Matthew Reusswig
Senior Engineer

M.S., Environmental Engineering and Science, University of Iowa, 2009
B.S.E., Civil & Environmental Engineering, University of Iowa, 2006
B.S., Environmental Science, University of Iowa, 2006

SUMMARY OF EXPERIENCE

A data-driven engineer and scientist

- Skilled in the use of R software for use in data exploration, visualization, statistical modeling, and geospatial analysis.
- Supported and managed a wide variety of modeling efforts for EPA requiring the integration and use of datasets produced by multiple agencies.
- Writes and teaches on modeling and regulatory approaches under the Clean Water Act.

Matthew Reusswig is an environmental engineer with nine years of experience. His training is in environmental engineering and science, with an emphasis in water resource management, water quality assessment, ecological restoration, and wastewater treatment. Mr. Reusswig is currently providing support to U.S. EPA Headquarters and Regions in support of the development of NPDES permits, development water quality studies, and TMDL implementation assessment.

NPDES PERMITTING

Mr. Reusswig has provided extensive National Pollutant Discharge Elimination System (NPDES) program support to multiple states and EPA, spanning all aspects of the NPDES universe, including publicly owned treatments works, industrial facilities, industrial and construction stormwater, CAFOs, and MS4s. He has drafted permit packages, responded to public comments, provided expert witness testimony, developed implementation procedures, and delivered tailored on-site training. A subset of specific project support is provided, below.

NPDES Permit Development Support

Mr. Reusswig provides support to EPA and state agencies for the production of municipal and industrial NPDES permits. Mr. Reusswig has written or contributed to the development of over 70 NPDES permits and has led PG's permit development support for the Colorado River Basin Water Quality Control Board and for California's 316(b) power plants. Specific industries covered by permits to which Mr. Reusswig has contributed include municipal wastewater treatment plants, a wastewater treatment plant jointly owned and operated by the Governments of the United States and Mexico, water desalination facilities, food & foodservice packagers, ship repair dry-docks, sawmills, steam-electric power production facilities, concentrated aquatic animal production facilities, and hydropower production facility. Mr. Reusswig has provided NPDES regulators expert support in the evaluation and implementation of a variety of permittee special studies and modeling efforts. These include the review of discharger developed special studies for metal translators, water-effect ratios, dynamically-derived water quality based effluent limitation simulations, and mixing zone studies for marine and freshwater discharges.

Training for Permit Writers – Dilution Model Evaluation and Implementation

Under contract with EPA Region 9, Mr. Reusswig developed course materials, case studies, and co-taught a 2-day training course for NPDES permit writers in the evaluation, documentation, and implementation of dilution/mixing zone studies within NPDES permits. This training required a thorough knowledge of all applicable water quality standards, implementation policies, state and federal regulations, and applicable EPA guidance documents. Direct implementation of dilution ratios and mixing zones, as it relates to all aspects of permit development, is discussed in detail. Mr. Reusswig has provided this training for Idaho, California, Arizona, Maine, New Hampshire, Massachusetts, EPA Region 9, and EPA Region 1 staff.

Economic Analysis of Water Quality Standards and Policies

Mr. Reusswig has supported the U.S. EPA in developing economic analyses of major revisions to water quality standards. Within these analyses, PG evaluates the effects of a policy or standard and develops an estimate of costs which are likely to affect relevant stakeholder communities. Previous work Mr. Reusswig has supported include statewide analyses (Washington's 2015 Human Health Criteria, California's Methylmercury Standard, California's Whole Effluent Toxicity Policy, and California's Pathogens Standard) and region-scale analyses (EPA's Selenium Criteria for the San Francisco Bay and Delta).

Low-Flow Statistical Tools Handbook

Authored a handbook for EPA and state National Pollutant Discharge Elimination System (NPDES) permit writers on practical methods for calculation of low-flow statistics in flowing water bodies. The handbook guides readers through the use of multiple USGS-developed statistical software tools (StreamStats, SWToolbox, and WREG), and provides guidance in how to identify, process, and evaluate flow data used in the calculation of low-flow statistics for purposes of NPDES permit development.

WATERSHED ASSESSMENT, TMDLS, & CLIMATE CHANGE MODELING

Mr. Reusswig uses data analyses and computer modeling, among other tools, to characterize and understand our watersheds. He assessed waterbodies using a scientifically-sound approach that considers all possible sources and conditions influencing water, sediment, and tissue quality. Mr. Reusswig A subset of specific project support is provided, below.

