SOUTH CAROLINA COASTAL EROSION ANNOTATED BIBLIOGRAPHY

Edited by

Leslie Reynolds Sautter, Ph.D.
Diana Sangster

References compiled through 1994

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The South Carolina Coastal Erosion Study is a cooperative investigation conducted by the U.S. Geological Survey (USGS) and the S.C. Sea Grant Consortium (SCSGC), pursuent to National Oceanic and Atmospheric Administration (NOAA) Award No. NA46RGO336.

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PREFACE

Coastal erosion is a major concern in South Carolina, where tourism is one of the state's most important industries. Hurricane Hugo in 1989 caused over $5 billion in damages and underscored the vulnerability of coastal development to natural processes. But, it also demonstrated the importance of protective beaches and a resiliency by the shoreline to rebound after storm events.

The physical processes responsible for coastal erosion are complex and difficult to measure. Understanding the relative importance of the different contributing elements—both natural and man-induced—is essential for management and preservation of beaches and coastal development.

Coastal processes mold and shape the coast, following certain basic natural laws, but these processes occur at a wide variety of time and space scales. Beach erosion is therefore extremely variable from location to location and cannot be generally predicted from single-site studies. Instead, a regional perspective and understanding is required, where changes in one beach or inlet are viewed as the result of multiple influences and processes from within a broader region. For example, knowing the relative contributions of inlet and barrier island sediment exchange, gradients in longshore transport, and net cross-shore transport is important to the economic analysis and engineering design of beach nourishment projects.

In South Carolina, knowledge of the important processes over large temporal (several decades) and spatial scales (tens of kilometers) is required to understand beach/inlet systems and how adjacent systems interact with one another. Fundamental and applied studies over a broad section of the South Carolina coast will be initiated to develop a regional framework of erosion. This framework would attempt to link the influences of one beach on another by critically analyzing the role of nearshore physical processes, regional geology, shoreline geometry, and shoreline development on the long-term preservation of the South Carolina coast. A study of this magnitude will also help to reveal processes responsible for shoreline and shoreface erosion that could not easily be determined from small-scale local studies. Ultimately, development of a state-wide sediment budget is planned to understand and quantify gradients of longshore sediment transport.

In order to better understand the changes that occur on the immediate beach, it is essential to document the availability as well as the migration of sand within the nearshore zone. In many cases the observed erosion or accretion patterns are a direct result of the wave and current modification of the offshore bar system. Knowledge of the onshore/offshore migration and quantity of sand is extremely important to the understanding of the dynamics of the coastal zone.

The South Carolina Coastal Erosion Study begun in 1994 (hereafter referred to as the SCCES) is a cooperative research effort involving investigators from four South Carolina universities [Clemson University (CU); Coastal Carolina University (CCU); University of Charleston, South Carolina (UCSC); and University of South Carolina (USC)] and two state agencies [SC Dept. of Health and Environmental Control–Office of Ocean and Coastal Resource Management (OCRM); and the SC Sea Grant Consortium (SCSGC)]. Additionally, the USGS Marine and Coastal Geology Program is represented by investigators from the St. Petersburg and Woods Hole offices. Table 1 summarizes the participating investigators, their affiliate institution, and their area of expertise relevant to the SCCES.

Table 1. Institutions, and areas of expertise for participating investigators within the SCCES (note abbreviations in text).

Institution	**Investigator**	**Area of Expertise**
CU	Earl Hayter	inlet dynamics, modeling
CU	Paul Work	sediment transport, environmental forcing
CCU	Paul Gayes	geophysical studies, seismic reflection
UCSC	Mitchell Colgan	shoreline change, remote sensing
UCSC	Michael Katuna	barrier island stratigraphy
UCSC	Leslie Sautter	program management, shoreline change
USC	Timothy Kana	sediment budget, inlet dynamics
OCRM	William Eiser	shoreline change, shoreline management
SCSGC*	Margaret Davidson	program management
SCSGC	M. Richard DeVoe	program management
USGS	Mark Hansen	nearshore bathymetry, historical changes
USGS	Jack Kindinger	geologic framework studies
USGS	Asbury Sallenger	geologic framework studies
USGS	William Schwab	geophysical studies

*currently at the NOAA Coastal Services Center

Understanding the relative contributions of processes causing coastal erosion is important for mitigating beach erosion. These processes are complex and may be difficult to determine from localized studies. Large scale studies conducted by the USGS in other regions of the U.S. have provided a large context within which to interpret results of smaller-scale studies and they have isolated processes which operate on larger spatial scales and over longer time periods. The purpose of the long-term (i.e., 10-year) program is to perform a regional coastal erosion study for the entire State of South Carolina in order to develop a state-wide sediment budget, and understand and quantify gradients of longshore sediment transport. Results from this study will

(a) provide managers, engineers, and policy makers with scientific information to make wise

decisions necessary to preserve and enhance South Carolina's coastal resources;
(b) assist managers/engineers with identifying potential sources of borrow material for beach nourishment projects, and evaluate the potential resultant effects of inlet channel modification and shoal mining; and
(c) improve our understanding of the processes which cause erosion will be greatly enhanced, leading to cost-effective mitigation, better management, and prediction of future erosion.

CONTRIBUTORS TO THE BIBLIOGRAPHY

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HOW TO USE THIS BIBLIOGRAPHY

Each reference in this bibliography is numbered sequentially (001–581) and includes a set of codes at the end of the annotation. Two-letter codes refer to topics addressed in the cited reference, such as Beach Erosion (BE) or Coastal Structures (CS). Numeric codes between 00 and 50 refer to geographic locations along the South Carolina coast or in other coastal regions.

Please refer to page 143 for a full listing of the index codes used throughout the bibliography. Pages 145–151 include a complete index of the encoded annotations.

001

ATM. 1987. Shoreline erosion analysis, Waites Island, SC. Tech. Rept., Newkirk Environmental Consultants, Inc.; Applied Technology and Management, Inc., Gainesville, FL, 11 pp.

Calculates erosion rates from the NOAA/COE shoreline change maps. Also considers shoreline impacts from construction of the Little River Inlet jetties. (W.C. Eiser)
BE SH 50

002

ATM/OA. 1987. Georgetown County shorefront management plan for Garden City to North Inlet. South Carolina Coastal Council, Charleston, SC; Applied Technology and Management, Inc., Myrtle Beach, SC, and Olsen Associates, Inc., Jacksonville, FL, 215 pp.

Gives a program to achieve rational balance between economic development and environmental conservation of natural resources within the shorefront of the coastal zone. Also develops a permit system for activities within the dynamic shorefront portion of coastal zone for implementation of the goals and objectives of the management program.
MP 30/40/50

003

ATM/OA. 1988. Horry County shorefront management plan, from Briarcliffe Acres to Singleton Swash, and from Springmaid Beach to Garden City. South Carolina Coastal Council, Charleston, SC; Applied Technology and Management, Inc., and Olsen Associates, Inc., 166 pp.

Gives a program for achieving a rational balance between economically developed and environmental conservation of natural resources within the shorefront portion of the coastal zone. Also gives a permitting system for the activities within the dynamic shorefront portion of the coastal zone that will serve to implement the goals and objectives of the management program.
MP 40/50

004

ALPINE. 1986. Geophysical/vibracore survey: Murrells Inlet to Little River Inlet, South Carolina. USACE, Charleston (SC) District; Alpine Ocean Seismic Survey, Inc., New Jersey, 33 pp.

Over 300 miles of seismic reflection (3.5 kHz) and side-scan sonar surveying was completed from Little River Inlet to Murrells Inlet (SC) to locate potential offshore beach renourishment resources. Vibracores collected at 21 sites and subsequent sediment analyses suggest that beach compatible sand may exist off Garden City and Little River but further coring is recommended. (P. Donovan-Ealy)
BN GP GS GT 01/50

005

ALTHAUSEN, J.D., COWEN, D.J., JENSEN, J.R., NARUMALANI, S., and **WEATHERBEE, O.** 1993. The detection and prediction of sea-level changes on coastal wetlands using satellite imagery and a geographic information system. Geocarto Intl., Vol. 8(4), pp. 87-98.

This research summarizes the use of remote sensor data and high resolution digital elevation models (DEMs) to predict the effect of sea-level rise on the Fort Moultrie coastal region near Charleston, South Carolina. (Authors)
EN GI RS 01

006
AMEIN, M. 1975. Computation of flow through Masonboro Inlet, N.C. Jour. Waterways, Harbors, and Coastal Eng. Div., ASCE, Vol. 101(WW1), pp. 93-110.

"This paper is primarily concerned with the development and testing of a numerical model for the computation of tidal and freshwater flow exchange through coastal inlets." The model developed was a node-link model that uses the equations of unsteady flow as the governing equations. Masonboro Inlet connects the Atlantic Ocean to a network of inland channels. (S.J. Smith)
ID MS TI 00

007
ANDERS, F.J., REED, D.W., and **MEISBURGER, E.P. 1990.** Shoreline movements: Report 2—Tybee Island, Georgia, to Cape Fear, North Carolina, 1851-1983. Tech. Rept. CERC-83-1, CERC, U.S. Army Eng. Waterways Expt. Sta., Vicksburg, MS, 152 pp. + app.

The authors present shoreline data from 1851 to 1983 based on 32 map sheets (1:24,000) generated from available charts and maps throughout the period. Additional analyses of average rates of change in various sections of the coast are presented in the accompanying text. (M.S. Harris)
BE SH 01

008
ARPIN, O.E. 1970. Tidal inlet problems along the New England Coast. In Proc. 12th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1171-1186.

Discusses problems (caused by excessive littoral drift) encountered by the Army Corps of Engineers in maintaining inlets along the New England Coast. (S.J. Smith)
TI 00

009
BACA, B.J., and **LANKFORD, T.E.** 1987. Environmental report: Captain Sams Inlet relocation project (March 1983 to July 1987). Environmental Rept., Seabrook Island POA; Coastal Science & Engineering, Inc. (CSE), Columbia, SC, 32 pp.

Provides a delineation of coastal environments around Captain Sams Inlet and the transformation of habitat areas for the period March 1983 (at the time of inlet relocation) to July 1987.
EN 20

010

BACA, B.J., and **LANKFORD, T.E.** 1988. Myrtle Beach nourishment project, biological monitoring report, Years 1,2,3. City of Myrtle Beach, Myrtle Beach, SC; CSE, Columbia, SC, 46 pp.

Reports on a detailed 25-month biological monitoring study conducted for the 1986-1987 Myrtle Beach nourishment project, to examine the environmental effects, focussing on populations of benthic organisms.
EN 50

011

BALES, J.D., and **HOLLEY, E.R.** 1989. Sand transport in Texas tidal inlet. Jour. Waterway, Port, Coastal, and Ocean Eng., ASCE, New York, NY, Vol. 115(4), pp. 427-443.

Addresses the estimation of net sand transport through a tidal inlet. "The magnitude of the net annual sand transport through the inlet was estimated: (1) as a percentage of the net longshore transport, (2) from excess beach erosion downdrift of the Pass, and (3) from dredge material volumes for the Intracoastal Waterway landward of the inlet." The methods of estimation were compared for Rollover Pass (a man-made, artificially stabilized inlet on the upper Gulf Coast of Texas). (S.J. Smith)
ST TI 00

012

BARWIS, J.H. 1976. Annotated bibliography on the geologic, hydraulic, and engineering aspects of tidal inlets. GITI Rept. No. 4, U.S. Army Corps of Engineers, Wash., DC.

TI 01

013

BARWIS, J.H. 1976. Internal geometry of Kiawah Island beach ridges. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments* (AAPG-sponsored field course). Coastal Res. Div., Dept. Geol., Univ. South Carolina (USC), Columbia, SC, pp. II-115 — II-125.

The internal geometry of Kiawah Island Beach ridges is discussed based on observations on exposures in the cutbank of tidal creeks. The cutbank exposures display internal stratification of several Holocene beach ridges.
CS 20

014

BARWIS, J.H. 1978. Stratigraphy of Kiawah Island beach ridges. SE Geol., Vol. 19, p. 1-21.

Exposures of tidal creek cut banks on Kiawah Island are examined to describe the internal geometry of Holocene beach ridges. This work is preliminary to the same concepts developed more fully in Barwis' dissertation below.
CP SM 20

015

BARWIS, J.H. 1979. The sedimentological and stratigraphical characteristics of beach ridge and tidal channel deposits in mesotidal barrier systems. Ph.D. Dissertation, Univ. South Carolina, Columbia, 134 pp.

Cutbank exposures of tidal creeks on Kiawah Island (SC) are described and evaluated for their use in determining beach ridge macroenvironments. Lithologic sequences observable in these ridges reflect subenvironments in modern foreshore and backshore settings. "The landward sequence is marsh — washover — berm crest/incipient dunes — dunes. The seaward sequence is marsh — beach face — runnel — berm crest/incipient dunes — dunes." The transgressive or regressive nature of these beach ridges cannot be determined by outcrop-scale sequences alone as their stratigraphy is mixed with marsh and tidal flat deposits. Instead, the entire barrier lithosome geometry must be considered.
SM TI 20

016

BARWIS, J.H., and **SEXTON, W.J.** 1986. Mesotidal barrier island depositional environments, Kiawah Island, South Carolina. AAPG Student Chapter Field Trip Guidebook, Kiawah Island, S.C., pp. 1-40.

SM TI 20

017

BARWIS, J.H., PERRY, F.C., and **LAGARDE, V.E. 1977.** Computer-aided photo studies of inlet stability. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 1057-1072.

An analysis of the use of digitized aerial photographs in analyzing short and long term changes in inlet geometry. The author presents analysis techniques and limitations of the procedure. (S.J. Smith)
ID TI 00

018

BATTJES, J.A. 1982. A case study of wave height variations due to currents in a tidal entrance. Coastal Eng., Vol. 6, pp. 47-57.

Addresses wave-current interactions at a tidal inlet in The Netherlands (entrance to the Oosterschelde estuary). Includes field data from two points, one near inlet throat and one offshore between 5 m and 10 m depth contours. (P.A. Work)
CP TI 00

019

BEHRENDT, J.C., and **YUAN, A.** 1987. The Helena Banks strike-slip (?) fault zone in the Charleston, South Carolina, earthquake area: results from a marine, high-resolution, multichannel, seismic-reflection survey. Geol. Soc. Amer. Bull., Vol. 98, pp. 591-601.

High-resolution 12-channel seismic reflection survey profiles collected by the USGS in 1981 were used to identify the Helena Banks fault zone (HBFZ). Trend of the HBFZ is similar to the narrow, underlying Kiawah (Triassic?) basin and includes several left-stepping echelon segments. The reflection profiles indicate strike-slip motion on the HBFZ and that the fault is a compressional reactivation of an extensional fault zone (Triassic?) bounding the Kiawah basin. (P. Donovan-Ealy)
CS GP 20/30

020
BEHRENDT, J.C., HAMILTON, R.M., ACKERMANN, H.D., HENRY, V.J., and **BAYER, K.C.** 1983. Marine multichannel seismic-reflection evidence for Cenozoic faulting and deep crustal structure near Charleston, South Carolina. In G.S. Gohn (ed.), *Studies Related to the Charleston, South Carolina, Earthquake of 1886 — Tectonics and Seismicity.* U.S. Geol. Surv., Prof. Paper 1313, pp. J1-J28.

Analysis of multi and single channel seismic-reflection data collected offshore Charleston, South Carolina allowed identification and description of several features including the Helena Banks fault zone, possible decollment zone at 11.4 km depth, Mohorovicic discontinuity at 29-35 km depth, series of west-dipping, north-striking reflecting surfaces beneath decollment zone, Jurassic-age basalt layer deepening offshore Charleston from 1.0 km to 1.4 km, and lateral Triassic-age or older faults beneath the basalt layer which do not show evidence of reactivation. Authors conclude that seismicity in the Charleston area is primarily caused by detachment along the decollment zone and secondarily to movement on high-angle reverse faults. (P. Donovan-Ealy)
CS GP OS 20/30

021
BEHRENS, E.W. 1979. New Corpus Christi Pass, a Texas tidal inlet. Shore & Beach, Vol. 47(4), pp. 9-14.

Includes topographic and bathymetric surveys of the Gulf Coast for a four-year period after the construction of the inlet, tide gauge recordings, tidal current velocity and discharge measurements, and beach wave observations. (S.J. Smith)
ID TI 00

022
BELKNAP, D.F., and **KRAFT, J.C.** 1981. Preservation potential of transgressive coastal lithosomes on the U.S. Atlantic Shelf. Marine Geol., Vol. 42, pp. 429-442.

The authors' study of the Delaware coast and continental shelf indicate that migration of coastal lithosomes during transgression, and the rate of that migration due to sea-level rise rates, influences the potential for preservation of those coastal lithosomes. "The preservation potential is dependent on many complex factors, including pre-existing topography, wave energy, sediment supply, resistance to erosion, tidal range, and rate of relative sea-level change." (p. 440) (M.S. Harris)
BE CP SM 00

023

BERKHOFF, J.C.W. 1972. Computation of combined refraction-diffraction. In Proc. 13th Coastal Eng. Conf., ASCE, New York, NY, pp. 471-490.

Early paper on this problem which has been widely cited by work that followed. Presents derivation of so-called mild slope equation, and a finite element solution approach. Assumes linear waves, irrotational flow. (P.A. Work)
CP 00

024

BIRKEMEIER, W.A. 1990. Post-*Hugo* surveys of Debidue Beach and Myrtle Beach, South Carolina. U.S. Army Engineer Waterways Expt. Sta., Vicksburg, MS, pp. 6-8.

CERC's objective was to conduct nearshore surveys of profile lines which recently had been surveyed by Coastal Science & Engineering, Inc. (CSE). By resurveying these lines soon after the storm (Hurricane *Hugo*), a data set would be obtained which could be used to evaluate numerical dune and beach erosion models. (Authors)
BS MS 40/50

025

BIRKEMEIER, W.A., McCONATHY, M., BICHNER, E., SCARBOROUGH, B., and **EISER, W.** 1989. Post-*Hugo* Surveys of Myrtle Beach and DeBordieu Beach, South Carolina: preliminary report. Draft Rept., CERC, USACE.

