

JEFFREY S. ROSEN

EDUCATION

1986 – M.S. Experimental Statistics, University of Rhode Island

1982 – M.S. Biological Oceanography, Graduate School of Oceanography, University of Rhode Island

1976 – B.S. Biology, State University of New York at Albany

PROFESSIONAL BACKGROUND

Mr. Rosen combines extensive expertise in research, data analysis, and statistics to support environmental decision making and resources management. Mr. Rosen has a long and established record of supporting the analysis of historical data to determine complex relationships in environmental systems and then to use these relationships to model future reactions to changing conditions. These models are used to evaluate future regulations, design future monitoring programs and develop plans for managing the ecological interactions between communities and their environment. Mr. Rosen's research includes the fate and transport of contaminants and the risks associated with environmental conditions. He has applied his unique combination of environmental science and statistical analyses to predict risks associated with recreational use of surface waters, treatment of drinking water and reuse of water for agriculture and potable water. He has analyzed large data bases to evaluate optimal sampling plans for both microbial and chemical contaminants, including *Cryptosporidium*, *E. coli*, and enterococci.

PROFESSIONAL EXPERIENCE

Corona Environmental Consulting, LLC

2013 – Present

Mr. Rosen is the President and Managing Partner of Corona Environmental Consultants, LLC. The Mission of Corona Environmental Consultants (CEC) is to support clients that are in the process of improving the full life cycle of capturing, processing and using data to improve their business capabilities. CEC focuses on all aspects of information life cycles while specializing in the integration and application of data related to environmental businesses. CEC specializes in information security, quality control and business intelligence.

Tetra Tech inc.

2010 – 2013

Mr. Rosen is a Senior Scientist and Statistician with Tetra Tech. In this capacity he is responsible for management, marketing and performance related to scientific and statistical consulting. He applies his combined skill as a scientist and a statistician with deep knowledge of data base management and modeling to address environmental issues that relate to large complex data collection, analysis and interpretation. He has managed and participated in a number of large complex environmental projects. He has supported the development of information systems for the Papahānaumokuākea Marine National Monument in Hawaii and led the effort to integrate data from a disparate group of data collectors into an integrated information system shared by multiple agencies. He is a consultant to a number of drinking water utilities including the City of Philadelphia, The Metropolitan Water District (southern California) and Portland Water Bureau (Oregon). He supports homeland security information systems and water source monitoring to determine safety of drinking water and required treatment. He supports the Melbourne Water Department in the evaluation of tertiary treatment requirements for waste water discharge and reuse. Mr. Rosen regularly supports the American Water Works Association on a variety of projects including regulatory review, guidance manual development and the evaluation of proposed statistical approaches to interpret complex environmental data.

Mr. Rosen was a technical consultant to the US Environmental Protection Agency for the evaluation of Recreational Water Criteria and the evaluation of emerging methodologies for measuring pathogens and indicators of fecal contamination.

Clancy Environmental Consultants, Inc.

2004 – 2010

Mr. Rosen was the Vice President of the Environmental Information Services group. He continued consulting in the management, analysis and use of environmental information to support management of environmental resources. His efforts continue to focus on drinking water, marine ecosystems and watersheds. He combined his expertise in Science, Statistics and Information Systems to support environmental decision making based on the best available data. As a senior manager within CEC he was responsible for managing a division of the company including marketing, proposal development, technical management, technical performance and delivery of products. He was also responsible for recruiting, personnel management

and client interactions. He has acted as a senior facilitator helping clients identify requirements and options for complex information capture, management and interpretation for environmental management.

