M. LESLIE FIELDS, CFM, M.S., B.S.

Coastal Geologist/Marine Environmental Analyst

Qualifications Summary

- Over 25 years of experience in multi-jurisdictional environmental studies
- Specializes in environmental studies of coastal and marine projects, including resource and existing conditions surveys, impact analyses, flood zone mapping, and mitigation/restoration planning for climate change
- Experience with field data collection of sediments, water, plants, fish, and benthic infauna for environmental studies, and with laboratory services required to analyze such samples
- Skilled at utilizing GIS and database technology to display and analyze spatially related data for coastal and marine projects
- Extensive experience with local, state, and federal permitting of coastal projects
- Strong written, communication, and organizational skills, including expert testimony

Professional Affliations

Association of State Floodplain Mangers (2014)
Marine Outreach Guidance Group, Woods Hole Oceanographic Institution Sea Grant Program (June 1999 – present)
Member Falmouth Conservation Commission (1990 – 1997)

Fields of Expertise

Shoreline change analyses, coastal hazard evaluation, GIS development, environmental impact analyses, coastal wetland delineation, sediment transport analyses, tidal inlet hydrodynamics, nearshore wave propagation analyses, storm surge analyses, and permitting (local, state, and federal).

Higher Education

M.S. Coastal Geology-Rutgers University (1984)
B.S. Geology-Southern Methodist University (1981)

Employment History

1989-Present	Woods Hole Group, Inc.
2003-2004	Massachusetts Coastal Zone Management
1984-1989	U.S. Army Corps of Engineers, CERC
1981-1984	Rutgers University
1980-1981	Sun Energy and Development Co.

Key Projects

Technical Evaluation of Preliminary 2013 FEMA FIRMs for the Towns of Scituate, Marshfield, and Duxbury, MA – Project Manager

Managed projects for the Towns of Scituate, Marshfield, and Duxbury to perform coastal hydrologic and hydraulic evaluations of preliminary FEMA FIRMs released in May 2013. The work included assessment of 100-yr stillwater elevations, offshore wave conditions, and wave setup criterion utilized by FEMA in the coastal modeling. Woods Hole Group worked with the communities to select specific transects for detailed evaluation using FEMA's models and methods for erosion, PFD delineation, overland wave transformation, wave runup, and overtopping. Results from the analyses were used to update the flood zone and BFE mapping shown on the preliminary FIRMs. The work was

Key Projects (continued)

performed on an accelerated schedule and resulted in an appeal to FEMA for revisions to the FIRMs. The appeal is currently under review by FEMA.

Technical Evaluation of Preliminary 2013 FEMA FIRMs for areas in Barnstable County, MA – Project Manager
Managed three (3) separate projects in Barnstable County to perform coastal hydrologic and hydraulic evaluations of preliminary FEMA FIRMs released in May 2013. The work included sites in the Towns of Chatham, Barnstable, and Falmouth. Elevations for the 100-yr stillwater conditions, offshore wave conditions, and wave setup criterion utilized by FEMA in the coastal modeling were evaluated. FEMA's models and methods for erosion, PFD delineation, overland wave transformation, wave runup, and overtopping were used to assess the 100-yr flood conditions at each site. Results from the analyses indicated that an appeal of the preliminary FIRMs was warranted for the Chatham site, but not for the sites in Barnstable or Falmouth. An appeal was filed with FEMA by the necessary deadline showing revisions to the flood zone and BFE mapping in Chatham. Upon review, the appeal was accepted by FEMA and the map revisions will be reflected in the effective maps when they are released.

Risk and Vulnerability Assessment for the Martha's Vineyard Hospital, Oak Bluffs, MA; Board of Trustees MV Hospital and MV Commission - Project Manager/Floodplain Analyst
Managed and conducted an extensive risk and vulnerability assessment for reconstruction of the Martha's Vineyard Hospital. The analysis considered risks of the existing hospital site to various natural hazards including storm surge, flooding, wind, snowfall, wildfire, coastal erosion, sea-level rise, and earthquakes. Vulnerability of the site and impacts to critical hospital services were considered. Results from the risk and vulnerability analysis were used to provide recommendations for reconstruction of the hospital facilities.

Town of Palm Beach Technical Review of Proposed Coastal Management Program; Town of Palm Beach – Coastal Geologist
Worked on the WHG team to conduct a technical review of the Palm Beach CCMP. Reviewed a broad range of reference documents and data describing the history of coastal management and coastal processes at Palm Beach. Developed island-wide recommendations for inlet management, evaluation of beach nourishment project performance and feeder beach strategies, sand source alternatives, maintenance of coastal structures, and protection of hardbottom resources. A selection of shore protection alternatives were also evaluated in terms of performance and value to help formulate recommendations for improved coastal management.

