

CURRICULUM VITAE

Mark Borrelli

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EDUCATION

Ph.D. Dept. of Geosciences, University of Rhode Island, 2008

M.S. Dept. of Geological Sciences, University of North Carolina at Chapel Hill, 2001

B.S. Dept. of Geology, Tufts University, 1999

PROFESSIONAL POSITIONS

1/2018 – Present Director, Coastal Processes and Ecosystems (CAPE) Lab, Joint Research Laboratory, School for the Environment, University of Massachusetts, Boston and The Center for Coastal Studies, Provincetown MA.

2014 – Present Research Faculty, School for the Environment, University of Massachusetts-Boston

2011 – Present Associate Scientist, Chair, Dept. of Marine Geology, Center for Coastal Studies, Provincetown, MA

2010 – Present Director, Seafloor Mapping Program, Dept. of Marine Geology, Center for Coastal Studies, Provincetown, MA

2009 – 2014 Adjunct Professor, Dept. of Environmental, Earth and Ocean Sciences, University of Massachusetts-Boston

2009 – 2010 Assistant Scientist, Project Manager: Cape Cod Bay Seafloor Mapping Project
Dept. of Marine Geology, Center for Coastal Studies,
Provincetown, MA

2007 – 2009 Coastal Geologist, Dept. of Recreation, Park and Tourism Sciences; Texas A&M University. Duty-Station: US National Park Service, Geologic Resources Division, Lakewood, CO

2003 – 2005 Coastal Geologist, Massachusetts Office of Coastal Zone Management, Boston, MA

PUBLICATIONS (*denotes student author)

Published, Peer-Reviewed Articles, Conference Proceedings, and Maps

Borrelli, M., Fox, S.E., Shumchenia, E.J., Kennedy, C.G., Oakley, B.A., Hubeny, J.B., Love, H., Smith, T.L., Legare, B., Mittermayr, A., Giese, G.S., in press. Submerged Marine Habitat Mapping, Cape Cod National Seashore: A Post-Hurricane Sandy Study, Natural Resource Report, NPS/XXXX/NRR—2018/XXX. National Park Service, Fort Collins, CO.

Borrelli, M., Oakley, B.A., Smith, T.L., Mabee, S.B., Legare, B., McFarland, S., Woodruff, J.D., Giese, G.S., 2017. Onshore-offshore surficial geologic map of the Wellfleet quadrangle and portions of

