

# **Mark R. Byrnes, Ph.D.**

*Principal Coastal Scientist, Applied Coastal Research and Engineering, Inc.*

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## **Areas of Expertise**

- Processes affecting land loss in coastal and estuarine environments
- Coastal and nearshore sediment transport
- Coastal change assessment and sediment budgets
- Physical environmental impact assessments for coastal environments
- Impact of coastal structures on shoreline response
- GIS/mapping for coastal environments
- Offshore sand resource evaluations
- Numerical modeling of wave transformation and shoreline change

## **Education**

1988 Ph.D., Oceanography, Old Dominion University

1978 B.A., Earth Science, Millersville University

## **Experience**

Dr. Byrnes is a Principal Coastal Scientist at Applied Coastal Research and Engineering, Inc. (Applied Coastal). For the past 28 years, he has been a Principal Investigator/Program Manager on more than 80 coastal and nearshore process studies as a Research Scientist at the U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory (formerly the Coastal Engineering Research Center); Coastal Geology Section Chief for the Louisiana Geological Survey; Research Professor at the Coastal Studies Institute, Louisiana State University; Senior Coastal Scientist at Aubrey Consulting, Inc.; and Principal Coastal Scientist at Applied Coastal. The emphasis for most studies has been on regional coastal change and geomorphic evolution of nearshore sedimentary deposits (shoreline and bathymetric change), physical environmental impact assessments for coastal and estuarine wetlands, sediment budget evaluations, shoreline restoration strategies, wetland loss delineation and classification, wave transformation and sediment transport, offshore sand resource assessments, and geologic framework of coastal deposits. He has authored more than 90 publications in these research areas.

Dr. Byrnes has been responsible for managing and conducting numerous projects focused on coastal sedimentation processes and regional response of beaches, inlets, and estuaries to incident wave and current processes. Projects include Potential Physical Environmental Impact of Oil and Gas Operations on Wetland Habitat in Coastal Louisiana; Shoreline Compilation and Change Assessment for the Louisiana Barrier Island Comprehensive Monitoring Program; Sediment Budget Development and Coastal Processes Analyses Toward Implementation of the Barrier Island Restoration Program for Coastal Mississippi; Recommendations for Implementing the Louisiana Sediment Management Plan for Coastal Restoration; Quantifying Settlement/Subsidence Associated with Barrier Beach Restoration in Coastal Louisiana; Damage Assessment Associated with oiled Wetlands in the Northern Gulf of Mexico; Regional Sediment Management Assessment for the Northern Gulf of Mexico; Sediment Budget Evaluation for Mobile Bay; Channel Dredging Impacts on Shoreline Response at and Adjacent to Main Pass, Mobile Bay Entrance, Alabama; Environmental Survey of Identified Sand Resource Sites Offshore Alabama, Central East Florida, North Carolina, New Jersey, and New York; Study of the Environmental Impacts of Offshore Sand Mining in Massachusetts Bay; Physical Environmental Impacts of Pipeline Construction and Operation for the Mardi Gras Pipeline, Barataria Basin, Louisiana; Rockefeller Refuge Gulf Shoreline Stabilization: Coastal Geology and Processes Analyses; Assessment of Beach Response to a Segmented Breakwater System: Southwest Louisiana Coast; Feasibility of Barrier Shoreline Restoration in

Coastal Louisiana-Coastal Geology, Geomorphology, and Physical Processes; Coastal Change Assessment for Brevard County, FL; Numerical Modeling Evaluation of the Cumulative Physical Effects of Offshore Sand Dredging for Beach Nourishment; Inlet Sediment Transport Patterns at Grays Harbor, WA and Development of an Entrance Sediment Budget; Regional Analysis of Sediment Transport and Dredged Material Disposal Patterns, Columbia River Mouth, Washington/Oregon, and Adjacent Shores; and Inlets Online: A Tutorial of Interpreting Aerial Photography for the Analysis of Sediment Transport Patterns and Geomorphic Change at Entrances. GIS/mapping tools and numerical modeling are integral components of the strategy used to address project objectives. State-of-knowledge compilation and analysis techniques form the basis for providing innovative strategies for addressing complex coastal environmental issues.

### Coastal Change Assessment and Sediment Budgets

Since 1990, Dr. Byrnes has contracted with Federal agencies such as the U.S. Army Corps of Engineers (USACE), the U.S. Geological Survey (USGS), and the Federal Emergency Management Agency (FEMA) to develop state-of-science methods for compiling and analyzing historical hydrographic and shoreline surveys for quantifying change in the coastal zone. Detailed procedures were developed for compiling historical map data, where conversion from various cartographic parameters to a common coordinate system, map projection, ellipsoid, and datum is critical for accurately assessing change and associated potential measurement uncertainties. These data represent the most basic and useful information for evaluating local and regional sediment transport dynamics and their influence on coastal evolution. Applied Coastal personnel rely on hydrographic and shoreline surveys for basic and applied scientific research on sediment transport dynamics in the coastal zone (USGS and MMS projects). They also use shoreline and bathymetry data for developing sediment budgets, calibrating numerical models, and developing coastal structure design criteria (engineering projects). Finally, these data are used for determining setback criteria for coastal construction (FEMA projects). Hydrographic surveys provide data to quantify channel shoaling rates and supply bathymetric data for developing regional circulation and sediment transport numerical modeling grids. Dr. Byrnes also has applied these techniques in wetland environments for evaluating the causes of wetland change and the impact pipelines have on wetland loss, including scour associated with pipeline landfall from offshore sites. Dr. Byrnes has applied these procedures for developing coastal change data sets in support of litigation, for which he has served as an expert witness.