BS 40/50

026

BIRKEMEIER, W.A., BICHNER, E.W., SCARBOROUGH, B.L., McCONATHY, M.A., and **EISER, W.C.** 1991. Nearshore profile response caused by Hurricane *Hugo*. Jour. Coastal Research, Coastal Education and Research Foundation (CERF), Spec. Publ. No. 8, pp. 113-127.

The impact of Hurricane *Hugo* on Myrtle and Debidue beaches indicates erosion of the beach face and a relatively unchanged shoreline. Deep surveys revealed significant offshore deposition with most deposition occurring inshore of -5 m to -6 m. The impact was larger at Debidue beach which was closer to the point of landfall.
BS 40/50

027

BLACK, K.P., and **HEALY, T.R.** 1982. Sediment transport investigations in a New Zealand tidal inlet. In 18th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 2436-2457.

A study of sand and shell transport in a tidal inlet related to the velocity of flow at the one-meter depth. (S.J. Smith)
ST TI 00

028

BLACKWELDER, B.W. 1981. Late Cenozoic marine deposition in the United States Atlantic Coastal Plain related to tectonism and global climate. Palaeogeography, Palaeoclimatology, Palaeoecology, Vol. 34, pp. 87-114.

The upper Cenozoic marine depositional history on the Atlantic Coastal Plain is described using molluscan faunal changes at erosional unconformities to identify/delineate major depositional hiatuses. The author summarizes relation of global ice sheet volumes to climate and sea-level altitudes on the Atlantic coastal plain for early Miocene through late Pleistocene. A brief discussion of tectonic setting in relation to calculation of sea level and tectonic uplift for Cape Fear versus Georgia coastal plain in post-Miocene times follows. Author concludes that "glacio-eustatic control of sea level has been an important factor in depositional cycles of Pliocene age and younger in this area [Atlantic coastal plain]." (P. Donovan-Ealy)

CP SM 00

029

BLANTON, J.O., and **ATKINSON, L.P.** 1983. Transport and fate of river discharge on the continental shelf of the southeastern United States. Jour. Geophysical Research, Vol. 88(C8), pp. 4730-4738.

The authors present an analysis of wind and salinity data from inner continental shelf (nearshore 20-30 km) off Georgia coast near Savannah River discharge. After measuring monthly rate of change in freshwater content for period of eight years, the authors conclude that when wind stress is northward and offshore (during the late spring) the inner shelf zone ejects near-surface, low-salinity water by Ekman transport as far as the 40 m isobath. During summer and autumn, the lowered wind stress and reduced river discharge causes the low-salinity water to be stored in the inner shelf zone. (P. Donovan-Ealy)

CP TH 00

030

BODGE, K.R. 1993. Gross transport effects and sand management strategy at inlets. Jour. Coastal Research, CERF, Spec. Issue No. 18, pp. 111-124.

"Particularly for inlets which act as sediment sinks, the components of the gross longshore sediment transport rate (versus net transport) are demonstrated to be effective indicators of an inlet's sediment budget, sediment transport pathways, and transport effect upon adjacent shorelines. Using the example of Port Canaveral Entrance, Florida, it is shown that the inlet's impact on downdrift beaches may likely extend up to 30-42 km. Engineering methods for improving sand-bypassing across inlets are also discussed from the standpoints of improved attention to annual sediment transport variability, distribution of transport across the surf zone, the importance of crater-shoaling rates (versus pump productivity), and the integration of engineering solutions for navigation and beach-erosion problems."

ST TI 00

031

BOOTHROYD, J.C., and **HUBBARD, D.K.** 1975. Genesis of bedforms in mesotidal estuaries. In J.E. Cronin (ed.), Estuarine Research, Vol. 2, Geol. and Eng., Academic Press, NY, pp. 217-234.

Descriptive study of the inlet/estuarine processes such as time-velocity asymmetry, froude number, and sediment texture on the evolution and persistence of bedforms spanning a range of scales.
CS 00

032

BOTHNER, M.H., ARUSCAVAGE, P.J., FERREBEE, W.M., and **BAEDECKER, P.A.** 1980. Trace metal concentrations in sediment cores from the continental shelf off the Southeastern United States. Estuarine and Coastal Marine Science, Vol. 10, pp. 523-541.

Vibracores collected during October 1975 and 1976 were sampled and analyzed for 32 trace metals. Associations between several trace metals, rare earth elements, and sediment parameters suggest that a number of trace metals are controlled by chemical phases in the sediments such as hydration of Fe and Mn oxide/hydroxides, organic matter, and the fine fraction of sediments. (P. Donovan-Ealy)
CP TH 00

033

BOYLAN, D.C. 1982. Stratigraphy and depositional environments of the lower South Carolina coastal plain between Charleston and Hilton Head Island. M.S. Thesis, Univ. South Carolina, Columbia, 106 pp.

Lithologic units of the South Carolina coastal plain between Charleston and Hilton Head Island are differentiated through interpretation of a subsurface cross section based on geophysical logs and drillers logs. Paleoenvironments, interpretation of erosional unconformities and times of sediment emplacement are based on micropaleontological analysis of planktonic and benthic forms. Nine erosional unconformities are reported which range in age from late Cretaceous to Oligocene and were deposited in inner shelf to upper slope environments. They are primarily attributed to global submergent-emergent eustatic cycles.
SM 10/20/30

034

BOYLAN, D.C., THUNELL, R.C., and **COLQUHOUN, D.J.** 1982. A relative sea-level record for the lower coastal plain of South Carolina between Charleston and Hilton Head. Geol. Soc. Amer., Abstracts with Programs, Vol. 14(7), p. 450.

Depth-dependent planktonic foraminifera were used to identify ten emergent-submergent cycles from late Cretaceous-Oligocene time on the South Carolina coastal plain. Sedimentation rates indicate an increase in deposition in Cretaceous time than in the Tertiary. A relative sea-level curve was created and 8 of the 10 cycles identified can be correlated to global cycles and are assumed to be function of global tectono- and glacio-eustacy. (P. Donovan-Ealy)
CP SM 10/20

035
BROWN, P.J. 1977. Variations in South Carolina coastal morphology. SE Geol., Vol. 18(4), pp. 249-264.

Four specific morphologies (arcuate strand, cuspate delta, transgressive barrier, and beach/ridge barrier) are described and located, each resulting from some combination of tidal forces, winds and wind-generated waves. The four morphologies include the arcuate strand of South Carolina's "Grand Strand" and the Cuspate Delta of the North and South Santee Rivers. Each has its own sediment type, bathymetry and erosional/depositional history.
BA CP CS GS MS SM 01

036
BRUUN, P. 1954. Coastal erosion and the development of beach profiles. Tech. Memo. No. 44, Beach Erosion Board, Wash., DC.

BE BS 00

037
BRUUN, P. 1962. Sea-level rise as a cause of shore erosion. Jour. Waterways and Harbor Div., ASCE, New York, NY, Vol. 88(WW1), pp. 117-132.

BE SH 00

038
BRUUN, P. 1975. Coastal protection for Fripp Island. Rept., Fripp Island Public Serv. Commission, SC, 11 pp.

BN MP 10

039
BRUUN P. 1977. Design of tidal inlets on littoral drift shores. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 927-945.

"This paper presents an attempt to establish rational design procedures for tidal inlets on littoral drift shores. The principles outlined are a rational 'Field and Physics' approach."
TI 00

040
BRUUN, P. 1977. Practical solution to a beach erosion problem. Coastal Eng., Vol. 1(1), pp. 3-16.

This paper deals with a severe erosion problem, its initial solution and maintenance. The problem area is part of the Hilton Head Island (SC), a member of the large Carolina, Georgia and Florida island chain. The only practical solution, under the actual circumstances, was artificial nourishment of the beach which then had also to be maintained by

nourishment. The latter problem has not been fully solved at this time, but a "status quo" accepting slow erosion is upheld until pumping of sand to the beach from the ocean bottom can be initiated. In the introductory sections of the paper, some data of historic and geomorphological nature are given. (Authors)
BE BN 10

041
BRUUN, P. 1986. Morphological and navigational aspects of tidal inlets on littoral drift shores. Jour. Coastal Research, CERF, Vol. 2(2), pp. 123-145.

TI 00

042
BRUUN, P. 1988. Profile nourishment: its background and economic advantages. Jour. Coastal Research, CERF, Vol. 4(2), pp. 219-228.

BN 00

043
BRUUN, P. 1988. Rationalities of coastal erosion and protection, an example of Hilton Head Island, South Carolina. Jour. Coastal Research, CERF, Vol. 4(1), pp. 129-138.

Discussion of where, when, and how shore protection measures should be engaged. Aspects of coastal protection that relate to the technique of profile nourishment are addressed.
BE BN 10

044
BRUUN, P. 1990. Improvement of bypassing and backpassing at tidal inlets. Jour. Waterway, Port, Coastal, and Ocean Eng., ASCE, New York, NY, Vol. 116(4), pp. 494-501.

Discussion of improvements and current practices in bypassing and backpassing of sediments. (S.J. Smith)
ST TI 00

045
BRUUN, P., and **ADAMS, J.** 1988. Stability of tidal inlets: use of hydraulic pressure for channel stability. Jour. Coastal Research, CERF, Vol. 4(4), pp. 687-702.

A review of existing procedures and methods of channel stabilization and a discussion of sand transport in the channel by fluidization are presented. (S.J. Smith)
ID TI 00

046
BRUUN, P., and **GERRITSEN, F.** 1959. Natural bypassing of sand at coastal inlets. Jour. Waterways and Harbor Div., ASCE, New York, NY, Vol. 85(WW4), pp. 75-107.

ST TI 00

047

BRUUN, P., and **GERRITSEN, F.** 1961. Stability of coastal inlets. In Proc. 7th Conf. Coastal Engineering, ASCE, New York, NY, pp. 386-417.

TI 00

048

BRUUN, P., and **WILLEKES, G.** 1992. Bypassing and backpassing at harbors, navigation channels, and tidal entrances: use of shallow-water draft hopper dredgers with pump-out capabilities. Jour. Coastal Research, CERF, Vol. 8(4), pp. 972-975.

A review of existing methods of tidal inlet maintenance and coverage of new procedures for bypassing of materials (bypassing and backpassing) is presented. (S.J. Smith)
TI 00

049

BRUUN, P., GERRITSEN, F., and **BHAKTA, N.P.** 1974. Evaluation of overall entrance stability of tidal entrances. In Proc. 14th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1566-1584.

"This paper is written in continuation of earlier published material dealing with stability of tidal inlets on littoral drift shores. The experience available at that time was responsible for the introduction of two parameters: $V_{mean\ max}$, defined as the mean maximum velocity in the gorge at spring tide and the P/M_{tot} ratio (tidal prism at spring tide divided by material transport to the entrance from the adjoining shores) as the most pertinent parameters for description of overall stability. A more detailed justification for this choice is given in this paper, based on computation of the relative sediment transport at various tidal phases. Examples of earlier date and twelve new examples for India are given."
ID TI 00

050

BURDETTE, R.M. 1985. Myrtle Beach, S.C. A shorefront management. In Coastal Zone '85, Proc. Fourth Symposium on Coastal and Ocean Management, Vol. 2, ASCE, New York, NY, pp. 2026-2029.

The author discusses a management plan that was initiated in order to control/minimize/eliminate the need for structural beach control measures along the oceanfront. Analysis of erosion trends and the relationship with development patterns, adoption of effective building control measures and long-term nourishment project are recommended.
MP 50

051

BYRNE, R.J., DEALTERIS, J.T., and **BULLOCK, P.A.** 1974. Channel stability in tidal inlets: a case study. In Proc. 14th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1585-1604.

"Wachapreague Inlet, a downdrift offset inlet in the barrier island complex of the mid-Atlantic U.S. coast was studied during the period 1971-1973. Elements of the study included: (1) the inlet morphometric history (120 years), (2) assessment of surficial and sub-bottom sediments within the inlet complex, (3) response of the channel cross-sectional area to short-term variations in wave activity and tidal volumes, and (4) the distribution of tidal flows within the channel."
ID TI 00

052
BYRNE, R.J., GAMMISCH, R.A., and **THOMAS, G.R.** 1980. Tidal prism-inlet area relations for small tidal inlets. In 17th Coastal Engineering Conf., ASCE, New York, NY, Vol. 104, pp. 2517-2533.

Fourteen tidal inlets located within the lower Chesapeake Bay were studied to reveal deviations in the behavior of smaller tidal inlets from the relationships (inlet throat area to tidal prism, inlet width versus depth, maximum velocity in inlets, and phase lags) of larger inlets. (S.J. Smith)
ID TI 00

053
CRD. 1973. Inlet and coastal environments at North Inlet, S.C. Field Trip Guide, Dept. Geol., Coastal Res. Div. (CRD), Univ. South Carolina, Columbia.

Good overview of coastal processes in tidal inlets. (S.J.Smith)
CP TI 40

054
CSE. 1993. Preliminary survey of creek deposits for possible use in beach nourishment, Pawleys Island, South Carolina. Geotechnical Rept., Town of Pawleys Island; CSE, Columbia, SC, 27 pp. + app.

GT 40

055
DeBordieu
CSE. 1989. Beach survey and erosion analysis in connection with plans for beach nourishment at DeBordieu Colony. Final Rept., DeBordieu Colony Property Owners Group and North Inlet Corp.; CSE, Columbia, SC, 44 pp. + app.

Includes estimate of volumetric erosion rates from profiles, results of long profiles to approximately -5 m NGVD, and a nourishment estimate for central Debidue Island. Project was constructed in spring 1990.
BE BN BS 40

056

Edisto Beach

CSE. 1990. Erosion assessment and beach restoration alternatives for Edisto Beach State Park, South Carolina. Feasibility Study, South Carolina Department of Parks, Recreation and Tourism, Columbia; CSE, Columbia, SC, 61 pp. + app.

Sediment analyses from five vibracores collected off the northern and southern end of Edisto beach were used to delineate a potential renourishment borrow site. A review of the island's shoreline erosion and beach nourishment history is presented. Beach nourishment alternatives are evaluated, estimated costs provided, and a review of the environmental concerns presented. (P. Donovan-Ealy)

BE BN GS GT SB SH 20

057

CSE. 1992. Edisto Beach nourishment project — engineering report: geotechnical studies, bathymetric and beach surveys, wave modeling studies. Draft Rept., South Carolina Department of Parks, Recreation & Tourism, Columbia; CSE, Columbia, SC, 120 pp. + app.

Sediment analyses from 34 vibracores identified a potential offshore renourishment borrow site within the shoals of the ebb-tidal delta of Edisto Inlet. Wave modeling studies are presented which suggest that dredging within the recommended borrow site will not adversely affect the wave conditions or resulting sediment transport rates on Edisto Beach. A project plan for beach renourishment is presented with an estimated design life of 10 years. (P. Donovan-Ealy)

BA BN BS CP GS GT MS ST 20

058

CSE. 1993. Edisto Beach groin study. Final Rept., Town of Edisto Beach; CSE, Columbia, SC, 132 pp. + data app.

Includes a detailed analysis and recommendations for improvements to the groin field along Edisto Beach. Includes results from application of GENESIS, the USACE shoreline change prediction model. Report served as a basis for groin repairs and nourishment along Edisto Beach implemented in spring 1995.

BA BN BS 20

059

Fripp Island

CSE. 1990. Shoreline assessment and erosion analysis of Fripp Island, South Carolina. A Preliminary Report (Phase 1A) for Fripp Island Public Serv. Dist.; CSE, Columbia, SC, 64 pp. + app.

Gives an assessment and erosion analysis of the Island. Synopsis of previous surveys, an estimate of sand deficit and annual erosion rates, are given. A conceptual model for erosion and alternative solutions are proposed.

BE BS MS 10

060

Hunting Island

CSE. 1990. Erosion assessment and beach restoration alternatives for Hunting Island, South Carolina. Feasibility Study, South Carolina Department of Parks, Recreation and Tourism. Coastal Science & Engineering, Inc. (CSE), Columbia, SC, 66 pp. + app.

Outlines findings and recommendations regarding beach restoration alternatives for Hunting Island. A conceptual model for erosion is developed from findings of previous studies and new surveys. Sediment analyses from ten vibracores collected offshore Hunting Island show suitable beach-quality sand exists relatively near to the shore. A review of historical shoreline erosion at Hunting Island is provided and beach renourishment alternatives are evaluated. (P. Donovan-Ealy)

BE BN GS GT SB SH   10

061

CSE. 1991. Geotechnical study for the Hunting Island beach nourishment project. Survey Rept., South Carolina Department of Parks, Recreation and Tourism. CSE, Columbia, SC, 35 pp. + app.

Sediment analyses from 35 vibracores collected offshore Hunting Island, South Carolina, were used to delineate a potential offshore beach renourishment resource site within two miles of the island. Criteria for the borrow site are explained and applied to the proposed site. Grain-size distributions and core logs are provided. (P. Donovan-Ealy)

BE BN GS GT SB   10

062

CSE. 1991, 1992, 1994. Hunting Island State Park 1991 beach nourishment project. Survey Reports 1 (26 pp.), 2 (18 pp.), and 4 (32 pp.), SC Dept. Parks, Recreation & Tourism, Columbia; CSE, Columbia, SC. [Note: Survey Rept. No. 3 is by Kana and Andrassy (1993), 32 pp. + app.; available from CSE.]

A series of three postnourishment survey reports which track performance of the 1991 (fifth) Hunting Island nourishment project using closely spaced profile lines (100-200 ft centers) surveyed to closure depth.

BS   10

063

CSE. 1992. Hunting Island State Park beach nourishment project, environmental surveys. Final Rept., SC Dept. Parks, Recreation & Tourism, Columbia; CSE (with Coastal Science Associates, Inc.), Columbia, SC, 33 pp.

Data analysis focussing on results of benthic surveys after the 1991 Hunting Island nourishment project.

EN   10

064

Litchfield Beach

CSE. 1989. Summary of proposed revisions to interim baseline and setback line at Inlet Point south, Litchfield Beach, South Carolina. Final Rept., The Litchfield Company; CSE, Columbia, SC, 35 pp.

