Dan Cooke

Principal Scientist

Mr. Cooke has 32 years of project management experience in the design, direction, and performance of ecological risk assessments, sediment evaluations, environmental toxicology studies, coastal marine habitat assessments, chemical biodegradability and treatability studies, natural resource evaluations, chemical fate and effect studies. Mr. Cooke has project management and technical expertise for both private and public sector clients throughout the country.

He has extensive experience as a regulatory liaison, and has acted as lead technical reviewer for dozens of ecological risk assessments and environmental site assessments for the USEPA. He has substantial experience in the development and implementation of a wide range of quality assurance project plans, health and safety plans, soil, groundwater, surface water and sediment investigations, laboratory and field toxicology and bioaccumulation studies, bench-scale treatability and field pilot studies. He also has significant experience with emergency response activities.

He has been responsible for business development for several clients and has demonstrated the ability to work with the client to identify their needs, define project requirements, work with senior program management to develop contract/proposals for the work, and successfully manage the ensuing projects.

Representative Projects

Ecological Risk Assessment

Lead Ecological Risk Assessor, Lower Passaic River Site, New Jersey. The 17-mile long Superfund sediment site has been under investigation for many years. Working on an oversight contract for USEPA Region 2, I performed technical reviews for deliverables submitted by the Responsible Party (RP), including a baseline ecological risk assessment (BERA), biota sampling plans and results, interim action work plans, bioaccumulation modeling, and the overall remedial investigation report. Reviews of the BERA included evaluation of sediment quality triad data (toxicity, chemistry, and benthic invertebrate community data), toxicity/chemistry correlations, and an in-depth review of sediment toxicity reference values (TRVs) and biota-sediment accumulation factors (BSAFs). I took part in numerous meetings between EPA, NOAA, NJDEP, USFWS, and the RP, during which technical arguments were worked out. The reviews and meetings resulted in revisions to the deliverables, altering the potential remedial footprint. I also helped prepare presentations for the EPA's Contaminated Sediments Technical Advisory Group (CSTAG) and the public.

Lead Ecological Risk Assessor, Newtown Creek Superfund Site, New York. The 4-mile long Superfund sediment site in New York City has been under investigation for many years. Working on an oversight contract for USEPA Region 2, I performed technical reviews for deliverables submitted by the Responsible Party (RP), including a baseline ecological risk assessment (BERA), multiple rounds of biota sampling work plans and results, and bioaccumulation modeling. Reviews of the BERA included evaluation of sediment quality triad data (toxicity, chemistry, and benthic invertebrate community data),

Education

M.S. – Biology, Fairleigh Dickinson University, Teaneck, NJ, 1991

B.S. – Marine Biology, Fairleigh Dickinson University, Rutherford, NJ, 1984

Certifications

USEPA Divemaster

USEPA Scientific Diver

OSHA – HAZWOPER Supervisor

OSHA – 40hr HAZWOPER

toxicity/chemistry correlations, and an in-depth review of sediment toxicity reference values (TRVs) and biota-sediment accumulation factors (BSAFs). I took part in numerous meetings between EPA, NOAA, NYSDEC, NYCDEP, USFWS, and the RP during which technical arguments were worked out. I also developed the final weight of evidence (WOE) approach that was utilized in the final BERA. The reviews and meetings resulted in revisions to the deliverables to make them acceptable to EPA, and alter the potential remedial footprint to be more protective. I also helped prepare presentations for the EPA's Contaminated Sediments Technical Advisory Group (CSTAG) and the public.

Lead Ecological Risk Assessor, Kalamazoo River Superfund Site, Michigan. The 80-mile long Superfund sediment site is broken into multiple operable units and areas. Working on an oversight contract for the Michigan Department of Environmental Quality (MDEQ), I performed in-depth technical reviews of the ecological and human health risk assessments for the floodplain areas, including a thorough recalculation of food chain exposure modeling, the derivation of biota-sediment accumulation factors (BSAFs), and the exposure parameters for human recreational users. I took part in multiple meetings between MDEQ, EPA, and the Responsible Party (RP) during which technical arguments were worked out. I prepared several presentations regarding the appropriate calculation of accumulation factors and toxicity reference values (TRVs) for bioaccumulative compounds such as PCBs and dioxins/furans (the site risk drivers).

Lead Ecological Risk Assessor, Clariant Site, New Jersey. The site was impacted by chlorinated solvents in groundwater that was discharging to the sediment of the Passaic River. Passive sampling devices were put in place by divers, and the results used to measure volatile organic compound concentrations in sediment pore water from a series of transects across the river. I derived the potential for ecological risk utilizing the EPA's equilibrium-partitioning sediment benchmark toxic unit (ESB-TU) method. Through the ecological evaluation, I was able to determine the effectiveness of the groundwater treatment system for protecting the river sediment.