### Offshore Sand Resource Evaluations

Over the past 22 years, Dr. Byrnes has conducted offshore sand resource evaluations for determining the sedimentary characteristics of deposits and associated potential environmental issues concerning sand mining on the Continental Shelf. The geographic extent of these studies ranges from coastal Louisiana to offshore Massachusetts. Dr. Byrnes' primary interest is with the geological development of offshore shoals and the physical environmental effects of dredging activities in altering fluid and sediment transport patterns at potential borrow sites and along shorelines landward of resource areas. Analyses rely on comparison of NOAA historical bathymetry and shoreline data sets and numerical modeling of waves and currents over variable bathymetry. Analysis results supply information for policy decisions regarding potential dredging effects and for development of impact reports required under the National Environmental Policy Act in support of potential lease agreements.

### Channel and Shoal Dynamics at Inlets

Since 1992, Dr. Byrnes has compiled and analyzed site-specific and regional bathymetric surveys to document the evolution of channels and shoals at entrances relative to navigation safety and environmental concerns. Many studies were funded under the USACE Inlets Research Program and specific USACE District projects to address shoal migration and sedimentation processes in

navigation channels and environmental considerations associated with maintenance dredging activities. Because sedimentation patterns and rates of change were determined by comparing sequential bathymetric and shoreline surveys, detailed procedures have been developed for compiling and analyzing data sets and associated potential measurement uncertainties. Net sediment volume changes were quantified to develop inlet sediment budgets for predicting long-term system response to engineering activities.

### Impact of Coastal Structures on Shoreline Change

Since 1984, Dr. Byrnes has evaluated the impact of coastal structures on sediment transport dynamics and coastal evolution throughout the U.S. He has been principal investigator on several studies assessing the influence of navigation and shore protection structures on beach response, including an evaluation of beach change to construction of 85 segmented breakwaters offshore southwestern Louisiana and an assessment of downdrift beach evolution in response to jetty construction at St. Marys Entrance, GA/FL; Grays Harbor and Columbia River, WA; Port Canaveral and Sebastian Inlet, FL; and Mattituck and Goldsmith Inlets, Southold, NY. More recently, Dr. Byrnes has evaluated the impact of channel dredging on sand bypassing and littoral sediment transport processes for coastal Alabama and Mississippi, and for beaches on Long Island, NY. All projects relied on the application of GIS/mapping tools for accurate compilation and analysis of survey data sets.

### Geologic Framework Evaluation

In a number of regional projects, Dr. Byrnes has conducted studies on the geologic evolution of coastal environments. These deposits represent the framework upon which modern coastal change is occurring. As such, he has devoted substantial time understanding the geological factors contributing to the evolution of nearshore, barrier beach, and estuarine deposits. Sediment dynamics at the land-sea boundary exert substantial influence on the placement of structures relative to erosion trends. Dr. Byrnes has conducted most of these studies with the U.S. Geological Survey and the U.S. Army Corps of Engineers.

### ***Professional Societies***

- Coastal Education and Research Foundation (CERF)
- American Geophysical Union (AGU)
- Society for Sedimentary Geology (SEPM)
- Geological Society of America (GSA)
- Sigma Xi - The Scientific Research Society
- Phi Kappa Phi

### ***Professional Committees***

- Editorial Board, Geo-Marine Letters, 1993-2004
- Editorial Board, Marine Models Online, 1996-1999
- Associate Editor, Gulf of Mexico Science, 1996-1999
- Gulf Coast Section SEPM Editor for Gulf Coast Association Geological Societies Conference, 1995
- Technical Study Advisor for Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA): Louisiana Barrier Shoreline Study, Louisiana Department of Natural Resources, October 1994 to March 1995
- Public Policy Committee, Southeast GSA, 1991-1994
- Workshop on the Future Needs of Users for Nautical Information, Working Group 3: Database Issues/Nautical Charts and Marine GIS, National Research Council, 1993

