

### *Qualifications Summary*

- More than 30 years of experience in the fields of oceanography, coastal engineering, sediment transport, and nearshore processes
- Strong written and verbal skills. Excels in presenting complex information and concepts to non-technical audiences
- Specializes in developing and implementing complex data collection efforts, which require solving detailed and often-diverse logistic problems such as marsh restoration and sediment transport projects
- Excellent project management skills. Excels at managing large projects with multi-discipline investigators
- Specializes in collection, analysis/interpretation, and integration of field data into project design. This includes the design of field studies/programs to measure waves, currents, water levels, and suspended sediment transport at tidal inlets, nearshore, and in estuaries in MA, DE, NC, VA, FL, AL, NY, and Caribbean
- Managed projects which designed and completed investigations to determine the optimum offshore borrow site locations, which maximize grain size, and quantities of borrow material while minimizing project environmental impacts
- Managed and completed longshore sediment transport and examined shoreline response at numerous tidal inlets along the eastern coast of the U.S. Designed and completed large-scale field investigations to examine wave interaction on ebb and flood tidal shoals
- Managed and completed numerical and physical modeling studies for the design of shore protection facilities. Numerical model simulations, water elevations during storms, and shoaling effects of nearshore bathymetry were integrated to determine shore protection design criteria. The model and field data including the shoaling affects of nearshore bathymetry were integrated to develop shore protection design criteria. Cost optimization of the shore protection design resulted in significant cost savings to this phase of the project

## **LEE L. WEISHAR, Ph.D., M.S., B.S., P.W.S.**

Senior Scientist/Coastal Engineer

### **Professional Certification**

Professional Wetlands Scientist (PWS) 2005

### **Professional Affiliations**

Sigma Xi

American Association for the Advancement of Science

American Geophysical Union

Society of Economic Paleontologists and Mineralogists

American Society of Engineers

Society of Wetland Scientist

Estuarine Research Federation

ASCE Wetlands & Sediment Management Committee

Chairman of ASCE Wetlands Engineering Guidelines

Subcommittee

Certified as Professional Wetlands Scientist

American Shore & Beach Preservation Association – Board Member

### **Fields of Expertise**

Scientific consulting in marsh ecology and the tidal hydraulics of wetlands. Salt marsh restoration as mitigation for power plant intake impacts (e.g., 316(b) restoration measures), and NRDA. Engineering consulting on the effects of tidal inlet and shore protection structures, longshore sediment transport, shoreline response, marsh hydrology and restoration. Conducted numerical model studies of channel stability, shoaling, and tidal flushing at tidal inlets. Designed field studies and performed numerical and physical modeling of waves, currents, water levels, and suspended sediment transport at tidal inlets. Field collection of oceanographic and geotechnical data. Designed and supervised several large beach nourishment projects requiring dune and beach design, construction oversight, and field monitoring.

### **Higher Education**

Ph.D., Physical Oceanography-Purdue University (1982)

M.S., Geophysical Oceanography-Virginia Institute of Marine Science and College of William and Mary (1976)

B.S., Mechanical Engineering-Michigan State Univ. (1973)

## Employment History

1989-Present Woods Hole Group, Inc.  
1983-1989 U.S. Army Corps of Engineers  
1973-1982 Purdue University (Research Coordinator, Research Fellow, Research Instructor)  
1972-1973 F.W. Amend Company  
1969-1972 Michigan State University (Research Assistant)

## Key Projects

### **Monitoring Marsh Restoration in Delaware River Estuary, Public Service Electric and Gas Company –Project Manager**

Dr. Weishar is the adaptive management evaluation team leader responsible for an ongoing project evaluating restoration plans, developing and implementing corrective mitigation strategies, required to ensure the successful restoration of 20,000 acres of salt marsh in the Delaware River Estuary. Restoration strategies included restoring tidal hydraulics, marsh creation, and eradication of invasive species. This project requires evaluation and dissemination of complex data to the public regulatory community and scientists.