Remedial Investigations/Remedial Actions

NJDEP, Field Sampling Procedures Manual, New Jersey. Technical advisor and contributing author for a major revision of the NJDEP's *Field Sampling Procedures Manual*. The document was last promulgated in 2005 to provide guidance for collection of field samples to be used in remedial investigations. For the current technical rewrite, I revised the guidance for sediment sampling and wrote new guidance sections for biota collection (e.g., small mammals, fish, plants). I am also a peer reviewer and contributor for the entire document. The guidance document is anticipated to be released in late 2019.

NJDEP, Science Advisory Board, Ecological Processes Standing Committee, New Jersey. I was invited to join the committee to provide technical expertise to the NJDEP for matters relating to ecological processes and functions. Our latest issues have included a peer review of NJDEP's GIS-based tool for addressing ecological habitat corridors in NJ. The Continuous Habitat Across New Jersey (CHANJ) web site will be opened for public use in early 2019. I am currently working on a project to assess the potential impacts of undersea seismic testing off the coast of NJ on wildlife receptors (birds, marine mammals, turtles, fish, invertebrates), as a follow-up to the federal government opening the mid-Atlantic coast for oil and gas exploration. The research will form the basis for NJDEP's policy on seismic testing.

Representative Projects – Prior to CDM Smith

Ecological Risk Assessment

NJDEP, Ecological Evaluation Technical Guidance, New Jersey. Technical advisor and contributing author for the New Jersey Department of Environmental Protection's *Ecological Evaluation Technical Guidance*. The document was promulgated to provide guidance for conducting Ecological Evaluations (EE) and Ecological Risk Assessments (ERA) for environmentally sensitive natural resources associated with contaminated sites. Mr. Cooke wrote all of the guidance document sections dealing with toxicity and bioaccumulation studies for aquatic and terrestrial species for use in ecological assessment, and was also a peer reviewer for the completed document.

Project Manager, Red Bank Landfill Site, Red Bank, New Jersey. Mr. Cooke designed and directed an ecological risk assessment of a former landfill site along a tidal estuary, destined for beneficial reuse. The project entailed multiple field events to assess sediment, surface water, soil, and biota in and around the former landfill to assess whether it would be feasible to create a park for recreation and to open the river for fishing/crabbing. Several stakeholder/public presentations were made to explain the results of sediment toxicity assessments, wildlife food chain exposure modelling, and the presence of endangered birds. The project was partially funded by the New Jersey Department of Environmental Protection, and the Department was involved in the review of all reports and presentations.

Lead Sediment Biologist, Former Stratford Army Engine Plant Site, Stratford, Connecticut. Mr. Cooke led a large sediment remediation project at a Formerly Used Defense Site (FUDS). A large, estuarine tidal flat had been contaminated through historical operations at the plant. As part of Base Realignment and Closing (BRAC), the Army contracted to design and perform a large-scale sediment sampling and analysis program to determine the potential remedial footprint. A series of 100+ sampling locations were assessed for metals and PCBs, and 56 of the sampling locations were submitted for 28-Day chronic toxicity studies using the amphipod *Leptocheirus plumulosus*. The toxicity study I designed and oversaw was the largest sediment study ever undertaken by the US Army Corps Engineering Research and Development Center laboratory in Vicksburg, MS. The study was used in concert with the multiple-depth sediment analyses to derive a site-specific remedial footprint.

Project Manager, Route 1 P.W., LLC Site, Linden, New Jersey. Mr. Cooke designed and directed an ecological risk assessment of an urban stream impacted by petroleum hydrocarbons from a leaking storage tank. Mr. Cooke designed a series of studies to delineate the groundwater and sediment contamination and to determine whether the measured polycyclic aromatic hydrocarbons (PAHs) were of pyrogenic or petrogenic origin. State-of-the-science techniques included the use of solid-phase micro-extraction (SPME) analysis of USEPA's list of 34 PAHs, calculation of the Pyrogenic Index for all sampling locations, and the use of equilibrium partitioning sediment benchmark modelling for PAH toxic units (ESBTU). The study determined that the PAHs in sediment were from off-site sources, saving the client from costly remediation and directing regulators to alternate sources.