He has a long record of supporting the drinking water community to optimize available data to support regulations and decision making. He has worked with the American Water Works Association to review emerging federal drinking water regulations, testing of emerging water treatment technologies, and to develop better ways to gather, analyze and apply environmental data. He has analyzed large data bases to evaluate optimal sampling plans for contaminants and for naturally occurring pathogens. Major programs have included Atrazine and TCT, Cryptosporidium, E. Coli, Enterococcus, and other contaminants. Supported the review of regulations for 75 contaminants regulated by the Environmental Protection Agency. He participated in the evaluation of monitoring strategies and requirements related to recreational water monitoring, Total Maximum Daily Loads and use attainment. He also supported water utilities in the design and implementation of monitoring plans for chemical contaminants and pathogens to determine treatment requirements in order to comply with state and federal regulations.

Mr. Rosen supported the Philadelphia Water Department in the development of protocols and systems for analyzing on line water quality monitoring data to identify contaminants in the distributions system. Part of this project included the evaluation of algorithms and systems for identifying events based on water quality data. As a subcontractor to CH2MHill, Mr. Rosen was technical lead for the development of the Water Quality Monitoring Information System at Philadelphia Water, which interfaced with an early warning event detection system being deployed as part of the EPA Contamination Warning System Programs.

Mr. Rosen also supported Tampa Bay Water and Philadelphia Water in the integration of water quality and operations data to support event detection and near real time evaluation of water quality and water treatment. He developed strategies for rapid quality control of on-line data to remove erroneous data to reduce false positive results. He also developed consequence management plans to ensure that once a possible event is detected the actions taken are optimized to protect the public and make good defensible decisions. In 2005 and 2006 Mr. Rosen was a member of team led by Malcolm Pirnie Inc. that evaluated the status of on-line monitoring and requirements for integrating multiple data streams to improve operational decisions for the Los Angeles Department of Water and Power (LADWP). He also developed the specifications for a Laboratory Information Management Systems (LIMS) for the Cayman Islands Water Utility laboratories.

Mr. Rosen supported the EPA Office of Science and Technology, Health and Environmental Criteria Division (OST, HECD) as a senior consultant and project leader for the evaluation of recreational water monitoring. In this capacity he evaluated the existing criteria and methods while exploring the use of emerging technologies including quantitative Polymerase Chain Reaction (qPCR) and quantitative microbial risk assessment (QMRA). Mr. Rosen explored the relationships between the current technologies and methods and the new emerging methods that may allow for faster turn-around with improved ability to recognize real health risks.

He supported the National Marine Sanctuaries Program in the development of a sanctuaries wide monitoring program. He participated in the development of a cohesive information system that will support Sanctuaries management and protection of the marine environment. He also was a member of a large interdisciplinary team that implemented a system that connected the Integrated Ocean Observing Systems (IOOS) which is made up of deployed environmental buoys with the National Marine Sanctuary Program.. He supported the deployment design and the information processing the enabled the capture, analysis, and dissemination of the data.

In 2007, CEC added a third office in Honolulu, HI managed by Mr. Rosen to support environmental information management for the Northwestern Hawaiian Island's newly-designated Papahānaumokuākea Marine National Monument, (<http://hawaiireef.noaa.gov/>). The Papahānaumokuākea Marine National Monument (PMNM) is one of the five largest natural ecological sanctuary in the World. CEC provided information system development and data processing support along with scientific analysis and integration of a wide variety of environmental data. CEC information technology specialists evaluated requirements, design and implemented systems to meet those requirements. CEC scientists analyzed the data to answer specific scientific and management questions. The data that were processed and analyzed include permits, habitats, fish, mammals, birds, water quality, physical oceanography, bathymetry and related data. CEC supported the collection, quality assurance and documentation of data. The systems integrated include GIS, relational data bases, advanced statistical analysis and modeling. In addition to the PMNM, clients being supported include the National Marine Sanctuaries Program, National Marine Fisheries Service, Fish and Wildlife Service, the State of Hawai'i and many other stakeholders in the Monument.

Mr. Rosen supported AWWA in the development of comments for the review of both the Second and Third Candidate Contaminant List proposed by EPA in April 2004, and February 2008 respectively.

