of its kind bioreactive mat system. Monitoring has demonstrated contamination concentration reductions in excess of 99% and complete degradation of solvents. The reactive mat remained stable in the tidal wetland and proved to be exceptionally successful, continuing to remediate groundwater beyond the first year with no ongoing maintenance.



Project Elements

Development of new technology

Laboratory testing

Field treatability demonstration

Environmental monitoring



Project Elements

Site ecological characterization

Ecological risk screening

Regulatory support

Ecological Risk from MTBE at a National Wildlife Refuge Seal Beach Naval Weapons Station, CA

Seal Beach National Wildlife Refuge is a 965-acre wetland and estuary habitat contained within the Naval Weapons Station. The Navy planned full-scale active remediation to clean up MTBE compounds in groundwater and sediments. Geosyntec conducted a detailed ecological risk screening and concluded that there was no significant threat to the Refuge from the contaminants. We recommended a confirmation round of groundwater sampling to evaluate monitored natural attenuation as the most feasible method to achieve regulatory goals for the site. This conclusion and recommendation were based on our thorough understanding of federal and state regulatory guidance, our own prior studies, and expertise in the use of MNA to remediate MTBE. Regulators agreed with Geosyntec's evaluation, saving the Navy the significant cost (\$300,000) of active remediation and preventing the Refuge from being disrupted. Geosyntec's approach provided closure of the site within two years of our analysis. Our value engineered approach mitigated the need for a proposed hydrogen releasing compound remediation.



Project Elements

Aquatic community bioassessment

Ecological risk assessment

Ecological Risk Assessment of Little Vermilion River LaSalle, IL

Several hundred thousand cubic yards of zinc slag material is present along the banks of and within the Little Vermilion River (Illinois River Basin), and is of interest in ongoing CERCLA activities related to a former zinc processing facility. Geosyntec conducted a biological assessment to evaluate potential adverse effects to the aquatic community in this segment of the river. Our bioassessment consisted of four major tasks: evaluation of aquatic habitats, fish community surveys, benthic macroinvertebrate surveys, and tissue analyses of aquatic organisms. The sampling and assessment were conducted in accordance with Illinois Department of Natural Resources (DNR) and Illinois Environmental Protection Agency (IEPA) field collection and data analysis protocols. Geosyntec's biological assessment firmly demonstrated that the biotic integrity of fish and macroinvertebrate communities is good and comparable to unaffected areas of the river, and provided a "weight-of-evidence" component to the ecological risk assessment. This risk assessment is a key component of an ongoing feasibility study effort. The results of the risk assessment demonstrate that slag material in the river does not create an unacceptable risk to the environment; therefore river dredging is not necessary. Furthermore, the risk assessment is a central part of the argument that the mass of the slag pile along the banks of the Little Vermilion does not need to be removed if it is stabilized and covered to prevent future surface erosion and stormwater runoff into the river. This has been a major focus of the ongoing discussions with the IEPA, which has indicated preliminary concurrence with our approach. The outcome of the risk assessment supports a compelling argument for remedial alternatives that avoid large-scale removal of the zinc slag, thus substantially lowering cleanup costs by an order of magnitude.

Sediment Removal at a Gas-Fired Energy Plant

Port Washington, WI

Geosyntec developed and implemented sediment removal plans for several critical path projects at the We Energies Port Washington power generating facility on the shore of Lake Michigan. For an intake and discharge tunnel removal project, the selected method was to isolate tunnel segments, and dewater and solidify the sediment in place. We worked with the offsite disposal facility to develop an appropriate field solidification testing program to ensure that the solidified sediment met landfill acceptance criteria. This prevented the need for temporary on-site storage of the solidified material. For an emergency intake tunnel, the sediment was removed from the tunnel and mixed with a polymeric additive within geotubes to facilitate the dewatering and solidification process prior to offsite disposal. We assisted with the dredging permit, including evaluation of polymer toxicity/dosage and discharge water quality criteria. The sediment removal was critical to plant reconstruction activities and continued operations. Geosyntec worked with the client through several feasibility iterations to develop practical removal plans that caused the least disruption to plant operations and met the criteria of the Wisconsin DNR permits, the on-site water treatment facility, and disposal facilities. Our unique and creative approach to each sediment removal effort has resulted in significantly reduced project time and cost.



Project Elements

Sediment characterization

Feasibility evaluation of removal options

Sediment removal plans

Construction management and CQA

Permitting support

Pipeline Stream Stabilization, Carolina Gas Transmission

Aiken, South Carolina

Geosyntec assisted Carolina Gas Transmission (CGT) with Federal Energy Regulatory Commission permitting and compliance, environmental permitting and agency consultations, and performed a geomorphic assessment and instability analysis for an 8-mile pipeline replacement. Ecological and wildlife surveys, a stormwater pollution prevention plan, erosion control design and permitting, environmental inspection, stream stabilization design and construction oversight were all conducted.

Geosyntec evaluated stream stabilization design alternatives for 155 linear feet of stream crossing within CGT's pipeline easement for this active gas pipeline replacement project. The stream (0.35 mi² watershed) maintains a five percent gradient through the project area over disturbed cohesive and non-cohesive coastal plain soils with the sand as the primary sediment load in the system. A geomorphic analysis was performed to protect the pipeline crossing from future exposure, provide enhanced stream function and protect adjacent roadway and property owners from continued erosion. The analysis included an evaluation of the dimension, pattern, and profile of the severely eroding stream and upstream reaches to characterize instability, channel evolution, design hydrology, and development of a sustainable stabilization design for the channel. Vertical stability for stabilization design was addressed



Pre and Post-construction views of the high-gradient stream crossing gas pipeline easement in Aiken, SC.

Project Elements

*Geomorphic assessment and
instability analysis*

*Hydrology and Hydraulics
Evaluation*

Stream stabilization design

FERC permitting and compliance

Environmental permitting

SWPPP and erosion control design

Agency consultation

Construction oversight

through the installation of two permanent constructed riffles and one boulder cascade. Lateral stability of the meandering channel was addressed through the application of boulder toe protection to meander bends and a reinforced bank wrap along each bank to strengthen the soils and promote native vegetation establishment, which accommodates the shear stress produced by the high-gradient channel and promotes long-term sustainability. Geosyntec maintained the client's aggressive schedule while maintaining the project budget. Notably, CGT and the FERC regulators have commended Geosyntec's attention to detail in the design of this stream stabilization project, craftsmanship in the final product, ecological benefits and aesthetics.

This project highlights the vulnerability of energy and transportation infrastructure to stream evolution processes as a result of evolving land-use patterns in the watershed and resulting changes in channel hydrology, hydraulics and sediment transport.



Section 5 People

Section 5

Key Staff

Howard Cumberland

Environmental Services, Natural Resources, Ecological Sciences

Howard Cumberland is a principal marine scientist with 20 years of environmental consulting experience. He specializes in remedial planning and negotiation strategies as well as developing and implementing remedial investigation, design, and restoration solutions associated with contaminated sediments and waterfront development activities.

Focus and Experience

Focusing on ports and harbors, Howard provides strategic consulting services to owners and tenants on the evaluation, design, and permitting of nearshore, in-water activities such as contaminated sediment remediation, waterfront redevelopment, and maintenance dredging. He has in-depth training and experience related to the ecological impacts associated with contaminated sediments and surface waters. He also has in-depth familiarity and experience with the numerous state and federal regulatory programs that govern dredged material and contaminated sediments projects.

Howard has managed, designed, permitted, and/or implemented remedial investigations, feasibility studies, removal actions, remedial actions and post-removal/remedial action monitoring for a variety of industrial, port, and public sector clients working under federal and state regulatory programs. He has successfully completed projects across the United States and in Mexico, Guam, and Australia.

Throughout his career, Howard has pursued solutions involving innovative applications of proven technologies, as well as emerging technologies, to meet cleanup objectives while at the same time minimizing his client's operational impacts and/or the cost to achieve sediment remediation objectives. His emphasis on beneficial use has led to significant reductions in disposal costs at specific sites, and his understanding of the evaluation of contaminants and their sources, coupled with risk communication, has been essential to successfully gaining stakeholder support for his clients. He is adept at strategic planning and at interacting with and negotiating with regulatory agencies as well as among PRPs with divergent interests.

Howard routinely publishes and gives presentations on contaminated sediments and maintenance-dredged material disposal strategies and site improvements at ports and harbors. He is a member of the Western Dredging Association, American Association of Port Authorities (AAPA), and the Society of Ecology, Toxicology, and Chemistry (SETAC).



