

MATT HODGE, PE

Water Resources Engineer



EDUCATION

MIT (2008), M.Eng.

Civil and Environmental Engineering

MIT (2007), M.S.

TPP Engineering Systems Division

U. of South Carolina (2004), B.S.

Civil and Environmental Engineering

REGISTRATIONS/MEMBERSHIPS

Professional Engineer (MA)

American Society of Civil Engineers

2015-2016 Chair of the

Environmental Water Resources

Institute (EWRI) for the Boston

Society of Civil Engineers Section

(BSCES)

Hodge.WaterResources, LLC

95 Arlington St.

Brighton, MA 02135

803-606-8343

MHodge@HodgeWaterResources.com

<http://HodgeWaterResources.com>

QUALIFICATIONS

Matt Hodge is a Professional Engineer (PE) with experience in many aspects of environmental modeling. Matt specializes in numerical modeling of surface water resources and groundwater. Matt has more than 10 years of experience providing modeling of wetlands, estuaries, lakes, rivers, streams, and coastal zones. Matt has expertise in hydrodynamic modeling, hydrology and hydraulics, sediment transport, contaminant fate and transport, water quality, and mixing zone models. Matt works with a range of numerical models such as ADCIRC, BASINS, CGWAVE, CMS-FLOW, CORMIX, EFDC, GNOME, HEC-HMS, HEC-RAS, HEC-5, HEC-5Q, HSPF, HydroCAD, ICPR, MODFLOW, PHABSIM, PTM, QUAL2K, RIVER2D, RMA2, RMA4, STWAVE, SWMM, and WASP.

PROJECT EXPERIENCE

Water Quality

NPDES Permit Model Review: HydroAnalysis, Inc.*

Kershaw County, SC

A local municipality requested a technical review of a nearby town's most recent draft wastewater treatment plant (WWTP) National Pollutant Discharge Elimination System (NPDES) permit in order to provide appropriate comments during public comment period. Reviewed QUAL2E model and supporting documentation. Provided memo to client explaining potential basis for comment and challenge of draft permit.

TMDL Model Review: DK Water Resource Consulting*

Davidson, NC

Provided technical review of EFDC model for Total Maximum Daily Load (TMDL) study of High Rock Lake. Review was specifically focused on the incorporation of dam spillways into EFDC water quality model.

Waste Load Allocation Study: HydroAnalysis, Inc.*

Sumter County, SC

In support of study to evaluate assimilative capacity of receiving water, modeled 12 miles of river in QUAL2K. Used model to evaluate dissolved oxygen (DO), biochemical oxygen demand (BOD), and ammonia under low flow conditions. Provided modeling expertise through project scoping, field program, regulatory review and final allocation decision.

Waste Load Allocation Study: Multiple Municipalities*

Catawba County, NC

In support of study to evaluate assimilative capacity of receiving water, modeled multiple streams within watershed. Evaluated DO, BOD, and ammonia under a range of flow and operating conditions. Evaluated optimal performance options for multiple wastewater treatment plants within watershed incorporating historical evaluations and biological studies to provide recommendations on appropriate permit limits.

Water Quality Assessment– Flushing Model: Private Developer Englehard, NC

Developed two-dimensional hydrodynamic model, using RMA2/RMA4, to predict flushing times for a proposed boating marina in tidal estuary. Used available salinity data to make assessment of fresh water flows. Analyzed alternative designs in order to improve flushing, maintain water quality and enable proposed marina to be permitted. Provided preliminary design of mechanical system to maintain DO in boat basin.

* denotes Hodge.WaterResources, LLC project

Expert Review Long Term Control Plan: HydroAnalysis, Inc.*

New York, NY

Reviewed draft long-term control plan (LTCP) for urban estuary in New York City. Evaluated LTCP data review for appropriateness of findings. Conducted a preliminary assessment of the selected alternative ability to meet performance gaps identified in the LTCP. Compared selected alternative to approved alternatives for other relevant LTCPs in New York City. Evaluated modeling that formed the basis of the LTCP findings. Provided feedback to client on how LTCP would impact contaminants of concern in estuary.

Discharge Model and Salinity Analysis: Environmental Consulting & Technology, Inc.*

Virginia

In support of Virginia Pollutant Discharge Elimination System (VPDES) permit application, evaluated mixing zone of proposed cooling water discharge of 2 million gallons per day (mgd) to a tidally-influenced river using CORMIX. Investigated the influence of CORMIX model assumptions on resulting predictions and provided support to client during review of applicable regulations.

Studied the influence of the proposed 10 mgd cooling water intake on the upstream extent of brackish water. Developed algorithm to identify and extract isohaline contours from results of the Chesapeake Bay Operational Forecast System (CBOFS) model and authored technical memorandum summarizing assumptions, analysis, and findings that demonstrated the minimal impact likely to occur from the withdrawal.