- eastern Cape Cod Bay, Barnstable County, Massachusetts, 1:24,000 scale, 3 sheets.
Massachusetts Geological Survey, Open File Report 17-01.
- Giese, G.S., **Borrelli, M.**, Mague, S.T., Smith, T.L., Barger, P., Adams, M.B., Hughes, P., 2015. Century-Scale Longshore Sediment Transport Rates Calculated from Reconstructed Historical Coastal Surfaces, *The Proceedings of the Coastal Sediments 2015*.
- Borrelli, M.**, Smith, T.L., Oakley, B.A., Shumchenia, E.J., Wilson, J., Gontz, A., Giese, G.S., (2014). Onshore-offshore surficial geologic map of the North Truro Quadrangle, Barnstable County, Massachusetts. 1:24,000. Massachusetts Geological Survey, p. 2 sheets and digital product: Adobe PDF and ESRI
- Borrelli, M.**, Gontz, A.M., Smith, T.L., Shumchenia, E. J., Wilson, J.R., Giese, G.S. (2013). Progress map of the onshore-offshore surficial geologic map of the North Truro Quadrangle, Barnstable County, Massachusetts. 1:24,000. Massachusetts Geological Survey, Open File Report. 2013-01. 1 sheet and digital product: Adobe PDF and ESRI ArcGIS database.
- Borrelli, M.**, Gontz, A.M., Wilson, J.R., Brown, T.L.B., Norton, A.R., Giese, G.S. (2012) Onshore-offshore surficial geologic map of the Provincetown Quadrangle, Barnstable County, Massachusetts. 1:24,000. Massachusetts Geological Survey, Open File Report. 2012-01. 1 sheet and digital products: Adobe PDF and ESRI ArcGIS database.
- Borrelli, M.** (2012). Storm-driven coastal change, shoreline orientation, and tidal phase: A case study from Hurricane Irene. *Shore and Beach*, v.80, n. 2. p. 76-80.
- Borrelli, M.**, Oakley, B.A., Giese, G.S., Boothroyd, J.C., (2011). Inlet Formation as a Result of Hydraulic Inefficiency Leading to Further Inlet Instability. In, P. Wang, J.D. Rosati and T.M. Roberts (eds.), *Coastal Sediments '11*, American Society of Civil Engineers, v.1. p. 519-532.
- Giese, G.S., Adams, M.B., Rogers, S.S., Dingman, S.L., **Borrelli, M.**, Smith T.L., Coastal sediment transport on outer Cape Cod, Massachusetts. In, P. Wang, J.D. Rosati and T.M. Roberts (eds.), *Coastal Sediments '11*, American Society of Civil Engineers, v. 3, p. 2353-2356.
- Watts, I.M, Rosati, J.D., **Borrelli, M.**, (2011) Re-establishing a Historical Inlet at East Harbor, Cape Cod, Massachusetts. In, P. Wang, J.D. Rosati and T.M. Roberts (eds.), *Coastal Sediments '11*, American Society of Civil Engineers, v. 1, p. 419-429.
- Nichols, O.C., Lind, H., Baldwin, J., Jackett, A.R., **Borrelli, M.**, Small, P.A. (2011) Site selection for sustainable shellfish aquaculture development areas: A practical mapping approach. *The Journal of Ocean Technology*. v. 6, n. 3, pp.59-70.
- Borrelli, M.**, and Beavers, R., (2008) Natural and Cultural Resources in Ocean and Coastal National Parks: Science-based Storm Vulnerability Assessments and Management Implications. *Proceedings, Solutions to Coastal Disasters 2008*; April 13-16, 2008, Oahu, Hawaii: American Society of Civil Engineers (ASCE) Publications, pp. 518-525,
- Hapke, C., Reid, D., and **Borrelli, M.**, (2007). The National Assessment of Shoreline Change; A GIS compilation of vector cliff edges and associated cliff erosion data for the California coast: U.S. Geological Survey Open-File Report 2007-1112.
- Borrelli, M.**, Wells, J.T., (2003). Swash bars and spit growth: Evolution of a rapidly prograding spit along a sediment-starved coast, *Proceedings of the International Conference on Coastal Sediments 2003*.
- Borrelli, M.**, and Wells, J.T., (2002) Sediment bypassing, spit progradation and the Cape Lookout "Jetty": *Shore and Beach*, v. 70, no. 3.

Abstracts (*denotes student author)

- Borrelli, M.**, Fox, S.E., Shumchenia, E.J., Kennedy, C.G., Oakley, B.A., Hubeny, J.B., Love, H., Smith, T.L., Legare, B., Mittermayr, A., Giese, G.S., (2017). Shallow Water Benthic Habitat Characterization: Getting Baseline Data and Mapping the White Space. Coastal and Estuarine Research Foundation, Biennial Conference, Providence, RI. 05-09 November, 2017