Analysis of linear shoreline change rates from aerial photos focussing on the period 1950 to 1988.
BS 40

065

CSE. 1992. Updated shoreline change rate for Litchfield Beach, South Carolina. Draft Rept., The Litchfield Company; CSE, Columbia, SC, 28 pp. + app.

A more detailed update of the results in CSE (1989) (Litchfield) including additional profile volume analysis.
SH 40

066

Myrtle Beach/North Myrtle Beach

CSE. 1988-1993. Myrtle Beach nourishment project — beach monitoring report. Survey Reports, City of Myrtle Beach, SC; CSE, Columbia, SC.

Annual reports on the postproject beach surveys and performance evaluations following the $4.5 million Myrtle Beach nourishment project. Reports document semiannual trends for the previous year, and later reports compare the sand volumes remaining for each of ~55+ profile lines, four reaches, and the overall 8.4 mile project area. (One report in the series is by Jones and Kana).
BN BS 50

067

CSE. 1990. Unpublished survey data following emergency nourishment projects at North Myrtle Beach and Myrtle Beach, South Carolina. CSE, Columbia, SC.
BN BS 50

CSE. 1991. Myrtle Beach emergency nourishment project, March 1990 — May 1991. Survey Rept., City of Myrtle Beach, SC; CSE, Columbia, SC, 29 pp. + app.
BN BS 50

068

CSE. 1990. Shoreline assessment for Wyndham Ocean Dunes Resort, Myrtle Beach, South Carolina. Final Rept., Trammell Crow Company, Dallas, Texas; CSE, Columbia, SC, 21 pp. + app.

The results of a shoreline assessment at Wyndham Ocean Dunes Resort at Myrtle Beach are summarized. Areas assessed included erosion rates, 1985-1987, nourishment project, storm impact (including Hurricane Hugo), 1989-1990 nourishment project, local and state oceanfront setback lines, future erosion and storm vulnerability.
BS 50

069
CSE. 1990. North Myrtle Beach emergency nourishment project, April 1990 beach survey. Final Rept., City of North Myrtle Beach; CSE, Columbia, SC, 85 pp. incl. app.

Data on beach changes along North Myrtle Beach resulting from Hurricane *Hugo* and the post-*Hugo* emergency nourishment project are given. Beach recovery is reported and recommendations are given for improving nourishment projects.
BN BS 50

070
CSE. 1992. City of North Myrtle Beach, South Carolina, beachfront management plan. Final Rept., South Carolina Coastal Council (City of North Myrtle Beach); CSE, Columbia, SC, 65 pp. + app., exhibits, overlays.

MP 50

071
CSE. 1992. Hog Inlet — Cherry Grove remedial nourishment project, 1992-1992 beach surveys. Final Rept., City of North Myrtle Beach, SC; CSE, Columbia, SC, 20 pp. + app.

BN BS 50

072
CSE. 1993. Updated estimate of beach nourishment requirements for North Myrtle Beach. Final Rept., City of North Myrtle Beach, SC; CSE, Columbia, SC, 67 pp. + app.

Provides detailed volumetric erosion rates along North Myrtle Beach for the period 1958-1993 and a predicted ten-year nourishment requirement for monitoring a stable dry beach.
BN 50

073
Seabrook Island
CSE. 1988. Beach surveys along Seabrook Island, South Carolina, through July 1988. Final Rept., Seabrook Island POA, SC; CSE, Columbia, SC, 31 pp. + app.

BS 20

074
CSE. 1989. Beach restoration and shore-protection alternatives along the south end of Seabrook Island. Feasibility Study for Seabrook Island POA; CSE, Columbia, SC, 38 pp. + app.

Includes chapters detailing shoreline changes since inlet relocation, the condition of the seawall, and the impact of the northern marginal flood channel on erosion. Includes a recommended nourishment plan involving realignment of the northern channel.
BN 50

075
CSE. 1990-1993. Seabrook Island, South Carolina, beach nourishment project. Four Survey Reports, Seabrook Island POA, SC; CSE, Columbia, SC.

Results of semiannual beach and channel surveys following the 1990 nourishment project (685,000 cy) along Seabrook's South Beach.
BN BS 20

076
CAZEAU, C.J., DUBAR, J.R., and **JOHNSON, H.S., JR.** 1964. Notes on marine geology off the mouth of the North Edisto River, South Carolina. SE Geol., Vol. 5(3), pp. 157-176.

Eleven dredge samples, depth recorder profile, and fauna from a 20-ft trawl were collected along a 10-mile traverse eastward from the mouth of the North Edisto River. The data were used to characterize the inlet, delta, and shallow shelf environments, describing geomorphology, mineralogy, and fauna. (P. Donovan-Ealy)
BA CS GT 40

077
CHASTEN, M.A. 1992. Coastal response to a dual jetty system at Little River Inlet, North and South Carolina. MP-CERC-92-2, CERC, U.S. Army Eng. Waterways Expt. Sta., Vicksburg, MS.

Describes and discusses monitoring project at Little River Inlet after jetty construction (see paper by Chasten and Seabergh, 1993). (P.A. Work)
CS ID ST TI 50

078
CHASTEN, M.A., and **SEABERGH, W.C.** 1993. Beach response and channel dynamics at Little River Inlet, North and South Carolina, U.S.A. Jour. Coastal Research, CERF, Vol. 9(4), pp. 973-985.

Describes monitoring program (1979-1992) associated with construction of jetties at Little River Inlet. Attempts to determine the direction and magnitude of net longshore sediment transport were inconclusive. Overall, the project was concluded to not be a significant detriment to adjacent shorelines. (P.A. Work)
CS ID ST TI 50

Summary of two CERC studies to evaluate the performance of the dual jetty system at Little River Inlet. Includes beach and nearshore response to construction of the dual jetty inlet stability project, as well as inlet hydraulics and scour occurring at the jetty structures. (S.J. Smith)
ID SH ST TI

079
CLEARY, W.J., and **THAYER, P.A.** 1973. Petrography of carbonate sands on the Carolina continental shelf. Gulf Coast Assoc. Geol. Soc. Trans., Vol. 23, pp. 288-304.

Three hundred thin-sections from samples collected between Cape Hatteras (NC) and Cape Romain (SC) were analyzed to interpret ancient mixed clastic-carbonate shelf deposits. Skeletal, nonskeletal, and terrigenous constituents of carbonate grains as well as digenetic processes affecting carbonate grains and carbonate lithoclasts are discussed. (P. Donovan-Ealy)
GS SM 40/50

080
COCH, N.K., and **MANFRED, P.W.** 1991. Effects of Hurricane *Hugo* storm surge in coastal South Carolina. Jour. Coastal Research, CERF, Spec. Issue No. 8, pp. 201-228.

Severe surge damage was a result of high winds, a fast coast-normal hurricane track across a wide continental shelf, landfall near high tide, and anthropomorphic alterations along the shoreline. Structural damage was a function of location with respect to the eye of the hurricane, elevation, exposure, foundation type, and bracing of the structure.
CP 01

081
COLLINS, A.G., et al. 1987. Anna Maria, Florida: case study of sand fluidization for channel maintenance. Shore & Beach, Vol. 55(2), pp. 42-48.

Includes a review of sand fluidization technology and how this technology was successfully applied to the relatively short and shallow inlet at Anna Maria, Florida. (S.J. Smith)
ST TI

082
COLQUHOUN, D.J. 1965. Terrace sediment complexes in central South Carolina. Atlantic Coastal Plain Geol. Assoc. Field Conf., Univ. South Carolina, Columbia, South Carolina, 62 pp.

Two possible sequences exist within surficial coastal plain deposits: (1) a "landward terrestrial sequence" comprised of "bed-load and overbank, estuarine, palustrine, and deltaic stages" and (2) a "seaward marine sequence" comprised of "littoral, sublittoral, bar, barrier island-lagoon, and barrier island-tidal marsh and flat stages" (p. 5). Colquhoun has identified and described seven terrace formations, and eluded to four additional sequences which have yet to be proved. Types of unconformities, depth of

fluvial incision, lithologic character, and biostratigraphic information are described. (M.S. Harris)
SM 20/30/40

Pleistocene age escarpments, terraces and associated stratigraphic units are described for eleven terraces in the coastal plains. Cyclic, transgressive-regressive sequences are established for eight of the terraces by confirmation of "a terrestrial erosional unconformity on a preceding sequence with a terrestrial or terrestrial and marine sequence overlying."
MS SH SM 10/20/30

083
COLQUHOUN, D.J. 1969. Geomorphology of the lower coastal plain of South Carolina. SC Div. Geol., Vol. MS-15, Columbia, SC, 36 pp.

The report specifically addresses landforms forming and deposits beneath the lower coastal plain of South Carolina. The relationship between continental and marine processes is observed with regard to landform formation and stratigraphic relationships. A geomorphic map of the lower coastal plain is accompanied with text. (M.S. Harris)
CS SM 01

084
COLQUHOUN, D.J. 1981. *Variations in Sea Level on the South Carolina Coastal Plain.* Univ. South Carolina, Columbia.

The regional physiographic, tectonic and stratigraphic aspects of the Atlantic Coastal Plain are detailed in this introduction for Quaternary scientists. Included are physiographic features, paleosoils, terrestrial, marginal marine and marine depositional units and stratigraphic units emplaced since the late Miocene. It specifically treats those features formed during the "Ice Ages," a time much broader than the Pleistocene and Holocene.
MS SM TI 30

085
COLQUHOUN, D.J., and **BROOKS, M.J.** 1986. New evidence from the southeastern U.S. for eustatic components in the late Holocene sea levels. Geoarchaeology, Vol. 1(3), pp. 275-291.

A new sea-level curve is proposed based on marsh stratigraphy and archaeologic sites located in marsh and interriverine areas along the South Carolina coast. Both regional and local tectonic elements are considered. Authors conclude that major and some minor trends in sea-level change are attributed to significant eustatic components because they occur in both neotectonically positive and negative areas, and in a region that should show constant isostatic response. (P. Donovan-Ealy)
CS SM 01

086
COLQUHOUN, D.J., and **JOHNSON, H.S., JR.** 1968. Tertiary sea-level fluctuation in South Carolina. Palaeogeography, Palaeoclimatology, Palaeoecology, Vol. 5(1), pp. 105-126.

The authors discuss physical, chemical, and biotic parameters associated with cyclic formations to determine sea-level changes reflected in the South Carolina coastal plain. Describes geomorphology and stratigraphy for Cretaceous through early Pleistocene and a schematic interpretation of sea-level changes is presented. The authors state that "what is apparent is a regional drop in sea level commencing in late Eocene or Early Oligocene with relatively major fluctuations in sea level commencing in late Miocene." (P. Donovan-Ealy)
CS SM 01

087

COLQUHOUN, D.J., BOND, T.A., and **CHAPPEL, D.** 1972. Santee submergence, example of cyclic submergence and emerged sequences. Geol. Soc. Amer., Mem. 133, pp. 475-496.

The cyclic development of terrace formations during continental submergence and emergence are illustrated based on Colquhoun's auger drilling investigation in east-central South Carolina. The history of filling is explained for both the Piedmont draining Santee River and the coastal plain draining Cooper River. Initial erosional disconformities are succeeded by alluvial aggraded bedload and overbank deposits, estuarine clay and marsh clay fills, shoestring channel fill sands, and deltaic sediments that prograde seaward. Holocene estuaries are in a very early stage of the submerged cycles, compared to full cycle sediments of the ancient ones.
MS SH SM 10/20/30/40

088

COLQUHOUN, D.J., JOHNSON, G.H., PEEBLES, P.C., HUDDLESTUN, P.F., and **SCOTT, T.** 1991. Quaternary Geology of the Atlantic Coastal Plain. In R.B. Morrison (ed.), *The Geology of North America, Quaternary Nonglacial Geology: Conterminous U.S.*, Vol. K-2, Geol. Soc. Amer., Boulder, CO, pp. 629-650.

The nonglacial section of the eastern coast of North America is covered specifically with regards to Quaternary stratigraphy, chronology, and geomorphology. An attempt is made to correlate varied lithostratigraphic, biostratigraphic, and chronostratigraphic units along the coastal plain with varied success. As an introduction to the understanding of the general development of "passive" coastal margins, this presentation provides very important background material. (M.S. Harris)
CS SM 01

089

COLQUHOUN, D.J., WOOLEN, I.D., VAN NIEUWENHUISE, D.S., PADGETT, G.G., OLDHAM, R.W., BOYLAN, D.C., HOWELL, P.D., and **BISHOP, J.W.** 1983. Surface and subsurface stratigraphy, structure and aquifers of the South Carolina coastal plain. DHEC, Groundwater Protection Div., publ. through the Office of the Governor, State of South Carolina, Columbia, 78 pp.

The coastal plain stratigraphic wedge is dissected into smaller wedges by regional unconformities and shown in three sets of maps and five cross-sections. The cross-sections are regularly spaced throughout the coastal plains. Lithostratigraphy, biostratigra-

phy, and porosity inferred from electric logs are illustrated. Maps include 8 structure contour maps, 5 isopach maps, and 5 lithofacies maps. A 19th map shows lithostratigraphy at the surface and immediately below the Pliocene and Pleistocene units in the Middle and Lower Coastal Plains. A 20th map shows the surface distribution of recharge areas. This work is the culmination of numerous dissertations and theses as well as 28 man-years of investigations in the coastal plains geology.
MS SH SM 01

090
COOKE, C.W. 1936. *Geology of the Coastal Plain of South Carolina*. U.S. Geol. Surv., Bull. 867, 189 pp.

C.W. Cook's now classic text describes the 20,000 square miles of land southeast of the Fall Line in South Carolina. Coastal terraces of the "low country" are detailed as well as the Cretaceous and Tertiary formations that underlie it and the rivers that incise it.
MS SM 01

091
CORRADO, J.C., WEEMS, R.E., and **HARE, P.E.** 1986. Capabilities and limitations of applied aminostratigraphy, as illustrated by analysis of *Mulinia lateralis* from late Cenozoic marine beds near Charleston, South Carolina. SC Geol., Vol. 30(1), pp. 19-45.

More than 120 valves of the bivalve *Mulinia lateralis* from the Charleston (SC) region were analyzed for alloisolucine, isolucine, and total amino acid content. Results show that the average ratio of allo/ile consistently increases with increasing age of the stratigraphic unit sampled. Analytical precision of data fields is very high and matches the patterns of high and low sea-level stands for late and middle Pleistocene times.
GT MS SM 30

092
COUGHLAN, P.M., and **ROBINSON, D.A.** 1990. The Gold Coast Seaway, Queensland, Australia. Shore & Beach, Vol. 58(1), pp. 9-16.

Covers the inlet stabilization of the Nerang River Inlet (a notoriously unstable inlet). The inlet was previously unstable due to a large net longshore transport to the north, caused by the predominant southeasterly wind and wave climate at this location. The inlet was stabilized by a combined jetty/fixed-sand-bypassing system. (S.J. Smith)
ID ST TI

093
COWEN, D.J., JENSEN, J.R., and **LAMPMAN, J.L.** 1990. The use of digital orthophotography to measure the impact of Hurricane *Hugo*: a case study of Sullivans Island, South Carolina. Papers & Proc. Applied Geography Conf., State Univ. New York at Binghamton, Vol. 13, pp. 140-146.

Beach erosion along the South Carolina coast has always been a major concern. Therefore, the 1988 and 1990 Amendments to the South Carolina Coastal Zone Management Act, also known as the Beachfront Management Act, were legislated. Reestablishment of the natural beach/dune system would provide a barrier for the protection of the coastline. However, some criteria contained in this Act would prevent many beach front property owners from developing their property further. Furthermore, in cases of severe destruction, like Hurricane *Hugo*, criteria in the Act may prevent them from rebuilding their homes, groins, or seawalls at exactly the same location within their property boundaries. This paper examines the spatial relationships between the destruction to structures along the beachfront of Sullivans Island, a South Carolina barrier island, and the zones established by the SCCC for jurisdictional use in the Beach Management Act. The procedure used incorporates digitized orthophotos of "pre-*Hugo*" Sullivans Island and rectified and digitized "post-*Hugo*" aerial photographs in a raster/vector environment. A spatial database was created by superimposing pre-*Hugo* features onto the post-*Hugo* photographs and measuring the change in location, as well as the effect that the Beach Management Act will have on each individual structure. On a larger scale, the methodology can be expanded to create a database for the entire coast for use in monitoring proper development in the coastal zone. (Authors)
BE CS RS 01

094
COWEN, D.J., VANG, A.H., and **WADDELL, J.M., JR.** 1983. Beyond hardware and software: implementing a state-level geographical information system. Computer Graphics and Environmental Planning, pp. 30-51.

Discusses the process through which the State of South Carolina implemented an automated geographical information system, to meet the needs of the Coastal Zone Management Act. Presents a case history of an incremental approach to the conceptualization, design, construction, and operationalization of a system in which a state university played a major role. (Authors)
BE GI SH 01

095
CRONIN, T.M. 1979. Eustacy, tectonism, and the correlation of the Southeastern Atlantic Coastal Plain Pliocene and Pleistocene marine deposits. Geol. Soc. Amer., Abstracts with Programs, Vol. 11(7), p. 407.

Marine transgressive-regressive cycles caused by climatically induced glacio-eustatic sea-level fluctuations and periods of tectonic deformation characterize the Pliocene and Pleistocene in South Carolina and make stratigraphic interpretation difficult. Ostracode assemblages may allow distinctions in marine and marginal-marine stratigraphy for the southeastern coastal plain. (P. Donovan-Ealy)
CS SM 01

096

CRONIN, T.M. 1980. Biostratigraphic correlation of the Pleistocene marine deposits and sea levels, Atlantic coastal plain of the southeastern United States. Quaternary Research, Vol. 13, pp. 213-229.

Marine ostracods from 50 localities were studied to determine the age and elevation of Pleistocene sea levels in the Atlantic coastal plain from Maryland to Florida. Ostracode biofacies provided ranges of paleodepths for each locality. Though complicated by other factors in the early Pleistocene, possibly differential crustal uplift, the data suggest that climatically induced glacio-eustatic fluctuations account for sea levels of the Pleistocene.
GT MS SM 00/01

097

CROWELL, M., LEATHERMAN, S.P., and **BUCKLEY, M.K.** 1991. Historical shoreline change: error analysis and mapping accuracy. Jour. Coastal Research, CERF, Vol. 7(3), pp. 839-852.