Investigation of Upland, Beneficial Reuse, and Sediment Dewatering Sites for Dredged Materials Management in Long Island Sound; US Army Corps of Engineers – Environmental Scientist
Conducted investigations at 104 upland, beneficial reuse, and sediment dewatering sites for potential dredged materials management in the Long Island Sound area. Site summaries provided information on general location, ownership, surrounding land use, zoning, wetland resources, proximity to habitat for rare and endangered species, sediment type, site access, and staging areas. Conceptual engineering designs were evaluated and site capacities were determined.

Key Projects (continued)

Management of the New Bedford Harbor Superfund Site Environmental Management Information System; US Army Corps of Engineers – Project Manager
Served as project manager for the New Bedford Harbor superfund site information system containing environmental measurements and geographic information generated for contaminant identification, delineation, and regulatory compliance during the Corps remediation activities. The information management system incorporates an Oracle environmental database, a web-based front-end that provides data access for project team members, and data management methods and procedures for quality assurance and data validation. The database holds over 300,000 analytical, biological, toxicological, and geotechnical results generated by a team of field and laboratory contractors.

Comprehensive 10-Yr Permitting for Town of Falmouth Dredging and Beach Nourishment Projects; Town of Falmouth – Project Manager
Managed a project for the Town of Falmouth Harbormaster and Department of Public Works offices to secure comprehensive 10-yr permits for dredging and beach nourishment throughout the town. The purpose of the project was to consolidate and manage environmental permits for 25 dredging and beach nourishment sites associated with maintenance of the Town's waterways, harbors, salt ponds, and public beaches. The work involved sediment sampling and analyses, wetland delineation, impact analyses, plan preparation, and permitting. Applications were secured from the appropriate local, state, and federal agencies.

Coordination, Design, and Permitting for the Vineyard Haven Harbor Dredging and Beach Nourishment Project; Town of Tisbury- Project Manager/Coastal Scientist
Coordinated, designed, and permitted a dredging and beneficial reuse beach restoration project in Vineyard Haven Harbor, Martha's Vineyard. Shoaling at the western entrance to Vineyard Haven Harbor created problems for navigation and threatened water quality in the Inner Harbor. Sandy dredge material was permitted for restoration of critically eroded beaches. Work on the project included preparation and filing for the full range of environmental permits from local, state, and federal agencies.

Evaluation of Beach Replenishment Alternatives for Narragansett Beach, Rhode Island; Town of Narragansett – Project Manager/Coastal Scientist
Managed a project to evaluate a range of alternatives for beach replenishment at Narragansett Town Beach. Erosion of the beach has historically been managed by trucking in small quantities of sand immediately prior to the summer beach season. The Town was interested in identifying longer-term solutions that would enhance the recreational resource and provide improved storm damage protection. This project evaluated quantities of sand needed for various beach nourishment scenarios involving different berm widths, elevations, nearshore slopes, and beach lengths. Levels of storm protection and project performance were evaluated. Potential sand sources and associated construction costs were also identified, and permitting requirements were addressed.

Key Projects (continued)

Development of a Plan to Address Beach Erosion at Chapin Beach, Dennis, MA; Town of Dennis – Coastal Geologist
Worked to develop a plan addressing long-term erosion at the Town of Dennis public beach area known as Chapin Beach. Concern over high erosion rates along the barrier beach prompted the Town to commission a study of causes and potential remedial actions. The work involved mapping of critical resources, analysis of historical shoreline change, investigation of site specific erosion processes, as well as an analysis of alternatives for mitigating the erosion. Planning level cost estimates and regulatory requirements for a series of recommended solutions were identified.

Preparation of a Waterways Asset and Resources Master Plan for Dredging and Beach Nourishment for the Town of Dennis, MA; Town of Dennis – Project Manager/Coastal Scientist
Documented existing conditions and management practices at the four waterways and eight primary public beach sites within the Town of Dennis. The project resulted in a master plan for dredging activities in the waterways, as well as associated beach nourishment to restore the public coastal resources. Available information from town records and permit documents was used to evaluate dredging needs and environmental resources in the different waterways. The beach sites were evaluated using a combination of information from town records, permit documents, State and Federal agencies, and survey data collected specifically for this study. Recommendations were developed and prioritized for improved management of the Towns waterways and beach resources.