- Chen, R.F., **Borrelli, M.**, Brynes, J., Lockwood, L., Kirshen, P., (2017). Assessing the Environmental Impacts of a Harbor-Wide Strategy for Preparing for Sea-Level Rise in Boston. Coastal and Estuarine Research Foundation, Biennial Conference, Providence, RI. 05-09 November, 2017
- Borrelli, M.**, Shumchenia, E., Kennedy, C.G., Oakley, B.A., Hubeny, J.B., Love, H., Smith, T.L., Legare, B., McFarland, S., Fox, S., Giese, G.S. (2017). Submerged marine habitat mapping, Cape Cod National Seashore: A Post-Hurricane Sandy Study. GeoHab 2017 Marine Geological & Biological Habitat Mapping May 1st - May 5th 2017, Nova Scotia, Canada.
- Borrelli, M.**, Giese, G.S., Mague, S.T., Smith, C.G., Legare, B. and Barger, P., 2016. Insights into historical and current sediment transport pathways from quantitative sediment budgets. American Geophysical Union, Annual Meeting, San Francisco, CA.
- Borrelli, M.**, Legare, B., Smith, T. L., and Love, H., 2016, Mapping the Estuarine Seafloor with Vessel-Based Acoustic Instruments: The Shallowest Water Survey, Geological Society of America *Abstracts with Programs*, Volume Vol. 48, No. 7 Denver, CO.
- Borrelli, M.**, Smith, T.L., 2016. Vessel-based Acoustic Mapping of Intertidal Zones in Microtidal and Mesotidal Environments: Increasing Efficiencies and Reducing Uncertainties with Phase Measuring Sidescan Sonars, Northeastern Geological Society of America, Albany, NY.
- Love, H., Hubeny, J.B., **Borrelli, M.**, 2016. Analysis of Anthropogenic Influences on Organic Matter Deposition in Pleasant Bay and Nauset Marsh Back Barrier Systems, Cape Cod, Northeastern Geological Society of America, Albany, NY.
- Oakley, B.A., Turenne, J.D., Bartosiewicz, J., Hollis, R.J., Alvarez, J.D., **Borrelli, M.**, Boothroyd, J., 2016. Mapping Benthic Geologic Habitat in Shallow Estuarine and Lagoon Environments: Case Studies, Experience and Results from Southern New England, Northeastern Geological Society of America, Albany, NY.
- Borrelli, M.**, Smith, T.L., Kennedy, C.G., Oakley, B.A., Hubeny, J.B., 2015. Science and Mapping in Very Shallow Coastal Waters with Phase-Measuring Sidescan Sonar, Geological Society of America *Abstracts with Programs*, Baltimore, MD, p. 266.
- Giese, G.S., **Borrelli, M.**, Mague, S., T., Barger, P., Smith, T.L., Adams, M.B., 2014. Quantification of Historical Variations in Longshore Sediment Transport Rates: A Tool for Estimating Future Coastal Change, AGU annual meeting, San Francisco, CA.
- Borrelli, M.**, Smith, T.L., Giese, G.S., 2014. Impact of a Small Anthropogenic Alteration on a Highly Energetic Estuary with Multiple Inlets, Geological Society of America, Vancouver, British Columbia, Canada, p. 0.
- Giese, G.S., **Borrelli, M.**, Mague, S., T., Adams, M.B., Smith, T.L., 2014. Application of a Simple Geomorphic Model to Cape Cod Coastal Change, Abstract ID: 14943 presented at American Geophysical Union Ocean Sciences Biennial Conference. Honolulu, HI. 23-28 Feb.,
- Borrelli, M.**, (2013). Nearshore Seafloor Mapping in Cape Cod Bay: The Technology, Science, and Management Implications. Cape Cod Natural History Conference. 09 Mar 2013.
- Borrelli, M.**, Norton*, A.R., Brown*, T.L.B., (2012). Nearshore resource characterization maps: marine spatial planning, capacity building and coastal science in Massachusetts. Abstract B1070 presented at American Geophysical Union Ocean Sciences Biennial Conference. Salt Lake City, UT., 20-24 Feb.
- Brown*, T.L.B., Norton, A.R., Rogers, J., Gontz, A., **Borrelli, M.**, (2012). Creating a high-resolution, high accuracy, seamless map of the marine-terrestrial interface using swath bathymetry, intertidal structures, and terrestrial LiDAR. American Geophysical Union Ocean Sciences Biennial Conference, Salt Lake City, UT., 20-24 Feb., 2012.
- Borrelli, M.**, Giese G.S., Dingman, S.L., Gontz, A.M., Adams, M.B., Norton*, A.R., Brown*, T.L.B., (2011). Linear Scour Depressions or Bedforms? Using Interferometric Sonar to Investigate Nearshore Sediment Transport. Abstract OS13B-1536 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 05-09 Dec
- Norton*, A.R., Trembanis, A.C., Brown*, T.L.B., **Borrelli, M.**, (2011). Mapping and quantifying morphological parameters of eelgrass (*Zostera marina*) beds in eastern Cape Cod Bay, MA using