Howard Cumberland, Sediment Management Practice Leader

Specialties

Sediment Assessment and Remediation

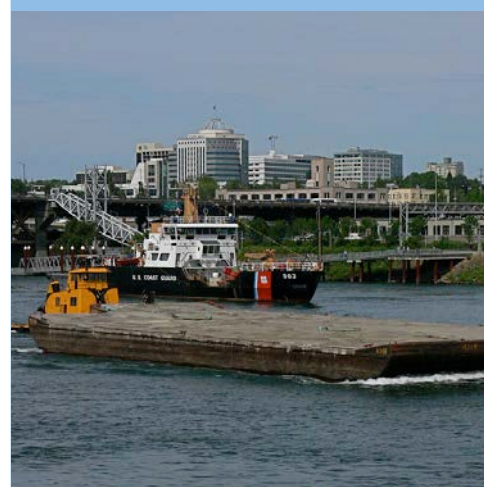
Site Investigation and Remediation

Risk Assessment and Applied Toxicology

Education

M.S., Biology, California State University at San Diego, 1996

B.S., Marine Biology, California State University at Long Beach, 1989





Susan Hill
Vice President

Specialties

*Sediment Assessment and
Remediation*

MGP Site Remediation

RI/FS Development

Program Management

Education

*M.S., Environmental Engineering,
University of Michigan, 1984*

*B.S., Chemical Engineering,
Michigan State University, 1980*

Susan Hill, PE

**Chemical Engineering, Environmental Engineering,
Public Health**

Susan Hill, a principal environmental engineer, focuses on the investigation and remediation of sediment mega sites. She has worked extensively with large PRP groups within the CERCLA program.

Focus and Experience

Over her more than 25-year career, Susan has become a recognized leader in the development of remedial approaches for waterways with contaminated sediments and associated floodplain soils. She has served as project manager for the feasibility study of one of the largest contaminated sediment sites in the U.S. at Onondaga Lake in upstate New York. Susan is presently serving as the RI/FS project manager for the Berry's Creek Superfund site, a 12-square-mile watershed in the New Jersey Meadowlands, and she provides strategic consulting services on the Newtown Creek Sediment Superfund site in New York City.

Susan's experience includes all project phases from remedial investigations, feasibility studies, and design and construction to long-term operations and monitoring and delisting. She has worked on sediment remediation projects with complex issues for the last 10 years. Her experience includes work plan and sampling plan design and implementation; quality assurance plan development; health and safety plan development; data management; RI/FS report preparation; alternatives evaluation; risk assessment preparation; public relations, consent decree negotiation, and cost estimating; remedial design; construction management; regulatory negotiation; and bid-document preparation and review.

Her career experience also includes serving as project manager and/or technical lead for remediation programs at over 15 major NPL sites, including several large chlorinated solvent sites and more than 50 manufactured gas plant (MGP) sites throughout the country. Susan is particularly adept at pulling together multi-disciplinary teams to work on large projects resulting in successful outcomes for her clients.

Susan is an active member and local leader of several professional organizations, including the American Council of Engineering Companies (ACEC) of Illinois where she served as a Senior Vice President and a member of the Board of Directors. She chaired the Illinois Engineering Excellence awards program for ACEC. She is also affiliated with the Sediment Management Work Group.



Berry's Creek, NJ

Tom Krug, PEng

Chemical Engineering, Environmental Engineering, Hydrogeology, ZVI Technology

Tom Krug, a principal environmental engineer, focuses on the evaluation and development of innovative strategies and technologies for remediation of complex contaminated properties for Fortune 500 companies, the U.S. Department of Defense, and NASA.

Focus and Experience

Tom's experience includes the development of innovative strategies and technologies for remediation of complex contaminated sites, including: in situ bioremediation of chlorinated organic compounds, polycyclic aromatic hydrocarbons (PAH) and perchlorate; zero-valent iron (ZVI) permeable reactive barriers (PRBs); reactive caps for contaminated sediments; treatment of PCBs; innovative technologies for dense non-aqueous phase liquids (DNAPL); and monitored natural attenuation. He has worked at over a hundred sites helping to develop appropriate strategies and technologies for remediation and management of subsurface and sediment contamination.

Through his applied research work in collaboration with NASA and U.S. Department of Defense (DoD) agencies, Tom has extended the applications of ZVI technology to include the use of emulsified nano-scale zero-valent iron (EZVI) for treatment of chlorinated solvent DNAPL source zones and the use of zero-valent magnesium for the treatment of PCBs. In 2007, he was inducted into the Space Foundation Technology Hall of Fame for his work in the EZVI technology.

Tom has directed several projects evaluating natural and enhanced biodegradation processes and the use of amendments to sequester contaminants in reactive sediment caps. This work has included evaluating the impact of: (1) biogeochemical conditions on the biodegradation of chlorobenzenes, PAH and other hydrocarbons; and (2) amendments on sequestration and biodegradation processes for PCBs, mercury and other contaminants.

He has worked for the U.S. DoD demonstrating in situ bioremediation of perchlorate impacted groundwater and was the principal investigator for another ESTCP project investigating the use of EZVI for treatment of DNAPL source zones. His experience evaluating technologies for remediating PCBs in soils and building materials includes thermal treatment of PCB contaminated soil and treatment of PCB contaminated construction materials using zero-valent magnesium.

Tom also has extensive experience with engineering design of conventional remediation technologies and waste water treatment systems including: the design and operation of groundwater extraction and treatment systems for chlorinated solvents in groundwater; installation of collection trenches to enhance the removal of DNAPL and dissolved contaminants; soil vapor and multi-phase extraction systems; containment barriers; and excavation.



Tom Krug

Specialties

In Situ Remediation of Soil, Sediment and Groundwater

Intrinsic and Enhanced Biodegradation

Geochemical Processes for Sequestration and Degradation

Contaminated Site Management

Education

M.Sc., Chemical Engineering, Queens University, 1984

B.Sc., Chemical Engineering, Queens University, 1981

In 2007, Tom Krug was inducted into the Space Foundation Technology Hall of Fame for his work in EZVI technology



Brian Hitchens

Specialties

Specialized In Situ Treatment Technologies

Sediment Assessment and Remediation

Groundwater Assessment and Remediation

Site Investigation and Remediation

Data Management, Visualization and Analysis

Erosion and Sediment Control

Education

M.S., Structural Geology, University of Wyoming, 1999

B.A., Geology, The College of Wooster, 1997

Following catastrophic wild fires in Southern California in 2003 and 2007, Brian developed new geospatial analytical methods to identify post-fire site conditions indicative of high risk for mud and debris flows allowing for better implementation and placement of emergency erosion control measures in the field.

Brian Hitchens, PG, CHG

Hydrogeology, Environmental and Geotechnical Data Management

Brian Hitchens, PG, CHG, is a senior hydrogeologist specializing in site characterization, remediation, and regulatory negotiation.

Focus and Experience

Brian is a senior hydrogeologist with over 12 years of practice experience focusing on the evaluation and improvement of sediments, groundwater and surface water impacted by contaminants. He specializes in applied in situ remedial technologies, sediment remediation, bioremediation, and data management and visualization. He is also adept at evaluating human health and ecological risk, and working with regulatory agencies on behalf of his clients.

Brian has expertise in evaluating the fate and transport of PCBs in the environment, and has directed extensive investigation and remediation programs related to PCB impacts in soil, groundwater, storm drains, and marine sediments. Brian has managed and assisted in the design of forensic PCB investigations in sediment, soil, and groundwater. He has also led source investigations for PCBs in building materials such as paint, caulking, joint compound, and historical manufacturing operations including the use of cutting oils, hydraulic oils, capacitors, and transformers among other potential sources. He has experience working with both Federal EPA and state regulatory agencies to find agreement on the often complex issues of site assessment, contaminant source, fate and transport, and risk assessment which typically are associated with PCB releases.

Notably, Brian led the design and implementation of one of the largest passive bioaugmentation programs implemented in the United States to date, delivering more than 1.6 million gallons of electron donor solution through nearly 1,000 temporary injection points. The result was a complete reduction of volatile organic compound (VOC) impacts from concentrations exceeding 50,000 ppb to less than 10 ppb across the majority of the treatment area within nine months of the initiation of the injection program. VOC concentrations have not shown indications of rebound in the treatment area after more than two years of post-injection monitoring.

Pete de Haven, PE

Environmental Site Assessment and Remediation, Hydrogeology, Environmental and Geotechnical Data Management

Peter de Haven is a senior engineer and contaminated sediments specialist with more than 15 years of experience in site characterization, data management and analysis, numerical modeling, and both the conceptual and final design of engineered remediation measures for groundwater, soils, and sediments.

Focus and Experience

Pete specializes in addressing investigative and remedial administrative orders under CERCLA, as well as executing and managing projects under RCRA, state-regulated, and non-regulatory frameworks. He has performed comprehensive project management, team leadership, and a broad range of technical services for projects and facilities in 25 U.S. states and territories and the United Kingdom. These encompass multidisciplinary work and client/regulatory interaction through long-term client-site assignments, synthesis of disparate investigative methods, strategic planning, and communication to technical and non-technical project stakeholders.

Of note, Pete currently serves as Remedial Investigation (RI) Task Manager for the Berry’s Creek Superfund Site in Bergen County, New Jersey. This sediment mega-site is undergoing investigation at the watershed level that encompasses approximately 12 square miles adjacent to industrial, commercial, and residential properties. The watershed has been found to contain elevated levels of a variety of chemicals of potential concern (COPCs) that have migrated to the watershed from various point and nonpoint sources. His responsibilities have been varied, including the conceptualization and authorship of the RI planning documents, field management over a period of several months, and data analysis and reporting for investigation components addressing multiple abiotic site media.

Pete continues to advance the state-of-the-practice through his expertise and innovation in the use of databases, geographic information systems (GIS), three-dimensional visualization packages, and finite-difference and finite-element modeling applications. He is a registered civil engineer and is the author of several conference and poster presentations on the use of GIS and databases, groundwater extraction systems, subsurface vapor intrusion, and geostatistical evaluation.