Beach Management Plan for Town of Falmouth Public Beaches; Office of the Town Manager and Falmouth Beach Committee - Project Manager/Coastal Scientist
Managed and prepared a comprehensive Beach Management Plan for 10 public beaches in the Town of Falmouth. The project involved collection of beach profile data, sediment analyses, resource area delineations, and infrastructure assessments. Dominant coastal processes, directions of sediment transport, historical shoreline change, and history of human alterations were all addressed. Recommended management activities were provided for infrastructure maintenance, beach monitoring, routine maintenance, restoration activities, education, enforcement, and fund raising. Results from the Beach Key Projects Management Plan were used to file for and secure a local permit from the Falmouth Conservation Commission for a number of the recommended management activities.

Coordination, Design, and Permitting for the Menauhant Beach and Dune Restoration Project, East Falmouth, MA; Town of Falmouth - Project Manager/Regulatory Specialist
Coordinated, designed, and permitted a beneficial reuse dune and beach restoration project at Menauhant Beach in East Falmouth. Through extensive interagency coordination and cooperation, the Town of Falmouth was able to secure sand from a nearby dredging project that created a deepwater port in Great Harbor Woods Hole for a new NOAA research vessel. Dredged sand was dumped at a temporary, nearshore rehandling site offshore of Menauhant Beach, and then hydraulically pumped to Menauhant public beach to form a protective dune. The project required the full range of environmental permits from local, state, and federal agencies. Coordination

Key Projects (continued)

between local Town of Falmouth representatives, DEP regulatory officials, the Barnstable County Dredge office, NOAA, and USACE project managers was required to construct this beneficial reuse project.

Environmental Impact and Risk Assessments for Proposed Natural Gas Pipelines Offshore of Trinidad and Tobago; National Gas Company of Trinidad and Tobago Limited - Project Manager/Environmental Analyst

Managed a large-scale environmental impact and risk assessment project for two proposed natural gas pipelines offshore of Trinidad and Tobago. The work involved extensive field data collection and laboratory analysis of oceanographic, coastal, and terrestrial data. Detailed descriptions of the projects were provided along with alternatives analyses, existing conditions reports, and environmental impact analyses. Recommendations were provided to the project applicant and the regulatory agencies of Trinidad and Tobago for minimizing adverse impacts and for long-term monitoring.

Analysis of Historical Shoreline Change and Management Alternatives for Nauset Beach, Orleans, MA; Orleans Parks and Beaches Department - Project Manager/GIS Analyst

Managed and performed a comprehensive analysis of shoreline change and management alternatives for Town of Orleans public beach areas located on Nauset Beach. The project involved a quantitative analysis of historical shoreline change using ArcGIS, as well as an analysis of barrier breaching and inlet formation. Results from the study were utilized to develop recommendations for short- and long-term management of the public beach facilities and the extensive off-road vehicle trails and barrier spit to the south.

Design, Environmental Impact Analysis and Permitting for Chapoquoit Beach Replenishment, West Falmouth, MA; Chapoquoit Associates - Project Manager/Coastal Geologist

Managed a large private/public partnership project to replenish eroding beaches along the Chapoquoit Beach section of West Falmouth, MA using sand dredged from the Cape Cod Canal by the US Army Corps of Engineers. The project involved detailed design computations for the replenishment, as well as wave and sediment transport modeling to evaluate spreading and potential impacts of the project. Extensive project management was required to facilitate permitting on a fast track basis and to coordinate construction with the USACE's schedule.

Design, Environmental Impact Analysis, and Permitting for the Centerville River Dredging Project, Centerville, MA; Town of Barnstable - Project Manager/Coastal Geologist

Managed a large-scale municipal project to dredge the Centerville River for the purposes of improving navigation. This project involved extensive field investigations of the physical environment, biology, wetland resources, and sediments within the river. The nature of the sediments required identification of two types of reuse sites for the dredged material. The design included beach replenishment at the adjacent barrier beach for the sand sized material, and a variety of upland reuse sites for the fine-grained sediments. The project required the full range of environmental permits from local, state, and federal agencies.

Key Projects (continued)

Design, Environmental Impact Analysis, and Permitting for the Mashpee River Dredging Project, Mashpee, MA; Town of Mashpee - Project Manager/Coastal Geologist
Managed a large-scale municipal project to dredge the Mashpee River for the purposes of improving navigation. This project involved extensive field investigations of the physical environment, biology, wetland resources, and sediments within the river. A detailed alternatives analysis was performed to identify potential dewatering and beneficial reuse sites. The fine-grained nature of the proposed dredge sediments coupled with the lack of nearby staging sites for dewatering and storage has presented a number of unique and difficult challenges to this project. The WHG is currently working with the Town of Mashpee to identify and scope several alternative technologies for dredging and dewatering the sediments.