Oil Spill Trajectory Study: Industrial Client

Confidential Location

Developed two-dimensional model of tidal estuary in order to predict current field in vicinity of oil spill. Applied National Oceanic and Atmospheric Administration (NOAA) GNOME model to predict spill trajectory and compared predicted oil transport to field observations collected immediately after spill to evaluate model performance. Made preliminary assessments of water column and sediment concentrations based on transport of spilled oil in support of natural resource damage assessment.

Thermal Discharge Study: Epsilon Associates*

Schuylkill River, PA

Provided senior review of mixing zone study for a thermal discharge to the Schuylkill River. The project included CORMIX modeling consistent with the Delaware River Basin Commission (DRBC) water quality standards and approaches. Study determined existing mixing zone and made recommendations on alternative outfall designs to reduce the mixing zone.

Thermal Discharge Study: Oil Refining Company

Lake Erie, OH

Serving as lead modeler, developed three-dimensional hydrodynamic model in order to delineate extent of thermal plume in Lake Erie using the EFDC model. The EFDC model was coupled to the NOAA Great Lakes Coastal Forecasting System (GLCFS). Evaluated extent of thermal impact of cooling water discharge. Assessed lateral extent and vertical temperature profile in order to determine likelihood of available fish passage around thermal plume. Provided technical expertise from project development, through field program, modeling, and NPDES permit application.

Thermal Discharge Study: Oil Refining Company

Lake Michigan, IN

Serving as lead modeler for 316(a) study, developed coupled three-dimensional hydrodynamic and water quality model in order to delineate extent of thermal plume in Lake Michigan using EFDC. Evaluated normal operation and maximum permitted operational effluent in response to range of ambient conditions in order to delineate thermal plume extents. Worked with biological survey team to plan field study that identified and characterized representative fish populations.

Hydrodynamic Data Collection QAPP: Industrial Client

Passaic River, NJ

Developed Quality Assurance Project Plan (QAPP) for data collection to support development of tidally influenced sediment erosion model using acoustic Doppler current profiler (ADCP). Oversaw data collection and conducted quality assurance checks of final dataset.

Hydrology and Hydraulics

Hydrologic and Hydraulic Study: OptiRTC, Inc.*

Prince George's County, MD

Developed HydroCAD models for a number of stormwater ponds to evaluate peak flood elevations, storage volumes, and discharge flows. Obtained model inputs from as-built plans, publically available topography and land use data, as well as the Maryland Stormwater Design Manual.

Hydraulic Analysis of Bridge Construction: Private Property Owner*

Delaware River, NY

Assessed the risk of additional flooding due to temporary channel fill added to support ongoing bridge construction. Reviewed applicable Flood Insurance Study (FIS), local topography, and construction plan details to understand how flooding might increase during a range of high-flow events.

Energy Facility Stormwater Model: ESS Group, Inc.*

Massachusetts

Working with a project team tasked with evaluating permitting requirements for an energy-from-waste facility, reviewed and updated the facility HydroCAD model to understand the capacity of existing retention basins to meet water usage needs of facility as well as the likelihood of off-site discharge from the facility in the event of a large precipitation event. Evaluated most recent hydrologic design storms for facility and provided preliminary design guidance on the need for additional retention ponds.

Energy Facility Base Flood Elevation Delineation: ESS Group, Inc.*

Rhode Island

In support of facility expansion permitting, conducted hydrologic and hydraulic study of a set of streams that flood during large precipitation events. Developed a HEC-RAS model of the area surrounding the facility and used model to make a determination of the 100-year base flood elevation (BFE) for the streams. Incorporated site-specific survey with statewide datasets and culverted road crossings to establish flood plain around the facility.

Technical Support for PHABSIM Fish Habitat Model: DK Water Resource Consulting*

Chattahoochee River, GA

Supported a team of multiple consulting firms in developing and updating a PHABSIM model of the Chattahoochee River. Provided on-call technical expertise including trouble shooting and helping to develop a conceptual understanding.

Dam Restoration and Removal Study: Town of Franklin

Franklin, MA

Conducted hydraulic and hydrologic analysis of dam system to determine maximum ponding elevations during a range of storm events in order to inform decisions about potential dam removal stream restoration.

Preliminary Stormwater Storage Design: Town of Winchester

Winchester, MA

Modeled existing stormwater system in order to make recommendations for improvements to the system that would lead to reduced flooding of Aberjona River during storm events. Completed conceptual design of upgrades and underground storage. Met with municipality staff to discuss modeling and preliminary designs.

Wetland Flood Study: U.S. Army Corps of Engineers

Somerville, NJ

Updated existing HEC-RAS model of portion of Raritan River in order to assess likely peak flooding elevations and predicted inundation of revitalized wetland area. Mapped localized inundation based on model results and assessed potential improvement of wetland water budget based on changes to wetland restoration design.