Pete de Haven

Specialties

- Contaminated Sediment Assessments and Remediation
- Remedial Design and Remedial Action for Soils and Groundwater
- Groundwater Assessment and Remediation
- Specialized In Situ Treatment Technologies
- Sediment Assessment and Remediation
- Data Management, Visualization, and Analysis
- Erosion and Sediment Control

Education

- M.S., Civil Engineering, Environmental Fluid Mechanics/Hydrology, Stanford University, 1997
- B.S.E., Civil-Environmental Engineering (magna cum laude), Princeton University, 1996



Greg Gibbons

Specialties

*Sediment Assessment and
Remediation*

Feasibility Study

Treatability/Pilot Study

Site Investigation and Remediation

Education

*M.S., Environmental Engineering,
University of Michigan, 1980*

*B.S., Civil Engineering,
University of Notre Dame, 1978*

Gregory M. Gibbons, PE

Environmental Engineering

Greg Gibbons is a senior environmental engineer with more than 31 years of experience. His current practice concentrates on the investigation and remediation of sediment mega-sites; he serves as a company-wide resource for sediment remediation.

Focus and Experience

Greg's career experience has included technical and project management roles for a variety of environmental projects including sediment and upland site investigation and remediation efforts, water resources, wastewater treatment, and potable water treatment as well as technical support to litigation activities. He serves as Project Engineer on the feasibility study portion of the Berry's Creek Remedial Investigation/Feasibility Study in Bergen County, New Jersey. The feasibility study will likely recommend a combination of targeted dredging, capping, and monitored natural recovery within the waterways and the extensive marsh areas. Greg had lead author responsibility for the Candidate Technologies Memorandum. He was also a lead author on an extensive pilot study test work plan and construction bid package and he has been involved in the administration of this multiyear project.

Greg served as Task Manager/Lead Engineer for the dredging residuals (dredge spoil and dredge water) management aspects of the Onondaga Lake mega-site feasibility study conducted for Honeywell in Syracuse, New York. This remediation effort will be one of the largest sediment remediation projects ever conducted in the United States with a proposed dredged volume of 2.65 million cubic yards. He served as Project Engineer and lead author for the development of a mitigation plan for a wetlands site impacted with cement kiln dust on the Hudson River in Upstate New York. The mitigation study included evaluation of a number of technologies. The eventually selected plan involves sediment removal and subsequent isolation capping of heavily impacted sediment areas with monitored natural recovery (MNR) of other impacted site areas. Greg as Project Manager is directing the feasibility study for OU1 of the Matthiessen and Hegeler Zinc Company Superfund Site in Peru, Illinois. Issues include an upland zinc slag pile site and the impacts to the Little Vermilion River. Potential actions include mitigation of impacted soil, groundwater, and sediments.

In addition, Greg has provided consulting or project management expertise to several USEPA Superfund RI/FS projects for potentially responsible parties or under the direction of counsel, including the Riverfront NPL Site in New Haven, Missouri. Greg continues to advance the state-of-the-practice as a member of the Sediment Management Working Group (www.smwg.org), and has co-chaired a panel discussion on public participation in sediment remediation projects. He also serves on the Environmental Division Steering Committee of the Three Rivers Manufacturers Association.



Robert Veenstra

Environmental Engineering, Environmental Sciences

Bob Veenstra is a principal environmental engineer with over 30 years of experience that includes the characterization, remediation and disposal of sediments contaminated by industrial operations, as well as the management of multimedia site characterizations, risk assessments, feasibility studies, remedial designs and remedy implementations at facilities across the U.S.

Focus and Experience

Bob has served as the Project Manager for a variety of sediment investigation and remediation projects, addressing sediments impacted with dioxins, PAHs, PCBs and chlorinated organics. These projects have involved sediments located in large waste lagoons, small tributary creeks, mid-sized streams and large rivers, including both the Columbia River and the Mississippi River. He also has experience in the area of litigation support related to contaminated sediments and dredging projects. The types of industries that contributed to the sediment impacts that he is familiar with include the pulp and paper industry, the chemical manufacturing industry, and several manufactured gas plant (MGP) sites. This experience has been gained through the management of these projects under a variety of regulatory programs, including RCRA, CERCLA and a number of state-lead programs.

For a large chemical manufacturing client, Bob served as the Project Manager for the pilot testing, design, construction, and start-up of a materials removal and handling plant to dredge, dewater, and dry 650,000 cubic yards of dioxin-contaminated sediments from a series of industrial wastewater treatment ponds. The project scope included the design and implementation of a dredging plan involving hydraulic dredging at the ponds, an on-shore pumping station and construction of two miles of 10-inch HDPE piping, including a river crossing using double-walled piping, to transport the dredged slurry to the treatment plant. The treatment plant included dewatering and drying of the sediments, after which they were incinerated in an on-site incinerator operated by the client.

At an MGP site, Bob served as the Project Manager for a sediment removal and bank stabilization project under CERCLA. MGP wastes were identified in the sediments of an urban creek adjacent to a historical MGP waste disposal area. As part of the remedial action, all flow in the creek was diverted through temporary piping around the remediation area, allowing the removal of waste material and impacted sediments in the creek bed. Additionally, a clay cap was installed over impacted material that remained in place. Following the remedial action, site restoration was conducted for creek banks upstream of, adjacent to, and downstream of the remedial action areas.



Robert Veenstra

Specialties

Sediment Assessment and Remediation

Site Investigation and Remediation

Groundwater Assessment and Remediation

Subsurface Vapor Intrusion to Indoor Air

Education

M.S., Environmental Engineering, University of Washington, 1982

B.S., Environmental Sciences, Grand Valley State University, 1979



Dr. Kwasi Badu-Tweneboah

Specialties

Site Investigation and Remediation

Waste Containment Facility

Planning and Design

*Geotechnical Infrastructure/
Foundation Design*

Education

*Ph.D., Geotechnical Engineering,
University of Florida, 1987*

*M.S., Geotechnical Engineering,
Arizona State University, 1984*

*B.S., Civil Engineering, University of
Science & Technology,
Kumasi, Ghana, 1979*



Elba Island, GA

Kwasi Badu - Tweneboah, PhD, PE

Geotechnical Engineering, Civil Engineering, Geoenvironmental Engineering, Construction Management

Dr. Kwasi Badu-Tweneboah, a senior engineer, has over 20 years of consulting and research experience focusing on the design and construction of containment structures for solid and liquid wastes.

Focus and Experience

Kwasi specializes in confined disposal facility (CDF) design, dredged material management, sediment capping, shore protection rehabilitation, geotechnical investigations, containment system design, landfill design and permitting, resident engineering, and construction management/quality assurance. His clients include commercial solid waste disposal firms, municipal and local governments, petrochemical manufacturing, utility, pulp and paper processing industries, and land development firms throughout the Southeast and Midwest U.S.

Kwasi is the principal geotechnical engineer and program manager for multiple sediment-related projects at a Liquefied Natural Gas facility in Savannah Harbor, Georgia where he is responsible for maintenance dredging management; design and construction of confined disposal facility dike raisings; shore protection rehabilitation design and construction oversight; and dredging permit renewal applications including wetlands delineation and mitigation plans. He has developed a long-term dredged material management plan that maximizes CDF storage capacity for the long-term (20+ years) operation of the LNG facility. He served as the Task Manager for the preparation of an Environmental Reserve Fair Value Evaluation report for the Ottawa River Natural Resource Damage Assessment site in Toledo, Ohio on behalf of a private waste company. For the report, he evaluated several technologies, including dredging, capping, and monitored natural recovery, to remediate approximately 257,000 cubic yards of contaminated sediments along an 8-mile section of the river.

He also has extensive experience in the planning and implementation of construction quality assurance/quality control for the installation of geosynthetic and soil lining systems for landfills and other waste containment facilities. Working with clients in the petroleum refinery, petrochemical manufacturing, pulp and paper processing, and land redevelopment sectors, Kwasi has been involved in the design, permitting, and construction of over 30 solid waste management and waste containment system facilities in 15 states.

Kwasi continues to advance the state-of-the-practice through his research into the development of new and improved design procedures for geosynthetics applications in geotechnical engineering and waste management; focusing on geosynthetics reinforcement design; waste settlement analysis; stability analysis of embankment on soft foundations; and liner system interface stability and global stability analyses. He has published more than 30 papers on landfill design and solid waste issues.

Keith A. Kroeger

Aquatic Toxicology

Keith Kroeger is an aquatic toxicologist, specializing in evaluating the ecological impacts posed by contaminated sediments. The majority of his 16 years of experience has centered on ports and harbors, where he performs sediment quality, water quality and ecological studies for contaminated and maintenance dredged material, source control from stormwater discharges, and permitting of waterfront development projects.

