

Alex J. Shaw, M.S., B.S

Coastal Engineer

EXPERTISE

Hydrodynamic modeling using numerical and analytical models on coastal and estuarine systems using both structured and unstructured grids. Validation of models based on observed data and analytical methods. The use of SMS, ArcGIS, MATLAB and other programs to visualize and process model inputs and outputs.

QUALIFICATION SUMMARY

- M Coastal numerical modeling experience with ADCIRC, WHAFIS, SLOSH, STWAVE, EFDC, ACES, CMS flow, HEC-RAS and SWAN.
- Programming experience with MATLAB
- Laboratory and numerical model assessment of storm surge flooding and the effects of dredging
- Strong written and verbal communication skills
- Strong data processing and analysis skills

WORK EXPERIENCE

2016-Present Coastal Engineer, Woods Hole Group
2014-2016 Teaching/Research Assistant, University of Rhode Island
2013 Intern, Applied Science Associates (RPSASA)
2012 Intern Office of Marine Programs



Education

2016 – M.S.
Ocean Engineering
University of Rhode Island
2014 – B.S.
Ocean Engineering
University of Rhode Island

Licenses and Registrations

- Advanced SCUBA certification
- HAZWOPER certification

Professional Affiliations

- Member; Coast, Oceans, Ports, and Rivers Institute
- Member; Order of the Engineer
- Tau Beta Pi Engineering Honor Society
- Omega Epsilon Ocean Engineering Honor Society

Publications & Presentations

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KEY PROJECTS

MassDOT Massachusetts Coasts Flood Risk Model – Engineer/Modeler

Worked to expand Woods Hole Groups previous award-winning effort, the Boston Harbor Flood Risk Model, to encompass the entire state. The coupled ADCIRC/SWAN model was utilized to simulate both extra-tropical and tropical cyclone events using an ensemble Monte Carlo approach. Probabilistic results are being utilized to identify road and infrastructure risk around the state. The large state-wide grid has also been utilized to analyze tidal conditions across the state. Overtopping analysis was also performed as part of this modeling effort and incorporated into the probabilistic results.

Palm Beach Coastal Vulnerability – Engineer/Modeler

Worked to develop a modeling effort for the town of Palm Beach using ADCIRC/SWAN modeling. The coupled model was utilized to simulate a suite of tropical events, both historical and synthetic, to generate probabilistic results for present day and future conditions. Overtopping was incorporated as part of the modeling effort to determine the additional flooding caused by this process.

Sandwich Harbor Dredging – Engineer/Modeler

Created a Hec-RAS model to analyze the effect of dredging the harbor on the dynamics of the estuary. Fluxes both during existing conditions and during alternatives were determined and showed an increase in flushing of the system.

Eagle Neck Creek Restoration – Engineer/Modeler

The culvert under Old County Road in Truro, Massachusetts was assessed to determine the size needed for tidal restoration in Eagle Neck Creek. To assess the culverts an EFDC model was created and run for existing conditions, as well as alternatives to determine the restoration effects of different culvert sizes.

Maidford, Rhode Island Marsh Restoration Project – Engineer/Modeler

Worked on the developed of a hydrodynamic model for Maidford River, Rhode Island. The model used was EFDC. The model was used to determine best location for the river inlet to best restore the marsh plane.

Mayo Creek Wetland Restoration Project – Engineer/Modeler

Modified an existing hypsometric MATLAB model to determine the correct culvert design. The parameters were constricted to maintaining mean tide level (MTL) to maintain the ground water level around the nearby houses. The final design was a 6 x 6-foot culvert with a combination tide and sluice gate to limit flow. This increased the wetted area of the marsh without affecting the surrounding houses.

Woods Hole Oceanographic Institute (WHOI) Flood Insurance Revision – Engineer/Modeler

Accessed the current conditions of for flood insurance from the Federal Emergency Management Agency (FEMA). Recreated FEMA transects in the area with modified topography, water, and wave conditions using ACES, CHAMP, and SWAN 1D. The reassessment lowered the BFE for WHOI and the surrounding area.

KEY PROJECTS (CONTINUED)

Swampscott Overtopping and Runup Analysis – Engineer/Modeler

Different properties in Swampscott, Massachusetts were accessed for their vulnerability to runup and overtopping. Using equations from the Coastal Engineering Manual (CEM), the topography of the area, and probability curve for water levels the overtopping rate and runup elevation were calculated for each site. Design alternatives for reduced runup and overtopping were accessed to determine effectiveness.

Narrow River Dredging Project for the CRMC and Fish and Wildlife Service – Engineer/Modeler

Created a hydrodynamic model using ADCIRC to assess the impact of multiple dredging scenarios on the Narrow River flushing times and tide ranges. The dredging scenarios considered included dredging to 1, 1.4, 2, and 3 meters in the narrows of the river to increase flow and decrease flushing time. Both tidal and surge cases were evaluated. The work was completed ahead of schedule and is being considered by the CRMC and other agencies.

Effect of Erosion on Storm Surge Flooding: Case Study of Coastal Ponds in Rhode Island – Engineer/Modeler

Developed and validated high resolution model of the south coast of Rhode Island. Erosion was estimated for 25 years and after a storm event where the dunes have been eroded. Two storms, Hurricane Bob and a synthetic 100-year recurrence event, were simulated both with and without erosion. The erosion of the shoreline was shown to have negligible effects on flooding extents, while dune erosion produced a dramatic increase in flooding along the coastline for smaller scale events.

PUBLICATIONS & PRESENTATIONS

Hashemi, M. Reza, Malcolm L. Spaulding, Alex Shaw, Hamed Farhadi and Matt Lewis. 2016. "An efficient artificial intelligence model for prediction of tropical storm surge." *Natural Hazards* 82.1 (2016): 471-491.

Shaw, Alex, Mohammad Reza Hashemi, Malcolm Spaulding, Bryan Oakley and Chris Baxter. 2016. "Effect of Coastal Erosion on Storm Surge: A Case Study in the Southern Coast of Rhode Island." *Journal of Marine Science and Engineering* 4.4 (2016): 85.