## **Refereed Publications**

- Byrnes, M.R., J.D. Rosati, S.F. Griffee, and J.L. Berlinghoff, 2013. Historical sediment transport pathways and quantities for determining an operational sediment budget: Mississippi Sound barrier islands. In: Brock, J.C., Barras, J.A., and Williams, S.J. (eds.), *Understanding and Predicting Change in the Coastal Ecosystem of the Northern Gulf of Mexico*, Journal of Coastal Research, Special Issue, No. 63, pp. 166-183.
- Byrnes, M.R. and J.L. Berlinghoff, 2012. Gulf Regional Sediment Management Master Plan: Case study compilation. In: S.M. Khalil, L.E. Parson, and J.P. Waters (eds.), *Technical Framework for the Gulf Regional Sediment Management Plan (GRSMMP)*, Journal of Coastal Research, Special Issue 60, pp. 72-124.
- Byrnes, M.R., J.D. Rosati, and S.F. Griffee, 2011. Sediment Budget: Mississippi Sound Barrier Islands. In: P.Wang, J.D. Rosati, and T.M. Roberts (eds.), *Coastal Sediments 2011*, World Scientific, Hackensack, NJ, 2366-2379.
- McBride, R. A., M.R. Byrnes, and L.D. Britsch, 2011. Subsidence-corrected elevations of paleoshorelines (chenier ridges) of the Mississippi River Chenier Plain, USA: implications for forcing mechanisms. In: P.Wang, J.D. Rosati, and T.M. Roberts (eds.), *Coastal Sediments 2011*, World Scientific, Hackensack, NJ, 176-187.
- Byrnes, M.R. and R.A. McBride, 2009. Coastal response to Hurricane Ike: Southwest Louisiana and southeast Texas. *Shore and Beach*, 77(2): 37-48.
- McBride, R.A., M.J. Taylor, and M.R. Byrnes, 2007. Coastal morphodynamics and Chenier Plain evolution in southwestern Louisiana, USA: A geomorphic model. *Geomorphology*, 88: 367-422.
- Byrnes, M.R., S.F. Griffee, and H.R. Moritz, 2007. Engineering activities influencing historical sediment transport pathways at the Columbia River Mouth, WA/OR. In: N.C. Kraus and J.D. Rosati (editors), *Coastal Sediments '07*, American Society of Civil Engineers, Reston, VA, pp. 1754-1767.
- McBride, R.A., M.J. Taylor, and M.R. Byrnes, 2007. A geomorphic process-response model for Chenier evolution in southwestern Louisiana, USA. In: N.C. Kraus and J.D. Rosati (editors), *Coastal Sediments '07*, American Society of Civil Engineers, Reston, VA, pp. 762-775.
- Byrnes, M.R., R.M. Hammer, and T.D. Thibaut, 2004. Physical and biological effects of sand mining offshore Alabama. *Journal of Coastal Research*, 20(1): 6-24.
- Byrnes, M.R., R.M. Hammer, and T.D. Thibaut, 2004. Effects of sand mining on physical processes and biological communities offshore New Jersey. *Journal of Coastal Research*, 20(1): 25-43.
- Kelley, S.W., J.S. Ramsey, and M.R. Byrnes, 2004. Evaluating the physical effects of offshore sand dredging for beach nourishment. *Journal of Coastal Research*, 20(1): 89-100.
- Drucker, B.S., W. Waskes, and M.R. Byrnes, 2004. The U.S. Minerals Management Service Outer Continental Shelf Sand and Gravel Program: environmental studies to assess the potential effects of offshore dredging operations in Federal waters. *Journal of Coastal Research*, 20(1): 1-5.
- Byrnes, M.R., M. Crowell, and C. Fowler, 2003. Preface. In: Byrnes, M.R., M. Crowell, and C. Fowler (editors), *Shoreline Mapping and Change Analysis: Technical Considerations and Management Implications*. *Journal of Coastal Research*, Special Issue 38, pp. 1-4.
- Taylor, M.J., R.A. McBride, L.C. Anderson, and M.R. Byrnes, 2002. Building on the research of our founders: 65 years of chenier plain studies at Louisiana State University. In: M.K. Steinberg and P.F. Hudson (editors), *Cultural and Physical Expositions: Geographic Studies in the Southern United States and Latin America*. Geoscience and Man Series, Volume 36, Louisiana State University Press, Baton Rouge, LA, pp. 261-276.

