

Daniel I. Duval, M.S.

Coastal Scientist

EXPERTISE

Expertise in coastal processes and sediment transport. Application of field and laboratory research to resolve and evaluate hydrodynamic and geologic processes within coastal and estuarine environments. Deploy and maintain instrumentation, land-based or shipboard operations. Data processing utilizing MATLAB, including time-series and quantitative analyses. Oceanographic data collection systems. Coastal mooring system instrumentation and deployment techniques. Field operations logistics, efficiency, safety, and shipboard deck operations. Programming, deployment, and data analysis of oceanographic instruments including the ADCP, ADV, and CTD. Water and sediment processing for gamma spectroscopy.

QUALIFICATION SUMMARY

- 15 years of experience
- Experienced in the deployment/recovery of coastal instrumentation and data processing
- Use of ADCPs for temporal (moorings) and spatial (vessel surveys) oceanographic studies
- Extensive field/shipboard operations and logistics management of geologic and water sampling
- Small and large water processing for SSC and LOI analysis, and gamma spectroscopy
- Sediment core collection and characterization
- Specializes in coastal data collection program management and operational logistics for both surface and subsurface systems.

WORK EXPERIENCE

2016-Present Woods Hole Group, Inc. (Coastal Scientist)
2014-2016 University of Delaware (Limited Term Researcher)
2010-2013 University of Delaware (Research Assistant)
2006-2008 Stony Brook University (Research Assistant)



Education

2013 – M.S.
Marine Studies/Oceanography
University of Delaware
2013 – M.S.
Marine Studies/Oceanography
Stony Brook University
2006 – B.S.
Marine Science
University of South Carolina

Licenses and Registrations

- N/A

Professional Affiliations

-N/A

Publications & Presentations

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KEY PROJECTS

Marsh Restoration Project, Prime Hook National Wildlife Refuge, Delaware. U.S. Fish and Wildlife and Delaware Department of Natural Resources and Environmental Control. Coastal Scientist.

U.S. Fish and Wildlife is leading the restoration of Prime Hook Marsh after storms created breaches in the barrier beach. Previously managed as a combination of natural salt marsh and man-made freshwater marsh, the breaches caused saltwater buildup within the interior of the marsh with limited drainage. The goal of restoration is to return the marsh to a full salt water marsh. This includes: 1) filling in the breaches in the barrier island, 2) dredging over 20 miles of channels to allow tides to propagate through the marsh, and 3) removal of water control structures that block tidal flow.

As part of the restoration process, a monitoring plan was developed to envelop the entire marsh restoration. One year of data was collected prior to restoration and continues for one year after construction is complete. Monitoring includes the deployment of five ADCPs and automated water samplers (ISCOs) at the major waterways of the marsh. This data is used to characterize the circulation at all phases of restoration, as well as quantify the sediment transport in the marsh. By doing so, it can be determined whether or not the marsh receives enough sediment to accrete naturally, or if it requires further assistance.

Scusset and Town Neck Beaches, Town of Sandwich, Massachusetts. Coastal Scientist.

Town Neck beach has experienced significant erosion and has a limited natural sediment supply due to the presence of jetty structures at the entrance to the Cape Cod Canal. Littoral transport from the north is interrupted by the structures, and some of the sand that would naturally be destined for Town Neck becomes trapped in the Canal. Woods Hole Group evaluated a number of bypass alternatives, and the preferred alternative is to dredge sand from a site offshore of Scusset Beach, north of the Canal, to nourish Town Neck Beach. In order to assess potential impacts to wildlife habitat, topographical surveys were conducted using a Trimble® R8 RTK GPS. The purpose of the surveys was to 1) determine potential nesting grounds for piping plover, 2) identify rocky intertidal and eelgrass zones, and 3) help estimate the volume for sand required for nourishment. Surveys were compared to previous LIDAR elevation data, as well as Mass DEP surveys for rocky intertidal and eelgrass zones, and assisted in future spreading analysis.

Callahan Mine, Goose Pond Estuary, Brooksville, Maine. AMEC Foster Wheeler Environment & Infrastructure, Inc. Coastal Scientist.

