

### *Qualifications Summary*

- 10 years of experience in the marine sciences
- Coastal and deep-water research experience
- Experienced in the deployment/recovery of oceanographic mooring systems, instrumentation, and data processing
- Use of Acoustic Doppler Current Meters for temporal (moorings) and spatial (vessel surveys) oceanographic studies
- Extensive field and shipboard work performing geologic and oceanographic sampling
- GIS geospatial analysis applications, cartographic transformations, and digital terrain modeling of topographic and bathymetric data
- Bathymetric and shoreline change analysis
- Geophysical survey data acquisition, processing, and interpretation (bathymetric, side-scan, sub-bottom)
- Interpretation of sedimentary environments based upon seafloor bedforms and sub-surface sediment facies
- Sediment budget analysis
- Geochronological analysis of sediment cores using radioisotopes activities and contaminant histories

## **DAVID R. WALSH, M.S.**

Coastal Scientist  
(Coastal Sciences, Engineering and Planning Division)  
Field Oceanographer  
(Oceanography and Measurement Systems Division)

### **Fields of Expertise**

Expertise and research interests in coastal geomorphology and sedimentology. Application of field and laboratory research to resolve and evaluate geologic processes within coastal, estuarine, and oceanic environments. Utilization of GIS and other geospatial software packages to map and define geomorphological processes. Design, acquisition, processing, and interpretation of bathymetric, side-scan sonar, and sub-bottom sonar surveys. Implementation of sediment sampling strategies to ground-truth geophysical survey data (physical properties, sediment stratigraphy, layer thickness) and estimate sedimentation rates.

Coastal and deep-water mooring system instrumentation and deployment techniques. Field operations logistics, efficiency, security, and at-sea deck operations. Programming, deployment, and data analysis of oceanographic instruments including the ADCP, ADV, and CTD. Mooring design, floatation/hardware components, and acoustic releases.

### **Higher Education**

M.S. Marine Studies - Oceanography, Univ. of Delaware (2004)  
B.S. Geoscience, Hobart College (1999)

### **Employment History**

2004-Present Woods Hole Group, Inc. (Coastal Scientist)  
2001-2004 University of Delaware (Research Assistant)  
1999-2001 USGS Coastal and Marine Geology Program  
(Mooring Systems Technician)

### **Certificates of Training**

OSHA 40-Hour HAZWOPER  
Offshore/HUET Survival

## Key Projects

### **Hydrodynamic Analysis and Alternatives Design Assessment for the Restoration of Bride Brook, Rocky Neck State Park, East Lyme, CT. 2007–2009 - Coastal Scientist/Project Manager**

This project investigated the hydrodynamic characteristics of the degraded Bride Brook estuary and provided an assessment of the potential alternatives designed to restore more natural conditions to the system. The estuary has been structured since the early 20<sup>th</sup> century by twin elliptical culverts located at the mouth of the estuary on Long Island Sound. Since that time, alewife numbers in Bride Brook have declined and the estuarine salt marsh surface is noticeable degraded with pockets of vegetation die back; these present conditions have spurred a restoration effort. The WHG investigation was performed by collecting field observation data and incorporating the data into a 1-D hydrodynamic model. The model was calibrated and verified using the field observations for existing conditions, and subsequently modified to conceptual design specifications for two proposed alternatives. The model was used to assess hydrodynamic conditions (water level and velocity) for the two alternatives during typical conditions and extreme event conditions. Model output was used in a channel scour analysis for both alternatives to determine whether scour was likely to occur in the channel. A recommended alternative was chosen by the client based on the WHG investigation report and construction plans for the restoration were provided as final products.

### **Oceanography Measurement Program, New York Bight. 2008–Present - Field Operations Manager**

WHG designed, deployed and maintained two long-term monitoring locations in the New York Bight. Each location contained a complex array of instrumentation designed to fully characterize the oceanographic properties of the water column at the two specific sites over the course of a year. Surface and internal waves, currents, and water column stratification are of primary interest. The effort has included instrumentation mounted to surface buoys, subsurface moorings, and bottom platforms, with all positions monitored by satellite tracking. Quarterly service visits, reports, and data are deliverables to the client.

### **Environmental Assessments and Impact Evaluation of Hammonasset Beach State Park, Madison, CT. 2007–2008 - Coastal Scientist/Field Technician Lead**

In this multi phase project, Mr. Walsh led the field data collection program, performed a shoreline change analysis, and assisted in writing several report chapters pertaining to the coastal geology and morphology of Hammonasset Beach, and beach nourishment sand sources. In preparation for the wave modeling phase of this project, Mr. Walsh performed a nearshore bathymetric survey and successful deployment of two trawl resistant bottom mounted ADCP moorings (near-shore, offshore) to collect wave and current data over a 60-day time period. A subaqueous sediment sampling program (using a petite ponar grab) was also completed to delineate potential beach nourishment resources.