The U.S. Federal Emergency Management Agency (FEMA) is assessing technical methodologies and procedures for the collection, analysis, and computation of coastal erosion rates. This assessment is being performed to determine the feasibility of generating such data for use as a basis for administering Section 544 of the Housing and Community Development Act of 1987 (commonly known as the Upton-Jones amendment to the National Flood Insurance Program). It is likely that the methodology selected will involve the use of historical shoreline data compared with current shoreline information. This fundamental approach of predicting shoreline location based on extrapolation of past changes has been utilized by several states in developing data to support setback programs. (Authors)
BE MS SH 00

098

CUBIT. 1981. Pawleys Island, South Carolina, beach erosion management strategy. Rept. to Pawleys Island Civic Assoc.; Cubit Engineering, Clemson, SC, 50 pp. + app.

BE 40

099

CUBIT. 1981. Beach nourishment evaluation: north end: Pawleys Island. Eval. Rept., Georgetown County, SC; Cubit Engineering, Clemson, SC, 25 pp.

BN 40

100

CUBIT. 1987. Shorefront management plan, Edisto Island, Jeremy Inlet to Big Bay Creek, South Carolina. For South Carolina Coastal Council, Charleston, SC; Cubit Engineering. Volume I — Management Program, 43 pp.; Volume II — Supporting Studies, 184 pp.

A management plan for Edisto Beach. Contains a review of historic data and present (1987) conditions, identifies long term erosion rates, storm impact zones, and inlet impact zones. Recommends groin restoration and beach renourishment. (W.C. Eiser)
BE BS MP SH 20/40

101
DANIELS, R.C. 1992. Sea-level rise on the South Carolina coast: two case studies for 2100. Jour. Coastal Research, CERF, Vol. 8(1), pp. 56-70.

Over the next century a "greenhouse"-induced sea-level rise (SLR) of 0.25 m to 2.00 m may occur. This SLR, when combined with local vertical movements along coasts, has the potential to cause significant changes in the South Carolina coastline. These changes may occur through the inundation of low-lying coastal areas, increases in erosion rates from increased wave heights and possible increases in tropical cyclone intensities and frequencies. To explore the potential effects of climate change on the South Carolina coast, four SLR scenarios were applied to two USGS 7.5 quadrangles (Wampee and Hilton Head, SC). The impacts of SLR were measured in terms of the amount of land that would be lost to the sea permanently (from SLR and local vertical movement) and episodically (from tropical cyclone-induced storm surges) if the current coastline was abandoned and the retreat option taken. (Authors)
BE SH 01

102
DARLING, J.M. 1968. Surf observations along the United States coasts. Rept. No. R-1-68, CERC, U.S. Army Eng. Waterways Exp. Sta., Vicksburg, MS.

(Not available in time to review for this bibliography, P.A. Work)
CP 00

103
DAS, M.M. 1971. Longshore sediment transport rates: a compilation of data. MP 1-71, USACE, Coastal Eng. Res. Center.

Summarizes, in detail, experiments and data related to longshore sediment transport rate, from both lab and field. Includes review of six laboratory data sets and four field data sets. (P.A. Work)
ST 00

104
DAVIS, R.A., JR. 1989. Management of drumstick barrier islands. In Proc. of the Sixth Symposium on Coastal and Ocean Management, ASCE, New York, NY, pp. 1-16.

Three problem areas in developing drumstick barrier islands are addressed: ". . . (1) the updrift inlet which tends to migrate and erode the upland barrier, (2) the narrow, low and sediment-starved downdrift end which experiences washover and transgression (erosion), and (3) the vegetated back-barrier environment which has commonly been dredged and

filled" (p. 1). A discussion of the morphodynamics of a general drumstick barrier is given, and then examples from the East Friesian Islands, west-central Florida, and Kiawah Island, South Carolina, are analyzed. (M.S. Harris)
CP CS 20

105
DAVIS, K.B., and **VAN DOLAH, R.F.** 1986. A survey of the existing information on the physical, chemical, and biological conditions in the vicinity of the Port Royal Ocean Dredged Material Disposal Site. Final Rept., USACE, Charleston Dist., 124 pp.

Describes the geologic setting, historical shoreline changes, and sediment data from existing studies conducted in the Port Royal area. Variable grain-size data and very limited sediment transport data in the Port Royal area exists. Previous studies at Hilton Head Island indicated that sand at 2.4 m MSL moved landward in considerable quantities while sand at depths of 3-4 m migrated onto the beach but at a much slower rate. (P. Donovan-Ealy)
BE CP GS SH ST 10

106
DEALTERIS, J., MCKINNEY, T., and **RONEY, J.** 1976. Beach Haven and Little Egg Inlets: a case study. In Proc. 15th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 1881-1898.

"A comprehensive investigation of coastal processes active within and in the vicinity of Beach Haven and Little Egg Inlets was completed as part of the Coastal Processes Investigation for the proposed Atlantic Generating Station. The suspected complex nature of this dual natural inlet system was documented and a process-response model is presented to relate the more significant physical forcing functions to observed morphologic and hydraulic changes. A rising sea level, a net littoral drift from the north and the sediment scouring power of the flow in the two main channels serving the tidal basins are the principal factors related to the geographic and hydraulic stability of the system. The results of the study can be used to evaluate the potential impact, if any, of the proposed Atlantic Generating Station on the adjacent coastal environment." Beach Haven and Little Egg Inlets are located along the New Jersey Coast. (S.J. Smith)
CP ST TI

107
DEAN, R.G., and **O'BRIEN M.P.** 1987. Florida's east coast inlets: shoreline effects and recommended action. UFL/COEF-87/017, Coastal & Oceanographic Eng. Dept., Univ. Florida, Gainesville.

". . . There are 19 inlets along that portion of Florida's east coast commencing from St. Marys Entrance at the Georgia border to Government Cut at the south end of Miami Beach. Six inlets are constructed inlets and were cut for navigational and/or water quality purposes. Of the 19 total, all but two have been modified for navigational purposes. A review of inlets in their natural condition demonstrates the presence of a shallow broad outer bar across which the longshore transport occurred. These shallow and shifting bar features were unsuitable for navigation which led to the deepening of the channels and training with jetties. Inlets in this modified state along with inappropriate maintenance practices have placed great erosional stress along most of Florida's east coast beaches. The ultimate in poor sand management practice is the placement of good quality beach sand in water depths too great for the sand to reenter the longshore system under natural forces; placement depths of 12 ft or less are considered appropriate for Florida in order to maintain the sand in the system.

. . . A brief summary review for each of the 19 inlets is presented including: a scaled aerial photograph, brief historical information, several items related to sediment losses at each inlet and special characteristics relevant to State responsibilities. For each inlet the above information is utilized to develop a recommended action, usually in the form of periodic sand transfer quantities."
ID ST TI

108
DEAN, R.G., and **O'BRIEN M.P.** 1987. Florida's west coast inlets: shoreline effects and recommended action. UFL/COEF-87/018, Coastal & Oceanographic Eng. Dept., Univ. Florida, Gainesville.

". . . There are 37 inlets along that portion of Florida's west coast commencing from Pensacola Bay Entrance to Caxambas Pass at the south end of Marco Island. Compared to those on the East Coast, most West Coast inlets have not had the deleterious effects on the adjacent beaches, yet all modified inlets without proper management have the potential of impacting unfavorably on the adjacent shorelines. Moreover, at present there is interest in opening three West Coast entrances which either have been open in the past (Midnight Pass) or which have opened occasionally (Navarre Pass and Entrance to Phillips Lake).

A review of inlets in their natural condition demonstrates the presence of a shallow broad outer bar across which the longshore transport occurred. These shallow and shifting bar features were unsuitable for navigation which led to the deepening of the channels and fixing with one or two jetty structures. Moreover, channel dredging can reduce wave sheltering of the shoreline by ebb tidal shoals and alter the equilibrium of the affected shoreline segments. The ultimate in poor sand management practice is the placement of good quality beach sand in water depths too great for the sand to reenter the longshore system under natural forces; depths of 12 ft or less are considered appropriate for Florida in order to maintain the sand in the system.

. . . A brief summary review for each of the 37 West Coast inlets is presented, including a scaled aerial photograph, brief historical information, several items related to sediment losses at each inlet and special characteristics relevant to State responsibilities. For each inlet, where appropriate, the above information is utilized to develop a recommended action."
ID ST TI

109

DE ARELLANO, R.R. 1981. Late Holocene unconformities within an accretionary beach ridge complex, Kiawah Island, South Carolina, MA Thesis, Univ. South Carolina, Columbia, 120 pp.

Discusses analysis of abrasion of sand samples using Fourier grain shape technique based on amplitude of grains at the upper end of the harmonic amplitude spectrum (of the fourier series). The pattern of sequential deposition inferred from the analysis indicates that eustatic fluctuations of sea level 4,000 bp, have been responsible for the generation of transgressive-regressive cycles.
CS GS 20

110

DEICKMENN, R. OSTERHUN, M., and **PARTENSCKY, H.W.** 1988. A comparison between German and North American tidal inlets. In Proc. 21st Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 2681-2691.

Initial results are presented relating to an investigation of geomorphological parameters from 26 of a total of 28 tidal inlets and 11 coastal structures similar to inlets along the German Bight. The following parameters were investigated: tidal prism-inlet area relationship, cross-sectional form and depth, location of the channel within the cross-section, ebb tidal deltas, and the structures of the back barrier regions. The most important parameter governing the shaping process of these coastal structures is considered to be the tidal volume.
ID TI

111

DENNIS, W.A., LANAN, G.A., and **DALRYMPLE, R.A.** 1978. Case studies of Delaware's tidal inlets: Roosevelt and Indian River Inlets. In Proc. 16th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1282-1301.

Documentation of past and present trends at the two inlets. Roosevelt Inlet tends to trap sediment within its throat, and Indian River Inlet tends to trap sediment in its ebb tidal shoal. A one-dimensional model and field measurements were utilized to explain the different behavior of these two inlets. (S.J. Smith)
MS ST TI

112

DILLON, W.P., KLITGORD, K.D., and **PAULL, C.K.** 1983. Mesozoic development and structure of the continental margin off South Carolina. In Gohn, G.S. (ed.), *Studies Related to the Charleston, South Carolina, Earthquake of 1886— Tectonics and Seismicity*, U.S. Geol. Surv., Prof. Paper 1313, pp. N1-N16.

Authors describe the structure and development of the Paleozoic basement, lower Mesozoic volcanic strata, and thick Cretaceous strata which form a fairly uniform blanket across the continental shelf off South Carolina. Isopach maps and a conceptual block diagram of the development of the continental margin off South Carolina are presented. (P. Donovan-Ealy)
CS OS 01

113
DINGMAN, J.S., and **KANA, T.W.** 1990. Myrtle Beach emergency nourishment project, April 1990 beach survey. Final Rept., City of Myrtle Beach, SC; CSE, Columbia, SC, 49 pp. incl. app.

Presents beach volume change data resulting from Hurricane *Hugo* and post-*Hugo* nourishment project. A combination of natural recovery plus nourishment restored the beach (above -5 ft NGVD) to near pre-*Hugo* levels by spring 1990.
BN BS 50

114
DOMERACKI, D.D. 1981. Assessment of salt marsh sedimentation (Pawleys Island): Parts I and II. Final Rept., Pawleys Island Civic Association, SC; RPI, Columbia, SC, 95 pp.

ST 40

115
DOMERACKI, D.D. 1982. Stratigraphy and evolution of the Pawleys Island area, South Carolina. M.S. Thesis, Univ. South Carolina, Columbia, 101 pp.

Analyses of 58 vibracores and auger borings were used to delineate the aerial extent and stratigraphic relationships of the sediments at Pawleys Island. An ancestral (Pleistocene) river valley underlies the island and its adjacent marsh system and is believed to mark the position of the ancestral Black River during a sea-level low-stand. Pawleys Island sediments include a complex arrangement of fluvial, barrier, and back-barrier facies. (P. Donovan-Ealy)
CS GT SM 40

116
DOMERACKI, D.D., and **HAYES, M.O.** 1980. Assessment of salt marsh sedimentation. Part I, historical survey. Final Rept., Pawleys Island Civic Association, SC; RPI, Columbia, SC, 65 pp.

Gives historical geomorphic changes pertaining to salt marsh sedimentation at back barrier marsh system at Pawleys Island. Factors responsible for the advanced sedimentation rates affecting the area, are suggested.
ST 40

117
DONOVAN-EALY, P., GAYES, P.T., NELSON, D.D., VAN DOLAH, R.F., and **MAIER, P.** 1993. Development of a database of geologic resources and critical habitats on the South Carolina continental shelf. In Proc. of the Geological Information Society, Vol. 24, pp. 173-178.

A comprehensive geologic database focussing on beach renourishment resources and critical habitats of the South Carolina continental shelf has been compiled by the South Carolina Task Force on Offshore Resources. The geologic database contains high-resolution seismic-reflection survey lines, side scan sonar survey lines, surficial sediment characterization, vibracore/boring logs, and heavy mineral analyses. Database structure and

analysis of the data contained in four geographic zones (Grand Strand, Santee Delta, Charleston area, and south islands) is presented. (P. Donovan-Ealy)
GP GS GT 01

118
DOUGLASS, S.L. 1987. Coastal response to jetties at Murrells Inlet, South Carolina. Shore & Beach, Vol. 55(2), pp. 21-32.

Describes construction of jetties at Murrells Inlet (1977-80) and monitoring program to document effects of project on the coast. Monitoring included collection of beach profile data, aerial photography, and visual wave climate descriptions. Corps of Engineers Wave Information Study (WIS) data were used to calculate net longshore sediment transport rates, which were concluded to be weakly northward (13,000 cy/yr) at Surfside Beach and strongly northward (125,000 cy/yr) at Litchfield Beach. Paper provides references to numerous Corps of Engineers reports on Murrells Inlet. (P.A. Work)
CP CS ID ST TI 40

119
DOUGLASS, S.L. 1987. Coastal response to navigation structures at Murrells Inlet, South Carolina. Tech. Rept. CERC-87-2, Coastal Eng. Res. Center, Ft. Belvoir, VA.

"Coastal response to navigation structures at Murrells Inlet, S.C., is documented herein. Data, which result from a postconstruction monitoring program, consist of beach, inlet, and jetty surveys, aerial photography, visual wave observations, wave buoy results, hindcast wave results, and site inspection trips. These data were collected during the period 1978-1982, approximately five years after jetty construction began."
CS TI 40

120
DOUGLASS, S.L. 1991. Simple conceptual explanation of down-drift offset inlets. Jour. of Waterway, Port, Coastal, and Ocean Eng., ASCE, New York, NY, Vol. 117(2), pp. 136-142.

"A very simple, conceptual explanation of the cause of down-drift offset inlets is presented."
ID TI 00

121
DUANE, D.B., SWIFT, D.J.P., and **Pilkey, O.** 1972. Linear shoals on the Atlantic inner continental shelf, Florida to Long Island. In *Shelf Sediment Transport*, Dowden, Hutchinson and Ross, Inc., Stroudsburg, PA, pp. 447-498.

ST 01

122
DUBAR, J.R. 1971. Neogene stratigraphy of the lower Coastal Plain of the Carolinas. Atlantic Coastal Plain Geol. Assoc., 12th Annual Field Conf., 128 pp.

Pleistocene-age terrace deposits are examined using "the stratigraphic unit concept," "the geomorphic unit concept," and "the physiographic unit concept" in field guide format. Data presented rely on detailed analysis of limited outcrops and subsurface data and samples. Specifically, this work establishes the relationship between previously little-understood subsurface lithic units and the topographic features of the seven "proven" terrace formations.
SM 10/20/30/40

123
DUC, A.W., and **TYE, R.S.** 1987. Evolution and stratigraphy of a regressive barrier/back-barrier complex: Kiawah Island, South Carolina. Sedimentology, Vol. 34, pp. 237-251.

The Holocene evolution and depositional environments around Kiawah Island are documented through analysis of 75 vibracores. Three primary depositional environments were encountered: "(1) a mud-rich central back-barrier sequence consisting of low marsh overlying fine-grained, tidal flat/lagoonal mud; (2) a sandy beach-ridge swale sequence consisting of high and low marsh overlying tidal creek channel and point bar sand, and foreshore/shoreface; and (3) a regressive sequence of sandy, mixed and muddy tidal flats capped by salt marsh that occurs on the updrift end of the island" (p. 237). The depositional environments related to the barrier island stratigraphy are described and discussed in detail. (M.S. Harris)
CS GT SM 20

124
EA. 1989. Folly Beach. Rept., Charleston County Committee to Restore Folly Beach, Charleston, SC; Edge Associates, Charleston, SC, 25 pp.

Attributes nearly 100 percent of the erosion of Folly Beach to the presence of the Charleston Harbor jetties.
BE BN 20

125
ERC. 1975. Environmental inventory of Kiawah Island. Final Rept., Coastal Shores, Inc., Columbia, SC; Environmental Research Center, Inc., ~350 pp.

A comprehensive inventory of geology, coastal processes, vegetation, vertebrates, invertebrates, and archeology of Kiawah Island (SC) which served as a basis for site planning by the original developer of the island in the mid 1970s. (GSRI)
EN 20

126
EBERSOLE, B.A., CIALONE, M.A., and **PRATER, M.D.** 1986. Regional coastal processes numerical modeling system report 1: RCPWAVE — A linear wave propagation model for engineering use. Tech. Rept. CERC-86-4, USACE, Coastal Eng. Res. Center, Vicksburg, MS.

Describes finite-difference, numerical model for wave propagation over arbitrary bathymetry that has been widely used by Corps of Engineers since development. Describes theory and assumptions. Includes verification against laboratory and field data. Model includes both refraction and diffraction (via mild slope equation) and assumes validity of linear wave theory. (P.A. Work)
CP 00

127
ECKARD, T.L. 1986. Stratigraphy and depositional history of the Santee River delta, South Carolina. M.S. Thesis, Univ. South Carolina, Columbia, 102 pp.