Lead Ecological Risk Assessor, NIPSCO Bailly Generating Station, NiSource, Chesterton, Indiana. Mr. Cooke led a team for the design and performance of a multi-year series of studies as a weight-of-evidence approach for an Ecological Risk Assessment (ERA). The ERA was used to determine whether historic releases of fly ash had impacted the wildlife and the unique wetland vegetation and amphibian populations in a National Park on the shore of Lake Michigan. The ERA included the collection of hundreds of groundwater, surface water, soil, sediment, and plant tissue samples. He designed and supervised a direct assessment of soil toxicity from across the Site via multi-species plant toxicity studies, and a direct assessment of ephemeral pool sediment toxicity via amphibian toxicity studies. He designed and directed a multi-year/multi-season field amphibian survey for twenty ephemeral pools in five different wetland and reference areas on the facility property and in the adjacent National Park. A cattail rhizome bioaccumulation study was designed to assess whether the cattail root system in a 50-acre wetland area could potentially accumulate enough Site-related metals to pose a risk of release after the National Park Service (NPS) cattail eradication program. The weight-of-evidence approach also included a physical/chemical assessment of barren soil areas, a characterization of wetland plants, a characterization of each wetland habitat, and routine monitoring of ephemeral pool water quality. He designed all studies with input from both USEPA and NPS, and each study was approved by USEPA prior to initiation in order to ensure that all results would be acceptable for the development of an ERA. Over the course of five years, all deliverables were submitted on schedule and within budget.

Lead Ecological Risk Assessor, Fair Lawn Well Field Superfund Site, Fair Lawn, New Jersey. Performed a screening level ecological risk assessment (SLERA) for a large groundwater plume of chlorinated solvents originating at a small industrial park in a commercial area, which flowed through a residential area and into a municipal well field. The SLERA was part of a much larger Remedial Investigation (RI), and was focused on potential impacts of groundwater volatile compounds on sediment and surface water in a stream corridor. Hundreds of groundwater samples and dozens of surface water and sediment samples were used to delineate the plume and to select potential areas of concern in the stream.

Lead Risk Assessor, ExxonMobil, Former Charleston Distribution Terminal, Charleston, South Carolina. Mr. Cooke designed and led a Baseline Ecological Risk Assessment (BERA) of a large petrochemical storage facility, focusing on the storm water retention pond areas and adjacent salt marsh on the Cooper River. The BERA was performed using soil, sediment and surface water samples collected from three areas of concern (AOCs) on the site and three marsh areas to determine whether historic and ongoing site activities pose risk to wildlife receptors in and around the Site.

Lead Ecological Risk Assessor, National Grid, Inc., Former Gloucester MGP Site, Gloucester, Massachusetts. Mr. Cooke completed a Stage II Environmental Risk Characterization (ERC) of the Gloucester Harbor area adjacent to the Site. The ERC was performed as part of a large Comprehensive Site Assessment (CSA) of the former Manufactured Gas Plant (MGP). Using sediment, surface water and biota samples in concert with historical data and a series of laboratory toxicity studies, he characterized the ecological risks associated with MGP-related constituents in conformance with

Massachusetts Department of Environmental Protection's presumptive certainty requirements.

Lead Ecological Risk Assessor, Bank of America, NA, White Swan and Sun Cleaners Superfund Site, Wall Township, New Jersey. Mr. Cooke designed a modified screening level ecological risk assessment (SLERA) for a large groundwater plume of tetrachloroethylene (PCE) originating at two former dry-cleaning facilities in a commercial area, and converging as it flowed through residential and wetland areas toward the Atlantic Ocean. The SLERA was part of a much larger Remedial Investigation (RI), and was focused on potential impacts of groundwater volatile compounds on sediment and surface water in two nearby stream corridors. Thousands of groundwater samples were used to delineate the plume and to select potential areas of concern in the two streams.

Project Manager, Atlantic Wood Industries, Inc. Site, Portsmouth, Virginia. Mr. Cooke designed and directed an ecological risk assessment on the Elizabeth River in Portsmouth, VA. The State of Virginia raised concerns that wood treating chemicals had contaminated the river to the point that seafood consumption advisories were in place, and wildlife was believed to be at risk. The project entailed study design, collection and analysis of sediment, fish tissue, and surface water in the Elizabeth River and several tributaries. Sediment profile imagery (SPI) and field collection of benthic invertebrates was used in conjunction with laboratory toxicity studies using amphipods (*Leptocheirus plumulosus*) and fish (*Cyprinodon variegatus*). Also incorporated were in situ toxicity and bioaccumulation studies with caged oysters (*Crassostrea virginica*) and laboratory toxicity and bioaccumulation studies with sandworms (*Neries Neanthes virens*). Site-specific, risk-based clean-up goals were derived.

Project Manager, Molycorp Mine Site, Red River, New Mexico. Mr. Cooke designed a series of *in situ* toxicity studies in the Red River, using the freshwater amphipod *Hyalella azteca* and the indigenous mayfly *Drunella grandis*. The project developed a novel approach to focus the toxicity studies. Piezometers were installed to monitor pressure differentials between the groundwater and surface water along 15 miles of the river, to monitor the effects of mine-contaminated groundwater upwelling into the stream. The six-month project entailed multiple trips to the site to install and monitor piezometers prior to designing the toxicity study. The *in situ* test chambers were placed in the river in locations where the groundwater was upwelling into the stream. Toxicity results were correlated with metals concentrations detected in groundwater collected from the piezometers.