### **Evaluation of Sedimentation and Associated Contaminant Transport Processes in a Shallow Estuarine Cove, Southeastern, MA. 2004–2006 - Coastal Scientist/Interim Project Manager**

Woods Hole Group, Inc. executed a comprehensive investigation of the transport processes of sediments and associated contaminants in a shallow estuarine cove located in southeastern

## **Key Projects (continued)**

Massachusetts. The purpose of this investigation was to provide quantitative results that will assist in the development of required remedial alternatives for this location. The investigation involved: 1) field data collection to quantify and rank transport processes more accurately, 2) laboratory analysis to constrain contaminant “hot-spots” and quantify contaminant mass, and 3) a quantitative characterization of certain hydrodynamic and sediment transport processes, and their associated rates. This investigation was intended to provide a detailed understanding of contamination history and transport processes to aid in determining the possible need for remediation and, as appropriate, provide input for evaluating possible remedial alternatives.

### **NOAA CO-OPS National Current Observation Program, Penobscot River and Bay, Maine. 2006 - Field Technician Lead**

Mr. Walsh managed the WHG field operations during the Penobscot Current Observation Program in 2006, participating in all three cruises. The program consisted of data collection at nine stations using TRDI ADCPs mounted in both SUBS buoys and TRBM platforms. During this project Mr. Walsh received experience working directly with NOAA CO-OPS personnel, policies, and equipment. GFE instrumentation consisted of TRDI ADCPs, ORE CART, Benthos 875-A PUB, Benthos UAT-376 transponders, and RBR XR-420 CTD. In addition to preparing, maintaining, and deploying the GFE, Mr. Walsh assisted with CTD casts, and prepared the final NOAA formatted log sheets. The experience that the Penobscot Current Observation Program has provided WHG and Mr. Walsh with a working knowledge of NOAA operations and requirements that will prove invaluable to the success of future projects.

### **Oceanographic Investigation of the Brazilian Shelf and Slope, Southern Atlantic Ocean, Brazil. 2008-Present - Field Technician Lead**

The objective of this project is to collect a two-year time-series of oceanographic data at various locations off the Brazilian coast. Mr. Walsh was the lead field technician during the project's initial deployment. Six deepwater moorings are deployed on the continental shelf and slope in water depths ranging from 300 to 2,200 meters. Contour normal CTD transects are also performed at each 90-day turnaround for data recovery and instrument maintenance. Current magnitude/direction and water physical properties are measured using TRDI 75 kHz ADCPs, Nortek Aquadopp ADVs, and Seabird 37-SMPs.

### **Offshore Current Observations via a Deepwater Mooring Array, Caribbean Sea, Colombia. 2007-2008 - Field Technician**

Mr. Walsh was a key participant in six research cruises performed to collect a continuous year-long time-series of oceanographic data at three deepwater locations off the Caribbean coast of Colombia, South America. Mooring water depths ranged between 750 and 1500 meters. Current magnitude/direction and water physical properties are measured using TRDI 75 kHz ADCPs, Nortek Aquadopp ADVs, and Seabird 37-SMPs.

### **Regional Current Velocity Mapping and Long-Term Observations, Strait of Gibraltar. 2007 - Field Technician Lead**

Managed the planning and design of a field survey of tidal currents offshore Europa Point, Gibraltar and Ceuta, Spain. The vessel based survey was performed using a TRDI 150 kHz

## **Key Projects (continued)**

Quartermaster ADCP with bottom-tracking in order to profile currents out to a depth of approximately 350 meters and collect bathymetric soundings. Subsequent to a rigorous spatial survey mapping current magnitude and direction over a 6 day period, the current meter was deployed in a subsurface mooring to collect a time-series of the complete lunar cycle of tidal currents over 30 days.

### **Hydrodynamic Observations of the Merrimack River, Manchester, NH. 2006 - Coastal Scientist/Field Technician Lead**

WHG was contracted to collect a 30-day time series of current velocity and water level in the Merrimack River at Manchester, NH. Mr. Walsh was the lead scientist and field technician for this project that required a unique approach to ensure the successful collection of data. Data collection was performed at two locations across a transect normal to river flow using the Nortek 2 MHz ADP. One instrument was located in the thalweg, and the other was jetted into the river bottom on the shallow (<1 meter) flats flanking the thalweg. Despite the difficulties caused by the riverine water turbulence, water column debris, and shallow water levels, a complete data record was recovered and provided to the client.