- Byrnes, M.R. and N.C. Kraus, 1999. Regional sediment transport patterns adjacent to Canaveral Harbor, Florida. In: N.C. Kraus and W.G. McDougal (editors), Coastal Sediments '99, American Society of Civil Engineers, New York, NY, pp. 750-760.
- Underwood, S.G., R. Chen, G.W. Stone, X. Zhang, M.R. Byrnes, and R.A. McBride, 1999. Beach response to a segmented breakwater system, southwest Louisiana, U.S.A. In: N.C. Kraus and W.G. McDougal (editors), Coastal Sediments '99, American Society of Civil Engineers, New York, NY, pp. 2042-2056.
- Anderson, L.C., R.A. McBride, M.J. Taylor, and M.R. Byrnes, 1998. Late Holocene record of community replacement preserved in time-averaged Molluscan assemblages, Louisiana Chenier Plain. *Palaios*, 13: 488-499.
- McBride, R.A. and M.R. Byrnes, 1997. Regional variations in shore response along barrier island systems of the Mississippi River delta: historical change and future prediction. *Journal of Coastal Research*, 13(3): 628-655.
- Anderson, L.C., B.K. Sen Gupta, R.A. McBride, and M.R. Byrnes, 1997. Reduced seasonality of Holocene climate and pervasive mixing of Holocene marine section: northeastern Gulf of Mexico shelf. *Geology*, 25(2): 127-130.
- Byrnes, M.R. and M.W. Hiland, 1995. Large-scale sediment transport patterns on the continental shelf and influence on shoreline response: St. Andrew Sound, Georgia to Nassau Sound, Florida, U.S.A. In: J.H. List and J.H.J. Terwindt (editors), Large-Scale Coastal Behavior. *Marine Geology*, 126: 19-43.
- McBride, R.A., M.R. Byrnes, and M.W. Hiland, 1995. Geomorphic response-type model for barrier coastlines: a regional perspective. In: J.H. List and J.H.J. Terwindt (editors), Large-Scale Coastal Behavior. *Marine Geology*, 126: 143-159.
- Byrnes, M.R., R.A. McBride, Q.Tao, and L.Duvic, 1995. Historical shoreline dynamics along the Chenier Plain of southwestern Louisiana. *Gulf Coast Association Geological Societies Transactions*, 45: 113-122.
- Anderson, L.C., M.R. Byrnes, and R.A. McBride, 1995. Paleoenvironmental and taphonomic evidence of diverse bioclast sources for southwest Louisiana Cheniers. *Gulf Coast Association Geological Societies Transactions*, 45: 21-30.
- McBride, R.A. and M.R. Byrnes, 1995. Surficial sediments and morphology of the southwestern Alabama/Florida Panhandle shelf. *Gulf Coast Association Geological Societies Transactions*, 45: 393-404.
- McBride, R.A. and M.R. Byrnes, 1995. A megascale systems approach for shoreline change analysis and coastal management along the northern Gulf of Mexico. *Gulf Coast Association Geological Societies Transactions*, 45: 405-414 (2nd Place, Best Paper Award, GCS-SEPM).
- Taylor, M.J., M.R. Byrnes, and R.A. McBride, 1995. Sediment texture and composition changes along the southwest Louisiana coast: implications to sediment supply. *Gulf Coast Association Geological Societies Transactions*, 45: 557-564.
- Zenero, R.R., D.L. Seng, M.R. Byrnes, and R.A. McBride, 1995. Geophysical techniques for evaluating the internal structure of cheniers, southwestern Louisiana. *Gulf Coast Association Geological Societies Transactions*, 45: 611-620 (1st Place, Best Paper Award, GCAGS).
- Byrnes, M.R. and M.W. Hiland, 1994. Shoreline position and nearshore bathymetric change (Chapter 3). In: N.C. Kraus, L.T. Gorman, and J. Pope (editors), Kings Bay Coastal and Estuarine Monitoring and Evaluation Program: Coastal Studies. Technical Report CERC-94-09, Coastal Engineering Research Center, Vicksburg, MS, p. 61-143.

Byrnes, M.R. and M.W. Hiland, 1994. Compilation and analysis of shoreline and bathymetry data (Appendix B). In: N.C. Kraus, L.T. Gorman, and J. Pope (editors), Kings Bay Coastal and Estuarine Monitoring and Evaluation Program: Coastal Studies. Technical Report CERC-94-09, Coastal Engineering Research Center, Vicksburg, MS, p. B1-B90.

Kraus, N.C. and M.R. Byrnes, 1994. Conclusions. In: N.C. Kraus, L.T. Gorman, and J. Pope (editors), Kings Bay Coastal and Estuarine Monitoring and Evaluation Program: Coastal Studies. Technical Report CERC-94-09, Coastal Engineering Research Center, Vicksburg, MS, p. 261-268.

Byrnes, M.R. and M.W. Hiland, 1993. Regional seafloor changes near St. Marys Entrance, Georgia/Florida and their influence on shoreline response. In: List, J.H. (editor), Large-Scale Coastal Behavior '93, Research Conference Proceedings, U.S. Geological Survey Open File Report 93-381, p. 17-20.

McBride, R.A. and M.R. Byrnes, 1993. Shoreline response types along barrier coastlines: a regional perspective. In: List, J.H. (editor), Large-Scale Coastal Behavior '93, Research Conference Proceedings, U.S. Geological Survey Open File Report 93-381, p. 119-122.

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Byrnes, M.R., S. Penland, K.E. Ramsey, T.G. Crawford, R.F. Kelly, and J. Rowland, 1991. Offshore sand resources for coastal erosion in Louisiana: physical environmental considerations and economic feasibility. MTS '91 Proceedings, Marine Technology Society, Washington, D.C., pp. 755-761.

Byrnes, M.R., R.A. McBride, and M.W. Hiland, 1991. Accuracy standards and development of a national shoreline change database. In: N.C. Kraus, K.J. Gingerich, and D.L. Kriebel (editors), Coastal Sediments '91, American Society of Civil Engineers, New York, NY, pp. 1027-1042.

Anders, F.J. and M.R. Byrnes, 1991. Accuracy of shoreline change rates as determined from maps and aerial photographs. *Shore and Beach*, 59(1): 17-26.

Hansen, M. and M.R. Byrnes, 1991. Development of optimum beach fill design cross section. In: N.C. Kraus, K.J. Gingerich, and D.L. Kriebel (editors), Coastal Sediments '91, American Society of Civil Engineers, New York, NY, pp. 2067-2080.

McBride, R.A., M.R. Byrnes, S. Penland, D.L. Pope, and J.L. Kindinger, 1991. Geomorphic history, geologic framework, and hard mineral resources of the Petit Bois Pass area, Mississippi-Alabama. In: Coastal Depositional Systems in the Gulf of Mexico: Quaternary Framework and Environmental Issues, GCS-SEPM 12<sup>th</sup> Annual Research Conference, pp. 116-127.