Focus and Experience

Keith's expertise in managing complex waterfront projects demonstrates that timely, cost-effective and environmentally acceptable solutions will be permitted by resource agencies when carefully designed, documented and negotiated. He is knowledgeable and thoroughly familiar with the regulatory and analytical requirements associated with the dredging of contaminated sediments, such as those administered by the U.S. Army Corps of Engineers, the USEPA (including CERCLA and NEPA projects), and various state and local programs. His regulatory knowledge has assisted clients with strategic planning in response to state-mandated cleanup actions at waterfront properties. He provides cost-effective approaches to evaluate the nature and extent of contamination and understands that proper evaluation of contaminants and their sources, coupled with risk communication, is necessary for successful resolution of sediment cleanups. Keith has assisted clients with internal strategic planning and budgeting; negotiation of the scope of work with agencies; managing and conducting remedial investigation and feasibility studies and the removal actions; permitting and monitoring.

Specific recent experience includes technical support to assist legal counsel in preparation of environmental documentation for upcoming Portland Harbor Superfund Site allocation proceedings and evaluation of potential environmental liabilities related to two upland properties and historic impacts to the Willamette River. For the U.S. Navy, Keith has served as project manager for Tier 1 and Tier 2 Ecological Risk Assessment and Supplemental Remedial investigations at the Jackson Park Housing Complex, Operable Unit OU2 in Bremerton, Washington. He also has extensive experience with the Port of Portland and USACE Portland District projects throughout Oregon, Washington and Idaho.



Keith Kroeger

Specialties

- Ecological Risk Assessment
- Contaminated Sediment Impacts
- Remedial Investigation

Education

- MS, Environmental Science (Aquatic Toxicology), Wright State University, 1998
- BS, Environmental Health Science, Wright State University, 1996



Portland Harbor, OR



George Ford

Specialties

Dredging and Sediment Treatment

Engineering Geology

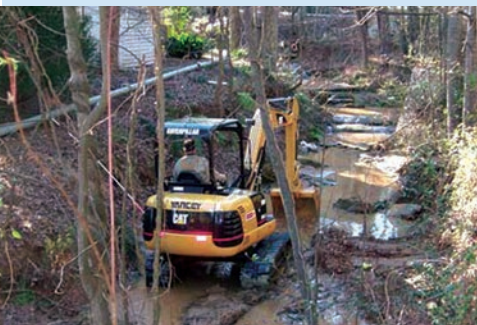
Construction Management

Health and Safety

Education

*M.S., Engineering Geology,
Stanford University, 1993*

*B.S., Geology,
Stanford University 1980*



George Ford, CEG, PG

Environmental Constructability

George Ford specializes in the constructability of remedial and geotechnical designs. As a geoenvironmental consultant and construction contractor, he has guided multi-million dollar projects through complex stakeholder remediation selection, design, and implementation.

Focus and Experience

George's experience focuses on management of large-scale environmental projects and programs that include dredging and sediment treatment and disposal projects for federal and municipal clients, as well as stream, wetland, and beach restoration projects with multiple stakeholders and extensive public outreach efforts. He managed the construction side of the \$100 million federal Presidio Trust environmental remediation program at the Presidio of San Francisco overseeing work on 40 CERCLA and RCRA sites and several hundred petroleum sites. He worked closely with Presidio Trust management on environmental multi-policy insurance reimbursement matters as well as redevelopment and re-use issues and assisted in negotiations with public stakeholders, federal agencies, state regulatory agencies, the City of San Francisco, and California Department of Transportation.

As an engineering geologist, George has performed geologic reconnaissance and conducted slope stability evaluations for landfills and has participated in site investigations and engineering evaluations for 30 dams in the western U.S. as well as several tunnel projects. He has also managed construction of rock fall and debris flow mitigation projects and slope stabilization projects for Caltrans, municipal, and private clients.

George's sediment related field experience includes the Spring Creek Sediment Removal at Iron Mountain Superfund site near Redding CA where he had responsibility for the 24-hour, 7-days per week heavy metal bearing sediment dredging (150,000 cubic yards) from the Spring Creek tributary of the Sacramento River and operation of a two-mile long sediment transfer pipeline. At the former Naval Air Station in Alameda, CA he managed 24-hour, 7-days per week field operations for environmental dredging of Seaplane Lagoon which removed approximately 60,000 cubic yards of sediment containing heavy metals, organic contaminants, and radionuclides. In Long Beach, CA George managed preparation of the pre-construction submittal for the Colorado Lagoon and the project's sediment treatment and stabilization plan for removal of lead-bearing sediments. As an integral role for the Mountain Lake project at the Presidio, San Francisco, CA George managed feasibility evaluations, and initial remedial design consultations including negotiation with DTSC, RWQCB, and stakeholders (NPS, City of San Francisco, golf course operator, and Presidio Restoration Advisory Board) regarding removal of lead and pesticide-bearing sediments from a lake located along the southern border of the Presidio. Additionally, he supervised the marine geophysical investigation of the proposed Oakland Cable Crossing of the Oakland Estuary, consisting of field sampling, elutriate testing, and evaluation of sediment disposal options.

David W. Himmelheber, PhD

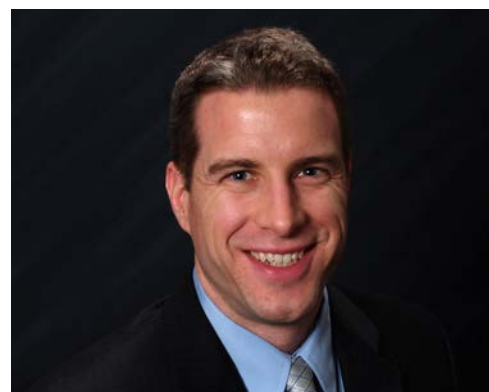
Aquatic Biogeochemistry

Dr. David Himmelheber is an environmental engineer specializing in contaminant attenuation processes both in groundwater and sediment environments.

Focus and Experience

Utilizing his expertise in contaminant biotransformations, aquatic biogeochemistry, and sediment remediation technologies, Dave has been a key member of sediment site investigations and led field efforts to characterize contaminant distribution at multiple sites, including tidal wetlands. He has been actively involved in the planning and implementation of the Berry's Creek Study Area Superfund site RI/FS in New Jersey, managing field teams sampling for numerous contaminants of potential concern and radiogeochemical parameters in surface water, sediment, marshlands, and surface water. Dave has led investigative design and data interpretation and efforts for significant aspects of Berry's Creek including assessment of mercury methylation/demethylation dynamics in marshes. For the FS portion of the project, he has helped design laboratory treatability studies to evaluate sediment amendments intended to reduce bioavailability of polychlorinated biphenyls (PCBs), mercury, and methyl mercury in waterway sediments. The results of the laboratory testing will be carried forward into pilot studies of thin-layer sand and amendment addition on mudflat and marsh sediments at the site, Dave has helped develop the Pilot Study scope which includes evaluation of physical stability of the placed materials in different hydrodynamic environments and the reduction in COPC concentrations in surface sediment and pore water. He oversaw the construction of pilot studies and also led performance monitoring, which included pore water collection for PCBs, mercury, and methyl mercury. He is also actively involved in the FS process and the evaluation of risk-reduction approaches at the mega-site. In addition to Berry's Creek, Dave has provided technical expertise for the sediment cap design at Onondaga Lake, including an assessment of biological degradation expected within the cap. He has also designed investigations at several other contaminated sediment sites, including evaluation of groundwater to surface water COPC transport and pre-design investigations to support remedy decisions.

His doctoral dissertation investigated in situ capping as a sediment remediation method, specifically performing interdisciplinary laboratory research to improve understanding of contaminant attenuation and biogeochemical processes following cap emplacement. During his studies he utilized advanced analytical techniques to demonstrate how capping can induce significant shifts in redox conditions, microbial communities, and natural attenuation processes within sediments. As part of his PhD work Dave also performed controlled laboratory experiments to directly assess gas ebullition in Anacostia River sediments and its impact on the performance of pilot capping demonstrations. Results indicated that a significant amount of gas generation was possible below the placed sediment caps, which could alter cap integrity and possibly facilitate contaminant transport.



David Himmelheber

Specialties

*Sediment/Groundwater
Remediation*

Biogeochemical Processes

*Biotransformation of
Contaminants*

Education

*PhD, Civil and Environ.
Engineering, Georgia Institute of
Technology, Atlanta, Georgia, 2008*

*MS, Civil and Environ. Engineering,
Georgia Institute of Technology,
Atlanta, Georgia, 2003*

*BS, Chemistry, Salisbury University,
Salisbury, Maryland, 1998*





Cristin Corless Krachon

Specialties

Aquatic Biology

*Freshwater and Estuarine
Sediments*

Environmental Sampling

Data Analysis

Education

*M.S., Environmental Health
Sciences, Harvard University,
School of Public Health,
Cambridge, Massachusetts, 1997*

*B.S., Biology, Duke University,
Durham, North Carolina, 1993*



Cristin Corless Krachon

Environmental Sciences, Ecology, GIS

Cristin Corless Krachon has 13 years of experience as an environmental scientist with extensive knowledge and skills in environmental and ecological field sampling techniques, data analysis and reporting.