Sediment Transport

Sediment Transport Study: ESS Group, Inc.*

Hudson River, NY/NJ

In order to assess impacts of proposed cable laying operation, developed hydrodynamic model using ADCIRC and sediment transport model using PTM to predict transport of sediment suspended during proposed cable laying operations. Evaluated available sediment coring data to determine representative grain size and variability of grain size. Provided demonstrations of suspended concentrations in three dimensions within the water column. Study provided determination of the duration and extent of impacts attributable to cable laying operations.

Sediment Transport Study: ESS Group, Inc.*

Delaware River, DE/NJ

In order to assess impacts of proposed cable laying operation, developed hydrodynamic model using ADCIRC and sediment transport model using PTM to predict transport of sediment suspended during proposed cable laying operations. Evaluated available sediment coring data to determine representative grain size and variability of grain size. Aided client in planning additional sediment data collection to support more accurate modeling of sediment dispersion.

Sediment Transport Study: TRC Companies, Inc.*

Lake Champlain, NY/VT

In order to assess impact of proposed cable laying operation, developed a hydrodynamic model (RMA2) and sediment transport model (PTM) to predict transport of sediment suspended during proposed cable laying operations. Evaluated available sediment

coring data to determine representative grain size and variability of grain size. Used model to provide predictions of suspended sediment concentrations and deposition depths throughout model domain.

Sediment Transport Study: ESS Group, Inc.*

Raritan Bay and New York Bight, NY/NJ

In order to assess impact of proposed cable laying operation, developed a hydrodynamic model (ADCIRC) and sediment transport model (PTM) to predict transport of sediment suspended during proposed cable laying operations. Evaluated available sediment coring data to determine representative grain size and variability of grain size. Used model to provide predictions of suspended sediment concentrations and deposition depths throughout model domain.

Sediment Transport Study: AECOM*

New York Bight, NY

In support of permitting for a proposed natural gas pipeline conducted a study of sediment transport and deposition along coastal shelf. Developed a hydrodynamic model and sediment transport model to predict transport of sediment suspended during proposed excavation and backfilling activities. Evaluated available sediment coring data to determine representative grain size and variability of grain size. Used model to provide predictions of suspended sediment concentrations and deposition depths throughout model domain.

In Channel Construction Erosion Study: Private Developer

Kelso, WA

Developed HEC-RAS model of Cowlitz River and confluence with Columbia River to evaluate shear stresses during peak flows in support of a proposed pier design. Evaluated potential for erosion and deposition patterns to change due to in-channel construction and potential for long-term geomorphic changes to river bed.

Groundwater

Expert Review of Hydrogeologic Study: Old New England Properties*

Arlington, MA

Conducted expert review of a hydrogeologic study that was completed on behalf of the Town of Arlington. Provided developer an independent review of the study findings and assessed how those findings might impact the permitting and design of the planned development. Presented findings at Conservation Commission hearing and provided continued support to developer through the completion of permitting.

Flooding Assessment: Revere Little League*

Revere, MA

Evaluated potential causes of chronic flooding at McMaken Field in Revere. Investigated regional geology, hydrogeology, and hydrology to understand why the field has seen chronic flooding in the last five years. Researched recent city construction including sewer lining to understand potential for construction to have impacted the field. Based on assessment of available information, provided likely cause of flooding and suggestions on how chronic flooding can be addressed.

Groundwater Contouring: MassDOT

Multiple Sites, MA

In support of planned site closures, provided groundwater contouring based on available groundwater sampling data using SURFER. Evaluated seasonal changes in groundwater based on sampling surveys. Provided mapping of groundwater contours in context of larger regional aquifer.

3-D Groundwater Model: City of Calgary

Calgary, Alberta

As a part of a performance evaluation for an existing pump and treat system, developed a three-dimensional groundwater model of site using MODFLOW. Incorporated hydrogeology, interaction with adjoining Bow River, regional groundwater patterns, active and inactive wells, as well as in-place slurry wall. Provided steady-state predictions of radius of influence from wells and flow paths (MODPATH) around impervious boundaries. Provided assessment of existing performance and made recommendations about modifications to pump-and-treat system in order to improve performance.

Dewatering Design: Private Developer

Southeastern, PA

Provided predicted dewatering requirements based on groundwater characteristics including aquifer thickness and conductivity as a part of plans to excavate trench for installation of natural gas pipeline. Modeled radius of influence and maximum drawdown in WELFLO. Also provided preliminary guidance on pump sizing and installation layout in order to achieve needed drawdown for excavation.

Historical Superfund Site Analysis: HydroAnalysis, Inc.***Confidential Location**

Conducted review of 30 years of hydrogeological investigations at former Superfund site in order to assess likely sources of groundwater contamination. Review included assessment of historical aerial photography, assessment of geologic stratigraphy, regional groundwater flow patterns, and mounding of groundwater on the site. Compiled findings and provided report of site history to client.