McBride, R.A., M.W. Hiland, S. Penland, S.J. Williams, M.R. Byrnes, K.A. Westphal, B. Jaffe, and A.H. Sallenger, Jr., 1991. Mapping barrier island changes in Louisiana: Techniques, Accuracy, and Results. In: N.C. Kraus, K.J. Gingerich, and D.L. Kriebel (editors), Coastal Sediments '91, American Society of Civil Engineers, New York, NY, pp. 1011-1026.

McBride, R.A., D.W. Davis, F.W. Jones, M.R. Byrnes, D. Braud, M.W. Hiland, A.J. Lewis, and H.R. Streiffer, 1991. Louisiana Coastal Geographic Information System Network (LCGISN): access to spatial data. *Meridian*, 6: 29-43.

Byrnes, M.R. and K.J. Gingerich, 1987. Cross-island profile response to Hurricane Gloria. In: N.C. Kraus (editor), Coastal Sediments '87, American Society of Civil Engineers, New York, NY, p. 1486-1502.

### ***Books and Edited Volumes***

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John, C.J. and M.R. Byrnes, 1995. Gulf Coast Association of Geological Societies Transactions, Gulf Coast Geology: A Global Resource. GCAGS 45th Annual Convention, Baton Rouge, LA, 648 p

### ***Technical Reports***

Byrnes, M.R., 2014. Sediment Transport Processes Adjacent to Lake Montauk Harbor Entrance: Impact of the Jetties and Navigation Channel on Accelerated Beach Erosion West of the Entrance. Final Report to Sinnreich Kosakoff & Messina LLP, Central Islip, NY, 27 p.

Byrnes, M.R., 2014. Observations and Review of Opinions Provided by Plaintiff's Experts Regarding the Mermentau River and Gulf of Mexico Navigation Channel Across Property Owned by the Rutherford Estate. Final Report to NeunerPate, Lafayette, LA, 18 p.

Byrnes, M.R., 2014. Observations and Review of Opinions Provided by Plaintiff's Experts Regarding the Effects of the American Midstream Pipeline Canal on Property Owned by Rigolets Limited Partnership. Final Report to Liskow & Lewis, New Orleans, LA, 19 p.

Byrnes, M.R., J.L. Berlinghoff, and S.F. Griffee, 2013. Sediment Dynamics in Mobile Bay, Alabama: Development of an Operational Sediment Budget. Technical Report to the Mobile Bay National Estuary Program, Mobile, AL, 134 p.

Byrnes, M.R., J.D. Rosati, S.F. Griffee, and J.L. Berlinghoff, 2012. Littoral Sediment Budget for the Mississippi Sound Barrier Islands. Technical Report ERDC/CHL TR-12-9, U.S. Army Engineering Research and Development Center, Vicksburg, MS, 184 p.

Byrnes, M.R., 2011. Land Area and Vegetation Changes Associated with Oil and Gas Exploration on the Savoie Property, Eugene Island, Cameron Parish Louisiana. Final Report to Johnson Gray McNamara, LLC, 21 p.

Byrnes, M.R., 2010. Processes Affecting Wetland Development at the Vermilion Parish School Board Property, Section 16 (T15S, R1E), Vermilion Parish, Louisiana. Expert Report to Kean, Miller, Hawthorne, D'Armond, McGowan, & Jarman, LLP, 27 pp. + Appendix.

Byrnes, M.R., S.F. Griffee, and M.S. Osler, 2010. Channel Dredging and Geomorphic Response at and Adjacent to Mobile Pass, Alabama. Technical Report ERDC/CHL TR-10-8, U.S. Army Engineer Research and Development Center, Vicksburg, MS, 309 pp.

Byrnes, M.R., 2010. Physical Impact Producing Factors Associated with Sand Mining on Shoals Offshore Maryland, Section 3.0, p. 31-38. In CSA International, Applied Coastal Research and Engineering, Barry Vittor & Associates, and Florida Institute of Technology, 2010. Analysis of Potential Biological and Physical Impacts of Dredging Offshore Ridge and Shoal Features. U.S. Department of the Interior, Minerals Management Service, Leasing Division, Marine Minerals and Alternative Energy Branch, Herndon, VA. OCS Report MMS 2010-010, 160 pp. + Appendices.

Byrnes, M.R. and M.S. Osler, 2010. Selection of Alternative Scenarios and Simulation of Physical Processes, Section 5.0, p. 75-119. In CSA International, Applied Coastal Research and Engineering, Barry Vittor & Associates, and Florida Institute of Technology, 2010. Analysis of Potential Biological and Physical Impacts of Dredging Offshore Ridge and Shoal Features. U.S. Department of the Interior, Minerals Management Service, Leasing Division, Marine Minerals and Alternative Energy Branch, Herndon, VA. OCS Report MMS 2010-010, 160 pp. + Appendices.