Mr. Rosen has led a multidisciplinary team in the mining and analysis of chemical contamination data in support of litigation related to drinking water contamination and treatment requirements. This work has focused on accessing, quality assuring, managing and analyzing data collected related to water quality, compliance monitoring and customer complaints. Data management has included the organization, data entry and integration of significant historical data available in a wide variety of formats including paper forms,

obsolete data bases and standard databases. Data analyses have included data tabulation, data visualization including GIS, advanced statistical analysis and modeling.

Perot Systems Government Services

Soza & Company

Technology Planning and Management Corporation

1994 - 2004

Mr. Rosen was the Vice President of the Environmental Information Services Division for Perot Systems Government Services (formerly Soza, and prior to that TPMC). He is experienced in the design, implementation, and maintenance of large environmental information systems. He has been the senior system analyst and principal data analyst on a number of regional and national environmental systems for marine research and monitoring programs. He has been the consulting statistician and data analyst on a number of American Water Works Association (AWWA) and the American Water Works Association Research Foundation (AwwaRF) projects related to the evaluation of pathogens data, methodology and sampling. He was responsible for recruiting, hiring and salary determination for all personnel within the division. He oversaw the technical work of over one hundred fifty (150) professionals and support personnel. He also managed the work of five senior program managers. He prepared and managed budgets and task plans for a variety of government and commercial contracts and monitors deliverables and scheduling. Mr. Rosen was responsible for negotiating with and managing subcontractors and consultants. He has regular interactions with contracting officer, technical representatives and client senior staff. He is responsible for directing the marketing for the division and the development of strategic plans for both the division and the entire organization.

Mr. Rosen participated in technical consulting in a variety of roles including senior database analyst, senior statistician and research ecologist. He has led or supported a number of environmental monitoring and research programs including the Mid-Atlantic Integrated Assessment (MAIA), the Massachusetts Water Resources Authority (MWRA) Harbor Outfall Monitoring Program, and the Environmental Monitoring and Assessment Program (EMAP). He led the team that produced EPA's 2003 Report on the Environment.

Senior Technical Consultant. Consults with the senior management team on EPA's Mid-Atlantic Integrated Assessment (MAIA) program regarding sampling, information management, data analysis and program strategy. The program involves the monitoring and assessment of a wide variety of resources including: marine, surface waters, forests, agriculture, air, ground water and landscape ecology.

Senior Consultant Stellwagen Bank National Marine Sanctuary Program Consults on the development of information management systems supporting filed monitoring, public outreach and marine mammal research.

Technical Manager, Environmental Indicator Initiative, Environmental Protection Agency. Mr. Rosen led a multidisciplinary team of experts supporting the development of a National State of the Environment Report. This effort involves cataloging the available environmental indicators, mining the available information, evaluating the usefulness of the indicators and communicating the results to the educated public. This effort includes indicators of ecological health, human health, air, water and terrestrial conditions.

Program Manager and Senior Information Technology Specialist. Program manager for a technical support contract supporting the efforts of the Coastal Services Center, in Charleston, South Carolina. For ten years Mr. Rosen led a technical team including, information specialists, GIS experts, remote sensing experts, scientists, modelers, technical writers, meeting facilitators and a wide range of public outreach and education. Programs include environmental education, administrative system, geographic system development, data clearinghouse, Internet system development, environmental database management and remote sensing.

In this effort Mr. Rosen provided hands on technical support related to system design and implementation, quality assurance and control of resulting biological, chemical and physical data. He participated in the development of indicators of biological condition for marine benthic communities. Participated in the analysis, interpretation, aggregation and presentation of resulting information.

Program Manager for developing requirements for the Water Utility Information Sharing and Analysis Center (ISAC) for the Association of Metropolitan Water Authorities (AMWA). Mr. Rosen led a diverse team of security experts, information technology specialist and water treatment plant operations engineers in the development of requirements for addressing vulnerabilities of water treatment facilities. The team gathered requirements from both drinking water and waste water utilities, evaluated options and made recommendations for the implementation of the ISAC which will support the utility industry nationwide.