Project Field Lead, Former Koppers Wood Treating Plant, Beazer East, Carbondale, Illinois. Mr. Cooke led a series of aquatic studies in three streams adjacent to the site to assess the health of the aquatic habitat. Both forage-sized fish and edible-sized fish were collected for tissue analyses to use in ecological and human health risk assessments. He also developed a site-specific sediment toxicity study plan for assessment of sub-lethal impacts to sediment invertebrates.

Project Manager, Jacobs Smelter Site, Salt Lake City, Utah. Mr. Cooke managed an ecological risk assessment of an abandoned mining and smelting site on a small dead-end, saline lake near Salt Lake City, Utah. The habitat was unique and the species utilizing the lake were believed by the Utah Department of Environmental Quality to be at risk. The project included the collection of soil, groundwater, sediment, surface water, plant tissue,

fish tissue, aquatic and terrestrial invertebrate tissue, and small mammal tissue for analysis of mine-related constituents. Food chain exposure modelling was performed and preliminary clean-up goals were derived.

Project Manager, Canal Creek Site, Aberdeen Proving Grounds, Harford, Maryland. Mr. Cooke performed an ecological risk assessment in the Canal Creek section of the US Army's Aberdeen Proving Grounds. The team had to coordinate with the US Army's ordnance disposal unit to screen all sampling locations for unexploded ordnance (UXO) prior to collecting sediment, surface water, fish tissue, and aquatic plant tissue samples for use in food chain exposure models to determine whether munitions and chemical warfare agents had contaminated a salt marsh. Contaminant sources were identified and preliminary clean-up goals were derived.

Project Manager, Kings Creek Site, Aberdeen Proving Grounds, Harford, Maryland. Mr. Cooke directed the performance of an ecological risk assessment in the Kings Creek section of the US Army's Aberdeen Proving Grounds. The team had to coordinate with the US Army's ordnance disposal unit to screen all sampling locations for unexploded ordnance (UXO) prior to collecting sediment, surface water, fish and clam tissue samples for use in food chain exposure models to determine whether munitions, metals and pesticides had contaminated a salt marsh.

Group Leader, Burnt Fly Bog Site, Marlboro, New Jersey. Mr. Cooke directed the performance of an ecological risk assessment of a New Jersey Pinelands bog that had been contaminated with metals and petroleum hydrocarbons. The team collected soil, plant tissue and small mammal tissue for analysis of contaminants. Analytical results were used in food chain exposure models to determine whether risk was present from site-related contamination. Contaminant loads were calculated and preliminary clean-up goals were derived.

Project Manager, Ringwood Mines/Landfill Superfund Site, Ringwood, New Jersey. Mr. Cooke was the Project Manager for a multi-year ecological and human health risk assessment of contamination from industrial solvents and automotive paint sludge releases into a wooded area near Ringwood, New Jersey. The project included post-remediation assessment of several mine-pit areas, and a biota assessment in the wooded/residential areas within and surrounding the site. Residents expressed concerns that local plants and wildlife tissue had been contaminated. A study was performed to collect tissue samples from those species commonly eaten by local residents (deer, turkey, rabbits, squirrels, frogs, crayfish, wild carrot, blackberries, and dandelion greens). Tissue contaminant burdens were compared to background and reference location samples and were used to develop human health consumption guidelines. The study also included an ecological assessment of soil, sediment, surface water, plants, and small mammals.

Natural Resource Surveys

Lead Biologist, Offshore Wind Turbine Impacts on Marine Animals, Fishermen's Energy, Atlantic City, New Jersey. Mr. Cooke was the Lead Marine Biologist for a project to place an offshore wind farm off the coast of New Jersey. He produced a white paper to determine the potential impacts of construction and operation of offshore wind turbines on the migration of marine mammals, dolphin calving areas, sea turtles and fish in both the near shore area and 20 miles from shore. An exhaustive literature search was

performed to compile all available data on marine animals and wind farms, construction noise, acoustic research, and enhancement of fisheries. In addition, a multi-year marine mammal and fishery monitoring plan was developed for the three stages of the project (pre-construction, construction, and post-construction/operation).

Field Team Leader, Reef Coral Bioassessment, St. Croix, US Virgin Islands. Mr. Cooke was a Field Team Leader for a series of field surveys from 2001 through 2007 designed by USEPA's Gulf Ecology Division Laboratory to develop rapid bioassessment techniques for stony corals. The bioassessment techniques were developed to create biocriteria for resource managers. Each of the field teams performed radial-belt transects to identify the coral species present, percent live tissue cover and the three-dimensional size of the coral colonies. In addition to the coral assessments, Mr. Cooke was also involved in a project with the National Oceanic and Atmospheric Administration (NOAA) to perform reef fish surveys. Reef fish were identified to species, and estimates were made of their population numbers and size classes.