Byrnes, M.R., T.D. Thibaut, B.A. Vittor, and K.C. Lindeman, 2010. Recommendations for Engineering Options and Mitigation Measures, Section 7.0, p. 131-135. In CSA International, Applied Coastal Research and Engineering, Barry Vittor & Associates, and Florida Institute of Technology, 2010. Analysis of Potential Biological and Physical Impacts of Dredging Offshore Ridge and Shoal Features. U.S. Department of the Interior, Minerals Management Service, Leasing Division, Marine Minerals and Alternative Energy Branch, Herndon, VA. OCS Report MMS 2010-010, 160 pp. + Appendices.

Nailon, R., M.R. Byrnes, I.A. Mendelssohn, R.P. Gambrell, and R.F. Bernier, 2009. Revised Plan for Restoration of Intertidal Marsh Vegetation at Port Fourchon, Louisiana, Impacted During Hurricane Katrina. Final Report to Kean, Miller, Hawthorne, D'Armond, McGowan, & Jarman, LLP, 29 p.

Byrnes, M.R. and S.F. Griffee, 2009. Site Observations for the Hawkins Property on Peninsula Road, Fishers Island, New York. Final Coastal Assessment Report for Ms. Patricia Moore, Esq., Southold, NY, 23 p.

Byrnes, M.R., 2008. Processes Affecting Wetland Change on the Davie Meaux, Sr. Property, Vermilion and Iberia Parishes, Louisiana. Final Report to Liskow & Lewis, Lafayette, LA, 21 p. plus Appendices.

Byrnes, M.R., 2008. Processes Affecting Wetland Change in the Calcasieu-Sabine Basin with Special Reference to Doré Energy Corporation Property: Supplemental Report. Final Report to Schully, Roberts, Slattery, & Marino, New Orleans, LA, 33 p.

Byrnes, M.R., 2008. Beach Changes Adjacent to the Montauk Harbor Jetties, New York, with Special Reference to the Cole Property at 112 Soundview Drive. Final Report to Manning Cole, Maspeth, NY, 36 p. plus appendix.

Byrnes, M.R., S.F. Griffee, and M.S. Osler, 2008. Evaluation of Channel Dredging on Shoreline Response at and Adjacent to Mobile Pass, Alabama. Final Report to U.S. Army Corps of Engineers, Mobile District, 212 p. plus 8 appendices.

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Byrnes, M.R. and J.L. Baker, 2005. Sediment Budget Analysis: Culloden Point to Shagwong Point, Lake Montauk, NY. Final Report to Offshore and Coastal Technologies, Chadds Ford, PA, 17 p.

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### ***Litigation Support***

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**NeunerPate**, Lafayette, LA, The Rutherford Estate Trust, et al. vs. Cameron Parish Police Jury, et al., 38<sup>th</sup> Judicial District Court, Cameron Parish, Louisiana, 2014.

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**Johnson Gray McNamara, LLC**, Lafayette, LA, Hazel Richard Savoie, et al. v. Alice T. Richard, et al., Shell Oil Company, 38<sup>th</sup> Judicial District Court, Cameron Parish, Louisiana, 2011

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**Kean, Miller, Hawthorne, D'Armond, McCowan, & Jarman**, Baton Rouge, LA, State of Louisiana, et al. v. The Louisiana Land and Exploration Company, et al., Chevron USA, Inc., 15<sup>th</sup> Judicial Court for the Parish of Vermilion, State of Louisiana, 2010

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**Liskow & Lewis**, Lafayette, LA, Larry Davie Meaux, et al. v. Hilcorp Energy Company, et al., 15<sup>th</sup> JDC, Vermilion Parish, LA, 2008. Processes Affecting Wetland Change on the Davie Meaux, Sr. Property, Vermilion and Iberia Parishes, Louisiana. Clients: Forest Oil, Hilcorp Energy, Unocal, LLOG Exploration.

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Parish, LA, 2007-2008. Processes Affecting Wetland Change in the Calcasieu-Sabine Basin with Special Reference to Doré Energy Corporation Property. Clients: Noble Energy and PITCO USA.

**John J, O'Connell, Esq.**, New York, NY, Town of Southampton v. County of Suffolk, 2007-2008. Consulting Expert to Town regarding beach erosion between Westhampton and Georgica Pond related to shore-perpendicular engineering structures. Client: Town of Southampton.

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**DLA Piper Rudnick Gray Cary US LLP**, New York, NY, Town of Southampton v. County of Suffolk, 2005-2006. Consultant to Town regarding beach erosion between Westhampton to Georgica Pond related to shore-perpendicular engineering structures. Client : Town of Southampton.

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**Department of Justice**, Washington, D.C., Applegate et al. v. the United States of America, 1996-1999. Coastal Processes Assessment for Brevard County, Florida, with Special Reference to Test Plaintiffs. Client: U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

### ***Research Grants and Contracts***

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**U.S. Army Corps of Engineers, Mobile District**, Engineering Division, 2010-2015. Coastal Engineering Services, Mississippi Coastal Improvements Program (MsCIP), Barrier Island Restoration Plan. Principal Investigator.

**Mobile Bay National Estuary Program**, 2012. Sediment Dynamics in Mobile Bay, Alabama: Development of an Operational Sediment Budget. Principal Investigator.

**Gulf of Mexico Foundation**, 2010-11. Gulf Regional Sediment Management Master Plan Case Study Compilation. Principal Investigator.