Coastal Modeling**Expert Review of Coastal Modeling Study: ESS Group, Inc.*****Wellfleet, MA**

In support of engineering design and permitted, reviewed coastal modeling study of Herring River restoration. Evaluated how the study addresses the Mill Creek tributary. Provided expert review of modeling to determine applicability of model results to design and permitting questions. Reviewed study documentation and provided insights into how the model handles precipitation, groundwater recharge, and proposed pumping. Provided findings of expert review to client for use in design and permitting of pump intake and pump design.

Coastal Hydrodynamic and Outfall Relocation Study: HydroAnalysis Inc.***Confidential Location**

In support of an outfall relocation study, developed three-dimensional hydrodynamic harbor model using EFDC. Built set of tools in Python for post-processing model output to make results easily understandable. Conducted analysis to establish tidal datums for project area. Provided technical review of preliminary diffuser design, CORMIX modeling, and draft mixing zone application.

Littoral Zone Study: AECOM***Lake Tahoe, CA**

As a part of a multi-year assessment of shoreline development, designed and executed modeling and analysis of wind-wave generation (STWAVE), wave transformation (CGWAVE), and long-shore current velocities (RMA2) in Lake Tahoe. Used the results from hydrodynamic modeling to evaluate changes in littoral drift processes caused by expansion of U.S. Coast Guard pier. Evaluated potential for erosion and deposition below water line as well as potential for erosion of shoreline. The types of shoreline development that were evaluated included installation of pilings, installation of floating dock, and dredging of lake bed. Provided comprehensive report on study findings in support of permitting.

Storm Surge Analysis: Rhode Island DOT**Kingston, RI**

Modeled tidal estuary's response to storm surge using RMA2. Developed complete model domain and conduct analysis of storm surge and breach of protective dunes in order to characterize scour at in-land bridge embankments during various storm surge events.

Hydrodynamic Modeling: U.S. Army Corps of Engineers**New Orleans, LA**

Assisted in development and analysis of model to determine maximum velocities during normal operation conditions for proposed gate structures in the Inner Harbor Navigation Channel. Conducted tidal constituent analysis for evaluation of model boundary conditions performance relative to alternative models.

Web Development**User Interface and Client-Side Model Implementation Development: University of Massachusetts***

As a part of the Ecosheds web development team (ecosheds.org), developed a user interface for a statistical model of stream temperatures throughout the northeastern region of the United States. Work includes development with JavaScript, HTML, Node.js, D3, Angular, and Bootstrap.

The Water Resources Report*

Conceptualized and developed the Water Resources Report (WRR) at www.WatResReport.com. The WRR tracks activity on Twitter by state regulatory agencies. Development of the WRR involved the use of JavaScript, HTML, Node.js, D3, Angular, and Postgres. Functionality of the WRR is based on executing and managing a series of Application Program Interface (API) calls and appropriate database storage of results. Current plans are to expand tracked organizations to include non-governmental organizations and potentially science/engineering firms that are active on different water bodies. There are also plans to increase filtering of tweets to provide time sensitive and content sensitive results.

PUBLICATIONS AND PRESENTATIONS

Thermal Mixing Zone Studies, BP Internal Workshop for Facility Environmental Managers. Hodge, M.; Gerath, M., May 2013.

Design of Critical Cases for the Application of Calibrated Thermal Models: A Key Part of the Modeling Process, Gerath, M.; Heinen, E.; Hodge, M., Annual Meeting of the American Fisheries Society: Innovations in Thermal Research and Ecological Effect from Thermal Discharges. August, 2012.

Quantifying Potential Profit from Material Recycling: A Case Study in Brick Manufacturing, Hodge, M.; Ochsendorf, J.; Fernandez, J., Journal of Cleaner Production, Volume 18, Issue 12, p. 1190-1199. August, 2010.

The Use of Chemically Enhanced Primary Treatment (CEPT) in Honduran Imhoff Tanks, Mikelonis, A.M.; Hodge, M.M; Adams, E.E., Herrera, A., Proceedings of the Water Environment Federation, WEFTEC 2009: Session 61 through Session 70, p. 3879-3891. January, 2009.

Honduran Imhoff Tanks: Potentials and Pitfalls, Mikelonis, A.M.; Hodge, M.M; Adams, E.E., Herrera, A., Dynamic Modeling of Urban Water Systems, Monograph 18, p. 363-377. February, 2009.

PREVIOUS EMPLOYMENT

AECOM | 2010 – 2012 | Chelmsford, MA

ENSR/AECOM | 2008 – 2010 | Westford, MA

WK Dickson & Co., Inc. | 2003 – 2004 | Columbia, SC