

Patrick L. Barnard

Coastal Geologist
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EDUCATION:

Ph.D., 2003, Major: Geological Sciences

University of California, Riverside

M.S., 1998, Major: Coastal Geology

University of South Florida, Tampa

B.A., 1995, Major: Geology, Minor: Environmental Studies

Williams College, Williamstown, MA

PRESENT POSITION:

Research Geologist, USGS (2003-present)

Principal Investigator/ Project Chief for the San Francisco Bay Coastal System Project, Southern California Coastal Hazards Project, and the Santa Barbara and Ventura Counties Coastal Processes Study. Perform field- and numerical modeling-based research of the morphodynamics and evolution of high energy coastlines. The purpose of these studies is to assess coastal sediment transport patterns and trends, quantify rates of coastal change, and assess coastal vulnerability to climate change and sea level rise. Conduct Delft3D numerical modeling, including the SWAN wave model, ATV beach surveys, personal watercraft cross-shore surveys, and analysis of digital grain size images, video images, multibeam and side scan data. Results for these studies have been presented in peer-reviewed journals, scientific conferences, and professional reports. Secured over \$1.5 million thus far in outside funding for the above coastal studies. In addition, I have mentored and employed numerous graduate and undergraduate students throughout these studies.

RECENT PUBLICATIONS (last three years):

2006

Barnard, P.L., Hanes, D.M., Rubin, D.M. and Kvitek, R.G., 2006. Giant sand waves at the mouth of San Francisco Bay. *Eos Transactions of the American Geophysical Union*, Volume 87, Number 29, p. 285, 289

Barnard, P.L., Owen, L.A. and Finkel, R.C., 2006. Quaternary fans and terraces in the Khumbu Himal south of Mount Everest: their characteristics, age and formation. *Journal of the Geological Society, London*, Volume 163, p. 383-399

Barnard, P.L., Owen, L.A., Finkel, R.C. and Asahi, K., 2006. Landscape response to deglaciation in a high relief, monsoon-influenced alpine environment, Langtang Himal, Nepal. *Quaternary Science Reviews*, Volume 25, Issues 17-18, p. 2162-2176

2007

Barnard, P.L., Eshleman, J.L., Erikson, L.H. and Hanes, D.M., 2007. Coastal processes study at Ocean Beach, San Francisco, CA: summary of data collection 2004-2006. U.S. Geological Survey Open-File Report 2007-1217, 165 pp., <http://pubs.usgs.gov/of/2007/1217/>

Barnard, P.L. and Hanes, D.M., 2007. Sand waves in San Francisco Bay, California, U.S.A.. *Journal of Coastal Research*, Volume 23, No. 3. pp. ii.

Barnard, P.L., Hanes, D.M., Lescinski, J. and Elias, E., 2007. Monitoring and modeling nearshore dredge disposal for indirect beach nourishment, Ocean Beach, San Francisco. In: Smith, J.M. (Ed.), *Coastal Engineering 2006, Proceedings of the 30th International Conference, Conference Proceedings, San Diego, CA, USA, 3-8 September 2006*, Volume 4, p. 4192-4204

Barnard, P.L., Revell, D.L., Eshleman, J.L. and Mustain, N., 2007. Carpinteria Coastal Processes Study, 2005-2007: Final Report. U.S. Geological Survey Open-File Report 2007-1412, 130 pp., <http://pubs.usgs.gov/of/2007/1412/>

Barnard, P.L., Rubin, D.M., Harney, J. and Mustain, N., 2007. Field test comparison of an autocorrelation technique for determining grain size using a digital 'beachball' camera versus traditional methods. *Sedimentary Geology*, Volume 201, Number 1-2, p. 180-195, <http://dx.doi.org/10.1016/j.sedgeo.2007.05.016>

Eshleman, J.L., Barnard, P.L., Erikson, L.H. and Hanes, D.M., 2007. Coupling alongshore variations in wave energy to beach morphologic change using the SWAN wave model at Ocean Beach, San Francisco, CA. 10th International Workshop on Wave Hindcasting and Forecasting, Oahu, Hawaii, November 11-16, 2007, Paper F4, 20 pp., http://www.waveworkshop.org/10thWaves/Papers/Eshlemanetal_Waves2007_final.pdf