Focus and Experience

Cristin has successfully performed multi-disciplinary projects involving aquatic ecosystem assessments, water resources, remedial site investigations, and ecological risk assessments. She has managed biological resource projects for Superfund remedial investigations and Clean Water Act demonstrations and participated in remedial investigations for complex sediment sites, environmental assessments for hydropower licensing studies, and biological and water quality/quantity assessments associated with Clean Water Act evaluation and compliance. At the Terry Creek Superfund Sediment Site in Brunswick, Georgia, Cristin serves as project manager for the remedial investigation/feasibility study of the estuarine site contaminated with toxaphene. Current activity at the site includes evaluation of remedial alternatives such as monitored natural recovery and sediment removal and/or isolation. Cristin has also been the project manager for the long-term monitoring of toxaphene concentrations in the local fishery. Her fisheries experience has also led her to work on several Clean Water Act 316(a) and (b) investigations to evaluate the impacts of thermal discharges and impingement/entrainment upon the aquatic community.

At the Berry's Creek Superfund Site in Bergen County, New Jersey, she serves as field team leader to evaluate site-related sediment contamination in biological resources within the watershed and nearby reference areas. She has also worked on the LCP Chemical site in Brunswick, Georgia. Her work there involved evaluation of biological resources exposed to the mercury and PCB-contaminated sediments. For this client, she was able to compile years of historical data as part of the Natural Resource Damage Assessment (NRDA). Cristin has also been involved in litigation support projects to support water withdrawal permit and power plant siting on the Chattahoochee River in Georgia. Activities included habitat assessment, downstream and upstream fish surveys, and detailed analysis of current and historical flows and water elevations in the river. She has also supported various NPDES permitting projects including the monitoring of fish tissue body burden for dioxins for several paper and pulp mills in the southeastern United States.

Cristin has experience in maintaining large environmental databases, conducting data analysis, and working with geographic information systems (GIS). She is able to use her strong database and GIS skills to master a thorough understanding of both large and small-scale projects. She is experienced in collecting both freshwater and estuarine sediments for chemical evaluation, as well as benthic macroinvertebrates and sediment toxicity.

Robert L. Annear, PhD, PE

Water Quality Modeling, Fate and Transport and Hydrology

Dr. Robert Annear is a senior engineer with extensive water quality modeling experience. He has 15 years of experience focused on the development and calibration of water quality models throughout the U.S.

Focus and Experience

As a water resources engineer, Robert is principally involved in hydrodynamic and water quality modeling with a focus on regulatory permits and requirements, surface water system assessments, Total Maximum Daily Loads development and implementation, Endangered Species Act (ESA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Natural Resource Damage Assessment (NRDA) studies, Federal Energy Regulatory Commission (FERC) relicensing of hydropower facilities and water quality management for multiple uses (supply, salmon, recreation etc.). He has over 15 years of experience in the development and calibration of hydrodynamic and water quality models (1-D, 2-D, & 3-D) throughout the U.S.

He has been involved in several CERCLA projects involving groundwater, surface water, sediment transport, and fate and transport processes. His experience includes reviewing 1-D, 2-D hydrodynamic and sediment transport and fate & transport models of riverine and estuarine systems. He also has experience in developing hydrodynamic and petroleum spill models for NRDA assessments.

Robert's modeling experience includes working with tools such as UNET, HEATSOURCE, CE-QUAL-W2, MIKE URBAN, MIKE 11, MIKE 21, and EFDC and the ability to pick up new models easily. He has the ability to convey complex modeling theory in more practical settings while maintaining a "big picture perspective" with implications in practice.

Robert has considerable experience in leading multidisciplinary teams of professionals, managing projects, budgets, work flow processes, quality control and assurance, on call contracts and complex project implementation and developing monitoring plans and conducting field work. He has developed long term monitoring plans and provided expert advice on developing monitoring plans for various public agencies to help meet project objectives such as watershed health, stream habitat improvements, regulatory compliance and long term management.

He has conducted numerous peer reviews of surface water models for agencies such as the USEPA, Oregon DEQ, WA Dept. of Ecology, and the U.S. Bureau of Reclamation and has also served as a reviewer for various water resource and hydrologic journals and has served on EPA national water quality grant review panels. He has a long history of working with hydrologic and hydraulic data sets and conducting extensive data analyses and modeling studies using a variety of meteorologic, hydrodynamic and water quality data.



Robert Annear

Specialties

Sediment Transport Modeling

Water Quality and Hydrodynamic Modeling

Fate and Transport Modeling

Water Resources Engineering

Expert Consultation and Testimony

Education

Ph.D., Portland State University, Civil and Environmental Engineering, 2007

M.S., Portland State University, Civil Engineering, 1997

B.S., Boston University, Aerospace Engineering, 1993

Robert teaches undergraduate and graduate courses at Portland State University and has more than 12 years of experience teaching water quality modeling training workshops.



David J. Vance

Specialties

Applied Fluvial Geomorphology

Ecosystem Restoration Sciences

CWA Section 404 Permitting

CWA Section 404 Mitigation Services

Education

*M.S., Geology, East Carolina University,
Greenville, NC, 2004*

*B.S., Geology, State University of West
Georgia, Carrollton, GA, 1999*

David J. Vance

Fluvial Geomorphology, Ecosystem Restoration, Clean Water Act Permitting

David Vance specializes in fluvial geomorphology and its application within ecological restoration projects across the United States. He has more than 10 years of experience delivering a wide variety of multidisciplinary water resource projects involving Clean Water Act permits, mitigation, ecosystem restoration design, and construction management.

Focus and Experience

David's expertise in fluvial geomorphology and his understanding of ecosystem restoration practices have made him a key member of our sediment management practice when sediment site investigations involve waterways, open waters, wetlands and marshes. He brings a very in-depth and experienced understanding of federal, state and local environmental regulations, principally involving Clean Water Act (CWA) Section 404/401 permitting related projects. He has participated in multidisciplinary projects involving remediation of soils in sensitive aquatic environments and provided technical advice on restoration strategies for these environments, especially for understanding sediment transport erosion and depositional processes and how they might influence the remedial design.

David's experience in natural resources/environmental consulting is largely focused on stream and river restoration. He possesses certifications in river restoration through Rosgen Level IV in Natural Channel Design. His emphasis in his restoration practice continues to be in watersheds where natural flow regimes have been altered due to urbanization, hydropower regulation, or water management and designing restoration projects suited to these complex environments. Recently, he designed the successful permanent stabilization of a high-gradient stream crossing over a natural gas pipeline easement in Aiken, SC. For this effort, the hydrologic, hydraulic, and geomorphic conditions of the site and the watershed were characterized and a stabilization design was created that achieved stream stability and pipeline protection while re-establishing aquatic habitat and ecosystem function.

Over the past several years David has served as the lead for the design and restoration team for a salt marsh mitigation project in Savannah Harbor, GA for a Liquefied Natural Gas Facility. As the CWA Section 404/401 permit liaison for this client, he negotiated a mitigation solution with federal, state, and local agency stakeholders, ending a nearly six year-long process to expand the facility's confined disposal facility for dredge material. David's master's research focused on the ecology, hydrology and sediment dynamics of fluvial, estuarine, tidal marsh, and coastal environments of North Carolina.

Scott R. Compston

Environmental Sciences, Data Management

Scott Compston is an environmental scientist with over 12 years of environmental consulting experience with significant and diverse field expertise.

Focus and Experience

Scott has significant experience performing site investigations at complex sediment sites. For the past five years he has served as the field team leader for the investigation of a sediment mega-site in New Jersey where he directed over 25 field staff and over 20 subcontractors to complete state-of-the practice sampling and investigation programs for sediment, surface water, pore water, interstitial water, and biota under supervision of the USEPA. Under his direction, field crews have collected and processed over 3,500 sediment samples, 900 tissue samples, 3,000 water samples, and 650 air samples. The sampling program included 3 years of continuous water quality and stream flow velocity monitoring at 7 stations, three years of continuous marsh water level monitoring at 40 locations, and 20 automated water sampling locations.

Scott’s significant and diverse field experience has enabled him to create and improve field sampling techniques to ensure data of the highest quality. Working in challenging sampling environments and meeting the requirements of demanding sampling programs prompted him to develop several innovative sediment sampling solutions. He developed equipment and methods to efficiently sample marsh and waterway sediment, and interstitial water in marshes. These devices permitted the confident sampling of sediment on intervals as small as one centimeter for high resolution analysis of geochronology and contaminant profiles in sediment. Innovative designs have also permitted monitoring of remedial strategies and supported feasibility study efforts.

Scott’s experience captures all phases of site investigation including work plan preparation and project scoping, development of quality control practices and procedures, field implementation of project objectives and data analysis, visualization and reporting. He has developed extensive Quality Assurance Plans and field procedure documentation for innovative sampling programs. Additionally, he developed and implemented health and safety practices for a five year field program that have resulted in no lost-time injuries or reportable incidents.



