

Eric Holmes, M.S., B.S.

Coastal Scientist

EXPERTISE

Expertise in numerical modeling of hydrodynamics in open-ocean and coastal regions with both structured and unstructured grid models. Coupling of wave and hydrodynamic models for a variety of purposes including, risk assessment, resiliency, sediment transport or restoration efforts. Ability to calibrate and validate models based on observational data, experience in interpreting model output. Using MATLAB and other tools to analyze and visualize data and model results. Administration of distributed memory computer cluster for large scale modeling efforts.

QUALIFICATION SUMMARY

- Numerical model experience with ADCIRC, SWAN, EFDC, CMS Wave and Flow, STWAVE, FVCOM and FVCOM-SWAVE
- Programming expertise in MATLAB-scripting experienced with FORTRAN, PYTHON, BASH-scripting and LATEX
- Strong skills in data evaluation and analysis
- Well versed in various software packages including SMS and Microsoft Office
- Strong written and verbal communication skills
- Strong data processing and analysis skills
- Strong skills in parallel computing, cluster computer setup and use.

WORK EXPERIENCE

2011-Present Coastal Modeler, Woods Hole Group
2010-2011 Research Associate, UMass School for Marine Science and Technology (SMAST)
2008-2010 Research Assistant, University of Massachusetts Dartmouth



Education

2010– M.S.

Physics

*University of Massachusetts
Dartmouth*

2018– B.S.

Physics

*University of Massachusetts
Dartmouth*

Licenses and Registrations

N/A

Professional Affiliations

-N/A

Publications & Presentations

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KEY PROJECTS

MassDOT Massachusetts Coasts Flood Risk Model – Lead Modeler

Worked to expand Woods Hole Groups previous effort, the Boston Harbor Flood Risk Model, to extend to cover the entire state. This work in progress will provide output risk levels for the entire state of Massachusetts for present conditions and four future year conditions. The ADCIRC model was used and the state was split into two segments, the North and the South. Outputs from the model will be made available for use in a variety of manners, such as planning, regulation and risk analysis.

Herring River Marsh Restoration Project – Coastal Scientist/ Modeler

Comprehensive multi-faceted study of the Herring River Marsh system in Wellfleet, MA. Lead the modeling effort and created a variety of output products to be used in a phased in restoration plan. Modeling was done using EFDC to model extensive present and future conditions, included various structural and topographic changes. Physical modeling effort was combined with others at Woods Hole Group to assess environmental impacts.

MassDOT-FHWA Pilot Project – Coastal Scientist/ Modeler

Worked on the development of the coupled wave-flow hydrodynamic model. Final product was the Boston Harbor Flood Risk Model (BH-FRM). Developed a suite of storm scenarios to be run to create a probabilistic risk map for the Boston Area. The model used was ADCIRC coupled with SWAN. Scenarios evaluated were present day conditions, 2030 conditions and 2070 conditions.

Ballard Street Estuary Marsh Restoration Project – Coastal Scientist/ Modeler

Numerical modeling to develop potential configurations for a restored Ballard Street Marsh, a site on the south side of the Saugus River in Saugus, MA. The site was modeled using Environmental Fluid Dynamic Code (EFDC) to assess restored marsh area, flood storage capacity during extreme rain events, and storm surge protection. The model is calibrated and validated using separate sets of field data.

Industrial Economic Sea Level Rise Study – Coastal Scientist/ Modeler

Developed large scale coastal ocean model of Grays Harbor, Washington using ADCIRC model. The numerical model was calibrated and validated using a variety of data. Study involved modeling of sea level rise and storm events to assess areas of potential flooding.

Weirs Beach Sand Migration Study – Coastal Scientist/ Modeler

STWAVE Model analysis of along- and cross-shore sediment transport due to wave action and analysis of Aeolian sediment transport in effort to assess erosion of beach.

Tsunami Super Computer – Developer/ Modeler

Created a multi-node super computer built from twelve nodes, each with two processors containing four cores for a total of 96 compute nodes. Helped to develop software and management plan.

KEY PROJECTS (CONTINUED)

Broad Cove Estuary Marsh Restoration Project – Coastal Scientist/ Modeler

Numerical modeling to assess feasibility, restoration potential and associated flooding risks for the Broad Cove Estuary in Hingham Harbor, Hingham Massachusetts. Use of Environmental Fluid Dynamic Code (EFDC) to assess potential control structure replacement below Route-3A which would allow increased exchange between the harbor and cove. The model is calibrated and validated using separate sets of field data.

North Haven Dock Study – Coastal Scientist/ Modeler

Wind-Wave analysis of waters surrounding the Village of North Haven, New York. Long term wind analysis done using meteorological data from a nearby airport was first completed. Results of the wind analysis were used as input for the Simulating WAVes Nearshore (SWAN) wind-wave generation model. SWAN simulations were then used to create a map to show areas of high wave activity around the Village.

Morton Salt Mixing Zone Study – Coastal Scientist

Analyzed field data collected at an effluent outflow on the Grand River in Fairport Harbor, Ohio. Data analyzed came from various instruments and sources including bottom mounted a riverbed mounted Acoustic Doppler Current Profiler (ADCP), boat based ADCP survey data, Conductivity Temperature Depth (CTD) cast data. ADCP data was analyzed to approximate river flow rates, CTD profiles were used to approximate the shape of the effluent plume in the river. All analysis output was documented in figures and put into standardized output format.

Bride Brook Estuary Marsh Restoration Project – Coastal Scientist/ Modeler

Numerical modeling to assess the impact of a recently installed box culvert connecting the Bride Brook Marsh system of East Lyme Connecticut to Long Island Sound. Building on an earlier numerical modeling study and now using the Environmental Fluid Dynamic Code (EFDC), a two-dimensional simulation of the system was set up and validated using field data to examine scour at key locations, including an AMTRAK bridge crossing the river.