- an interferometric sonar system. *21st Biennial Conference of the Coastal and Estuarine Research Federation. Societies, Estuaries and Coasts: Adapting to Change*. 6-10 November 2011, Daytona Beach, Florida.
- Borrelli, M.**, Brown*, T.L., Norton*, A.R., (2011). Marine Mapping for Managers in Ocean and Coastal Parks: Making it Possible with Partnerships. *Proceedings, George Wright Society Conference, March 14-18, 2011*, New Orleans, LA.
- Brown*, T.L., Norton*, A.R., **Borrelli, M.**, Gontz, A. (2011). Shallow water benthic habitat maps for resource managers: The technology and the science. *Proceedings, George Wright Society Conference, March 14-18, 2011*, New Orleans, LA.
- Nichols, O.C., Lind, H., Baldwin, J., Jackett, T., **Borrelli, M.**, Small, P. (2010). Site selection for subtidal aquaculture development areas: a comprehensive habitat mapping approach. *Northeast Aquaculture Conference and Exposition. Plymouth MA*, December, 2010.
- Borrelli, M.**, Brown*, T.L.B., Norton*, A.R. (2010). Marine Mapping in Coastal National Parks: Management, Science and Technology. *Geological Society of America Abstracts with Programs*, vol. 42, no. 5, p. 563
- Borrelli, M.** (2010). The efficacy of interferometric sonar to map the seafloor in very shallow waters: Cape Cod National Seashore and vicinity, *Geological Society of America Abstracts with Programs*, vol. 42, no. 1, pp. 103.
- Borrelli, M.**, Boothroyd, J.C., (2008). The Role of a Flood-Tidal Delta in the Evolution of a Tidal Inlet: Chatham Harbor, Cape Cod, Massachusetts, *Geological Society of America Abstracts with Programs*, Vol. 40, No. 6, p. 92.
- Borrelli, M.**, Boothroyd, J.C., (2008). Documenting Change Along a Low-Energy Coastal Embayment with Fringing Marsh: A New Proxy-Based Shoreline Indicator. *American Geophysical Union, Ocean Sciences Meeting*, Orlando, FL, March 2008.
- Borrelli, M.**, (2007). Storm Vulnerability Assessments and Management Implications in Ocean and Coastal National Parks. *The State of the Science for Assessing and Mapping Coastal Hazards, The First Cullowhee Coastal Conference*. Western Carolina University, Cullowhee, North Carolina.
- Borrelli, M.**, (2006). The Development of a New Method to Predict Inlet Evolution: Links Between Flood-Tidal Delta Morphology and Inlet Configuration: *Association of Environmental and Engineering Geologists*,
- Borrelli, M.**, Boothroyd, J.C., Oakley, B.A., (2005). Historic and present-day hydrodynamics of intertidal bedforms in a coastal lagoon: photogrammetric analyses and field surveys: *Geological Society of America Abstracts with Programs*, Vol. 37, No. 1, p. 0
- Borrelli, M.** (2002). Sediment bypassing and progradation downdrift of a wave-attenuating jetty. *Proceedings of the Northeast Shore and Beach Preservation Association Conference*, Woods Hole Oceanographic Institution. October, 2002.
- Wells, J.T., McNinch, J.E., Park, J.Y., **Borrelli, M.**, Freeman, C. W., (2002). A decade of research at the Cape Lookout cusped foreland: new insights into longshore transport, shoal evolution, spit growth and the regional sediment budget: *EOS Trans. AGU*, 83(47), Fall Meet. Suppl., Abstract OS52F-07, 2002.
- Borrelli, M.** and Wells, J.T., (2001). Large-scale volume change and progradation of Power Squadron Spit during a transgression at Cape Lookout, North Carolina: *Geological Society of America Abstracts with Programs* Vol. 33, No. 2, March 2001.
- McNinch, J.E., Freeman, C.W., Bernstein, D., **Borrelli, M.**, (2001). The influence of cusped forelands on regional circulation, sediment budgets, and carbon cycling: An overview of results: *Geological Society of America Abstracts with Programs* Vol. 33, No. 6, October 2001.
- Borrelli, M.** and Wells, J.T., (2000). Welding swash bars and progradation during a transgression: Cape Lookout National Seashore, North Carolina: *Southeast Geological Society of America Abstracts with Programs* Vol. 33, No. 6, October 2000.