Program Manager for Technical Support for Tucson Water Department. Mr. Rosen was responsible for high-level requirement analysis for the entire Tucson Drinking Water Department. This includes establishing the information requirements, data flows and data processing needs for all levels of employees within Tucson Water. In addition, Mr. Rosen supported the procurement, design and installation of a Laboratory Information Management System (LIMS). Mr. Rosen participated in a rapid application development for a Community Information System. The Community Information System captures real time, water quality

information being gathered from the drinking water distribution system. The data are processed and loaded into relational databases and are disseminated using client server applications as well as Internet information systems. Similar work was done for the Pinellas County utilities.

Drinking Water Consultant –

Information Collection Rule (ICR) - Mr. Rosen was involved in the ICR from early on in its inception and development. He acted as a technical expert supporting the American Water Works Association in reviewing the design and implementation of an information system, which will support the collection of \$130 million dollars of water treatment plant data. The Environmental Protection Agency mandated the data collection by the water industry to support the Enhanced Surface Water Treatment Rule and the second round of Regulation Negotiations for the reduction of disinfection by-products. Mr. Rosen participated in the developing of required reports and analyses for the collected data. He evaluated the quality assurance and quality control programs to ensure completeness and feasibility. He participated in the evaluation and modification of mission critical information systems for the Information Collection Rule. Mr. Rosen was a member of the steering committee for the development of a Data Analysis Plan for the Information Collection Rule.

Mr. Rosen was the Program Manager for an American Water Works Association project to evaluate the Safe Drinking Water Information System (SDWIS). In this capacity he evaluated the revised SDWIS and made suggestions to EPA and AWWA on the future direction of management and dissemination of Drinking Water Compliance Data.

Mr. Rosen served as principal investigator on a number of American Water Works Association Research Foundation projects including:

AwwaRF 395 - A Comparison of *in vitro* and *in vivo* Methods for Assessing Viability and Infectivity in the US and UK.

AwwaRF 385 - Feasibility Analysis and Design of Research to Evaluate Microbiological Constituents and Treatability in Source Waters:

AwwaRF 488 - Source Water Assessment: Variability of Pathogen Concentration.

AwwaRF 2503 - Development of a Decision Process for Prioritization of Emerging Pathogen Research.

AwwaRF 2603 – Evaluation of Knowledge Management for Water Quality Data

AwwaRF 2944 - Identify Knowledge Gaps with Total Maximum Daily Loads (TMDL) and Drinking Water Utilities

Mr. Rosen has also acted as statistical and database consultant on a number of other AwwaRF projects:

AwwaRF 2580 - Infectious Disease Associated with Drinking Water from Surface Water Sources - Microbiological Water Quality Factors

AwwaRF 2589 - Comparison of Cell Culture and Animal Infectivity

AwwaRF 2672 - Field Testing of USEPA Method 1601 for Coliphage

AwwaRF 3116 – Strategy to manage and respond to total coliforms and *E. coli* in the distribution system

AwwaRF 4130 – Evaluation of Large volume samples for detecting Total Coliform and *E coli*

Mr. Rosen is on the Project Advisory Committee for project 4217, “Demonstrate UV System Validation by Lagrangian Actinometry Using Dyed-Microspheres.”

Data Analyst/Statistician. Mr. Rosen was the data analyst and statistical consultant to the American Water Works Service Company evaluating the monitoring and detection of *Giardia* and *Cryptosporidium* in reservoirs and other surface waters. He also developed a scorecard based on ground water well monitoring.

Mr. Rosen supported the development of the Long Term 2 Enhanced Surface Water Treatment Rule. He led a multidisciplinary team in the evaluation of the development of CT tables for application of ozone for the inactivation of *Cryptosporidium parvum*. Based on the results of this work EPA modified the final CT table which are applied by major utilities in the treatment of drinking water using ozone inactivation.