Sedimentary deposits of the Santee River delta, South Carolina were studied using 63 vibracores, 75 auger borings, and 12 radiocarbon dates and a stratigraphic model for delta evolution is presented. late Pleistocene and Holocene deposits reveal a regressive-transgressive fluvial and deltaic sequence. A Holocene eustatic sea-level rise produced a period of aggradation of fluvial and floodplain deposits. Sea-level stabilization around 7,000-5,000 BP started the constructional phase of the Santee River delta formation. (P. Donovan-Ealy)
CS GT SM 40

128
ECKARD, T.L., HAYES, M.O., and **SEXTON, W.J.** 1986. Deltaic evolution during a major transgression. In D.A. Textoris (ed.), SEPM Field Guidebook, Field Trip No. 6, SE U.S., pp. 195-214.

129
EISER, W.C., and **BIRKEMEIER, W.A.** 1991. Beach profile response to Hurricane *Hugo*. In Coastal Sediments '91, N.C. Kraus, K.J. Gingerich, and D.L. Kriebel (eds), Vol. II. Proc. of a Specialty Conference on Quantitative Approaches to Coastal Sediment Processes, ASCE, New York, NY., p. 1681.

Hurricane impact is examined by comparing beach survey data prior to the storm, with post-storm survey data. Author indicates that profiles show a complete loss of primary dunes, upland scarping and outwash, a lowering and flattening of the beach face, and offshore accretion.
BS BE CS 01

130
EISER, W.C., and **KANA, T.W.** 1987. Summary of shoreline changes along Kiawah Island between September 1986 and October 1987. Summary Rept., Kiawah Island Company, SC; CSE, Columbia, SC, 12 pp. + app.

Results of semiannual surveys to wading depth at ~12 stations.
BS SH 20

131
EISER, W.C., and **KANA, T.W.** 1988. Analysis of beach survey data along the South Carolina coast: October 1986 — October 1987. Final Rept., South Carolina Coastal Council, Charleston; CSE, Columbia, SC, 48 pp. + 6 app.

BS 01

132
EISER, W.C., and **JONES, C.P.** 1989. Analysis of beach survey data along the South Carolina coast — fall 1988. Final Rept., South Carolina Coastal Council, Charleston; CSE, Columbia, SC, 63 pp. + app.

Provides a synopsis of 1986-1987 beach conditions and describes regional and statewide trends based on some selected locations.
BS 01

133
EISER, W.C., and **JONES, C.P.** 1989. Performance evaluation of a beach nourishment project in Myrtle Beach, South Carolina. In Coastal Zone '89, Vol. 3, Proc. of a Symposium on Coastal and Ocean Management, ASCE, New York, NY, pp. 2110-2122.

Indicates that the overall performance of the Myrtle Beach nourishment project has been successful. Net loss above low-tide wading depth has been found to be approximately 31 percent of the fill volume placed. It is reported that most of the "lost" material has been transported to the lower beach. High-tide and low-tide recreational beaches were approximately 29 and 42 acres greater respectively, during the study period (1985-1988).
BN 50

134
EISER, W.C., KANA, T.W., and **JONES, C.P.** 1988. Analysis of beach survey data along the South Carolina coast: October 1987 — August 1988. Final Rept., South Carolina Coastal Council, Charleston; CSE, Columbia, SC, 78 pp. + app.

A summary of beach profile data collected between October 1987 and August 1988 for the South Carolina Coastal Council's monitoring program.
BS 01

135
EISER, W.C., KANA, T.W., and **WILLIAMS, M.L.** 1986. Analysis of historical erosion rates and prediction of future shoreline positions, North Myrtle Beach, South Carolina. Summary Rept., Program Assistance Project, North Myrtle Beach Shorefront Management Plan; South Carolina Coastal Council (sponsor); CSE, Columbia, SC, 90 pp. + attachments.

A detailed review of historical erosion, application of the ideal profile methodology, and prediction of 25-year and 50-year future shorelines for the City of North Myrtle Beach. Provided the basis for interim setback lines under the 1988 Beach Management Act.
BE SH 50

136
EL-ASHRY, M.T. 1963. Effects of hurricanes on parts of the United States coastline as illustrated by aerial photographs. M.S. Thesis, Dept. Geol., Univ. Illinois, Urbana.

Thesis investigates effects of hurricanes on coastal features, primarily in North Carolina, as depicted on photos. Effects of hurricanes and other storms on Cape Hatteras, Hatteras Island, Hatteras Inlet, Ocracoke Island, Cape Lookout, Cape Fear, and Corncake Inlet, and vicinity were determined from periodic photos taken between 1958 and 1962 and from topographic maps. The effects of Hurricane *Helene* in 1958 were determined by comparing photos taken after the storm with older topographic maps. The effects of the storm of March 1962 were determined by comparing before-and-after photos. Although some measurements were made on the photos, the coastal changes were described primarily in qualitative terms. A discussion of the meteorology of hurricanes and the factors upon which the hurricane damage depends is included. An appendix describes changes in La Costa Island (FL) from periodic photos.
RS SH 00

137
EL-ASHRY, M.T. 1966. Photointerpretation of shoreline changes in selected areas along the Atlantic and Gulf Coasts of the United States. Ph.D. Dissertation, Dept. Geol., Univ. Illinois, Urbana.

Report describes shoreline changes at selected locations along the Atlantic and Gulf coasts as determined from periodic photos. Study areas were southern South Carolina (Beaufort, Charleston, and Georgetown counties), west coast of Florida (Lee County), and Matagorda Peninsula and other areas (Matagorda, Brazoria, and Cameron counties) in Texas. Comparative photos ranging in date from 1939 to 1962 were used to analyze coastal changes. Effects of storms and long-term coastal processes on the shoreline are illustrated and described in qualitative terms. Advantages of comparative photos for studies of coastal change are discussed. Changes in beaches, beach ridges, barrier islands, tidal inlets, deltas, spits, shoals, and other features are described. (Authors) (Stafford et al., 1973)
RS SH 01/10 30

138
EL-ASHRY, M.T., and **WANLESS, H.R.** 1967. Shoreline features and their changes. Photogrammetric Eng., Vol. 33(2), pp. 184-189.

Report presents an investigation of shoreline features and their changes from periodic photos. Photos illustrate changes in coastal features at Price Inlet (SC), Matagorda Peninsula and the Brazos River Delta (TX), Cape Lookout (NC), and La Costa Island (FL).

Advantages and disadvantages of using photos in studying coastal changes are discussed. Other uses of periodic photos in investigating dynamic phenomena are mentioned. Comparing periodic photos with older maps and charts in determining long-term trends in shorelines is also discussed. Periodic photos were concluded to be an excellent tool for studying shorelines and shoreline changes. (Authors) (Stafford et al., 1973)
RS SH 01/30

139
EL-ASHRY, M.T., and **WANLESS, H.R.** 1968. Photo interpretation of shoreline changes between Capes Hatteras and Fear (North Carolina). Marine Geol., Vol. 6, pp. 347-379.

Article presents a comprehensive description of changes in coastal features along the North Carolina coast between Cape Hatteras and Cape Fear based on periodic photos taken between 1939 and 1962. Changes in capes, inlets, and beaches are illustrated by photos and diagrams. Measurements were made on photos and changes were related to storms and other environmental conditions. Photos were also used to illustrate the large shoal area south of Cape Lookout. Article concludes that periodic photos are an excellent tool for studying coastal morphology and change.
CS RS SH 00

140
EMERY, K.O. 1966. Atlantic continental shelf and slope of the United States: geologic background. U.S. Geol. Surv., Prof. Paper 529-A, 23 pp.

Emery presents a general description of the topography, sedimentology, lithology, structure and methods of study on the western Atlantic continental shelf and slope. (M.S. Harris)
GS OS 01

141
ESCOFFIER, F.F., and **WALTON, T.L.** 1979. Inlet stability solutions for tributary inflow. Jour. Waterway, Port, Coastal and Ocean Div., ASCE, New York, NY, Vol. 105(4), pp. 341-356.

Discusses the inclusion of tributary inflow and inertia in the relationships that describe the processes that occur in tidal inlets. (S.J. Smith)
ID TI 00

142
EVERTS, C.H., and **WILSON, D.C.** 1981. Base map analysis of coastal changes in aerial photography. NTIS, Springfield, VA, 14 pp.

This report presents a method for obtaining shoreline change data from base maps constructed from time-sequence sets of aerial photos, with the image of the aerial photos superimposed at the constant scale of each base map. A comparison of each base map from the different sets of aerial photos will provide shoreline change data through time. (Authors)
RS SH 01

143
FARMER, R.C., and **WALDROP, W.R.** 1977. A model for sediment transport and delta formation. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 102-115.

"A mathematical procedure was developed for predicting the transportation and deposition of suspended material in streams. This procedure was used to mathematically model the formation of a delta so that the effects of river and tidal flow on the deposition of sediment and on bed migration could be predicted. The objective of the study was to develop a tool, in the form of a computer program, which described the important features known to control the movement of suspended material and hence the formation of deltas."
ID MS ST TI 00

144
FICO, C. 1977. Wave-refraction studies on the South Carolina Coast. In D. Nummedal (ed.), *Beaches and Barrier Islands of the Central South Carolina Coast* (field trip guidebook, Sullivans Island and the Isle of Palms in conjunction with Coastal Sediments '77). Coastal Res. Div., Dept. Geol., USC, Columbia, SC, pp. 1-10.

Presents preliminary findings on relative distribution of wave energy along the South Carolina Coast as determined by wave refraction studies.
CP 01

145
FICO, C. 1978. Influence of wave refraction on coastal geomorphology, Bulls Island to Isle of Palms, South Carolina. Tech. Rept. No. 17-CRD, Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, 203 pp.

To determine the effects of the continental shelf bathymetry on coastal geomorphology, a series of wave-refraction diagrams were generated for the South Carolina coast from Bulls Island to the Isle of Palms. REFRAC, a computerized wave-refraction program developed for this study, generates refraction diagrams which delineate the patterns of longshore variation in wave energy. A variety of input wave conditions were used in REFRAC to model the various possible wave conditions existing in nature. The results indicate that the offshore bathymetry partially controls the coastal geomorphology by creating zones of potential erosion and deposition and by influencing the direction of sediment transport. (Author)
BA CP MS 30

146
FIELD, M.E., and **TRINCARDI, F.** 1991. Regressive coastal deposits on Quaternary continental shelves: preservation and legacy. In *From Shoreline to Abyss*, SEPM Spec. Publ. No. 46, pp. 107-122.

Regressive deposits (internal downlapping surfaces) form from progradation of "coastal and deltaic lithosomes." These deposits are ". . . least likely to be preserved on broad,

low-gradient (coastal plain) shelves . . ." (p. 107) and ". . . are most likely to be preserved along the shelf margin . . ." (p. 107). Mid-shelf regressive deposits are rare. (M.S. Harris)
CS OS 01

147
FINKL, JR., C.W. 1993. Preemptive strategies for enhanced sand bypassing and beach replenishment activities in southeast Florida: a geological perspective. Jour. Coastal Research, CERF, Spec. Issue No. 18, pp. 59-89.

"Although beaches on the southeast Florida coast are periodically replenished in an effort to reduce shoreline recession, such efforts have been only moderately successful. Erosion of sandy beaches on the downdrift (south) sides of jettied inlets is a chronic problem that requires remediation. In order for erosion control measures to be effective (e.g., function harmoniously within the natural balance of coastal systems), coastal protection measures must consider the geological framework for this subtropical coast as it influences strategies for coastal management. Important to coastal engineering design are such factors as climate change (greenhouse effect), sediment discharge into the oceans, long- and short-term causes of sea-level rise, sediment sources and sinks in terms of gross/net littoral budgets.

The limited reserves of offshore borrow materials that are suitable for beach renourishment and the loss of nearshore sediments to deep offshore regions requires consideration of alternative sand sources and enhanced sand bypassing options. Environmental impacts and socioeconomic constraints of sand management schemes are related to the on-going "sand wars", and the consideration of ecologically-favored alternatives. There are several action items that need to be implemented if politically expedient solutions, such as long-range setbacks or abandonment of coastal sectors, are to be avoided. These action items are: (1) initiate full-scale comprehensive environmental monitoring of bypassing and replenishment projects, (2) set up continuous long-term ecological monitoring, (3) standardize methods and sampling techniques, (4) form Florida reference ecological stations, (5) include ecologically sensitive areas in data management plans, (6) monitor beach, borrow and bypass installations on the basis or ecological performance, and (7) establish a central depository for environmental performance data. The advantage of beach replenishment combined with enhanced sand bypassing is a preemptive strategy over conventional techniques. The initiation of comprehensive, long-term environmental (ecological) monitoring is needed as a means to approach a balance between engineering solutions to erosion control and environmental concerns."
BN CP ST TI 00

148
FINLEY, R.J. 1976. Hydraulics and dynamics of North Inlet, South Carolina, 1974-75. GITI Rept. No. 10, USACE, Coastal Eng. Res. Center, Ft. Belvoir, VA, 188 pp.

Quarterly studies at North Inlet (SC) show variation in wave parameters, beach and inlet morphology, and tidal hydraulics which are related to seasonal climatic patterns. Wind magnitude and direction, occurrence of northeast storms, and brackish water influx from adjacent Winyah Bay are significant process variables. Over 800 unique visual wave

observations indicate that annual resultant wave energy flux is directed to the south. However, an energy flux reversal resulting from ebb-tidal delta morphology results in longshore transport of sediment toward the inlet, adding to swash bars, the channel-margin linear bars, and a northward recurving spit. An estimate of the volume of inlet-directed longshore sediment transport ($3.5x10^5$ m^3/yr), based on observed energy fluxes, gives a value which is 83 percent of the annual longshore transport rate ($4.3x10^5$ m^3/yr), based on 39 years of spit and shoal growth. Beach profiles at 11 locations show that erosion is primarily due to northeast storms, and that the shoreline is transgressive. A maximum of 7 m of foredune retreat was observed during the winter of 1972-1973, contributing abundant sediment to the ebb-tidal delta.
CP ID ST TI 30/40

149
FINLEY, R.J. 1978. Ebb-tidal delta morphology and sediment supply in relation to seasonal wave energy flux, North Inlet, South Carolina. Jour. Sed. Petrol., Vol. 48(1), pp. 227-238.

Annual estimates of inlet-directed longshore sediment transport and sediment accumulation based on historic records agree closely, indicating that the longshore transport system has been the primary source of sediment supply for the North Inlet ebb-tidal delta. Author states that a mild northeast storm may have a constructive effect on the North Inlet ebb-tidal delta in the zone of transport reversal. (P. Donovan-Ealy)
CP ST 40

150
FITZGERALD, D.M. 1976. Ebb-tidal delta of Price Inlet, South Carolina: Geomorphology, Physical processes, and associated shoreline inlet changes. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments* (AAPG-sponsored field course). Coastal Res. Div., Dept. Geol., USC, Columbia, SC, pp. II-143 — II-157.

The ebb-tidal delta of Price Inlet is discussed based on geomorphology, physical processes and associated shoreline changes as influenced by climate, varying tidal range and flow directions.
TI 30

151
FITZGERALD, D.M. 1982. Sediment bypassing at mixed energy tidal inlets. In Proc. 18th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1094-1118.

"Inlet sediment bypassing, through the previously recognized mechanisms of stable inlet processes and ebb-tidal delta breaching, has been documented at six mixed energy (tide-dominated) coasts around the world including the coasts of: central South Carolina, Virginia, southern New Jersey, New England, the East Friesian Islands, and the Copper River Delta in Alaska. Regardless of the mechanism, the end product of the bypassing process is the formation of a large bar complex that migrates onshore and attaches to the downdrift inlet shoreline. Thus sediment bypassing is a discontinuous process at mixed energy tidal inlets." The author discusses the size of bars, and the frequency and location of the welding process of the bar on the downdrift beach. (S.J. Smith)
CP ID ST TI 30

152
FITZGERALD, D.M. 1984. Interactions between the ebb-tidal delta and landward shoreline: Price Inlet, South Carolina. Jour. Sed. Petrol., Vol. 54(4), pp. 1303-1318.

A detailed analysis of the dynamics of Price Inlet from 1941 to 1977 is given. Periods from 4 to 7 years of ebb delta growth and decay are superimposed on a 7 to 42 year duration of varied inlet offset. The model of inlet changes relates the main inlet channel configuration, ebb delta, and landward shore to variations in inlet flow and bar accretion. (M.S. Harris)
CP ID SH TI 30/40

153
FITZGERALD, D.M., and **FITZGERALD, S.A.** 1977. Factors influencing tidal inlet throat geometry. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 563-581.

"A study of central South Carolina inlets has shown that the symmetry of the inlet throat is related to three controlling factors: (1) the meandering of the channel thalweg, (2) the shoreline configuration, and (3) the dominant longshore transport direction. The sedimentological nature of the inlet throat can also have an important influence on its geometry... Cross-sectional profile data from Price Inlet, S.C., over a three-year period from July 1974 to July 1977, and an in-depth study on 29 June 1977, indicate that the inlet responds quickly to changing flow conditions and more slowly to changes in the ebb-tidal delta. A good correlation has been found between inlet throat cross-sectional area and the flood tidal range directly preceding the running of the cross-sectional profiles."
ID TI 30

154
FITZGERALD, D.M., and **HAYES, M.O.** 1980. Tidal inlet effects on barrier island management. In Proc. Coastal Zone '80, ASCE, New York, NY, pp. 2355-2365.