Invited Talks

- Borrelli, M.** (2016). *Benthic Habitat Maps in Wellfleet Harbor*. State of Wellfleet Harbor Conference. November 5, 2016.
- Borrelli, M.** (2015). *Where does the sand go when the beach erodes? Adding the third dimension to shoreline change*. Cape Cod Natural History Conference. Barnstable, MA, 14, March 2015.
- Borrelli, M.** (2015). *Phase-Measuring Sidescan Sonar: Mapping the seafloor in very shallow waters*. Center for Coastal and Ocean Mapping University of New Hampshire, Durham, NH, 06 March, 2015
- Borrelli, M.** (2015). *Phase-Measuring Sidescan Sonars in Very Shallow Coastal Sedimentary Environments*. Coastal Ocean Fluid Dynamics Laboratory, Woods Hole Oceanographic Institution, Woods Hole, MA, 30 January 30 2015.
- Borrelli, M.** (2014). *Coastal geology, processes, and management overview*. Massachusetts Coastal Erosion Commission. Gloucester, MA, 28 May 2014
- Borrelli, M.** (2013). *Sea Level Rise and Sedimentation in Wellfleet: Climate Change Impacts on Shellfishing in Wellfleet Harbor*. Social and Environmental Research Institute's Working Group on Climate Change Impacts on Shellfishing in Wellfleet Harbor. 22, November 2013.
- Borrelli, M.** (2013) *Sea Level Rise in Wellfleet: Understanding the Past, Working in the Present and Preparing for the Future*. 2013 State of Wellfleet Harbor Conference. 2, November 2013.
- Borrelli, M.** (2013). Led panel discussion after screening of *Chasing Ice* at the Science-on-Screen mini-festival, as part of the Provincetown Film Festival 2013. Funded by the Alfred B. Sloan Foundation, conducted by the Coolidge Corner Theatre Foundation, Brookline MA. 3, April 2013
- Borrelli, M.** (2013). *Seafloor Mapping for the Location and Characterization of Natural Resources, Shipwrecks and Derelict Fishing Gear*. Stellwagon Bank's Sanctuary Advisory Council Meeting. 5, March, 2013
- Borrelli, M.** (2012) *Understanding the Science of Shoreline Change*. 2012 State of Wellfleet Harbor Conference. 3, November 2012.
- Borrelli, M.,** Norton, A. R., Brown, T.L.B., (2010). *Nearshore Seafloor Mapping in Cape Cod Bay, Massachusetts*. *New England Estuarine Research Society*, Provincetown, MA, October 27-30, 2010.
- Borrelli, M.,** (2010). *Cape Cod Bay Mapping Project—Mapping the shallow waters in Cape Cod Bay, Massachusetts*. National Oceanic and Atmospheric Administration's Hydrographic Services Review Panel meeting in Providence, RI, May 5-6, 2010.
- Borrelli, M.,** Boothroyd, J.C., (2008). Implications of Management Practices in Park-Adjacent Areas: New Inlet Formation in Cape Cod National Seashore *Geological Society of America Abstracts with Programs*, Vol. 40, No. 6, p. 186
- Borrelli, M.,** (2006). Cape Cod to Cape Lookout: Coastal Processes, Policy and Management Along two Barrier Island Chains. *Institute for the Coastal Marine Environment*. Naples, Italy. October, 2006.
- Borrelli, M.,** (2006). Predicting Inlet Evolution Using Rectified Aerial Photographs and Field Surveys. *Pleasant Bay Symposium 2006: Understanding and Managing a Dynamic Coastal System*. Chatham, Massachusetts.

Technical Reports

- Borrelli, M.,** Giese, G.S., Mague, S.T., Smith, T.L., 2016. Ballston Beach Overwash: Understanding Overwash Events for Science-based Management. Town of Truro Massachusetts, p. 23.
- Giese, G.S., M. **Borrelli**, S.T. Mague, Smith, T., Barger, P., and P. Hughes, 2014. *Assessment of multi-decadal coastal change: Provincetown Harbor to Jeremy Point, Wellfleet*. Marine Geology Report No.14-1, Center for Coastal Studies, Provincetown, MA. Prepared for the Massachusetts

Bay Program, Boston, MA.