**U.S. Army Engineer Research and Development Center**, Coastal and Hydraulics Laboratory, 2009-2011. Quantifying Coastal Inlet Sedimentation Dynamics: Database Development and Evaluation, Sediment Transport Pathways and Budgets, and Web-Based Technical Transfer for USACE Personnel. Principal Investigator.

**U.S. Army Corps of Engineers, Mobile District**, Planning and Environmental Division, 2006-2008. Channel Dredging Impacts on Shoreline Response at and Adjacent to Main Pass, Mobile Bay Entrance, Alabama. Principal Investigator.

**U.S. Army Engineer Research and Development Center**, Coastal and Hydraulics Laboratory, 2006-2008. Quantifying Regional Sediment Dynamics in Nearshore Environments: Historical Sediment Pathways, Lateral Inlet and Island Migration, and Detailed Sediment Budgets. Principal Investigator.

**U.S. Minerals Management Service**, Leasing Division, Marine Minerals Branch, 2005-2007. Potential Biological and Physical Impacts of Dredging on Offshore Ridge and Swale Features. Co-Program Manager with Continental Shelf Associates, Inc.

**U.S. Army Engineer Research and Development Center**, Coastal and Hydraulics Laboratory, 2002-2005. Quantifying Inlet Sedimentation Dynamics: Sediment Pathways, Overwash and Island Breaching, Detailed Sediment Budgets, and Navigation Channel Resources. Principal Investigator.

**ENSR International**, 2001. Empire State Newsprint Project: Geophysical and Water Velocity Measurements for the Hudson River Field Program. Principal Investigator.

**U.S. Minerals Management Service**, International Activities and Marine Minerals Division, 2001-2003. Environmental Surveys of Potential Borrow Areas Offshore Northern New Jersey and Southern New York and the Environmental Implications of Sand Removal for Coastal and Beach Restoration. Program Manager.

**Paragon Engineering, Inc.**, 2001. Physical Environmental Impacts of Pipeline Construction and Operation for the Mardi Gras Transportation System. Principal Investigator.

**Offshore and Coastal Technologies, Inc. – East Coast**, 2000-2001. Sediment Budget Evaluation Using Historical Shoreline and Beach Profile Data: Western Town Line to Horton Point, Southold, NY. Principal Investigator.

**U.S. Minerals Management Service**, International Activities and Marine Minerals Division, 2000-2002. Environmental Surveys of Potential Borrow Areas on the East Florida Shelf and the Environmental Implications of Sand Removal for Coastal and Beach Restoration. Principal Investigator.

**ENTRIX, Inc.**, 1999-2000. Evaluation of Geological and Physical Processes Impacts Associated with the Gulfstream Pipeline, Northeast Gulf of Mexico. Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal and Hydraulics Laboratory, 1999-2002. Sediment Bypassing at Structured Entrances and Geomorphic Change Modeling. Principal Investigator.

**U.S. Minerals Management Service**, International Activities and Marine Minerals Division, 1999-2001. Numerical Modeling Evaluation of the Cumulative Physical Effects of Offshore Sand Dredging for Beach Nourishment. Principal Investigator.

**Rubin and Rudman, LLP**, 1999-2000. Sediment Erosion and Deposition Processes in Hyannis Inner Harbor, Hyannis, MA. Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal and Hydraulics Laboratory, 1999. Inlets Online: A Tutorial of Interpreting Aerial Photography for the Analysis of Sediment Transport Patterns and Geomorphic Change at Entrances. Principal Investigator.

**Massachusetts Coastal Zone Management**, 1999. Study of the Environmental Impacts of Offshore Sand Mining. Principal Investigator.

**Sebastian Inlet Tax District Commission**, 1998-1999. Historical Shoreline Change Analysis: Satellite Beach to Fort Pierce Inlet, Florida. Principal Investigator.

**Town of Southold, NY**, 1998. Historical Shoreline Change Analysis: Western Town Line to Horton Point, Southold, NY. Principal Investigator (subcontractor to Aubrey Consulting, Inc.).

**U.S. Minerals Management Service**, International Activities and Marine Minerals Division, 1997-2000. Collection of Environmental Data Within Sand Resource Areas Offshore North Carolina and the Environmental Implications of Sand Removal for Coastal and Beach Restoration. Principal Investigator (subcontractor to Aubrey Consulting, Inc.).

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**U.S. Department of Justice**, Environmental and Natural Resources Division, 1997-1998. Coastal Change Assessment for Brevard County, FL. Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal Engineering Research Center, 1996-1998. Historical Sediment Transport Patterns, Columbia River Mouth and Adjacent Shores. Principal Investigator.

**U.S. Department of Justice**, through Texas A&M Research Foundation, 1996. Shoreline and Bathymetric Change Analysis for Assessing Downtide Impacts Associated with the Port Canaveral Entrance Jetties. Principal Investigator.

**U.S. Minerals Management Service**, Office of International Activities and Marine Minerals, 1996. Environmental Impact Statement to Support Phase I of the Louisiana Barrier Shoreline Feasibility Study (Barataria-Terrebonne Basin Barrier Shoreline Restoration Effort). Principal Investigator.