Project Manager, Vieques Seagrass Survey, US Fish and Wildlife Service, Vieques, Puerto Rico. Mr. Cooke designed and led a study to develop a baseline seagrass survey for the U.S. Fish and Wildlife Service, prior to the construction of a passenger/cargo ferry docking facility along a former US Navy pier. The team monitored the density of seagrass species present within the anticipated impact zone, and in the surrounding seagrass bed as part of a proposed long-term study.

Divemaster, Artificial Reef Monitoring, US Environmental Protection Agency, New Jersey and Delaware. Working with USEPA Region 3, the USEPA Environmental Response Team Dive Team took part in annual monitoring of artificial reef structures offshore of New Jersey and Delaware. Atlantic coastal states routinely sink ships, rail cars, army tanks and personnel carriers, and large structures to enhance fisheries. The targets are thoroughly cleaned prior to sinking, but some potentially contaminated material may be missed. The project team monitored fish assemblages and invertebrate colonization of various structures and collected fish tissue samples for contaminant analysis.

Project Manager, Seagrass Survey, Virgin Islands Resource Management Cooperative, St. John, US Virgin Islands. Mr. Cooke was the Project Manager for an ecological assessment to quantify the effects of boat anchoring and sea turtle grazing damage to seagrass beds in the Virgin Islands National Park, St. John. He designed and performed comparative seagrass productivity studies. He determined sea turtle population dynamics and grazing habits, using both visual and ultrasonic tracking of diurnal migrations. He developed a resource management plan, and contingencies for implementation. He assisted researchers from the National Park Service with coral disease surveys along the north shore of St. John, and assisted researchers from the US Fish and Wildlife Service with sea turtle tag-and-release population surveys.

Remedial Investigations/Remedial Actions

NJDEP, Contaminated Ground Water Discharge to Surface Water Technical Guidance, New Jersey. Technical advisor and contributing author for the New Jersey Department of Environmental Protection's *Contaminated Ground Water Discharge to Surface Water Technical Guidance*. The document was being promulgated to provide guidance for conducting remedial investigations, monitoring and assessment of ground

water discharges to surface water bodies. Mr. Cooke was a stakeholder, a peer reviewer for the completed document, and was an instructor for NJDEP's training on the subject.

ITRC, Contaminated Sediments Remediation: Remedy Selection for Contaminated Sediments, Washington, DC. Technical advisor and contributing author for the Interstate Technology and Regulatory Council's *Contaminated Sediments Remediation: Remedy Selection for Contaminated Sediments*. The document was promulgated to provide guidance for selecting appropriate remedial activities for contaminated sediment sites. Mr. Cooke was a team member developing the guidance document, and was also part of the team to develop internet-based training sessions to disseminate the technology.

Group Leader, Sharon Steel Site, Sharon, Pennsylvania. Mr. Cooke led a collaboration to design and perform bench-scale and pilot-scale studies utilizing different mixtures of biosolids and lime as site-soil amendments for remediating metals-contaminated soil. Soil pH, nutrient requirements, and pore water samples were collected to ensure that conditions for plant growth remained favorable and that metals were bound. In addition to laboratory and field assessments of biosolids effectiveness with plants, a series of earthworm toxicity and bioaccumulation studies were performed concurrent with the plant studies. Earthworms (*Eisenia foetida*) were exposed first in laboratory studies using the same soil amendments used in the bench-scale plant studies, and later in situ during the pilot-scale field studies. Earthworm tissues were analyzed for metals bioaccumulation. Recommendations for field-scale remediation were made for biosolids/lime amendments and an initial cover crop to protect the slower-growing native grass mixture from weed infestation.

Project Manager, Jasper County Mining Site, Joplin, Missouri. Mr. Cooke was Project Manager for a phytoremediation project on a very large mine waste site. USEPA studies had shown that children in the county had elevated blood lead levels that were attributed to the mine waste (chat) that covered hundreds of square miles of the Tri-County Lead Belt. The team assessed the effectiveness of phytoremediation technology on a series of pilot scale areas. Sampled surface water and soil, and performed a small mammal survey. Performed small mammal necropsies, and kidneys were shipped for histological assay of metals-related cellular damage. Recommendations were developed for improved remediation.

Divemaster, Intermediate Lake and Higgins Lake Sites, Roscommon, Michigan. Mr. Cooke was a team member for a project to remove drums with unknown contents from two small lakes in residential communities in Michigan. The drums had been reported by local police divers who had spotted them during routine training dives. The USEPA Environmental Response Team Dive Team located the drums, over-packed them in place, lifted them to the surface and towed them to shore where they could be removed from the water and taken to a secure location for categorization of hazardous contents. The team removed approximately 20 drums of unknown origin from the lakes.