### **Evaluation of Wetland Remediation Techniques in an Arid Environment – Project Manager**

Dr. Weishar was the project manager for this large remediation project and led the remediation efforts within the Kingdom of Saudi Arabia. This field study extends along the 750 Km of the Kingdom of Saudi Arabia Arabian Gulf shore from the Kuwait border to the industrial city of Al-Jubail. This complex shoreline is composed of an interlaced series of tide flats, beaches, embayments, lagoons, and salt marshes. Much of these ecosystems remain severely impacted from the oil spill. The year-long remediation demonstration project tested remediation technologies at the field scale for these arid ecosystems. The project demonstrated that large-scale marsh restoration was feasible through construction of a marsh remediation project. The project also demonstrated restoration of the other affected biotypes was feasible using indigenous equipment.

### **Restoration of a Restricted Tidal Marsh: South Cape Beach, MA – Project Manager**

South Cape Beach is a high marsh that has been isolated from the tidal source waters by culverts and artificial ditches. The installation of the ditches has muted the tidal range on the marsh plain and as a result *Phragmites* has begun to invade the marsh from the upland fringes. Dr. Weishar led the numerical modeling of the effort that formed the foundation for deriving marsh restoration designs that will help restore tidal circulation and prevent *Phragmites* encroachment onto the marsh plain.

### **Restoration of a Restricted Tidal Marsh: Nonquitt, MA – Project Manager**

Dr. Weishar was the project manager for this project and worked with the Woods Hole group team to develop restoration design alternatives. Nonquitt marsh has been isolated from tidal source waters of Buzzards Bay from approximately 40 years. The isolated pipe leading to the Bay mutes the tidal range from several feet to several inches. As a result the marsh sediments are highly saturated and a fresh water upland community has developed around the marsh perimeter. The preferred restoration alternative incorporated establishing a new tidal inlet in its

## **Key Projects (continued)**

historical footprint. Restoration design alternatives addressed large-scale marsh plain erosion, impacts to the adjacent wetlands, and increased flooding potential.

### **Marsh Restoration and Estuary Enhancement in Southern New Jersey, Hancock's Bridge, NJ, Public Service Electric and Gas Company - Oceanographer/Project Manager**

As part of permit-required mitigation for nuclear facility with a once-through cooling system, Dr. Weishar reviewed feasibility of a program to restore 10,000 acres of degraded salt marshes through on-site visits and analytical analyses. Performed critical investigation using hydraulic modeling, resource area evaluations, design review of marsh channel and tidal inlet design, and investigation and quantification of restoration effects on ground water, septic systems, and private drinking wells. The success of this project required close interaction between Woods Hole Group, Inc., NJ State environmental agencies, NJ Attorney Generals Office, National Fish and Wildlife, US Army Corps of Engineers, National Marine Fisheries, and concerned citizens.

### **Beach Nourishment Design for Spectacle Island Massachusetts, Boston Harbor, MA, Massachusetts Water Resources Authority - Oceanographer/Project Manager**

Completed a detailed beach nourishment design for the shorelines of Spectacle Island. Used refraction/diffraction model, REF/DIF1, to predict transformation of waves in areas where the bathymetry was irregular and diffraction was important. Used wave height results as input to longshore and cross-shore sediment transport models. These models were employed to simulate the performance of several different beach fill designs.

### **Design and Environmental Permitting for Pier and Dock Reconstruction at US Coast Guard Facility, Provincetown, MA, United States Coast Guard - Oceanographer/Project Manager**

Performed coastal engineering analysis for the redesign and rehabilitation of a pier and dock facility and wave barrier for the US Coast Guard Station. Calculated design wave criteria for average and storm-induced conditions.

### **Beach Nourishment Design and Monitoring for the Southern Shore of Cape Cod, Cape Cod, MA, Great Island, Long Beach, and Dead Neck Homeowners Associations - Oceanographer/Project Manager**

Performed shoreline change studies to evaluate rate of erosion and sediment loss for three different sites. Designed and participated in collection of high-resolution bathymetry, vibra cores, beach profiles, and sediment grain size data at each site. Developed and implemented beach nourishment plans for each site. Performed on-site topographic and bathymetric surveying before and after nourishment projects.

### **Environmental Impact Report (EIR) for Shore Protection Structures Between Aunt Lydia's Cove and Morris Island, Chatham, MA, Town of Chatham - Oceanographer/Project Manager**

Prepared EIR to address impacts of revetments and other shore protection structures built to protect the Chatham mainland following the formation of the new inlet through the Nauset barrier, January 1987. Analyzed geologic history of the area, and studied evolution of Nauset

## **Key Projects (continued)**

barrier and tidal inlet system using historical maps, charts, and aerial photographs. Used a combination of existing studies and numerical analysis to quantify wave, tidal, storm surge and sediment transport processes. Prepared a plan of short-term action, long-term action, and short-term optional management alternatives for the Town of Chatham, property owners, and permitting agencies.