Woods Hole Group is supporting the remediation and restoration of Callahan Mine, an EPA Superfund site. To better characterize the estuarine system and develop a hydrodynamic model, side-scan sonar and bathymetric surveys were conducted in and outside the Goose Pond Estuary. Side-scan sonar data was collected using a Klein System 3900 towfish and topside unit. The Klein 3900 is an extremely high-resolution dual frequency (445 and 900 kHz) digital sonar for excellent characterization of identified targets. Surveys were conducted along proposed silt curtain locations to assist in anchor design. Bathymetric data was collected using a Sontek M9 Hydrosurveyor interfaced with a Trimble® R8 RTK GPS and a PC running the survey software HYPACK 2016. The M9 includes full water column velocity mapping capabilities, as well as five beam depth sounding. The M9 switches between one and three MHz transducers depending on the depth. In locations that are too shallow for the M9 (<1.2 feet depth), elevation data were collected using the RTK GPS along transects plotted in Hypack to ensure proper spatial distribution of data. Finally, vertical profiles of density, temperature, and salinity were

KEY PROJECTS (CONTINUED)

taken using a Sontek Castaway CTD. These profiles were used to validate seasonal conditions for modeling purposes.

Siasconset Beach, Nantucket, Massachusetts. Siasconset Beach Preservation Fund. Coastal Scientist.

Woods Hole Group, Inc. was contracted by the Siasconset Beach Preservation Fund (SBPF) to collect and analyze beach profile data supporting ongoing shoreline protection and monitoring efforts. In 1994, a beach dewatering systems was installed to mitigate beach erosion. More recently, an 852 foot long geotube system constructed between December 2013 and January 2014 to stabilize the bluff running along much of Siasconset Beach. The original geotube system consisted of three tiers of geotubes, and a fourth tier was added between November and December 2015 extending the northern and southern ends of the project. Topographic surveys are conducted quarterly, extending from the toe of the dune or bank seaward to the -5 ft MLW contour. Additionally, the quarterly monitoring includes top of bank monitoring within and around the geotube project area. Bathymetric monitoring is required twice annually in the spring and fall quarters. Topographic surveys are conducted with a Trimble® R8 GPS, a real-time kinematic global positioning system (RTK GPS) providing centimeter-level geodetic positioning. To extend the profile to the -5 ft MLW contour, a Leica TS-02 electronic total station is utilized to survey a swimmer with a survey rod. Bathymetric surveys are conducted interfacing the Trimble® R8 GPS with a HydroBox Hydrographic Echo Sounder with a single frequency 200 kHz beam using Hypack.

143 Plantingfield Way, Edgartown, Martha's Vineyard, Massachusetts. Coastal Scientist.

The land-owner contracted Woods Hole Group, Inc. to design and permit the dredging of a sandspit and renourishment of a nearby beach to mitigate future remediation. This includes post-remediation surveys including a bathymetric survey of the dredged area and topographic survey of the modified beach. The bathymetric survey was conducted interfacing the Trimble® R8 GPS with a HydroBox Hydrographic Echo Sounder with a single frequency 200 kHz beam using Hypack. The topographic survey was conducted using a Trimble® R8 GPS, a real-time kinematic global positioning system (RTK GPS) providing centimeter-level geodetic positioning. Grain-size analysis was conducted on sand samples from the modified beach to ensure compatibility.

Herring River, Wellfleet, MA. Friends of Herring River. Coastal Scientist.

Woods Hole Group, Inc. was contracted to install and maintain five telemetered water level/quality stations in Herring River, Wellfleet to provide hydrodynamic and baseline data for the system before the replacement of a large culvert structure. These stations are maintained by Woods Hole Group four times a year for regular maintenance, sensor calibration, and RTK GPS survey for converting water depth to elevation in NAVD88. The data is telemetered through WQData Live and managed daily by Woods Hole Group, including QA/QC and data processing for water elevation in NAVD88.

Town Creek, Salisbury, MA. Department of Ecological Restoration. Coastal Scientist.

In 2014, the Town of Salisbury constructed a new culvert/embankment to replace a defunct culvert that was not allowing proper drainage to the upstream marshes. The new culvert system was constructed based off recommendations from Woods Hole Group, Inc. and built as two 5'x5' culverts with slide/flap tide gates for water control. Woods Hole Group, Inc. was contracted to perform the post-construction water level analysis. Three water level stations were installed in Town Creek, re-occupying pre-construction water level stations. All

KEY PROJECTS (CONTINUED)

water level stations were surveyed using RTK GPS to convert water depth to elevation in NAVD88. The data were compared to data collected pre-construction, as well as model predictions, in order to assess the impact of the new culvert and tide gate system and provide recommendations for the tide gate opening.