Human Health Risk Assessments

Lead Biologist, Praia Bay, Lajes Field, US Air Force, Terciera, Azores, Portugal. Mr. Cooke was the Lead Biologist for a study to determine whether the operations of a military ocean terminal had contaminated the sediment and thereby the fish tissue in the enclosed area of Praia da Vitoria Bay on the island of Terciera. Working with hydrogeologists and

commercial divers, sediment cores were collected in order to perform depth contouring of constituents to correlate sediment contaminant concentrations to edible fish and invertebrate tissues. Samples of the most commonly caught and consumed fish species were collected along with intertidal invertebrates to assess the human health risk from consumption of fish and shellfish from the bay.

Lead Biologist, New Jersey Transit Fuel Spill Site, Washington Township, New Jersey. Mr. Cooke was the Lead Biologist for a study to determine whether fuel spill-related constituents had contaminated the fish tissue in two lakes downstream of the spill site and in an upstream reference lake. Three trophic levels of fish (predators, pan fish, and bottom feeders) were collected via electrofishing for tissue analysis using high resolution gas chromatography/mass spectrometry selective ion monitoring (GC/MS SIM) to assess the human health risk from consumption of fish from the impacted lakes.

Lead Aquatic Biologist, Koppers Pond Site, Beazer East, Horseheads, New York. Mr. Cooke developed a white paper on the productivity of a small natural pond that had been impacted by industrial drainage. The fish productivity of the pond was calculated using fisheries models to determine the sustainable biomass of fish tissue that could be captured for consumption by fishermen. The fish tissue concentrations of site-related constituents were used in conjunction with the productivity calculations to derive a human health risk assessment.

Project Manager, Hammond Hull Site, Beaufort, North Carolina. Mr. Cooke was Project Manager for a human health exposure assessment to contaminated oysters. Residents of homes built along Battery Creek, on the site of an abandoned fertilizer and chemical transfer facility had concerns about the safety of consuming oysters collected from Battery Creek as a result of river bank erosion and potential exposure of site-related arsenic. Mr. Cooke designed a study to collect oyster tissue samples and collocated sediment samples for correlation of tissue arsenic burden. Tissue metals were compared to USEPA seafood consumption guidance. The team also collected sediment and surface water samples along a two-mile stretch of the tidally influenced creek to assess the extent of contamination.

Project Manager, Vieques Biota Contaminant Survey, Vieques, Puerto Rico. Mr. Cooke was the Project Manager for a study in response to claims that the US Navy's training activities on the eastern end of the island had contaminated fish and shellfish. The Navy had been using the east end as a 'Live Impact Area' for training pilots and amphibious assault troops since World War II. The water north and south of the LIA was littered with unexploded ordnance (UXO), and local residents feared that locally caught fish were contaminated with metals and explosive residues. He led the USEPA Dive Team's collection and analyses of fish, lobster and conch tissue from five locations around the island, and compared the results to USEPA's seafood consumption guidance.

Site Assessments

Lead Biologist, Marcellus Shale Area Pond Assessments, Chesapeake Energy, Towanda, Pennsylvania. Mr. Cooke was the Lead Biologist for a series of assessments of privately-owned ponds that had potentially been impacted by well-drilling activities

associated with natural gas extraction. Mr. Cooke performed field assessments of the ponds and developed restoration plans to return the ponds to their previous condition.

Lead Biologist, Ohio River Basin and Susquehanna River Basin Invasive Species Assessments, New York and Pennsylvania. Mr. Cooke led a series of assessments of potential water sources for invasive aquatic species of fish, invertebrates and plants. Millions of gallons of water are required for the development of natural gas wells, and in the search for water sources, several surface water bodies (e.g., abandoned quarries, private ponds) were found. The Susquehanna River Basin Commission was concerned about transport of aquatic invasive species between watersheds, and between locations in the Susquehanna River watershed. He designed and performed field surveys of these water bodies to assess the presence of potentially invasive species, and assisted with the development of guidance to prevent the transport of invasive species.

Group Leader, Manistique Harbor Site, Manistique, Michigan. Mr. Cooke was Divemaster and Group Leader for the performance of sediment coring in Manistique Harbor to confirm that dredging of contaminated sediment was successfully removing PCBs. Core samples were used to determine not only concentrations of PCBs, but the depth profile of contamination. The USEPA Dive Team performed hundreds of dives to facilitate harbor remediation.

Project Manager, Occidental Chemical Site/Hylebos Waterway, Portland, Oregon. Mr. Cooke was the Project Manager for an assessment of groundwater infiltration into the Hylebos Waterway in the southeast end of Puget Sound. The USEPA Region 10 and the Washington Department of Environmental Quality were concerned that volatile compounds were leaching into the groundwater and being transported to the waterway. The team designed novel passive-diffusion sampling devices that were buried by divers in the sediment for two weeks. The devices were then collected and analyzed for volatile compounds. In addition to the diffusion samplers, several samples were collected using specially designed seep water collection devices.