### **Numerical Model Analysis of Wave Climatology and Storm Surge for Seawall Design, Deer Island, MA, Massachusetts Water Resources Authority via Metcalf and Eddy, Inc. - Oceanography/Project Manager**

Conducted numerical and physical model analyses of wave climatology, storm water levels, and wave run-up so that an effective and cost efficient shore protection plan could be developed for the island. Results from models runs were used to predict nearshore wave heights and water levels for 5-, 10-, 25-, 50-, and 100-year storm events and to optimize seawall design specifications. Two-dimensional physical modeling of the seawall design was performed using a test facility to evaluate the proposed structural design.

### **Bathymetric and Side Scan Surveys of Fort Point Channel, Boston Harbor, MA, BSC Group, Oceanographer/Project Manager**

Performed bathymetric and side scan sonar survey for part of the Central Artery/Tunnel Project. Bathymetry was plotted on the area basemap to ensure water depths were adequate for floating construction barges into the channel. Side scan data were reviewed for possible bottom debris or hazards. During the survey, field operations were restricted due to bridges crossing the channel, and barge and boat activity within the channel. Despite the navigational problems, full coverage of the channel was obtained.

### **Directional Wave and Current Meter Installation and Data Analysis, Townsend and Absecon Inlets, NJ, Offshore & Coastal Technologies, Inc. - Oceanographer/Project Manager**

Collected wave and current data at the entrances to and nearshore region downdrift of the Townsend and Absecon inlets. Analyzed data for directional spectral parameters including significant wave height, wave direction, mean water depth, and the variance of water surface elevation.

### **Particle Tracking Analysis at the Salem Nuclear Generating Station, Hancock's Bridge, NJ, Public Service Electric and Gas Company - Oceanographer/Project Manager**

Evaluated near- and far-field impacts to a nuclear generating station's intake basin using a particle tracking numerical model. Identified portions of the estuary providing potential detritus sources to the intake basin and evaluated the migration of detritus cleaned from the intake screens and dumped back into the estuary. Results of the particle tracking were collected in an effort to design a program to reduce and eliminate the detritus problem.

## Key Projects (continued)

### **Bathymetry, Geophysical Survey, and Wave Refraction Analysis for Sand Borrow Site Analysis, Siasconset, MA, Town of Nantucket - Oceanographer/Project Manager**

Completed a reconnaissance survey and analysis of two offshore sand borrow sites for a proposed beach nourishment project. Collected regional bathymetry, coring, beach sediment sampling, side-scan sonar, sub-bottom profiling, and magnetometer surveys. Modeled the wave climatology using collected data. Used model results to calculate sediment transport potentials and gradients in sediment transport to determine dredging from the proposed borrow sites.

### **Sub-bottom Investigations and Detrital Flux Analysis at the Salem and Hope Creek Nuclear Power Plant, Hancock's Bridge, NJ, Public Service Electric and Gas Company - Oceanographer/Project Manager**

Designed a phased field data collection program to evaluate potential causes of detrital loading at the Salem and Hope Creek Nuclear Power Plant after detrital loading had forced the operating plant to shut down. Collected bathymetric data, conducted a sub-bottom survey, and monitored physical conditions: temperature, conductivity and current profile at the power plant. Conducted additional surveys to the north and south of the power plant to identify potential sources of the detritus.

### **Data Collection and Analysis of Tidal Current Characteristics at St. Lucie Inlet and Adjacent Waterways, Martin County, FL, Coastal Technologies Corporation - Oceanographer/Project Manager**

Designed a survey to obtain high-resolution measurements of tidal current velocities and to map temporal variations in the spatial structure of flow through the Inlet and waterway cross sections. Calibrated a numerical model of Inlet dynamics using survey results. Quantified the effect of Inlet geometry on the spatial structure of tidal flow and explained sediment accretion/scour characteristics within the Inlet.

## Publications and Presentations: 104

**Presentations**            **41**

**Publications**            **63**