**U.S. Minerals Management Service**, Coastal Marine Institute, 1995-1997. Synthesis of Hard Mineral Resources of the Northeast Gulf of Mexico Shelf: Spatial Distribution, Subsurface Evaluation, and Sediment Budget. Principal Investigator, R. McBride Co-Principal Investigator.

**T. Baker Smith and Sons, Inc.**, through LA Department of Natural Resources, 1995-1997. Feasibility of Barrier Shoreline Restoration in Coastal Louisiana - Coastal Geology, Geomorphology, and Physical Processes. Principal Investigator, R. McBride Co-Principal Investigator.

**U.S. Geological Survey**, National Coastal Geology Program, 1995-1996. Shoreline and Bathymetric Change in Lake Pontchartrain. Principal Investigator.

**U.S. Geological Survey**, National Coastal Geology Program, 1995-1996. Geologic Processes Affecting Coastal Erosion in Western Louisiana, Including the Impact of Hurricane Andrew. Principal Investigator, R. McBride Co-Principal Investigator.

**LA Department of Natural Resources**, Coastal Restoration Division, 1995-1996. Assessment of Beach Response to a Segmented Breakwater System: Southwest Louisiana Coast. Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal Engineering Research Center, 1994-1996. Geographic Information System Development for Evaluating Sediment Transport Patterns at Inlets and Adjacent Environments: Data Capture, Analysis, and Management. Principal Investigator.

**LA Department of Natural Resources**, Office of Coastal Restoration and Management, 1994-1995. Technical Study Advisors for the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA): Louisiana Barrier Island Study. Principal Investigator, R.A. McBride Co-Investigator.

**U.S. Geological Survey**, National Coastal Geology Program, 1994-1995. Geologic Processes Affecting Coastal Erosion in Louisiana, Including the Impact of Hurricane Andrew. Principal Investigator, S. Penland Co-Principal Investigator.

**U.S. Geological Survey**, National Coastal Geology Program, 1993-1994. Geologic Processes Affecting Coastal Erosion in Western Louisiana, Including the Impact of Hurricane Andrew. Principal Investigator, S. Penland Co-Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal Engineering Research Center, 1993-1994. Geographic Information System and Relational Database Management System Development: New York Bight Study. Principal Investigator.

**Federal Emergency Management Agency**, Office of Risk Assessment, 1992-1993. Pilot Erosion Rate Data Study - Phase IV: Global Positioning System Survey. Principal Investigator.

**Argonne National Laboratory and Gas Research Institute**, 1992-1993. Coastal Land Loss Classification, Mapping, and Spatial Analysis. Co-Principal Investigator with S. Penland.

**U.S. Geological Survey**, National Coastal Geology Program, 1992-1993. Geological Processes Affecting Coastal Erosion in Western Louisiana: 1991-1996. Co-Principal Investigator.

**State of Louisiana**, Louisiana Education Quality Support Fund Enhancement Program, May-December, 1992. Flat-Bed Scanner and Geographic Information System Equipment for Accurate Computer Mapping of Land Loss in the Coastal Zone. Principal Investigator.

**Environmental Protection Agency**, Barataria-Terrebonne National Estuary Program, June-November, 1992. An Information Management Strategy to Ensure the Compatibility and Accessibility of Data Generated in Conjunction with the Barataria-Terrebonne National Estuary Program. Co-Principal Investigator with L. Wayne.

**U.S. Minerals Management Service**, 1991-1992. Evaluation and Characterization of Hard Mineral Resources in the Exclusive Economic Zone of Louisiana and Mississippi, Northern Gulf of Mexico. Principal Investigator, S. Penland Co-Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal Engineering Research Center, 1991-1992. Use of Geographic Information System Technology for Coastal Engineering Applications. Principal Investigator.

**U.S. Geological Survey**, National Coastal Geology Program, 1991-1992. Geological Processes Affecting Coastal Erosion in Western Louisiana: 1991-1996. Co-Principal Investigator with S. Penland.

**Federal Emergency Management Agency**, Office of Risk Assessment, 1990-1992. Pilot Erosion Rate Data Study - Phases I-III. Principal Investigator.

**Mississippi Office of Geology**, Department of Environmental Quality, State of Mississippi, 1990-1991. Aerial Videotape, Shallow Seismic, and Shoreline Mapping Surveys of Coastal Mississippi. Principal Investigator, S. Penland Co-Principal Investigator.

**Argonne National Laboratory and Gas Research Institute**, 1990-1991. Coastal Land Loss Classification, Mapping, and Spatial Analysis. Co-Principal Investigator with S. Penland.

**U.S. Minerals Management Service**, 1990-1991. Geological, Economic, and Environmental Characterization of Selected Near-Term Leasable Offshore Sand Deposits for Beach Nourishment. Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal Engineering Research Center, 1988-1990. Numerical Modeling of Cross-Shore Sediment Transport and Beach Profile Change. Principal Investigator.

**U.S. Army Corps of Engineers**, Coastal Engineering Research Center, 1986-1988. Barrier Island Sedimentation Studies. Co-Principal Investigator with F. Anders.

**U.S. Army**, Sediment Budget and Shoreline Dynamics, Fort Story, Virginia, 1984-1986. Co-Principal Investigator with G.F. Oertel.