Fieldwork at mesotidal barrier islands along the coasts of New England, South Carolina, Northwestern Germany and the Gulf of Alaska has led to the very basic conclusion that barriers are most unstable at their ends and that the shoreline changes at these locations result from tidal inlet processes. The ebb-tidal deltas which front inlets are huge reservoirs of sand and may be comparable in volume to that of adjacent barriers. Wave refraction around the ebb-tidal delta causes a longshore transport reversal along the downdrift barrier. Inlet migration, which occurs in areas that have high longshore sediment transport rates relative to the tidal scour ability of the inlets, results in erosion of the downdrift barrier and the addition of curved beach ridges to the updrift barrier. The processes of inlet sediment bypassing control the rate at which sand is transported through a tidal inlet from the updrift barrier to the downdrift barrier. (Author abstract)
ID TI 01

155
FITZGERALD, D.M., and **NUMMEDAL, D.** 1977. Ebb-tidal delta stratification. In D. Nummedal (ed.), *Beaches and Barrier Islands of the Central South Carolina Coast* (field trip guidebook, Sullivans Island and the Isle of Palms in conjunction with Coastal Sediments '77). Coastal Res. Div., Dept. Geol., USC, Columbia, SC, pp. 39-44.

Reports on preliminary information about stratification of ebb-tidal deltas at Breach, Dewees and Capers Inlet.
TI 30

156
FITZGERALD, D.M., FICO C., and **HAYES, M.O.** 1979. Effects of the Charleston Harbor, S.C., jetty construction on local accretion and erosion. In Proc. Specialty Conf., Coastal Structures '79, ASCE, New York, NY, pp. 641-664.

The effects of stabilization of tidal inlets in general and specifically Charleston Harbor are detailed. These include redirection and confinement of the main ebb channel, the prevention of sediment bypassing and redistribution of wave energy and tidal currents. The local response has been the addition of sediment to updrift beaches and accelerated erosion of downdrift beaches.
BE BP CP CS20/30

157
FITZGERALD, D.M., HUBBARD, D.K., and **NUMMEDAL, D.** 1978. Shoreline changes associated with tidal inlets along the South Carolina coast. In Coastal Zone '78, Proc. of the Symposium on Technical, Environmental Socioeconomic and Regulatory Aspects of Coastal Zone Management, ASCE, New York, NY, pp. 1973-1994.

Determines the processes which cause inlet-related shoreline changes (migrating, stable and ebb channels breaching through ebb tidal delta) and relates them to the resulting barrier island morphologies.
TI 01

158
FITZGERALD, D.M., NUMMEDAL, D., and **KANA, T.W.** 1976. Sand circulation pattern at Price Inlet, S.C. In Proc. 15th Coastal Engineering Conf., ASCE, New York, NY, pp. 1868-1880.

"A sand circulation pattern has been determined for Price Inlet, South Carolina, using wave refraction diagrams, littoral process measurements, bedform orientations, and inlet hydraulic data. The dominant process acting on the ebb-tidal delta is wave swash which impedes the ebb-tidal currents and augments the flood tidal currents. This produces a net landward transport of sand on the ebb-tidal delta as evidenced by the landward migrating swash bars. Bedform orientations and velocity measurements taken on the swash bars also support this conclusion."
ST TI 30

159
FITZGERALD, D.M., PENLAND, S., and **NUMMEDAL, D.** 1984. Changes in tidal inlet geometry due to backbarrier filling: East Friesian Islands, West Germany. Shore & Beach, Vol. 52(4), pp. 3-8.

Describes the changes in size of the inlets of the East Friesian Islands and relates this to the decreased tidal prism due to Backbarrier filling. (S.J. Smith)
ID TI 00

160
FLOYD, C.D., and **DRUERY, B.M.** 1976. Results of river mouth training on the Clarence Bar, New South Wales, Australia. In Proc. 15th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 1738-1755.

A case study of the river training at the mouth of the Clarence River. The training project involved construction that spanned 16 years, therefore allowing a study of the impacts of jetty length, tidal flow and channel width to bar depths. The study found that empirical formulas reasonably approximated the depth bar depth, and that bar depth is independent of jetty length. (S.J. Smith)
CS TI

161
FOLLY ISLAND WORKSHOP ON EROSION ABATEMENT (1979 FOLLY BEACH, S.C.). 1980. Proceedings of the Folly Island Workshop on Erosion Abatement, December 13-14, 1979, Folly Beach, South Carolina, Recommendations, 12 pp., illustrations, maps.

The assessments and suggestions for solutions, contained in this report are the results of a two day workshop which involved three concurrent panel discussions on issues that are pertinent to the resolution of an effective erosion abatement plan. The panels were defined as (1) a methodology panel, which discussed the best available means of mitigating erosion; (2) an economics panel, which discussed the financial aspects of erosion abatement as well as the economic future of an "improved" beach; and (3) a legalities and regulatory constraints panel, which investigated the legal ramifications of erosion abatement and the process of permitting such activities through federal, state, and local agencies of government. (Authors)
BE 01

162
FORCE, L.M. 1978. Thickness of overburden map, Charleston, South Carolina. USGS Misc. Field Studies Map MF-1021-B (1:250,000).

The thickness of the weakly consolidated to unconsolidated sediment "mainly rests on the Cooper Formation and Santee Limestone, calcareous units of early Miocene (?) to Eocene age." Scouring of these units during the Quaternary by the Ashley and Cooper Rivers is mentioned. (M.S. Harris)
CS 20/30

163
FORCE, L.M. 1978. Geological studies of the Charleston, South Carolina: area-elevation contours on the top of the Cooper River Formation. USGS Misc. Field Studies Map MF-1021-A (1:250,000).

Over 500 drill holes in the Charleston, South Carolina, area have been used to provide a contour map of the top of the Cooper Formation (upper Eocene to lower Miocene?). The topography is dominated by river and marine incision into the Cooper Formation since the Miocene. (M.S. Harris)
CS GT 20/30

164
FORCE, E.R., GROSZ, A.E., LOFERSKI, P.J., and **MAYBIN, A.H.** 1982. Aeroradioactivity maps in heavy-mineral exploration — Charleston, South Carolina, area. U.S. Geol. Surv., Prof. Paper 1218, 19 pp.

Occurrences of heavy mineral deposits and heavy mineral-bearing lithologic units in South Carolina are discussed. A method of correlating heavy mineral anomalies with geology is described and used to identify 14 accumulations in old beach complexes. An estimate of tonnage and grade of some of these deposits is presented. Difficulties in using aeroradioactivity in heavy mineral exploration are examined. (P. Donovan-Ealy)
TH 20/30

165
FRANKENBURG, A.C. 1987. Nearshore surface and subsurface sediment study using mineralogy, size, and shape analysis, Myrtle Beach, South Carolina. M.S. Thesis, Univ. South Carolina, Columbia, 96 pp.

The transgressive sequence off Myrtle Beach follows the form of other sequences found in the South Atlantic Bight (Milliman et al., 1968). The sequence is an erosional remnant due to the force of rising sea level. The hard ground in the area may have collaborated with the rising sea and worked as an erosional base, insuring the erasure of the entire upper unit. However, there is more to the record than that. Q-mode analysis has shown that the apparently uniform deposit holds a record of the sea-level rise in its variation in sediment shape type and its short-term record of storm deposits. It may be that what Brown (1980) saw off the South Carolina coast was not a beveled regressive deposit, but the remnants of a transgressive deposit unaffected by shore-parallel transport processes. (Author)
GS GT 50

166
FRANKENBURG, A.C. 1990. The application of image processing to the analysis of particle size and shape in loose sediments: Part II — the tracking of nearshore sediment movement using grain-shape analysis. Ph.D. Dissertation, pp. 15-40.

Part II is the first field application of Fourier grain-shape analysis to a controlled tracer study. Differences in the shapes of natural quartz sand facilitated its use as a marker in distinguishing deposited dredge material from surrounding offshore bottom sediments. The movement of the dredge material was monitored over time away from the original site of deposition. This was the first documentation of the onshore movement of borrow sediments in the Charleston offshore disposal site offshore area. (Author)
CP EN GS ST 20

167

FREEMAN, T.H. 1982. Bedform distributions, bedform dynamics and preserved bedding types on a mesotidal and ridge — Port Royal Sound, South Carolina. Unpubl. M.S Thesis, Dept. Geol., Univ. South Carolina, Columbia, 35 pp.

Bedform distribution and associated preserved bedding resulting from flood wave and ebb transport are described. It is observed that there is no one model applicable to all tidal sand ridges; sediment source, basin configuration and tidal regime are the geomorphological determinants.
TI 10

168

GALVIN, C. 1982. Shoaling with bypassing for channels at tidal inlets. In Proc. 18th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1496-1513.

"This report presents a systematic method for computing the rate of shoaling in channels subject to shoaling with bypassing."
ST TI 00

169

GALVIN, C., and **SCHWEPPE, C.R.** 1980. The SPM energy flux method for predicting longshore transport rate. Tech. Paper No. 80-4, USACE, Coastal Eng. Res. Center, Fort Belvoir, VA.

Explains in detail the energy flux method for prediction of longshore sediment transport rate which is discussed in the Shore Protection Manual published by the USACE. (P.A. Work)
ST 00

170

GAMMISCH, R.A., HOBBS, C.H., and **BYRNE, R.J.** 1988. Evolution of tidal inlet drainage basin systems. Jour. Coastal Research, CERF, Vol. 4(4), pp. 543-550.

"As well as causing estuarine shorelines to move landward, rising sea level modifies the small tidal inlet-drainage basin systems that fringe estuaries. The small tidal inlet-drainage basins on the Potomac River and nearby Chesapeake Bay are examples of an evolutionary sequence that progresses from larger, generally free flowing inlets, through smaller inlets which significantly modify the estuary's tidal characteristics, to ephemeral inlets associated with enclosed ponds. Shallow seismic data and vibracores demonstrate that a rising sea level drowns a drainage basin and reduces the basin's area. Consequently the tidal prism is decreased and the associated inlet moves toward the next evolutionary type."
ID TI 00

171

GAYES, P.T. 1991. Post-Hurricane *Hugo* nearshore side-scan sonar survey: Myrtle Beach to Folly Beach, South Carolina. Jour. Coastal Research, CERF, Spec. Issue 8, pp. 95-111.

Hurricane *Hugo* caused offshore transport of large amounts of sand and construction debris along much of the northern South Carolina coast. Side-scan sonar surveys identified development of rhythmic topography and on-offshore channels which may have been the result of large-scale coastal downwelling, driven by the >4 m storm surge. Evidence is presented showing rapid poststorm recovery in the zone shallower than 4 m MSL. (P. Donovan-Ealy)
CS GP OS 20/30/40/50

172

GAYES, P.T., SCOTT, D.B., COLLINS, E.S., and **NELSON, D.D.** 1992. A late Holocene sea-level fluctuation in South Carolina: Quaternary coasts of the United States. Marine and Lacustrine Systems, SEPM Spec. Publ. No. 48, pp. 155-160.

A mid-Holocene (4.2 ka) highstand of relative sea level has been identified in Murrells Inlet, South Carolina. The highstand preceded a fall in sea level of 2 m until 3.6 ka and then a constant sea level rise of 10 cm/century to the present. Sediment loading and subsidence of the Santee Delta area appears to have caused strong differential submergence between Murrells Inlet and the Santee Delta over the last 4 ka. (P. Donovan-Ealy)
CS SM 01

173

GIBEAUT, J.C., and **DAVIS, R.A.** 1993. Statistical geomorphic classification of ebb-tidal deltas along the west-central Florida coast. Jour. Coastal Research, CERF, Spec. Issue No. 18, pp. 166-184.

"An empirical morphologic classification for inlets occurring along the barrier island coast of west-central Florida is based on statistical analysis of 71 planforms of ebb-tidal deltas from 9 different inlets. A k-medoid cluster analysis of morphological parameters reveals a continuum of inlet configurations rather than distinct groups. Ebb-tidal deltas differ primarily by the amount of asymmetry and seaward protrusion relative to alongshore length. Amount of shoreline offset and whether adjacent shorelines are seaward, landward, or even with the general shoreline trend are also important. Even though there is a continuum of inlet variation, the cluster analysis has allowed the designation of four "end points" in the continuum. Qualitative observations of the relative effects of tidal currents and waves has allowed the designation of morphodynamic classes based on the "end point" conditions. These classes are (1) tide-dominated; (2) mixed-energy; (3) mixed energy, with large shoreline offset and asymmetry; and (4) wave-dominated. Ebb-tidal delta size does not correlate with morphology, but, when normalized by their throat cross-sectional areas, wave-dominated inlets have oversized and tide-dominated inlets have undersized ebb deltas compared to the equilibrium sizes displayed by mixed-energy inlets. The stage of ebb-tidal delta evolution is an important factor causing morphological and size variation."
ID ST TI 00

174
GLOVER, L.B., and **HALES, L.Z.** 1991. Numerical simulation of beach profile response to Hurricane *Hugo*. In Proc. Coastal Sediments '91, A Specialty Conference on Quantitative Approaches to Coastal Sediment Processes; N.C. Kraus, K.J. Gingerich and D.L. Kriebel (eds.); ASCE, New York, NY, pp. 1712-1726.

Numerical simulation of beach and dune erosion by Hurricane Hugo indicates good agreement for stabilized and unstabilized dune sections along the beach. This confirms that the presence of dunes reduces shoreline erosion by allowing the beach to steepen naturally and resist storm and increased water levels.
MS 01

175
GOHN, G.S., and **GOTTFRIED, D.** 1978. Regional implications of Triassic or Jurassic age for basalt and sedimentary red beds in the South Carolina coastal plain. Science, Vol. 202 (4370), pp. 887-890.

Whole-rock potassium-argon dates indicate a Triassic or Jurassic age for subsurface basalt samples collected in wells 700-900 m below the surface near Charleston, South Carolina. The K-Ar age is consistent with a widespread subsurface province of sedimentary red beds and mafic intrusions throughout the southeast thought to represent a large early-Mesozoic basin. (P. Donovan-Ealy)
CS 01

176
GOLDSCHMIDT, P.M., et al. 1991. Processes affecting shoreline changes at Morse River Inlet, central Maine coast. Shore & Beach, Vol. 59(2), pp. 33-40.

"The present study was undertaken to see what role the migrations of the inlet play in determining sand transport and, consequently, in erosional-depositional cycles on beaches not only on the banks of the inlet but also several kilometers away."
CP SH TI 00

177
GOODELL, H.G. 1967. The sediments and sedimentary geochemistry of the Southeastern Atlantic shelf. Jour. Geol., Vol. 75(6), pp. 665-692.

Author presents mathematical and statistical analyses of sediment data from Cape Hatteras, North Carolina to Juniper Light, Florida. Sediment composition, carbonate content, heavy mineral concentrations, and organic content display variability that can be resolved through multiple, nonlinear regression and geochemical and geomorphological trends on the shelf are discussed. (P. Donovan-Ealy)
GS GT TH 01

178
GOPALAKRISHNAN, T.C., and **MACHEMEHL, J.L.** 1980. Boundary conditions for analysis of flow in tidal inlets. In Proc. 17th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 2595-2606.

A discussion on the proper application of upstream and downstream boundary conditions for a one-dimensional model of a tidal inlet. (S.J. Smith)
ID MS TI 00

179
GRESHAM, C.A. 1979. A summary of beach erosion research on Debidue Beach from 1969-1974. Clemson Univ., College of Forest and Recreation Resources, Clemson, SC, 9 pp. + illus.

The late Dr. Koloman Lehotsky initiated dune stabilization research on Debidue Beach during the spring of 1969 and continued to install and monitor treatments until the summer of 1974. During this five-year period, Dr. Lehotsky developed and tested many methods of creating new dunes and stabilizing both new and existing dunes. The information in this report was taken from his annual reports to the trustees of the Belle W. Baruch Foundation. (Authors)
BE CS 01

180
GRIFFIN, M.M. 1981. Feldspar distribution in river delta and barrier sands of central South Carolina. M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia.

Twenty-five textural and mineralogic examinations from six coastal depositional environments relates feldspar abundance is related to grain size. Factor analysis confirms that this abundance may be used as a tool for determination of source area. Data confirm that the central South Carolina barrier island system originated by landward retreat from farther out on the continental shelf and indicate that calculated rates for longshore transport in this area are "greatly exaggerated."
GT MS 20/30

181
GRIM, M.S., DILLON, W.P., and **MATTICK, R.E.** 1980. Seismic reflection, refraction and gravity measurements from the continental shelf offshore from North and South Carolina. SE Geol., Vol. 21(4), pp. 239-249.

Analyses of Bouguer gravity and seismic reflection and refraction data suggest a complex pre-Cretaceous basement. Significant positive Bouguer anomalies indicate the presence of dense, mafic intrusions offshore Charleston (SC), bounded on either side by negative gravity anomalies attributed to extremely thick Triassic/early Jurassic basins. Smooth seismic reflectors at approximately 1 km depth, suggest relatively thin basalt flow(s) of large aerial extent. (P. Donovan-Ealy)
GP OS 01

182

GROSZ, A.E., and **NELSON, D.D.** 1989. Textural and mineralogic analyses of surficial sediments offshore of Myrtle Beach, South Carolina. U.S. Geol. Surv., Open-File Rept. 89-168, 23 pp.

Textual and heavy mineral analyses of 111 grab samples taken from the inner continental shelf off Myrtle Beach, South Carolina were studied to determine depositional environment and mineral resource potential. Depositional environments identified in the study area include channel deposits of the Pee Dee River, ebb-tidal deltas, distributary mouth bars, and submerged bars. Economically important heavy mineral assemblages including ilmenitite, rutile, zircon, and monazite in the sediments offshore Myrtle Beach may be significant if the concentrations are persistent with depth. (P. Donovan-Ealy)
GT OS TH 50

183

GUNDLACH, E.R., BACA, B.J., FRANKENBURG, A., WILLIAMS, M.L., and **KANA, T.W.** 1985. Myrtle Beach nourishment project. Geotechnical, Survey, and Ecological Data Rept., City of Myrtle Beach; RPI Coastal Science, Inc. (Columbia, SC), and Olsen Associates, Inc. (Jacksonville, FL), 43 pp. + 4 data app.

Offshore vibracoring and subsequent sediment analyses of 61 recovered cores indicate substantial sand deposits exist off Myrtle Beach, South Carolina. Beach compatible grain size and carbonate concentrations are identified offshore of the -12 ft MSL and -18 ft MSL contours, respectively. Ecological and beach profile survey data are presented. Subsequent engineering analyses by Siah et al. (1985) showed the sites analyzed did not yield acceptable sediment compatibility for beach nourishment (P. Donovan Ealy)
CP GS GT 50

184

HALES, L.Z., BRYNES, M.R., and **NEILANS, P.J.** 1991. Evaluation of beach fill response to storm-induced and long-term erosional forces, Folly Beach, South Carolina. USACE, Coastal Eng. Res. Center, MP-CERC-91, 260 pp.