Maraspin Creek, Hyannis, MA. Barnstable Department of Public Works. Coastal Scientist.

Woods Hole Group, Inc. was contracted to perform a hydrologic and hydraulic study of Maraspin Creek, Hyannis, MA to evaluate potential alternatives to alleviate flooding to properties in the area. To assist this assessment, four water level stations were installed, bracketing key structures in the area. The first structure is a bridge over the Creek mouth at Millway and the second a culvert beneath Commerce Rd. These stations were surveyed using RTK GPS to convert water depth to elevation in NAVD88.

128 Bluff Point Dr., 69 and 71 Ocean View Ave., and 0 and 100 Cross St., Cotuit, MA. Coastal Scientist.

As part of an agreement with Three Bay's Preservation, the beaches at the above properties are receiving sand from the dredging of Sampson's Island's spit. Woods Hole Group, Inc. was contracted to perform annual beach surveys to monitor erosion at these locations, as well as pre- and post-renourishment surveys. Surveys were conducted using a Trimble® R8 GPS and KeyStone KeyNet VRS network. Elevations were compared with previous surveys conducted in the area, as well as provide baseline elevations for pre-nourishment conditions.

Flushing Creek, NY. AECOM Transportation. Coastal Scientist.

Woods Hole Group, Inc. was contracted to perform hydrologic monitoring in Flushing Creek, NY for AECOM Transportation. Flushing Creek is located south-east of LaGuardia Airport and is crossed by several highways, as well as culverts and water control structures, and connects to Meadow and Willow Lake upstream. This monitoring included six water level sites, two flow sites, and one precipitation site over a period of 45-days. Sites were chosen to assess the impact of the various structures along Flushing Creek. Water level stations were surveyed using RTK GPS to convert water depth to elevation in NAVD88. Data were processed to evaluate the hydrodynamics of the system and the impact of the structures in the system.

Sandwich Harbor, Sandwich, MA. Department of Natural Resources. Coastal Scientist.

Woods Hole Group, Inc. is investigating the impacts of accumulating sediment in Sandwich Harbor and the potential use of sand for nourishing Town Neck Beach. Sandwich Harbor is situated just south of Town Neck Beach and frequently experiences overwashing from Town Neck Beach during storm events. The assessment proceeded in multiple phases. In the first phase, a bathymetric and coring survey were conducted to determine the quantity of sand that has accumulated within the channels. The bathymetric survey interfaced a Trimble® R8 GPS with a HydroBox Hydrographic Echo Sounder with a single frequency 200 kHz beam using Hypack. In the second phase, modeling was conducted to determine the effects of sand shoals on the hydrodynamics and water quality within Sandwich Harbor. Additionally, four water level stations and two flow stations were installed in the Sandwich Harbor marsh system. All water level stations were surveyed using RTK GPS to convert water depth to elevation NAVD88. Data were processed and used in model calibration and validation.

KEY PROJECTS (CONTINUED)

Fast Eddy, Gulf of Mexico, USA. Eddy Watch. Coastal Scientist.

The Woods Hole Group, Inc. is contracted by companies to monitor the Loop Current in the Gulf of Mexico. This includes the use of two ADCPs monitoring the top 150 meters of the water column. Data is transmitted by satellite for real-time current monitoring. In addition, depth profiles of temperature are taken periodically using XBT disposable temperature probes.

Palm Beach, Florida. Town of Palm Beach. Coastal Modeler.

The Town of Palm Beach contracted Woods Hole Group, Inc. to conduct a vulnerability assessment of coastal areas to flooding and sea-level rise. To assist, model grids and boundary conditions were created for CMS-FLOW to determine areas of overtopping in the coastal plane, taking into account structure elevation.

80 and 108 Sanddune Court, Sagaponack, NY. Coastal Scientist.

Homeowners contracted the Woods Hole Group, Inc. to investigate the FEMA flood plane designation. A LOMR analysis was conducted using up-to-date, higher resolution survey data. The survey was conducted using