Erikson, L., Hanes, D.M., Barnard, P.L. and Gibbs, A.E., 2007. Swash zone characteristics at Ocean Beach. In: Smith, J.M. (Ed.), *Coastal Engineering 2006, Proceedings of the 30th International Conference*, Conference Proceedings, San Diego, CA, USA, 3-8 September 2006, Volume 1, p. 909-921

Hanes, D.M. and Barnard, P.L., 2007. Morphological Evolution in the San Francisco Bight. *Journal of Coastal Research*, Special Issue 50, p. 469-473

Mustain, N., Griggs, G. and Barnard, P.L., 2007. A rapid compatibility analysis of potential offshore sand sources for beaches of the Santa Barbara littoral cell. In: Kraus, N.C., Rosati, J.D. (Eds.), *Coastal Sediments '07, Proceedings of the 6th International Symposium on Coastal Engineering and Science of Coastal Sediment Processes*, American Society of Civil Engineers, New Orleans, LA, Volume 3, p. 2501-2514

Storlazzi, C.D., Barnard, P.L., Collins, B.D., Finlayson, D.P., Golden, N.E., Hatcher, G.A., Kayen, R.E. and Ruggiero, P., 2007. High resolution topographic, bathymetric, and oceanographic data for the Pleasure Point area, Santa Cruz County, California: 2005-2007. Geological Survey Open-File Report 2007-1270, 29 pp., <http://pubs.usgs.gov/of/2007/1270/> (10%)

2008

Revelle, D.L., Barnard, P.L., Mustain, N. and Storlazzi, C.D., 2008. Influence of harbor construction on downcoast morphological evolution, Santa Barbara, California. *Solutions to Coastal Disasters Conference*, Oahu, Hawaii, April 13-16, 2008, Conference Proceedings, American Society of Civil Engineers, p. 630-642

2009

Barnard, P.L., Erikson, L.H. and Hansen, J.E., 2009. Monitoring and modeling shoreline response due to shoreface nourishment on a high-energy coast. *Journal of Coastal Research*, Special Issue 56, 5 pp.

Barnard, P.L., Erikson, L.H., Hansen, J.E. and Elias, E., 2009. The performance of nearshore dredge disposal at Ocean Beach, San Francisco, California, 2005-2007. U.S. Geological Survey Open-File Report 2008-1347, 93 pp., <http://pubs.usgs.gov/of/2008/1347/>

Barnard, P.L., O'Reilly, B., van Ormondt, M., Elias, E., Ruggiero, P., Erikson, L.H., Hapke, C., Collins, B.D., Guza, R.T., Adams, P.N. and Thomas, J.T., 2009. The framework of a coastal hazards model: a tool for predicting the impact of severe storms. U.S. Geological Survey Open-File Report 2009-1073, 21 pp., <http://pubs.usgs.gov/of/2009/1073/>

Barnard, P.L., Revell, D.L., Hoover, D., Warrick, J., Brocatus, J., Draut, A.E., Dartnell, P., Elias, E., Mustain, N., Hart, P.E. and Ryan, H.F., 2009. Coastal processes study of Santa Barbara and Ventura County, California: U.S. Geological Survey Open-File Report 2009-1029, 904 pp., <http://pubs.usgs.gov/of/2009/1029/>

Dallas, K. and Barnard, P.L., 2009. Linking human impacts within an estuary to ebb-tidal delta evolution. *Journal of Coastal Research*, Special Issue 56, 5 pp.

Elias, E., Barnard, P.L. and Brocatus, J., 2009. Littoral transport rates in the Santa Barbara Littoral Cell; a process-based model analysis. *Journal of Coastal Research*, Special Issue 56, 5 pp.

Hansen, J.E. and Barnard, P.L., 2009. The observed relationship between wave conditions and beach response: a tool for coastal management. *Journal of Coastal Research*, Special Issue 56, 5 pp.