The storm-Induced beach change numerical simulation model (SBEACH) was used to evaluate cross-shore transport of beach material and measure changes in the dune, beach, and berm elevations due to varying wave and water levels caused by northeasters and hurricanes. Longshore sand transport rates were evaluated to calculate sacrificial beach fills for Folly Beach. (P. Donovan-Ealy)
BE BN CP MS ST 20

185

HALES, L.Z., SEABERGH, W.C., and **STAUBLE, D.K.** 1992. Effects of Hurricane Hugo on the South Carolina coast. Jour. Coastal Research, CERF, Spec. Issue No. 8, pp. 129-162.

Most dunes were reduced to a flat, planar surface, while others were severely eroded. Shore protection structures were, for the most part, not designed for a storm of this magnitude, resulting in ruin of much of the stone revetments, wooded and concrete

bulkheads, and smaller concrete seawalls. Only larger wooden and concrete seawalls remained intact protecting the beach from development. With the loss of dunes and shorefront structures, damage to coastal buildings was extreme. Overwash of low-lying areas occurred during the height of the storm carrying water, sand and debris inland up to 183 m. (Authors)
BE CS 01

186
HAMILTON, R.M., BEHRENDT, J.C., and **ACKERMANN, H.D.** 1983. Land multichannel seismic-reflection evidence for tectonic features near Charleston, South Carolina. In G.S. Gohn, *Studies Related to the Charleston, South Carolina, Earthquake of 1886 — Tectonics and Seismicity*, U.S. Geol. Surv., Prof. Paper 1313, pp. I1-I18.

The 140 km of multichannel seismic-reflection profiles collected in 1979 identify several features in the vicinity of the 1886 Charleston earthquake. The northeast-trending Cooke, Gants, and Drayton fault zones are described. The former two have significant vertical displacement and are identified as possible sources of some of the seismicity in the Charleston area. (P. Donovan-Ealy)
CS GP 20/30

187
HANSON, H., and **KRAUS, N.C.** 1989. GENESIS: Generalized model for simulating shoreline change. Report 1, Technical Reference. Tech. Rept. CERC-89-19, U.S.Army Corps of Engineers, Coastal Eng. Res. Center, Vicksburg, MS.

GENESIS is a one-line, finite-difference numerical model for shoreline change. The report describes assumptions and theory of one-line modeling of shoreline change, presents equations used in GENESIS model. Report 2 (Gravens and Kraus, CERC-89-19) is a workbook and user's manual and can serve as a tutorial. (P.A. Work)
ST 00

188
HARRIS, W.D., and **JONES, B.G.** 1964. Repeat mapping for a record of shore erosion, Cape Kennedy, Florida. Shore & Beach, Vol. 32(2), pp. 31-34.

Paper discusses use of black-and-white infrared photos and photogrammetry by the USCGS to map the coast near Cape Kennedy (FL). Photos were taken at about high tide so that the high water line could be interpreted from the black-and-white infrared photos even with a moderate surf. Characteristics and advantages of infrared film are discussed. Map compiled from the photos was compared to old charts dated 1877, 1929, and 1948 to measure erosion. Amount of erosion or accretion is given for five selected points along the shore.
BE RS SH 00

189
HARRIS, S., GAYES, P.T., and **DONOVAN-EALY, P.** 1994. Influence of Cenozoic deposits on the coastal evolution of the South Carolina inner shelf and coastline. Geol. Soc. Amer., Abstracts with Programs.

Although the relationship of tidal and wave energy to coastal morphology of the barrier islands from Charleston to Edisto Island, South Carolina has been well documented, the role of local configuration and geometry of underlying Cenozoic strata to coastal evolution has not been studied. Extensive high-resolution seismic-reflection profiling has identified large scale structural flexures, paleovalleys, and changes in dip of the Tertiary strata in the study area. The authors establish a relationship between nearshore bathymetry and the location and nature of local stratigraphy. (P. Donovan-Ealy)
BA CS GP 20

190
HARRISON, W., BYRNE, R.J., BOONE, J.D., and **MONCURE, R.W.** 1970. Field study of a tidal inlet, Bimini, Bahamas. In Proc. 12th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1201-1222.

"This study was designed to examine the hydrography and the fluid-sediment interactions in an inlet floored with carbonate sand."
ST TI 00

191
HARTMANN, D., and **BOWMAN, D.** 1993. Efficiency of the log-hyperbolic distribution — a case study: pattern of sediment sorting in a small tidal inlet — Het Zwin, The Netherlands. Jour. Coastal Research, CERF, Vol. 9(4), pp. 1044-1053.

"This paper aims to demonstrate the sediment response to the morphodynamics in a small tidal inlet. The study focuses on the sediment size-sorting pattern in intertidal sub-environments. The controlling processes are tracked by the grain size data."
ST TI 00

192
HAUSER, W.T., JR. 1989. Murrells Inlet: where to from here. In Proc. Coastal Zone '89, ASCE, New York, NY, pp. 276-284.

Coastal jetties interrupt longshore sediment transport and modify the local wave environment and bathymetry of the area. A weir jetty system was constructed at Murrells Inlet between 1977 and 1981 to provide a stable navigational channel. A monitoring program was begun during construction in order to monitor the impact the jetties would have on the adjacent shoreline. The first two phases of the monitoring program provided valuable information concerning the shoreline response to the jetties. Phase III is providing enhanced monitoring of nourished areas of the shoreline as a result of maintenance dredging of the project during the spring of 1988. (Author abstract)
BN CS TI 40

193
HAYES, M.O. 1971. Geomorphology of tidal inlets, the estuarine environment. In J.R. Schubel (ed.), *Estuaries and Estuarine Sedimentation*, Amer. Geol. Inst. Short Course, pp. XIII-1 through XIII-17.

One of the early Hayes descriptions of tidal delta morphology based on studies before the author arrived in South Carolina.
CS TI 00

194
HAYES, M.O. 1972. Forms of sediment accumulation in the beach zone. In R. Meyer (ed.), *Waves on Beaches and Resulting Forms of Sediment Accumulation*, Academic Press, New York, NY, pp. 297-356.

Discusses the classic beach structures and geometry in photos, trenches, and geomorphic models.
ST 01

195
HAYES, M.O. 1976. Transitional-coastal depositional environments. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments*, American Association of Petroleum Geologists (AAPG) Field Course, Univ. South Carolina, Columbia, Tech. Rept. No.11-CRD, Part I, pp. 32-111.

"Transitional-coastal depositional environments are located in the coastal zone and, at one time or other, come under the influence of the marine conditions (e.g., during storm surges or spring tides). The principle types to be discussed in these notes are (1) deltas, (2) coastal dunes, (3) estuaries-bays-lagoons, (4) beach-barrier islands, and (5) tide-dominated coasts."
CP GS MS SM 00/01

196
HAYES, M.O. 1977. Development of Kiawah Island, S.C. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 828-847.

Divides the morphological components of Kiawah Island into four major subdivisions: (1) actively changing beach zone (2) tidal inlets (3) interior of the Island (4) salt marsh-tidal channel. Discusses the role of migrating tidal inlets and their associated ebb-tidal deltas in modifying the island, through wave-refraction and tidal current patterns, shaping the island into an arcuate "drumstick" pattern. An earlier version of this paper by Hayes is in Part II of Hayes and Kana (1976).
CP CS TI 20

197
HAYES, M.O. 1978. Impact of hurricanes on sedimentation in estuaries, bays, and lagoons. Estuarine Interactions, Academic Press, Inc., pp. 323-346.

ST 00

198

HAYES, M.O. 1979. Barrier island morphology as a function of tidal and wave regime. In S. Leatherman (ed.), *Barrier Islands*, Academic Press, New York, NY, pp. 1-26.

The classic paper outlining basic differences in morphology, comparing and contrasting microtidal and mesotidal barriers, using examples from South Carolina, Massachusetts, Alaska, and elsewhere.
CP 01

199

HAYES, M.O. 1980. General morphology and sediment patterns in tidal inlets. Sed. Geol., Vol. 26, pp. 139-156.

An excellent description of the morphology of tidal sand bodies associated with tidal inlets.
TI

200

HAYES, M.O. 1985. Atlantic USA-South. In E.C. Bird and M.L Schwartz (eds.), *The World's Coastline*, Van Nostrand Reinhold, New York, NY, pp. 207-211.

201

HAYES, M.O. 1991. Geomorphology and sedimentation patterns of tidal inlets: a review. In Coastal Sediments '91, ASCE, Vol. II, pp. 1343-1355.

202

HAYES, M.O. 1994. Georgia Bight. Chapter 7 in R.A. Davis, Jr. (ed), *Geology of the Holocene Barrier Island System*, Springer-Verlag, Berlin, pp. 233-304.

Discusses the morphology and stratigraphy of the barrier islands in the Georgia Bight, which extends from Cape Hatteras, North Carolina to Cape Canaveral, Florida, and the 77 tidal inlets along this shoreline. The following features that are related to tidal inlets are discussed: regional variation, inlet migration, and ebb-tidal deltas. (E.J. Hayter)
SM TI 01

203

HAYES, M.O., and **KANA, T.W. (eds.).** 1976. *Terrigenous Clastic Depositional Environments*, Tech. Rept. No. 11-CRD, Univ. South Carolina, Columbia, 306 pp.

Part I. Referenced as Hayes (1976) (this volume). Part II contains topical papers by Brown, Barwis, FitzGerald, and others. Widely used in the 1970s and 1980s as a textbook on coastal sedimentation.
BS TI 01

204
HAYES, M.O., and **LEATHERMAN, S.** 1979. Barrier island morphology as a function of tidal and wave regime. In Schwartz, M. (ed.), *Barrier Islands*, Academic Press, New York, pp. 1-27.

The morphology of barrier islands of the world's coastal areas are described in the context of tidal energy and wave energy. Mesotidally influenced coastlines generally have short and stunted barrier islands, whereas barrier islands along microtidal coastlines are long and linear. Variations exist in different climatic regimes, so Hayes intends for these criteria to be used in mid-latitude temperate regions. (M.S. Harris)
CP 00

205
HAYES, M.O., and **SEXTON, W.J.** 1983. Prognosis of future shoreline changes on Botany Bay Island, South Carolina. Rept. to Cubit Eng., Ltd.; RPI (83-4), Columbia, SC, 15 pp. + app.

20

206
HAYES, M.O., and **SEXTON, W.J.** 1989. Modern clastic depositional environments, South Carolina. Field Trip No. T371 for 28th Intl. Geol. Congress, American Geophysical Union, Wash., DC, pp. 1-85.

BE 01

207
HAYES, M.O., and **SEXTON, W.J.** 1992. The geologic impact of Hurricane *Hugo* and post-storm shoreline recovery along the undeveloped coastline of South Carolina, Dewees Island to the Santee Delta. Jour. Coastal Research, CERF, Spec. Issue No. 8, pp. 275-290.

The regressive barriers, which were eroded 20-25 m on the average, retreated landward more than the transgressive barriers. Hurricane channel widths ranged from 300 m to 1000 m. Coastal dunes were eroded between 90 m and 180 m. Washover terraces widened up to 185 percent, with a reversal of sediment grain size trends. Tidal inlet widths remained expanded by 25 percent 14 days after the storm, with evidence of greater tidal inlet expansion having occurred during the storm. Beaches had recovered markedly by 6-9 months after the hurricane. Beach scarps filled in with new berm and dune deposition. (Authors)
BE GS 01

208
HAYES, M.O., GOLDSMITH, V., and **HOBBS, C.H., III.** 1970. Offset coastal inlets. In Proc. 12th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1187-1200.

Discusses the causes and processes that cause the formation of offset tidal inlets. (S.J. Smith)
ID TI 00

209
HAYES, M.O., HULMES, L.J., and **WILSON, S.J.** 1974. Importance of tidal inlets in erosional and depositional history of barrier islands.

Examines erosional and depositional patterns on Kiawah Island, SC, which are controlled by morphology and hydrodynamics of affiliated tidal inlets. (GSRI).
TI 20

210
HAYES, M.O., KANA, T.W., and **BARWIS, J.H.** 1980. Soft designs for coastal protection at Seabrook Island, SC In Proc. 17th Conf. Coastal Engineering, ASCE, New York, NY, Chapter 56, pp. 897-912.

Results from a detailed field survey and historical study dating 1661 including vertical aerial photographs from 1939, field survey of beach profiles, nearshore bathymetry, and sediment cores, are given. Changing exposure and orientation of the shoals has had an effect on the adjacent shoreline of Seabrook. Offshore shoals act as natural breakwaters and sediment storage systems. Migration of shoals has allowed excess wave energy to strike portions of the shore causing local erosion.
BN BS 20

211
HAYES, M.O., KANA, T.W., and **MICHEL, J.** 1981. The influence of coastal geomorphology and erosion/deposition trends on the assessment of flood risks in South Carolina. Final Rept. RPI, Columbia, SC, 58 pp.

Describes the variability of the South Carolina coastline and illustrates some of the geomorphic controls on coastal erosion and deposition trends.
CP SH 01

212
HAYES, M.O., MOSLOW, T.F., and **HUBBARD, D.K.** 1979. Beach erosion in South Carolina. Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, 99 pp. + illus.

The primary goal of this report is to examine both the beach erosion trends and the dynamic processes responsible for them along the South Carolina coastline. Stable beach areas and areas of critical erosion are identified on the basis of studies of historical charts and maps, vertical aerial photographs and systematic measurements of shoreline changes carried out over a three-year period at over 70 field stations. Limits for setback lines, which define areas suitable or unsuitable for development, are defined in a general way from the erosion-deposition graphs presented. The data are presented in a format that should be of use to state and federal agencies, developers, homeowners, and groups interested in the environment of the state. However, some caution should be exercised in using the graphs and tables as the sole means for making development decisions. In many locations, site specific studies should be carried out by experts in coastal processes and engineering before final decisions are made regarding treatment of the erosion problem. (Authors)
BE CP 01

213
HAYES, M.O., SEXTON, W.J., and **KANA, T.W.** 1980. Stability of the Kiawah Island recurved spit system and its effect on the adjacent disputed acreage. Memo to Seabrook Island Company (R.Campbell), and Kiawah Island Company (A. Ball). RPI, Columbia, SC, 9 pp.

Reviews beach erosion at Captain Sams Inlet and its impact on adjacent property, including South of the Inlet. Included are reports outlining historical shoreline changes associated with the three tidal inlets bordering the property, Stono, Captain Sams, and North Edisto.
BE ID SH TI 20

214
HAYES, M.O., FITZGERALD, D.M., HULMES, L.J., and **WILSON, S.J.** 1976. Geomorphology of Kiawah Island, South Carolina. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments*, AAPG Field Course; Coastal Res. Div., Dept. Geol., USC, Columbia, Tech. Rept. No.11-CRD, Part II, pp. 80-100.

Kiawah Island morphological components are grouped into four subdivisions: "(1) an actively changing beach zone, (2) the three tidal inlets of the Stono, Kiawah, and Edisto Rivers, (3) the interior of the island, which is primarily beach-ridge complexes, and (4) the salt-marsh tidal channel area that surrounds the landward portion of the barrier."
CP CS GT SM 20

215
HAYES, M.O., OWENS, E.H., HUBBARD, D.K., and **ABELE, R.W.** 1972. The investigation of form and processes in the coastal zone. In D.R. Coates (ed.), Coastal Geomorphology, Proc. Third Annual Geomorphology Symposia Series, Binghamton, NY, pp. 11-41.

CP CS 00

216
HAYES, M.O., WILSON, S.J., FITZGERALD, D.M., HULMES, L.J., and **HUBBARD, D.K.** 1975. Coastal processes and geomorphology. In *Environmental Inventory of Kiawah Island*, Environmental Research Corp., Columbia, SC, 165 pp.

CP CS 01

217
HAYES, M.O., SEXTON, W.J., DOMERACKI, D.D., KANA, T.W., MICHEL, J., BARWIS, J.H., and **MOSLOW, T.F.** 1979. Assessment of shoreline changes, Seabrook Island, South Carolina. Summary Rept., Seabrook Island Company, SC; RPI, Columbia, SC, 82 pp.

A study of historical charts, maps, aerial photos field studies of beach processes, profile changes and tidal inlet bathymetry, to better understand the cycle of shoreline changes on Seabrook Island. The findings include recommendations to the Seabrook Island Company on how to deal with natural changes of the shoreline.
BA BE CP CS SH TI 20

218
HERBICH, J.B., and **HALES, Z.L.** 1970. Remote sensing techniques used in determining changes in coastlines. In Proc. 3rd Ann. Offshore Tech. Conf., Vol. 2, pp. 11319-11330.

Report describes a study of coastal changes at San Luis Pass on Galveston Island (TX) from photos and coastal charts. Vertical and oblique photos and charts were compared to determine changes in the tidal inlet and adjacent beach. The report notes while color photos are easier to interpret, they are not necessary for coastal change studies. Several photos show the San Luis Pass area and data on changes are presented. Report concludes that photos are an adequate sensor for detecting changes due to such long term phenomena as coastal processes or such short-term events as storms. (Authors)
RS SH 00

219
HESS, J. 1977. The chemical behavior of manganese and iron in the Pee Dee River-Winyah Bay Estuary, South Carolina. M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia.

Research on the behavior of manganese and iron at the area, has revealed that, Mn concentrations are elevated due to particle trapping within the estuarine turbidity maximum and subsequent desorption by cation exchange and bottom sediments. It was also found that dissolved Fe concentrations are depleted due to simultaneous flocculation with organics and precipitation of ferric hydroxides as the controlling mechanisms.
GS 30

220
HODGE, J.A. 1981. Erosion of the North Santee River Delta and development of a flood-tidal complex. M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia.