Scott Compston

Specialties

Coastal/Marine Expertise

Remedial Investigation/Feasibility Study

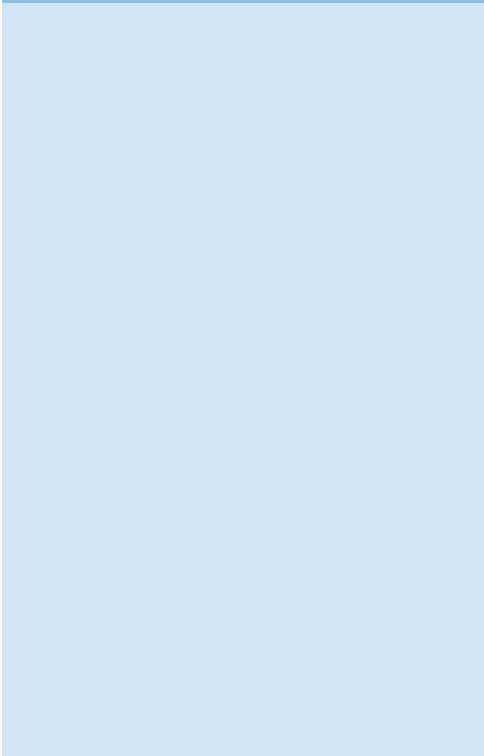
Environmental Sampling

Environmental Site Assessment

Education

M.S., Environmental Soil and Water Science, University of Arkansas, Fayetteville, Arkansas, 2002

B.S., Environmental Soil and Water Science, University of Arkansas, Fayetteville, Arkansas, 1999





Matt Vanderkooy

Specialties

*Sediment and Groundwater
Remediation*

Sediment Treatability Testing

Analyzing and Improving Sustainability

Pipeline Leak Detection

Education

*M.Sc., Hydrogeology, University of
Waterloo, Waterloo, Ontario, 2010*

*B.Sc., Honors Chemistry, University of
Waterloo, Waterloo, Ontario, 2007*

Matt Vanderkooy, M.Sc.

Sediments Restoration/Remediation, Sustainability, Pipeline Leak Detection

Matt Vanderkooy focuses on combining innovative technologies with proven methods to better characterize and cleanup contaminated sites

Focus and Experience

Matt is an Environmental Scientist practicing sediment, soil, groundwater, and soil vapor remediation, treatability testing, sustainability evaluations, and passive sampling programs.

Matt focuses his career on combining innovative methods and technologies with proven methods, to more efficiently and effectively characterize and treat environmental contamination. Matt recognizes the potential for innovative technologies and management approaches (e.g. monitored natural recovery of contaminated sediments) to help clients meet technical, financial, and sustainability goals.

Matt's remediation and site investigation experience spans the four major environmental media: sediment, soil, groundwater, and soil-vapor. He has planned and implemented site investigations and designed and managed remedies. His specializations include characterizing sediment pore water passive samplers, contaminant dynamics in sediments, sediment treatability studies for amending contaminated sediments, chlorinated solvent bioremediation, sustainability, and pipeline leak detection.

His skills and responsibilities include: analyzing and finding solutions to complex problems; effectively managing scope, schedule and budget for multiple projects; writing concise, well written reports; and delivering informative and engaging technical presentations to industry conferences and university classes.

Matt manages sediment treatability tests focused on identifying amendments to reduce PCB, mercury and methyl mercury concentrations in sediment pore water. Testing to date has identified geochemical conditions and combinations of amendments capable of significantly reducing pore water concentrations for specific sites.

Matt also pioneers using passive samplers in sediment investigations. Passive samplers can offer superior in situ measurements of contaminants compared to traditional approaches. Matt has implemented passive samplers and designed implementation plans for a number of Geosyntec projects and serves as an internal technical resource.

Matt also applies concepts from vapor intrusion into buildings to better understand pipeline leak detection possibilities. Subsurface hydrocarbon sources can result in vapor intrusion into buildings. Understanding these dynamics Matt is applying them to characterize the potential for vapors emanating from pipeline leaks to be used in identifying the pipeline leaks.

Meghan S. Schuck, MPH

Environmental Health and Toxicology, Risk Assessment

Meghan Schuck is an environmental scientist specializing in human health and ecological risk assessments for chemicals present in the environment.

Focus and Experience

Meghan conducts exposure and toxicity assessments in support of site-specific human health and ecological risk assessments, and is skilled in database management using various statistical analyses to identify trends in groundwater, soil and sediment contamination. She has conducted risk assessments under CERCLA and RCRA guidelines as well as under state regulatory guidelines throughout the country, including Florida, Georgia, Illinois, Ohio, Tennessee, Massachusetts, New Jersey, West Virginia and Virginia. Meghan holds a Master's degree in Public Health with an emphasis on environmental health, toxicology, and risk assessment.

Megan conducted a baseline human health and ecological risk assessment at the Matthiessen Hegeler Zinc NPL Site in La Salle, IL. Located on the Little Vermilion River, the site is a former zinc rolling mill and primary zinc smelter that had produced slab zinc, sulfuric acid, and ammonium sulfate fertilizer. Manufacturing processes resulted in the emission of airborne particulate matter containing PAHs, arsenic, cadmium, lead, zinc and other inorganic chemicals. In Brunswick, GA, Meghan conducted a tiered ecological risk assessment at the Terry Creek toxaphene manufacturing facility. Work to date has included development of a remedial investigation work plan to evaluate potential ecological risks associated with a facility outfall ditch and Terry Creek as the receiving water body.

Currently, Meghan is conducting a human health and screening level ecological risk assessment at the Hanlin-Allied-Olin NPL Site in West Virginia on the Ohio River. The former chemical manufacturing facility produced aniline, nitrobenzene, methylene dianiline, dinitrotoluene, diaminotoluene, toluene diisocyanate, and fumaric, maleic and malic acids. The plant also produced chloromethanes using the chlor-alkali mercury cell process; other products include chlorine, sodium hydroxide, and hydrogen. The human health evaluation includes several worker scenarios and hypothetical residential scenarios involving hypothetical use of groundwater. The results of the screening level assessment will be used to develop a focused work plan for refining ecological risk estimates. This risk assessment is being conducted with involvement from USEPA Region III and the mid-Atlantic Biological Technical Assessment Group.

Meghan conducted baseline human health and ecological risk assessments at the Former Peters Cartridge Facility NPL Site, a former munitions facility on the Little Miami River in Kings Mills, OH. Chemicals of concern include arsenic, copper, lead, mercury and PAHs. She used a weight-of-evidence approach to demonstrate impacts to the adjacent river were negligible and received agency approval to focus the risk assessment on the terrestrial portion of the site, which expedited the remedial investigation process.



Meghan E. Schuck

Specialities

Ecological Risk Assessment

Site Investigation

Education

Masters of

*Public Health (Environmental Health and Toxicology),
University of Florida, 2006*

*B.A., Biological Anthropology,
University of Florida, 2004*





Ryan Fimmen

Specialties

Remediation of Sediment and Groundwater Sites

Innovative Approaches to Site Characterization and Remedy Selection

Monitoring Programs for Natural Attenuation

Geochemical Modeling of Environmental Systems

Education

Ph.D., Geochemistry, Duke University, Durham, North Carolina, 2004

M.S., Chemistry, University of Wisconsin, Madison, Wisconsin, 1998

B.A., Chemistry, Carleton College, Northfield, Minnesota, 1995

Ryan Fimmen, PhD

Environmental Geochemistry, Sediments Restoration/Remediation, Metals Fate and Transport

Ryan Fimmen, a geochemist, focuses on the evaluation and development of innovative approaches to site investigation, characterization and restoration.

Focus and Experience

Ryan has more than 10 years of experience as an environmental geochemist, providing consulting services in the fields of remediation of sediments, soils, and groundwater. Ryan has applied his expertise to understanding contaminant fate and transformation at waste sites; research and development of environmental remedial technologies; litigation support and report preparation; and environmental technology evaluation, verification, and certification. His experience includes consulting to private sector and government clients for coordinating effective field-scale investigations, laboratory analyses, data reduction/interpretation, and the preparation of high-quality reports and technical memoranda for submission to clients, state and federal regulators, and publication in peer-reviewed journals.

Ryan is a Co-Principal Investigator for a Strategic Environmental Research and Develop Program (SERDP) project whose objective is to investigate the geochemical processes that govern the unintended mobilization of metals during ISCO application for remediation of contaminated groundwater. Ryan has worked with collaborators to develop a series of bench-scale experiments to experimentally quantify metals mobilization and transport through soil columns. The results of these experiments will lead to an improvement in our ability to anticipate metals migration during ISCO application and the development of strategies to mitigate metals transport to minimize potentially hazardous metals from impacting sensitive groundwater resources or exacerbating the extent present impacts.

Ryan served as a Project Manager for a multifaceted sediments project aimed at understanding the geochemical factors which govern mercury methylation in mercury contaminated sediments at a seasonal oxbow lake affected by local industry. Elucidation of the role of organic carbon, sulfate, and redox potential on mercury transformation has translated into efforts to exploit those factors which limit mercury methylation to use in the development of reactive capping sorbent material for use in mercury laden sediments to limit risk associated ecosystem exposure to methylmercury. Phytoremediation was also investigated in a laboratory evaluation of mercury uptake by wetland flora as possible technology for remediation of severely contaminated waterways. Responsibilities as project manager for this EPA project include project oversight duties in sample acquisition/sampling, planning and executing laboratory experiments, data analysis, and preparation of publications/presentations.



Richard DeWan

Sediment Investigation and Remediation, Disposal Site Identification, Evaluation and Selection, Sediment Characterization for Disposal, Regulatory Strategy

Richard DeWan is an environmental scientist who specializes in all regulatory aspects of contaminated sediment sites and provides strategic and innovative approaches to all elements of dredging and dredged material management. He often serves as a key team member on contaminated sediment “mega-sites” acting as a liaison between the technical and legal team members.