Field Team Leader, Pyramid Lake Oil Spill Assessment, Los Angeles, California. Mr. Cooke was Divemaster and Field Team Leader for an assessment of the extent of contamination from an oil spill into Pyramid Lake, a man-made reservoir that is one of the main water sources for the city of Los Angeles. The USEPA Environmental Response Team Dive Team made a series of dives to collect sediment cores to depths of 100 feet to determine the sediment volume that would have to be dredged to remediate the reservoir.

Project Manager, Virgin Islands Rum Industries Limited, St. Croix, US Virgin Islands. Mr. Cooke was Divemaster and Project Manager for a survey to monitor the effects of a rum distillery's unregulated, untreated process wastewater outfall on the seagrass beds and corals along the south shore of St. Croix, in the U.S. Virgin Islands. The team performed diving surveys for seagrass biomass studies and coral disease monitoring. Surface water samples were collected for nutrient analysis, and light attenuation was measured in and around the dark brown, opaque plume.

Aquatic Toxicology

Mr. Cooke has expertise in the design, direction and performance of environmental toxicology studies, chemical biodegradability and treatability studies, product registrations, and chemical product fate and effect studies. He has been the regulatory

liaison between clients and international/federal/state agencies for hundreds of projects. He has extensive experience in the development and implementation of a wide range of quality assurance project plans, toxicity and biodegradability study plans, bench scale treatability and field pilot studies, and investigations of soil, groundwater, surface water and sediment.

Mr. Cooke directed a full-service environmental toxicology laboratory for twelve years and has been involved in thousands of aquatic and terrestrial toxicity studies on chemical products, soils, sediments, surface waters and wastewaters. He also designed and directed the performance of biodegradability studies of chemical products under aerobic and anaerobic conditions. His lab was compliant with the USEPA Good Laboratory Practice (GLP) standards and was one of the first labs in the US to qualify for International Organization for Standardization (ISO) certification. He successfully designed and performed wastewater toxicity identification evaluations, and has broad experience with soil and sediment toxicity studies and remediation techniques. He has also designed *in situ* toxicity studies for soil, sediment and surface water to allow a more representative assessment of field conditions.

Mr. Cooke was also a member of the New Jersey Department of Environmental Protection's Environmental Laboratory Advisory Committee, and was a stakeholder and technical advisor for a major revision of NJDEP's *Regulations Governing the Certification of Laboratories and Environmental Measures*.

Mr. Cooke has managed projects on the treatability of human and veterinary pharmaceutical products and on the waste streams from pharmaceutical production. He has also designed studies on the toxicity of post-metabolized veterinary pharmaceuticals. In addition to the standardized shake-flask, activated sludge and soil biodegradability studies, He designed novel test apparatus to perform studies of septic system treatment of household chemicals and personal care products.

In the course of testing various pharmaceutical products, industrial chemicals, active ingredients, household chemicals, specialty chemicals, biocides, biological agents, oil spill cleanup agents and personal care products, Mr. Cooke has accumulated a wealth of experience with numerous marine and freshwater fish, invertebrates, plants and algae. In addition to the aquatic species, he also has extensive experience working with soil invertebrates and plants (crop-vegetable and non-target species).

For nine years, he was the senior aquatic toxicologist under contract to the USEPA's Environmental Response Team performing field studies and overseeing laboratory studies of toxicity and remediation techniques. He was responsible not only for the placement and oversight of laboratory studies, but also for the review of numerous laboratory studies submitted as part of ecological risk assessments for the USEPA's Superfund program.

Mr. Cooke was also a technical Advisor and contributing author for the New Jersey Department of Environmental Protection's *Ecological Evaluation Technical Guidance*. The document was promulgated to provide guidance for conducting Ecological Evaluations (EE) and Ecological Risk Assessments (ERA) for environmentally sensitive natural resources associated with contaminated sites. Mr. Cooke wrote all of the guidance document sections dealing with toxicity and bioaccumulation studies for aquatic and terrestrial species, for use in ecological assessment, and was also a peer reviewer for the completed document.

Emergency Response

Response Coordinator, World Trade Center Emergency Response, New York, New York. Mr. Cooke was the Response Coordinator for Lockheed Martin/REAC's support of the USEPA response. He coordinated the efforts of REAC's team of 60 field responders with USEPA's Environmental Response Team and USEPA Region 2, and the US Coast Guard to set up an air monitoring program in and around "Ground Zero", to monitor for hazardous air conditions (asbestos, volatile and explosive chemicals) to which rescue workers may have been exposed. Mr. Cooke was the Response Coordinator during the emergency response portion of the project for approximately three weeks after the terrorist attack. When the project became a well-ordered air monitoring program, project management was passed on to Lockheed Martin/REAC's Air Section Leader. Mr. Cooke also participated in boating surveys with the USEPA around lower Manhattan to search for floating debris.