Engineering Feasibility and Economic Cost Analysis

Mr. Reusswig has provided engineering technical support for the production and technical review of treatment feasibility studies to support the U.S. EPA in developing a compilation of nutrient treatability and treatment cost effectiveness data for point source and non-point source pollution throughout the United States. Other specific projects to which Mr. Reusswig has contributed expertise include the development of a preliminary treatment alternatives analysis for the southwestern region of Guam which includes the communities of Agat, Merizo, and Umatac; the development of cost estimates to a redevelopment of the Guam potable water system; and a technical review of a cost analysis for a proposed treatment system upgrade to the City of Sacramento's wastewater treatment plant.

Implementation of Total Maximum Daily Loads (TMDLs)

Mr. Reusswig has led PG's support for the Commonwealth of Virginia and the State of Maryland in the review of over 80 Phase I and II MS4 implementation plans for the Chesapeake Bay Nutrients TMDL. This review entailed ensuring that all permittees' plans conformed with the requirements of their MS4 permits, met required nutrient load reductions under the TMDL, and were verifiable. Mr. Reusswig has also supported USEPA Region 3 in the development of the TMDL-EZ Implementation Plan template—an automated TMDL implementation plan template for use by Region 3 Phase II MS4 permittees for use in complying with the Chesapeake Bay Nutrients TMDL.

Mr. Reusswig has also supported EPA Region 3 in conducting audits of non-point source nutrient credit generating facilities—principally those operators combusting livestock waste for purposes of generating electricity—operating within Pennsylvania's TMDL credit trading market. These audits included a review of each facility's credit generation authorization and related regulatory documents, an investigation of plant's baseline and observable nutrient material balances, monitoring data, and site visits.

Municipal Wastewater Treatment Plant Nutrient Treatment Analysis

Led PG's support for this project wherein the project team estimated both costs and load reductions anticipated if all WWTPs were to make upgrades necessary to meet EPA's Ambient Water Quality Criteria for Ammonia. Developed methodologies to estimate and compare the costs and pollutant reductions achieved by upgrading WWTPs with conventional activated sludge treatment to: (1) achieve ammonia removal based on anticipated permit limits following adoption and incorporation of new recommended Ambient Water Quality Criteria for ammonia, and (2) achieve total nitrogen removal equivalent to the recognized limit of demonstrated wastewater treatment technologies. Using a CAPDET model, the project team estimated costs (capital and O&M costs) and pollutant removal benefits for multiple treatment solutions and developed associated nationwide result estimates.

Mystic River TMDL Alternative Support

Mr. Reusswig has supported EPA Region 1 in developing a recommended nutrient loading analysis framework for the Mystic River Watershed. Mr. Reusswig analyzed available monitoring data to identify data gaps, provide recommendations for future water quality monitoring, and developed narrative criteria translators for identifying protective water column nutrient targets (i.e., levels or concentrations of indicator parameters which signal attainment of designated uses in the Mystic River).

Hang Town Creek Water Reclamation Facility Probabilistic Monte Carlo Discharge Simulation Study

Mr. Reusswig supported the Central Valley Regional Water Quality Control Board in the review and interpretation of a probabilistic simulation of discharges from the Hangtown Creek WRF. The purpose of the study was to dynamically derive water quality-based effluent limitations for the plant. Mr. Reusswig reviewed the model structure, performed alternative distributional analyses of the model's input parameters, identified deficiencies in the Permittee's random number generator, and documented faulty-outlier analyses.

Saginaw Bay Nutrient Loading Analysis

Mr. Reusswig supported EPA Region 5 in developing a nutrient and sediment loading analysis for point and non-point sources to Saginaw Bay. PG developed non-point source load estimates using STEPL modeling software and, using USGS flow data and water quality targets/criteria, developed a load-duration curve-based characterization of nutrient transport into Saginaw Bay.

Downscaled Climate Projections for Port Cities

Lead climate data analyst on project to examine projected impacts of warming water and salinity change on the potential for successful colonization by nonnative aquatic species introduced into U.S. waters as a result of ballast water transfer. The project involves obtaining 21st century RCP8.5 projections from multiple GCMs and a Great Lakes regional climate model, running R scripts to process and visualize enormous volumes of netCDF and other raster-based geospatial data, and calculating projected changes in the "environmental distance" (i.e., similarity) between pairs of ports with high shipping volumes. Emphasis is on cases where warming waters allow for the survival of organisms that were previously unable to thrive in a particular location. Helped to design an analytical approach that aligns observed data with projections in terms of units and spatial resolution.

EMPLOYMENT HISTORY

- **Senior Engineer**, PG Environmental, 2010 - present