Focus and Experience

Richard DeWan is a senior consultant and environmental scientist based in New Jersey with more than 30 years of experience specializing in sediment and dredged material management, sediment remediation, site investigation and remediation, and large-scale brownfields redevelopment initiatives.

Richard’s practice focuses on the development of innovative solutions to the costly issue of contaminated sediment management by identifying beneficial uses of dredged material with or without treatment technologies. He also consults with clients on the regulatory, technical, and analytical requirements associated with the management of contaminated sediments and innovative site remediation techniques.

Prior to joining Geosyntec, Richard was a principal environmental scientist and project coordinator for contaminated sediments teams at three international consulting and engineering firms. Between 1983 and 2004, he also served in multiple leadership roles at both the New Jersey Department of Environmental Protection (NJDEP) and the New Jersey Meadowlands Development Commission, which is the zoning and planning agency for a 30.4-square-mile area along the Hackensack River covering parts of 14 municipalities in Bergen and Hudson Counties.

As leader of NJDEP’s Office of Dredging and Sediment Technology, Richard coordinated all aspects of sediment and dredged material management projects for the state, including major initiatives in the New York/New Jersey Harbor Complex and the tri-state lower Delaware River region. As chief of NJDEP’s Bureau of Surface Water Permitting, he also managed and coordinated the technical activities for New Jersey’s Industrial Discharge to Surface Water Program.

Previously, Richard served as the leader of the Contaminated Sediments Team for the national Interstate Technology and Regulatory Council. He remains a member of the American Association of Port Authorities, the Sediment Management Work Group, the Western Dredging Association, and the Chemistry Council of New Jersey.



Richard DeWan

Specialties

Site Investigation and Remediation

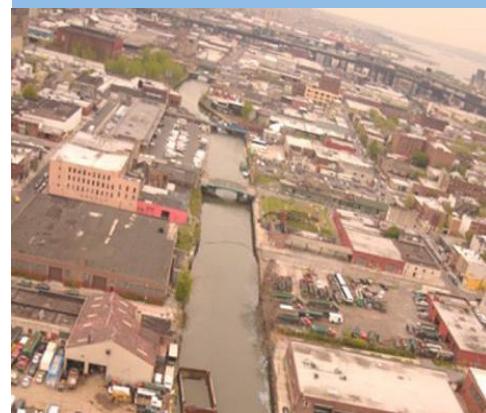
Groundwater Assessment and Remediation

Sediment Assessment and Remediation

Specialized Sediment Treatment Technologies

Education

B.S., Environmental Science, Rutgers University, New Brunswick, New Jersey, 1981





Darrell Nicholas

Specialties

Contaminated Sediments
Hazardous and Mixed Waste Remediation
Mining and Reclamation
Stormwater and Erosion Control
Water and Wastewater Treatment
Water Resources

Education

*B.S., Civil Engineering
(Environmental/Geotechnical),
Tennessee Technological University,
1978*
*M.S., Civil Engineering
(Environmental/Water Resources),
University of Kentucky, 1979.*



Darrell Nicholas, PE

Sediment Remediation, Water Resources, Civil Engineering

Darrell Nicholas, a professional engineer, focuses on sediment remediation and the restoration of streams and waterways. Responsible for the design of one of the first large scale sediment remediation projects conducted under Superfund, he transferred the knowledge and experience gained previously with a wide range of site reclamation, wastewater treatment, and hazardous/mixed waste remediation technologies to the remediation of contaminated sediments. While working on major remediation projects in the US and overseas, he collaborated with manufacturers to advance environmental dredging equipment and continues to work to effectively apply the latest technological advances in the field.

Focus and Experience

Mr. Nicholas, a professional engineer based in Tennessee, has performed as a lead technical manager on over \$3 billion worth of complex multiple stakeholder projects for EPA, DOE, DOD, and private industry clients. He offers 35 years of engineering, construction management, and quality assurance services on a wide range of projects. His experience includes the full project cycle from project planning, conceptual design, and cost estimating to detailed design, field inspection, and construction quality assurance and compliance monitoring. Over the past dozen years, he has concentrated on the remediation of contaminated sediments.

He has played a lead role in the design and management of some of the largest, most complex sediment remediation projects completed in the United States and overseas. Applying his problem solving skills and knowledge of mechanical and hydraulic dredging technology, he has supported remediation of over 2 million cubic yards of contaminated sediment. These successfully completed remediation projects have been recognized with several national and international awards and represent a total project value in excess of \$1 billion.

Prior to entering the sediment remediation field, Darrell provided a diverse range of civil, environmental, mining, and water resources consulting services in his private practice. His civil design experience includes site design of commercial and industrial facilities and the design of water and wastewater treatment plants for municipal and industrial clients. Working for private clients and various government agencies, he has designed storage and disposal facilities for solid, hazardous and mixed radioactive wastes, conducted remedial investigations/feasibility studies, and developed remedial action plans for numerous hazardous waste sites. In support of mining clients, he has experience in the areas of surface coal mine layout, the preparation of environmental impact assessments, environmental permitting, geotechnical investigation and design, and treatment of acid mine drainage. He has performed surface water, ground water, and sedimentology modeling for numerous Appalachian mine sites in an area stretching from southern Tennessee through West Virginia. Darrell's services have been sought as an expert witness to support litigation in a variety of water resources and sediment remediation cases.

J.F. Beech, PhD, PE

Geotechnical and Geoenvironmental Engineering, Waste Containment, Sediment Remediation

Dr. Beech is a Senior Consultant with over 35 years of experience in geotechnical engineering, , waste containment, civil site design, and sediment remediation. Dr. Beech routinely works on large projects taking them from conception through construction.

Focus and Experience

Dr. Beech has over 30 years of experience in design and construction related to large scale remediation projects. His geotechnical engineering experience includes design of containment systems, retaining structures, structures on soft soils, and foundation improvement. Throughout his career Dr. Beech has interfaced with various state and federal regulatory agencies to demonstrate the technical viability of proposed remedies. Dr. Beech also has experience with the design and construction of LLW disposal facilities, which provides him with good insight into the associated long-term performance requirements.

Dr. Beech is the Engineer-of-Record/Technical Coordinator for the design of a remedial action at an industrial canal in New York. Technical components of the project include bulkhead restoration, debris removal, dredging, dewatering and management of dredged material, water treatment, and capping.

Dr. Beech is the Engineer-of Record for the containment system associated with the remediation of a lake in New York State. Sediments dredged from the lake are being be pumped into geotextile tubes placed in the containment system. The system is unique in that it is being constructed over compressible material on the order of 45 to 90 ft deep, compressible and poses a number of geotechnical engineering challenges. He is also the Engineer-of Record for a sheet pile cut off wall; installed to control the flow of impacted groundwater into the lake. Following installation, up to 10 ft of soil and sediment will be dredged from directly in front of the wall. Dr. Beech has been called in to conduct a detailed geotechnical review of a subaqueous sediment cap. As part of the review settlement and stability (static and seismic) stability of the cap was developed.

Dr. Beech served as the design engineer for a removal action conducted at a former chlor-alkali and refinery facility in Brunswick, Georgia. He worked with the client and the USEPA on-scene coordinators to develop and design practical and economical removal response actions. The remedial designs were summarized in work plans which addressed such activities as construction of a cantilever sheet pile wall to allow excavation of material immediately adjacent to a salt marsh. construction of a berm in an estuarine marsh to prevent tidal inundation of a former disposal area, removal and consolidation of soft sediments in an outfall berm, construction of a barrier system to control potentially impacted ground water, excavation of sediments and restoration for 12 acres of impacted ecologically sensitive salt marsh, and solidification/stabilization of sludge and impacted soils. The work plans addressed health and safety, confirmation sampling, QA/QC requirements and close out documentation.



Jay Beech

Specialties

Geotechnical and Geoenvironmental Engineering

Waste Containment

Sediment Remediation

Education

Cornell University: Ph.D, Geotechnical Engineering, 1986

Wayne State University: M.S. Civil Engineering, 1978

Wayne State University: B.S. Civil Engineering, 1977





Chris Greene

Specialties

Sediment Remediation

Geotechnical/Geoenvironmental Engineering

Remedial Investigations

Feasibility Studies

Program Management

Education

*M.S., Engineering Management,
Tufts University, Medford,
Massachusetts, 2004*

*M.S., Environmental
Geotechnology, Tufts University,
Medford, Massachusetts, 1999*

*B.S., Civil Engineering Technology,
Wentworth Institute of Technology,
Boston, Massachusetts, 1995*

Christopher Greene, PE

Geoenvironmental Engineering and Sediment Remediation

Chris Greene is a Senior Consultant with 18 years of experience in investigations, designs, and construction for Fortune 500 companies, Army Corp of Engineers as well as PRP Groups within the CERCLA program. His focus is on developing innovative remediation solutions for complex projects.

Focus and Experience

Chris' experience includes managing, designing and constructing various remediation projects. His experience includes various project phases of hazardous waste sites, excavations, sediments, landfills, groundwater collection trenches, caps, cut-off walls, and bioremediation. He also has experience with a variety of contract types including firm fixed price, lump sum, unit price, and cost reimbursable.