Mr. Rosen supported the development of sampling plans and methodology for sampling *Cryptosporidium* and *Giardia* in drinking water sources and distribution system. Performed data analysis on pilot project and performance evaluation data to determine power of the tests being proposed for the Information Collection Rule.

Mr. Rosen acted as the statistical consultant to the American Water Works Association Microbial Technical Working Group.

Mr. Rosen designed and developed a nationwide database on the occurrence of *Giardia* and *Cryptosporidium*. This project involved surveying large utilities, receiving, loading and quality assuring the data from disparate sample designs.

Mr. Rosen is lead a team that supported AWWA in evaluating the methodology for the development of the Candidate Contaminant List that is being developed by the National Drinking Water Advisory Committee.

Mr. Rosen supported the National Drinking Water Advisory Group (NDWAC) review of the Candidate Contaminant list Development. Mr. Rosen was a member of the technical support group. He analyzed data sources, data and strategies for developing the CCL based on the recommendations of the National Research Council (NRC). As part of this effort he hosted and facilitated a three day intense information source evaluation workshop.

American Management Systems, Inc.

1993 - 1994

Database Use and Data Analysis Consultant. Consultant on the continued development of the EMAP Estuaries Information Management and Dissemination system and the ongoing analysis of the collected data. Mr. Rosen reviewed and advised on technical plans for the integration of the EMAP Estuaries system with the EMAP central system. He consulted on plans for further development of user interfaces and the transition of the EMAP Estuaries information system to ORACLE. Mr. Rosen was involved in designing and performing statistical analyses, including the validation of a benthic index developed in 1990, evaluation of the sampling design, and assessment of environmental status.

System Analysis and Design Consultant. Mr. Rosen helped design the information management system and the analytical approach for the National Eutrophication Project. In this capacity he reviewed the survey design, information requirements, quality assurance plan and analytical approach. He recommended database designs, local area networking, infrastructure, personnel requirements, interfaces and statistical approaches to meet the objectives of the project.

Under the same work assignment, Mr. Rosen reviewed requirements and recommended approaches for the development of a SEA Division Data Service Center to service the needs of the entire division and the migration of the Service Center into a NOAA Center of Data. The Center of Data will ultimately interface via Local Area Networks and Wide Area Network with the entire NOAA Earth Data Information Management System.

Data Manager and System Analyst. Mr. Rosen acted as the Senior Data Manager for the New Jersey Harbor Estuary Project and Long Island Sound Study. Both regional programs are part of the National Estuary Program. In this capacity Mr. Rosen directed the review, reformatting and loading of historical data into the Ocean Data Evaluation System (ODES). He also directed the support of data processing for all current monitoring programs in the region. To meet the objectives of this contract Mr. Rosen supervised the efforts of two staff members and a subcontract.

Management Information System and Data Analysis. Lead system analysis and data analyst supporting a corporation that focuses on the prevention and rehabilitation of job-related injuries and illnesses. Mr. Rosen is involved in determining requirements for management information systems in support of Occupational Health and Rehabilitation, Inc. mission and in choosing systems to meet the requirements. He is also involved in the analysis of clinical and corporate data in the support of program development and business development.

Data Analyst. Mr. Rosen was the lead data analyst supporting the assessment of historical fish/shellfish tissue contamination data for Region IV of the U.S. Environmental Protection Agency (EPA). The objective of the program was to consolidate the historical fish tissue analyses into a comprehensive information system. This consolidation allowed data users from a variety of agencies within Region IV to access each agency data. The data analysis included summaries of status and trends of different compounds found in fish tissues analyzed in a variety of studies.