### **Hydrodynamic Observations at the Former Callahan Mine Property, Brooksville, Maine. 2006 - Coastal Scientist/Field Technician Lead**

Mr. Walsh led the field data collection program for this project located in this interesting coastal Maine estuary. At the project site, a complex interaction between the strong Penobscot Bay tides, an inlet restriction, the flooded former mine pit (>300 feet deep), and the extremely shallow upper estuary created an exceptional hydrodynamic situation and required a unique data collection plan. A time series of currents, turbidity, water level, salinity, and temperature were collected for 60-days at three locations in the estuary in order to characterize these complex hydrodynamics. Subsequent to collection, data were applied to calibrate and verify a 3-D model that was used to estimate the effects of extreme events on the system's hydrodynamics, and to estimate sediment transport potential.

### **Reverse Osmosis Concentrate Dilution Analysis and Ambient Water Quality Characterization, Melbourne, FL. 2005 - Coastal Scientist/Field Technician Lead**

Completed collection and processing of field data for application in an analytical model to characterize the dilution of a reverse osmosis (RO) plant discharge in the Eau Gallie River. The field data collection program consisted of measurements of tide, salinity, and temperature over a 45-day period using four strategically placed CTD sensors, a high resolution bathymetric survey, water quality sampling, and additional CTD surveys to account for spatial variability. River flow and discharge data were obtained from the City of Melbourne and other sources to complete the comprehensive data set required for the dilution analysis. The field data was processed and used in an analytical model to simulate the existing discharge and determine if a mixing zone could be achieved and permitted under existing water quality regulations and both the State and Federal level.

## Key Projects (continued)

### **Mixing Zone Evaluation, BP Products North America, Whiting Business Unit, Lake Michigan. 2005 - Field Technician Lead**

Conducted study to support the review of a permit renewal application for a discharge into Lake Michigan. The study included a literature review on Lake Michigan currents to help characterize receiving waters in the vicinity of the discharge. Observations of currents in Lake Michigan were also collected over a 45-day period using two TRDI ADCP systems in order to better determine the discharge site-specific ambient conditions. The current data were processed and an attempt was made to correlate the currents with wind observations obtained from nearby locations in order to model long-term conditions. This data was then analyzed to define the appropriate ambient water input conditions to use in modeling the discharge's dilution and mixing zone.

### **NOAA CO-OPS, Physical Oceanographic Real-Time Systems (PORTS), Narragansett Bay, RI. 2004-Present - Field Technician**

Over his tenure with WHG, Mr. Walsh has been assisting with the operation and maintenance of sensors comprising the Narragansett Bay PORTS. Duties included on-site service and maintenance, and reporting. Mr. Walsh is knowledgeable with PORTS measurement systems, including current meter, water level, meteorological stations and data telemetry.

### **Instituto Mexicano del Petroleo Deepwater Oceanography Enhancement, Bay of Campeche, Gulf of Mexico. 2005 - Instrument Specialist/Field Technician**

Mr. Walsh facilitated and assisted with classroom and field training in the maintenance, programming, and deployment of oceanographic instruments. Specifically, these instruments comprised a 1,500 meter deep-water mooring system. Mooring components included the TRDI 75 kHz ADCP, TRDI 300 kHz ADCP, Nortek Aquadopp ADV, and Benthos 865-A acoustic releases. A one-month training deployment was successfully performed in the May of Campeche, Gulf of Mexico.

### **Investigation of Sediment Shoaling in Hyannis Harbor, Hyannis, Massachusetts. 2004-2005 - Coastal Scientist/Field Technician**

Mr. Walsh assisted with the design and implementation of a one-month oceanographic instrument deployment in order to identify processes responsible for the observed shoaling of Hyannis Harbor. The deployment consisted of two TRBM instrument platforms, each housing a Sontek ADV current meter and D&A OBS-3A turbidity sensor. Subsequent to a successful deployment, Mr. Walsh performed the data processing, analysis, and reporting of the time-series data and assisted with reporting.

## Publications and Presentations

- Walsh, D. R. 2004. Anthropogenic influences on the morphology of the tidal Delaware River and Estuary: 1877–1987. Master's Thesis. University of Delaware. Newark, DE.
- Walsh, D. R. and C. K. Sommerfield. 2004. Anthropogenic influences on the morphology of the tidal Delaware River and Estuary. Geological Society of America Abstracts with Programs 36(2).