In Press/Review

Barnard, P.L., Hanes, D.M., Erikson, L.H., Rubin, D.M., Dartnell, P. and Kvitek, R.G., in press. Analyzing bedforms mapped using multibeam sonar to determine regional bedload sediment transport patterns in the San Francisco Bay coastal system. *Sedimentology*, In: Li, M., Sherwood, C., and Hill, P. (Eds.), International Association of Sedimentologist's Special Publication Book on Shelf Sedimentology, 33 pp.

Barnard, P.L., Erikson, L.H., Rubin, D.M. and Kvitek, R.G., in review. New advances in high resolution multibeam bathymetry and 3-D modeling reveal small-scale sediment transport dynamics of bedforms. *Geophysical Research Letters*, 19 pp.

Barnard, P.L. and Warrick, J.A., in review. Dramatic beach and nearshore morphological changes due to extreme flooding at a wave-dominated river mouth. *Marine Geology*, 50 pp.

Hansen, J.E. and Barnard, P.L., in review. The spatial and temporal variability of a high-energy beach; insight gained from over 50 high-resolution sub-aerial surveys. *Journal of Geophysical Research-Earth Surface*, 51 pp. (40%)

OTHER RELVANT PUBLICATIONS:

Barnard, P.L. and Davis, R.A., Jr., 1999. Anthropogenic vs. natural influences on inlet evolution: west-central Florida. *Coastal Sediments '99 Conference Proceedings*, Fire Island, New York, Volume 2, p. 1489-1504 (75%)

Davis, R.A., Jr. and Barnard, P.L., 2000. How anthropogenic factors in the back-barrier influence tidal inlet stability: examples from the Gulf Coast of Florida, USA. In: Pye, K. and Allen, J.R.L. (Eds.), *Coastal and Estuarine Environments: sedimentology, geomorphology and geoarchaeology*. London Geological Society, Special Publication Number 175, p. 293-303

Davis, R.A., Jr. and Barnard, P.L., 2003. Morphodynamics of the barrier-inlet system, west-central Florida. *Marine Geology*, Volume 200, Issues 1-4, p. 77-101

Barnard, P.L. and Hanes, D.M., 2005. Integrating field research, modeling and remote sensing to quantify morphodynamics in a high-energy coastal setting, Ocean Beach, San Francisco, California. 5th International Conference on Coastal Dynamics 2005 Conference Proceedings, Barcelona, Spain, American Society of Civil Engineers, CD-ROM, 14 pp.

JOB-RELATED SKILLS:

- Geological field and lab experience in Tibet, India, Nepal, Bahamas, Florida, Oregon, Washington, South Carolina, and California included tripod deployment and recovery; bathymetric surveying using personal watercraft; Real-Time Kinematic (RTK) and differential GPS topographic mapping; multibeam and side scan surveying; video image analysis; digital bed sediment camera surveying and image analysis, sediment logging, sieving, and analysis; geophysical techniques and analysis (refraction surveys, reflection surveys, etc.); base station surveying; scientific diving (current meter deployment, bedform analysis, etc.); vibracoring; geomorphic mapping, soil logging, mapping and analysis; aquifer pump testing and analysis; groundwater mapping and modeling; mass accelerator operation and analysis; chemical analysis, separation and dissolution.
- Extensive public speaking, and grant and technical writing experience.
- Project management experience in India, Nepal and the U.S..
- Computer expertise with Delft3D, SWAN, ArcGIS, MATLAB, Fledermaus, Photoshop and Illustrator.
- Training certifications: Advanced SCUBA Diver, First Aid, CPR, Oxygen, Forklift Operator, Crane Operator, MATLAB, K38 Personal Water Craft Safety, Small Boat Safety, ATV Safety
- Reviewer for *Journal of Geophysical Research-Oceans*, *Journal of Coastal Research*, *Journal of Marine Systems*, *Estuary, Coastal and Shelf Science*, *Sedimentology*, *Sedimentary Geology*, *Quaternary Geology*, *Quaternary International*, *Quaternary Science Reviews*, and *San Francisco Estuary and Watershed Science*

- Reviewer for National Science Foundation (NSF) and California Ocean Protection Council Proposals

MEMBERSHIPS:

Geological Society of America (1999-present)

American Geophysical Union (2002-present)

American Shore and Beach Preservation Association (2005-present)