Presently, Chris' focus is on sediment projects. Chris actively participates in industry organization including the Sediment Management Work Group (SMWG) and provides management and technical direction on several large sediment projects. He has worked on remedial investigations, feasibility studies, designs, and construction implementation.

As the Project Manager/Technical Director for one of the potentially responsible party (PRP) members on the Berry's Creek Study Area (BCSA) Superfund Site in New Jersey, he was responsible for technical support and strategic planning. Chris led a team that designed and implemented pilot studies in tidal marshes to evaluate in-situ treatments (e.g. activated carbon) for PCBs, methyl-mercury, and mercury. He participated in the evaluation of FS remedial alternatives, development of conceptual site models, conducted a technical reviews of PRP group documents, work plans, and reports, compiled information on regional background concentrations, and appropriate sediment criteria, assessed potential natural resource damages, and evaluated potential habitat restoration options.

Chris was the Project Manager for the Fisherville Mill Site Sediment Remediation project for the MADEP in Grafton, Massachusetts. Chris was responsible for the environmental investigations, design, and construction oversight for the remediation of PCB- and petroleum-impacted soils and sediments in the Blackstone Canal. Site assessments were performed to determine the nature and extent of contamination in the sediments in the canal to delineate the area(s) and volume of sediments posing a condition of "Readily Apparent Harm" under Massachusetts regulations. He was also responsible for the evaluation of sediment remediation options with cost estimates for various options as well as permitting to implement the remedial tasks. The final remedy included removal for approximately 2,000 cubic yards of sediment using vacuum excavation and long reach excavators.

Chris was the Project Manager for the West Riser Tide Gate Sediment Removal Project for Rohm and Haas in Wood-Ridge, New Jersey. Chris was responsible for the delineation of mercury-impacted sediments, evaluation of remedial alternatives, and preparation of design and construction documents.



Emmie Chen, PE

Environmental Site Assessment and Remediation, Data Management, Visualization and Analysis

Emmie Chen is an environmental engineer specializing in characterization and remediation of contaminated sediment sites as well as management, visualization, and analysis of site data in support of conceptual site model (CSM) development and remedy design.

Focus and Experience

Mrs. Emmie Chen is a Registered Professional Engineer in Geosyntec's Kennesaw, GA office who has been a key contributor to numerous sediment site investigation and remediation projects. As a project and task manager, Emmie has experience in all phases of environmental site characterization including Sampling Plan design and Work Plan development; Quality Assurance Project Plan and Health and Safety Plan development; execution of field sampling programs; data management and analysis; two-dimensional (2-D) and three-dimensional (3-D) data visualization; CSM development; and report preparation. Emmie has conducted investigations at complex upland and sediment sites under a variety of state and federal regulatory frameworks; however, her work has focused on addressing investigative and remedial administrative orders under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

As the Data Compilation and Visualization Task Manager for two large sediment CERCLA sites, Emmie served the client and project teams through detailed management of site and upland datasets, integrated analysis of multimedia results, and creation of visualization tools to assist with data interpretation and analysis. These data visualization tools helped both project teams refine site CSMs, evaluate potential historical and on-going contaminant sources, scope additional site investigation efforts to further characterize the site(s) and to support remedial design, and assess optimal remedial approaches. Emmie's strong technical background in sediment investigations and remediation has provided her with the skills to manage and analyze site data and create visual aids in an effective, technically-focused manner.



Emmie Chen

Specialties

Sediment Site Investigation and Remediation

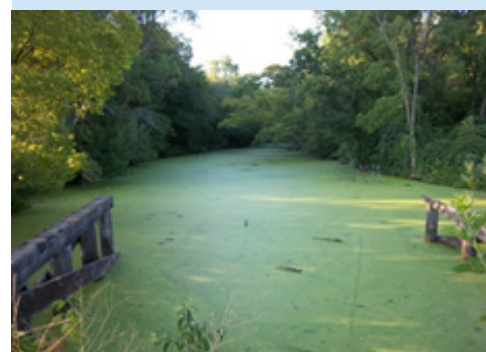
Remedial Investigation/Feasibility Study

Data Management, Visualization and Analysis

Education

*M.S., Environmental Engineering,
Georgia Institute of Technology,
Atlanta, Georgia, 2009*

*B.S., Environmental Science,
University of North Carolina-
Chapel Hill, Chapel Hill, North
Carolina, 2007*





James Brinkman

Specialties

Remedial Planning and Design

Construction Management

Treatability Studies

Feasibility Studies

Education

M.S., Chemical Engineering, University of Missouri, Columbia, Missouri, 1991

B.A., Chemical Engineering, University of Missouri, Columbia, Missouri, 1983

James Brinkman, PE

Sediment Management

Mr. Brinkman is a senior engineer based in Massachusetts with close to 30 years of experience executing and managing a wide variety of environmental projects. He has a particular specialty in projects associated with sediments, both for remediation and navigation purposes. His clients have primarily included large industrial interests with holdings and legacy sites around the world.

Focus and Experience

Mr. Brinkman's extensive experience leading large, complex sediment remediation projects includes both domestic and international projects and spans all phases of design and construction. He has developed project strategies, conducted bench- to-full scale evaluations, evaluated remedial alternatives, and performed conceptual design. He has also performed detailed design plans and specifications, estimated construction costs, and conducted scheduling, procurement, and program management. He has specific technical expertise in dredging, dewatering, stabilization, material handling, capping, and water treatment.

Mr. Brinkman's specific sediment-related experience includes managing the dredging works and sheet pile removal for the \$800 million Hunter River Remediation Project in Newcastle, Australia, one of the largest projects of its kind in the world. The project, associated with the removal of approximately 1.6 million cubic yards of sediment contaminated with polycyclic aromatic hydrocarbons (PAHs), came in approximately \$200 million under budget and ahead of schedule. His efforts on the Hunter River Remediation Project earned the project the 2012 Australian National Engineering Excellence Award.

He also served as the Engineer of Record on a Time Critical Removal Action project on the Lower Passaic River in New Jersey, where approximately 16,000 cubic yards of sediment contaminated with dioxin, PCBs, and mercury were dredged and a reactive cap was subsequently placed.

Mr. Brinkman's additional sediment-related experience includes the New Bedford Harbor Superfund Project in Massachusetts and the Fox River Project in Wisconsin. He regularly presents at U.S. and international sediment related conferences.

Jason Conder, PhD

Aquatic Toxicology and Chemistry, Risk Assessment, Contaminated Sediment Management

Dr. Jason Conder is a contaminated sediments specialist with more than 11 years of experience in contaminated sediment assessment and management, environmental toxicology, and ecological and human health risk assessment

Focus and Experience

Jason's expertise in risk assessment, environmental toxicology, and environmental chemistry focuses on strategic guidance and effective solutions to the most difficult contaminated site and contaminated sediment management challenges. Jason's expertise in chemical fate and risk assessment emphasizes the most effective approaches to investigate and manage sediment contaminants. Applying a pragmatic, risk-focused paradigm to contaminated sediment management, Jason provides risk- and cost-effective sediment management support to design, cost, and monitor sediment remediation programs. Jason also routinely applies state-of-the-science tools to understand chemical liabilities at sites impacted by multiple contaminant sources, synthesizing a wide spectrum of chemical forensics and fate information, site-specific chemical use history, and risk evaluation to support equitable remedial cost allocation.

Jason has performed a variety of technical services for numerous large, multi-stakeholder client and client groups at contaminated sediment sites in North America, Europe and Asia. His diverse responsibilities have included conceptualization and project management of sediment RI/FS programs, design and management of field investigations, advanced modeling, statistics, visualization of sediment data, litigation support and expert witness testimony, remedial cost allocation and liability analysis, and preparation of strategic guidances for clients with large programmatic needs (e.g., US Navy, US Army Corps of Engineers, etc.). Jason is currently evaluating innovative in situ activated carbon sediment remediation treatments for sediment sites in the Lower Duwamish Waterway, Puget Sound, and Gowanus Canal, advising on liability and allocation issues on four multi-million dollar sediment sites, and conducting preliminary risk and chemical fate assessments at several sediment sites in the US.

Jason continues to advance the state-of-the-practice in contaminated sediments. He has published more than 20 peer-reviewed articles in sediment management and environmental toxicology and chemistry, presented technical work at numerous international scientific conferences, and has served on and co-chaired several technical workshops. Jason is currently developing novel passive samplers to evaluate chemical availability and fate in sediment porewater and surface water (service is commercially-available through SiREM).



Jason Conder

Specialties

Contaminated Sediment Assessment and Remediation

Risk Assessment and Applied Ecotoxicology

Innovative Passive Sampling Technologies and Fate Modeling

Liability Analysis and Forensics

Education

Ph.D, Environmental Science, University of North Texas, 2004

M.S., Zoology, Oklahoma State University 2000

B.S., Wildlife and Fisheries Ecology, Oklahoma State University, 1997



We are
engineers, scientists
and innovators.



Geosyntec Consultants is a leading consulting and engineering firm that operates throughout North America, Asia, Australia, and Europe. We address new ventures and complex challenges involving our environment, natural resources, and civil infrastructure through high-value services, first-to-field deployment of emerging technologies, and innovative solutions for our private and public clients.

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Sediment Assessment and Remediation