Federal Emergency Management Agency (FEMA) Flood Insurance Restudy for the Town of Hampton, NH, FEMA - Project Manager/Coastal Geologist
Performed and managed a Flood Insurance Restudy (FIS) for the Town of Hampton, NH. This project involved updating the FEMA Flood Insurance Rate Maps (FIRM) for the Town of Hampton by re-establishing the flood zone boundaries. Numerical models were utilized to simulate nearshore wave transformation and wave runup, and were combined with estimates of erosion potential to determine the location of the flood zones. The FIRMs were updated using quantitative information on waves, wave runup, and flooding, and were graphically displayed using GIS techniques.

Assessment of Sand Resources in Northern and Central San Francisco Bay, CA; Hanson Aggregates - GIS Analyst
Worked with a team of WHG professionals to assess sand resources in Northern and Central San Francisco Bay, and to evaluate Hanson Aggregate and RMC leased sand borrow regions to determine their viability as a renewable sand resource. The work was accomplished using available hydrodynamic, geophysical, sediment, and geological data as well as digital terrain modeling tools available with the GIS software ArcInfo. Historical changes in bottom topography were evaluated using an acoustic survey of the bedrock surface, coupled with NOS bathymetric surveys and a high resolution multibeam survey collected by the USGS. Isopach maps showing changes in sediment thickness were generated and used to compute variations in sediment volume within specified borrow sites.

Historical Shoreline Change Analysis: Western Town Line to Horton Point, Southold, NY, Town of Southold - Project Manager/Coastal Geologist
Managed and performed a comprehensive historical analysis of a 10-mile segment of shoreline within the western portion of the Town of Southold, NY. The analysis was performed using historical T-sheets, traditional aerial photography, and low-altitude, high-resolution digital photography. Rates of shoreline change were computed at 100-ft intervals throughout the study area. The impacts of shoreline protection structures and storms on the historical rates of shoreline change were evaluated. Estimates of longshore sediment transport rates were obtained from the shoreline data.

Key Projects (continued)

Beach Nourishment Design, Permitting, and Oversight at Long Beach, Centerville, MA, Long Beach Association, Inc. - Project Manager/Coastal Geologist
A beach nourishment project was designed and permitted at Long Beach, Centerville, MA to alleviate long-term erosion of the shoreline and to provide improved storm damage protection and flood control. The beach was designed with a berm elevation of +9 ft MLW and a width of 100 ft. Sediment was dredged from shoals seaward of the East Bay tidal inlet, and hydraulically pumped to Long Beach. Approximately 2,100 ft of beach was nourished with 60,000 cubic yards of clean, compatible sand. This was a multi-disciplinary project involving analysis of coastal processes, environmental sensitivity, coordination with regulatory officials and marine contractors, and management of project funds.

Federal Emergency Management Agency (FEMA) Flood Insurance Restudy for the Town of Greenwich, CT, FEMA - Project Manager/Coastal Geologist
Performed and managed a Flood Insurance Restudy (FIS) for the Town of Greenwich, CT. This project involved updating the FEMA Flood Insurance Rate Maps (FIRM) for the Town of Greenwich by adding the effects of wave runup to the designation of flood zone boundaries. Numerical models were utilized to simulate nearshore wave transformation and wave runup, and combined with estimates of erosion potential to determine the location of flood zones. The FIRMs were updated using quantitative information on waves, wave runup, and flooding, and were graphically displayed using GIS techniques.

Sediment Transport Study - Evaluation of Causeway on Coastal Processes, Westport, MA, Massachusetts Department of Environmental Management - Coastal Geologist
Team member involved in a comprehensive evaluation of regional sediment transport processes along Horseneck Beach, Gooseberry Neck, East Horseneck Beach, and Little Beach in the Towns of Westport and Dartmouth, MA. Sediment transport patterns and alternatives for beach stabilization were evaluated along with various management and engineering alternatives for the causeway connecting Gooseberry Neck to the mainland. The historical evolution of the coastal system was evaluated, and an analysis of shoreline change was performed using historical maps and aerial photography. A combination of field data and numerical modeling was used to provide a detailed evaluation of the littoral processes. Nearshore wave transformation was modeled to provide the necessary data to drive the longshore sediment transport model. Cross-shore sediment transport was also modeled and combined with the longshore sediment transport model results to provide an estimate of the net annual longshore sediment transport.

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