Consultant. Responsible for surveying Army Corps of Engineer Districts States and other federal agencies to determine the success of the No Net Loss of Wetlands Policy. Mr. Rosen did the data analysis which resulted in estimates of acres lost, acres created through mitigation, permits issued, enforcement actions taken and net loss or gain of wetlands. These estimates were made for all the states in EPA's Region IV. Mr. Rosen also participated in the writing of the final report.

Computer Sciences Corporation

1983 - 1993

Senior Data Analyst and Data Base Specialist. Mr. Rosen was responsible for the complete life cycle management of The Estuaries Resource Group Information System for the EPA. He was the task leader of a team of ten programmers and data analysts. This team implemented an information system including field computer systems, communications, data processing, data base management, data verification, data validation, documentation, data analysis, data dissemination, hardware and software maintenance, data aggregation, standards development, and geographic information systems. Mr. Rosen also represented the Resource Group on the EMAP National Information Management Committee. He was the Resource Group liaison with information management efforts within NOAA, USGS, and the EPA National Estuaries Program. He was a member of the EMAP Estuaries assessment team and the EMAP Estuaries statistical design team. In this capacity he interacted closely with the leads for field logistics and quality assurance.

Senior Computer Specialist-Data Base Administrator. Mr. Rosen was responsible for the design, implementation, and maintenance of large interdisciplinary databases and user-friendly interfaces for a large marine research laboratory. In this capacity he worked on a number of interdisciplinary teams and was responsible for all aspects of data processing, data base management, and data analysis. He was also responsible for laboratory automation including analytical chemistry systems, image analysis systems, and experiment monitoring systems. He managed a staff of three to five people responsible for data management and user support.

Mr. Rosen was the laboratory liaison with many regional environmental programs including the National Estuary Programs in Buzzards Bay, Narragansett Bay, Long Island Sound, and Chesapeake Bay. He participated in the Field Verification Program, the Greenwich Cove Study, and the New Bedford Harbor study.

University of West Florida

1981 - 1983

Programmer. Mr. Rosen was involved in the design and implementation of scientific computing systems supporting marine research programs. Mr. Rosen developed programs in FORTRAN, BASIC, and SAS to meet the needs of researchers. He supported the data analysis and interpretation.

U.S. Environmental Protection Agency

1975 - 1981

Biologist. Mr. Rosen was responsible for the design and implementation of *in situ* ecological experiments. He performed biological and chemical analyses on the samples collected in the field. He developed and maintained the data bases for his research group and participated in the analysis and interpretation of the data. His specific duties included research scuba diving, invertebrate taxonomy, organic chemistry analyses, and nutrient analyses.

Systems Analyst and Statistical Consultant. Work includes experimental design, parametric and non-parametric data analyses, multivariate data analysis, exploratory analysis, interpretation of results, data base design and writing and reviewing technical papers.

APPOINTMENTS

American Water Works Association Advisory Team (A-Team) for implementation of the Information Collection Rule.

Technical Working Group Supporting the EPA Office of Water Information Collection Rule.

National Marine Sanctuaries National Advisory Committee on system wide monitoring

Senior Fellow of the Coastal Institute at the University of Rhode Island.

Chairman of the Water Resources Committee for the Town of Scituate, Massachusetts

Advisory Committee for the California Water Board CIWQS Program

Technical Working Group Supporting the evaluation of the Total Coliform Rule.

PUBLICATIONS

- Salter, R. S., G.W. Durbin, E. Conklin, **J.Rosen**, and J.Clancy. 2010. Proposed Modification of Environmental Protection Agency method 1601 for detection of Coliphages in drinking water, with same-day fluorescence-based detection and evaluation but the performance-based measurement system and alternative test protocol validation approaches. *Applied and Environmental Microbiology*, December 2010 vol, 76, No. 23. pp7803-7810.
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- Rosen, J.S.** and J.A. Roberson. 2007. A simplified approach to developing future contaminant candidate lists. *J. Am. Water Works. Assoc.* 93 (3) 63-72. **Journal AWWA Management Division Best Paper Award, 2007.**
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