- Giese, G.S., M. **Borrelli**, S.T. Mague, and P. Hughes, 2013, *Evaluating century-scale coastal change: Provincetown/Truro line to Provincetown Harbor*. Marine Geology Report No.13-1, Center for Coastal Studies, Provincetown, MA, 11 p. Prepared for the Island Foundation, Marion MA.
- Giese, G.S., M. **Borrelli**, S.T. Mague, and P. Hughes, 2012, *Evaluating century-scale coastal change: a pilot project for the Beach Point area in Truro and Provincetown, Massachusetts*. Marine Geology Report No.12-2, Center for Coastal Studies, Provincetown, MA, 18 p. Prepared for the Island Foundation, Marion MA.
- Giese, G.S., Mague, S.T., Rogers, S.S., **Borrelli, M.**, (2010). A Geomorphic Analysis of the Monomoy Barrier System. Technical report submitted to the Monomoy National Wildlife Refuge, Chatham, Massachusetts. 27 p.
- Borrelli, M.**, (2009). 137 years of Shoreline Change in Pleasant Bay: 1868 - 2005. Technical report submitted to the Pleasant Bay Resource Management Alliance. Harwich, Massachusetts. 23 p.

Chaired Sessions:

- Borrelli, M.**, Tyrrell, M., (2017). Coastal Mapping: Costly maps for cost-effective coastal and estuarine management. Coastal and Estuarine Research Foundation, Biennial Conference, Providence, RI. 05-09 November, 2017
- Borrelli, M.**, Leatherman, S.P. (2016). New Research in Coastal Environments. *Geological Society of America Meeting*. Denver, CO, 25-28 September, 2016.
- Borrelli, M.**, Oakley, B.A. (2016). Marine and Terrestrial Coastal Mapping: Data, Discovery, and Science. *Northeastern Geological Society of America Meeting*, Albany, NY 21- 23 March 2016.
- Borrelli, M.**, Oakley, B.A. (2015). Coastal and Glacial Processes from Alaska to New England: In Honor of Jon Boothroyd. *Northeastern Geological Society of America Meeting*, Bretton Woods, NH, 23-25 March 2015.
- Borrelli, M.**, Schupp, C. (2010). Coastal and Nearshore Processes Affecting Our National Parks, Combined Northeastern / Southeastern *Geological Society of America Meeting*, Baltimore, Maryland, 13-16 March 2010.
- Borrelli, M.**, (2009). Storm Response and Recovery in Ocean and Coastal Parks. *George Wright Society Biennial Conference. Doubletree Hotel, Portland, Oregon, 2-6 March 2009.*
- Borrelli, M.**, Beavers, R., (2007). Assessing Storm Hazards in Vulnerable Areas of the National Park Service. *George Wright Society Biennial Conference. Crowne Plaza Hotel, St. Paul, Minnesota, 16-20 April 2007.*

Select Recent Outreach:

- Borrelli, M.** (2014). *Sea Level Rise in Wellfleet*. Wellfleet Conservation Trust, 16 August 2014.
- Borrelli, M.** (2014). *Seafloor Mapping, Technology, Science, Education and Policy*. Cape Cod Sea Camp. 03 May 2014.
- Borrelli, M.** (2014). *Coastal Erosion, Sea Level Rise and Herring Cove Beach: What Cape Cod might look like in the future*. Talk to retirees at Seashore Point, Provincetown, MA. 03 May 2014.
- Borrelli, M.** (2013). *Shipwrecks, Seagrass and Sonar: Mapping the Seafloor in and around Cape Cod* Orleans Pond Coalition. 15 September 2013.
- Borrelli, M.** (2013). *Ballston Beach Overwash Event, March 08-09 2013*. Town of Truro MA. 03 August 2013.
- Borrelli, M.** (2013). *Coastal Processes, Science and Public Perception*. Community Leadership Institute, 16 May 2013.

PROFESSIONAL ASSOCIATIONS

- Geological Society of America
- American Geophysical Union
- Coastal and Estuarine Research Foundation
- New England Estuarine Research Society

BOARDS AND MEMBERSHIPS

- State Geologic Mapping Advisory Committee: Massachusetts
- Pleasant Bay Alliance, Coastal Work Group

REVIEWER

- Estuarine, Coastal and Shelf Science
- Limnology and Oceanography
- Ocean Engineering
- Journal of Coastal Research
- US National Park Service