Divemaster, Space Shuttle Columbia Recovery, Toledo Bend Reservoir, Texas. Mr. Cooke was a Divemaster and Senior field team member involved in dive operations over three months searching Toledo Bend Reservoir for parts from the Space Shuttle Columbia. The team worked closely with NASA, US Navy, US Coast Guard, Texas state police, Houston police, and dive teams from four USEPA Regions. The dive operations utilized sidescan and multi-beam sonar, sector scan sonar, remotely operated vehicles, surface supplied air, and various search techniques. The USEPA Dive Team was involved because of the potential for hazardous materials associated with the Shuttle's propulsion system.

Response Coordinator, Hurricane Katrina Response, New Orleans, Louisiana. Mr. Cooke was Response Coordinator for Lockheed Martin/REAC's support of USEPA response activities for the first few weeks of the emergency. Mr. Cooke worked to coordinate the efforts of REAC's 50 field responders with the USEPA's Environmental Response Team. When the response had completed its emergency phase, he passed on the project management to REAC's Air Section Leader. He also took part in the field response, assisting with monitoring in the New Orleans area.

Response Coordinator, Athos I Oil Spill, Philadelphia, Pennsylvania. Mr. Cooke was the Response Coordinator for Lockheed Martin/REAC for the first few days of the spill response, and retained Project Management when the project became a clean-up operation. The team was responsible for determining the extent of the spill contamination, both on the shore line and in the Delaware River channel. Much of the oil sank to the bottom of the river and had to be suction dredged by commercial divers. The team also provided side-scan sonar support to locate the obstruction that was struck by the Athos I, and to locate a response vessel that had sunk in the river.

Health and Safety

Lead Divemaster Instructor, US Environmental Protection Agency Diver Training, Gulf Breeze, Florida. Mr. Cooke was the lead instructor for USEPA Divemaster training, and also led training in contaminated water diving and diver decontamination in May 2005, 2006 and 2007.

Professional Activities

Member, Society of Environmental Toxicology and Chemistry (SETAC)

Member, Hudson/Delaware Chapter SETAC

Member, New Jersey Department of Environmental Protection (NJDEP) Science Advisory Board, Ecological Processes Standing Committee

Presentations/Publications

Cooke, D. 2019. I was an invited speaker and session chair for the Society of Environmental Toxicology and Chemistry (SETAC) Australasia conference in Darwin, Australia in July 2019, *Use of Passive Sampling in Ecological Risk Assessment and Restoration Projects*.

NJDEP (New Jersey Department of Environmental Protection) 2016. *Characterization of Contaminated Ground Water Discharge to Surface Water Technical Guidance*. January 2016. I was a stakeholder and contributing author. I also helped develop the technical training session for remediation professionals and presented the training at public meetings.

ITRC (Interstate Technology and Regulatory Council) 2014. *Contaminated Sediments Remediation: Remedy Selection for Contaminated Sediments*. I was a team member for two years working on the document, and also worked on the development of the internet-based training module.

NJDEP (New Jersey Department of Environmental Protection) 2011/2012. *Ecological Evaluation Technical Guidance*. NJDEP, Site Remediation Program. August 2011, revised 2015. I was a contributing author, writing all of the toxicology, bioaccumulation, and sediment AVS/SEM sections.

R. DeVries, T. Sorell, D. Cooke, J. Robb. 2011. *Vegetation Uptake Factors in Wetland Vegetation*. Poster presentation, Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting, Boston, MA.

J.W. Huang, C. Gussman, D. Cooke, M.D. Sprenger, H. Compton and R. Mathur. 2008. *Using Organic Residuals to Remediate Metal-Contaminated Soils: What is the Risk to the Ecosystem?* Proceedings of the 3rd International Conference on Soil Pollution and Remediation. October 2008, Nanjing, China.

Cooke, D. 2007. *Dive Operation Planning; Risk Management and Liability in Dive Operations;* and *Diver Decontamination*. Presented at USEPA Annual Diver Training Course, Gulf Breeze FL. May 2007.

Cooke, D. 2005. *Abiotic Field Sampling Equipment and Procedures*. A short-course presented to the Hudson-Delaware Chapter of the Society of Environmental Toxicology and Chemistry (HDC SETAC), at Rutgers University, New Brunswick, New Jersey. May 2005.

Cooke, D. 2004. *Tropical Seagrass Species Identification and Survey Methods*. Presented to the US Fish and Wildlife Service, Southwest Region Dive Team in Vieques, Puerto Rico. June 2004.