Three-dimensional study of a modern flood-tidal delta revealed that it was developed in response to shoreline erosion in a transgressive sequence system. It is speculated that a flood tidal delta will continue to transgress the adjacent tidal flat on Cape Island.
ID TI 30

221
HOWELL, G. 1980. Florida coastal data network. In Proc. 17th Coastal Engineering Conf., ASCE, New York, NY, pp. 421-431.

Describes the Florida nearshore wave data collection program run by the University of Florida. (P.A. Work)
CP 00

222
HUBBARD, D.K. 1976. Changes in inlet offset due to stabilization. In Proc. 15th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 1812-1823.

Changes in offset inlets are presented as affected by local transport phenomenon and inlet stabilization structures. (S.J. Smith)
CS TI 00

223
HUBBARD, D.K. 1977. Variations in tidal inlet processes and morphology in the Georgia Embayment. Tech. Rept. No. 14-CRD, Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, 79 pp.

A study conducted to describe morphologic variability in tidal inlets along the southeastern coast of the United States. A stratigraphic model is produced from 63 core and auger holes taken from Kiawah and Seabrook Islands, South Carolina. Holocene sediments overlie and abut two late Pleistocene beach ridges. Late Holocene depositional history is given which involve both transgressive and regressive phases. Kiawah Island has prograded during a transgressive phase beginning 3500-4000 years B.P.
CP TI 00 01

224
HUBBARD, D.K., and **BARWIS, J.H.** 1976. Discussion of tidal inlet sand deposits: examples from the South Carolina coast. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments*, AAPG Field Course, USC, Columbia, Tech. Rept. No.11-CRD, Part II, pp. 128-142.

A wide variety of sedimentary structures are described from sand bodies associated with tidal inlets. Three such systems are discussed in detail — the inlet channel, beach sediments, and the flood tidal delta. Each system is characterized by grain type and size; orientation, sequence, type and size of sedimentary structures; and depositional environment. The author states: "The lagoon and open marine environments need not be connected by a channel oriented normally to the shoreline trend."
GS ST TI 01

225
HUBBARD, D.K., BARWIS, J.H., and **NUMMEDAL, D.** 1977. Sediment transport in four South Carolina inlets. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 582-601.

"Hydrographic studies were conducted at four South Carolina tidal inlets to identify zones of active landward and seaward transport, and to document the processes responsible for this dominance."

Studies were conducted at Murrells, Fripp, Little River, and Stono Inlets. (S.J. Smith)
ST TI 01

226
HUBBARD, D.K., HAYES, M.O., and **BROWN, J.P.** 1977. Beach erosion trends along the South Carolina coast. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 797-814.

Beach erosion studies to characterize short-term and seasonal changes and recent historical changes and long-term changes have found variable beach stability due to variable physical conditions. Assessment of long-term shoreline changes for the entire South Carolina coast. Includes analysis of three-year record of beach profiles from 38 stations, aerial photographs dating back to 1940, and historical maps and charts dating to 1850. (P.A. Work)
BE SH 01

227
HUBBARD, D.K., OERTEL, G., and **NUMMEDAL, D.** 1979. The role of waves and tidal currents in the development of tidal inlet sedimentary structures and sand body geometry: examples from North Carolina, South Carolina, and Georgia. Jour. Sed. Petrology, Vol. 49, pp. 1073-1091.

CP 01

228
HUBBARD, D.K., BARWIS, J.H., LESESNE, F., STEPHEN, M.F., and **HAYES, M.O.** 1977. *Beach Erosion Inventory of Horry, Georgetown, and Beaufort Counties, South Carolina.* Tech. Rept. No. 8, SC Sea Grant, Charleston, SC, 58 pp.

Gives a summary of beach erosion-deposition trends for Horry, Georgetown and Beaufort Counties.
BE 10/30/40/50

229
HUBERTZ, J.M., BROOKS, R.M., BRANDON, W.A., and **TRACY, B.A.** 1993. Hindcast wave information for the U.S. Atlantic Coast. WIS Rept. No. 30, U.S. Army Eng. Waterways Expt. Sta., Vicksburg, MS.

Report describing and presenting results of revised hindcast for years 1956-1975 for the U.S. Atlantic coast. Brief discussion; remainder of report consists of tabulated output from the hindcast model. Digital time-series data also available. (P.A. Work)
CP 01

230
HULL, B.W., and **SILL, B.L.** 1984. Optimization of coastal bulkhead design by wing-wall addition. SCCC; Clemson Univ., Dept. Civil Eng., Clemson, SC, 136 pp.

This study examines the use of wing-walls attached to the ends of vertical bulkheads to reduce erosion along the flanks of the bulkhead. The laboratory study examined in detail eight different designs. Infrared photographs at approximately ten different water surface elevations were taken at the conclusion of each test. These were used to produce contours from which topographic maps were drawn and used to calculate volumes of sand erosion and deposition during each test. Also, a visual analysis of the erosive process was made during each test. Calculated volumes along with the visual analyses were used as the basis for comparing test results and ultimately for selection of the proposed wing-wall design. The 135° wing-wall design was selected as the best design due to most satisfactorily eliminating adjacent shoreline erosion. (Authors)
BE CS 01

231
HUME, T.M., and **HERDRENDROF, C.E.** 1992. Factors controlling tidal inlet characteristics on low drift coasts. Jour. Coastal Research, CERF, Vol. 8(2), pp. 355-375.

Discusses the tidal inlet processes for the low littoral drift conditions along the New Zealand coast. (S.J. Smith)
CP TI

232
HUMPHRIES, S.M. 1977. Morphologic equilibrium of a natural tidal inlet. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 734-753.

The dynamic equilibrium between tidal currents, and deposition of sand delivered by the longshore transport was monitored at North Inlet. The results show contemporaneous reduction in channel cross-sectional areas and beach erosion, or increase in channel cross-sectional area and beach accretion.
TI 40

233
HUNTLEY, D.A., and **NUMMEDAL, D.** 1978. Velocity and stress measurements in a tidal inlet. In Proc. 16th Conf. Coastal Engineering, ASCE, New York, NY, pp. 1320-1355.

Based on field measurements within the ebb-tidal delta of Price Inlet.
TI 30

234
HUSSEY, GAY, and **BELL.** 1974-1982 (various dates). Beach profile surveys and nourishment plans: Palmetto Dunes, Hilton Head Island, South Carolina. Unpublished, Savannah, Georgia.

BN BS 10

235
IDRIS, F.M. 1983. Cenozoic seismic stratigraphy and structure of the South Carolina lower coastal plain and continental shelf. Ph.D. Dissertation, Univ. Georgia, Athens, 127 pp.

Single-channel high-resolution seismic reflection data and limited core data on the South Carolina continental shelf reveal seaward-dipping Paleocene through Quaternary depositional sequences (carbonate and terrigenous sediments) which represent post-Paleocene progradation of the shelf. Paleocene, Oligocene, and Miocene surfaces are channelled which suggests submarine erosion by the ancestral Gulf Stream. Another result of this erosion is a large, NNW/SSE basin filled with thick Miocene and Pliocene sediments. Structural features identified on the continental shelf include a few fold-like features and relatively minor faulting. (P. Donovan-Ealy)
GP OS 10/20/30

236
IMPERATO, D.P. 1984. Sandy depositional environments of the North Edisto tidal basin. M.S. Thesis, Univ. South Carolina, Columbia.

Fathometer traces, surface samples and vibracores are used to describe sediments of ebb tidal deltas and tidal point bars of the North Edisto tidal basin. Descriptions of these deposits serve as a model for interpreting ancient sediments and are thus valuable aids in hydrocarbon exploration.
GT TI 20

237
IMPERATO, D.P., SEXTON, W.J., and **HAYES, M.O.** 1983. A mechanism for beach ridge formation. Annual Geol. Soc. Amer. Meeting, Indianapolis, IN.

238
IMPERATO, D.P., SEXTON, W.J., and **HAYES, M.O.** 1988. Stratigraphy and sediment characteristics of a mesotidal ebb-tidal delta, North Edisto Inlet, South Carolina. Jour. Sed. Petrol., Vol. 58(6), pp. 950-958.

Authors describe the ebb-tidal delta at North Edisto Inlet, South Carolina including discussion of the diagnostic textures, sedimentary structures, and geometry of delta in its mesotidal setting. Data used in the study include 15 km of fathometer profile traces, 5 km side scan sonar traces, 70 grab samples, 2 box cores, 35 vibracores, SCUBA observations and aerial surveys. (P. Donovan-Ealy)
CS GS GT 40

239
INMAN, D.L., and **FRAUTSCHY, J.D.** 1966. Littoral processes and the development of shorelines. In Proc. Coastal Engineering, Santa Barbara Specialty Conference, Chap. 22, pp. 511-536.

SH 00

240
INMAN, D.L., and **NORDSTROM, C.F.** 1971. On the tectonic and morphologic classification of coasts. Jour. Geol., Vol. 79, pp. 1-21.

CS 00

241
JANISKEE, R.L. 1990. Storm of the century: Hurricane *Hugo* and its impact on South Carolina. SE Geographer, Vol. 30(1), pp. 63-67.

Hurricane *Hugo* struck South Carolina in September 1989, causing extensive major damage to property and natural resources. Trees were damaged or destroyed on one-third of the state's forested land, with resulting losses of more than $1 billion in the timber indus-

try, plus a five-year heightened risk of serious wildfires. The damages sustained by old growth forest and coastal dune ecosystems greatly altered wildlife habitat and may have pushed several endangered species closer to extinction. The most important of *Hugo's* enduring impacts will be its influence on beachfront development. This "storm of the century" not only destroyed or damaged thousands of beachfront dwellings and businesses, but also drew sharp attention to the damage abatement provisions of South Carolina's highly controversial Beach Management Act. Perhaps *Hugo* will prove to be the critical event that tipped the balance in favor of socially and ecologically responsible beachfront management in South Carolina. (Authors)
BE BN 01

242
JARRETT, J.T. 1978. Coastal processes at Oregon Inlet, North Carolina. In Proc. 16th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1257-1275.

A study of the Coastal processes at Oregon Inlet for a proposed inlet stabilization project which was to include sand bypassing. (S.J. Smith)
CP TI 00

243
JOHNSON, J.W. 1973. Characteristics and behavior of Pacific Coast tidal inlets. In Proc. Coastal Sediments '73, ASCE, New York, NY, Vol. 99(3), pp. 325-340.

TI 00

244
JOHNSON, H.S., JR., and **DUBAR, J.R.** 1963. Geomorphic elements of the area between the Cape Fear and Pee Dee Rivers, North and South Carolina. SE Geol., Vol. 6, pp. 37-48.

Geomorphic features between the Cape Fear River, North Carolina and Pee Dee River, South Carolina are described and a sequence of geologic events for the region is proposed. (P. Donovan-Ealy)
CS 40/50

245
JONES, C.P. 1987. Shoreline assessment and determination of development setbacks for proprietary client, Hilton Head Island, South Carolina. CSE, Columbia, SC, 44 pp. + app.

BS 10

246
JONES, C.P. 1987. Shoreline assessment of southern Isle of Palms, S.C. Assessment Rept., The Beach Company; CSE, Columbia, SC, 40 pp.

Provides detailed inventory of historical shorelines using vertical aerial photography, identifying the most landward shoreline in 40 years.
BS 20

247

JONES, C.P. 1988. Beach and seawall inspection Block 16, Seabrook Island. Memo., Seabrook Island Property Owners Association; CSE, Columbia, SC, 17 pp.

Findings of a detailed inspection of the Seabrook Island beach and seawall, being an expansion on the findings of the beach monitoring report of December 1987. Focus is along the south end where beach is eroding and stability of the seawall is threatened by migrating north marginal flood channel of North Edisto Inlet on Block 16.
BE 20

248

JONES, C.P., and **KANA, T.W.** 1988. Performance of beach nourishment at Myrtle Beach, South Carolina. In Proc. Beach Preserv. Tech. '88, Florida Shore and Beach Preservation Assoc., pp. 75-86.

Presentation of postproject monitoring data and performance information for the 1985-1987 Myrtle Beach nourishment project.
BN 50

249

JONES, C.P., and **MEHTA, A.J.** 1977. Sand transfer systems at Florida's tidal entrances. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 48-66.

"In this study, six types of sand transfer systems, which have been and are currently employed at Florida's tidal entrances, are reviewed and compared. Emphasis has been placed on the engineering and the economic efficiencies, and on the hydraulic and the sedimentary characteristics relating to entrance stability and natural bypassing tendencies."
ST TI

250

JONES, C.P., and **MEHTA, A.J.** 1980. Inlet sand bypassing systems in Florida. Shore & Beach, Vol. 48(1), pp. 25-34.

A summary of sand bypassing at nine Florida tidal inlets. The paper discusses history, economics, and effectiveness as well as the state's role in sand bypassing. (S.J. Smith)
ST TI

251

JONES, C.P., SCATURO, D.M., KANA, T.W., and **EISER, W.C.** 1988. Calculation of interim baselines and 40-year setback lines. Final Rept., South Carolina Coastal Council, Charleston; CSE, Columbia, SC, 60 pp.

Gives (1) a methodology for delineating standard erosion zones, inlet erosion zones, and 40-year setback lines, (2) summary and tabulated revisions to shorefront management plans giving the interpolated 40-year setback lines, (3) recommendations for additional data requirements and analysis.
BS 01

252
KACZOROWSKI, R.T. 1976. Origin of the Carolina Bays. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments* (AAPG-sponsored field course). Coastal Res. Div., Dept. Geol., USC, Columbia, SC, pp. II-16 to II-36.

Origin of Carolina Bays is discussed in the context of modern analogues from Alaska and Chile.
EN 40/50

253
KACZOROWSKI, R.T. 1977. The Carolina Bays: a comparison with modern oriented lakes. Tech. Rept. No. 13-CRD, Coastal Res. Div., Dept. Geol., USC, Columbia, SC, 124 pp.

The origin of the South Carolina Bays is discussed. They are compared and contrasted with modern analogues in Alaska, Chile and Texas.
EN 40/50

254
KAMPHIUS, J.W. 1991. Alongshore sediment transport rate. Jour. of Waterway, Port, Coastal and Ocean Eng., Vol. 117(6), ASCE, New York, NY, pp. 624-640.

Careful laboratory study on longshore sediment transport rate. Includes both monochromatic and random waves, two different grain sizes. Transport rates determined by catching sediment in boxes and determining weight captured as a function of time. Results are compared to lab and field data and derived expressions. (P.A. Work)
MS ST 00

255
KANA, T.W. 1976. Sediment transport rates and littoral processes near Price Inlet, S.C. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments* (a field course sponsored by AAPG). Coastal Res. Div., Dept. Geol., USC, Columbia, SC, pp. II-158 — II-171.

Direct measurements of suspended sediment in the surf zone at four transects near Price Inlet are used to estimate littoral transport rates.
ST 01

256
KANA, T.W. 1977. Suspended sediment transport in Price Inlet, SC. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 366-382.

Daily longshore sediment transport rates were estimated two ways near Price Inlet (SC) between August and November 1975. A transport rate, Q_e, was calculated from the longshore component of wave energy flux and compared with a suspended sediment transport rate, Q_s, determined from suspended sediment concentration and longshore current velocity. Over 650 "instantaneous" water samples were collected in the surf zone to establish the typical distribution of sediment in suspension from 4 cm above the bed to the surface. Concentrations range to as much as 50 kg/m^3 at 10 cm above the bed, but the mean for all sample elevations is less than 1 kg/m^3.

Despite several simplifying assumptions, the results show a fair correspondence between Q_e and Q_s. A regression line, log Q_e = 0.95 log Q_s, incorporates almost half the data points within the 95 percent confidence limits and accounts for 95 percent of the variation. This relatively close correspondence between Q_e and Q_s indicates that suspended load accounts for the major portion of sand transported alongshore in the littoral zone. (Author abstract)
ST 30

257
KANA, T.W. 1977. Beach erosion during minor storm. In Jour. Waterway, Port, Coastal & Ocean Engineering, ASCE, New York, NY, Vol. 103(WW4), pp. 505-518.

Reports an episode of beach erosion near Georgetown, South Carolina, during minor northeast storm and examines the processes and other nonstorm-related factors that accelerated the rate of erosion.
BE 30/40

258
KANA, T.W. 1978. Surf zone measurements of suspended sediment. In Proc. 16th Conference on Coastal Engineering, ASCE, New York, NY, pp. 1725-1742.

Suspended sediment concentration was measured in approximately 250 breaking waves on undeveloped beaches near Price Inlet, South Carolina, U.S.A., using portable in-situ bulk water samples. As many as 10 instantaneous 2-liter water volumes were obtained in each wave for a total of 1500 samples. Concentrations of suspended sediment were determined at fixed intervals of 10, 30, 60, and 100 cm above the bed for various surf zone positions relative to the breakpoint. Surf zone process variables measured included breaker height and depth, breaker type, wave period, surface longshore current velocity, wind velocity and direction. Results for plunging and spilling waves, under moderate swell conditions indicate:

1) Suspended sediment concentration in the breaker zone is primarily dependent on elevation above the bed, breaker type, wave height and distance from the breakpoint.
2) Concentration decreases exponentially above the bottom to approximately 60 cm elevation as a function of the intermittent suspension of coarse sediment from the bed.
3) Relative breaker height (d/H_b) is useful for quantifying breaker types and predicting concentration at a given elevation.
4) Concentration decreases with wave height in the range 50-150 cm for spilling and plunging waves, but the relationship for waves less than 50 cm is not adequately resolved.
5) In spilling waves, concentration rapidly increases inside the breakpoint, then remains relatively constant under the bore as it propagates toward the beach. In plunging waves, concentration peaks within a few meters of the breakpoint, then decreases gradually toward shore. (Author)

ST 30

259

KANA, T.W. 1979. Suspended sediments in breaking waves. Tech. Rept. No. 18-CRD, Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, 153 pp.

Suspended sediment concentration was measured in 235 breaking waves on undeveloped beaches near Price Inlet, South Carolina, using portable in-situ bulk water samplers. The principal factor controlling suspended sediment concentration at a point in the breaker zone is breaker type. Plunging waves typically entrain on order more sediment than spilling breakers. Breaker type for these data can be reasonably quantified as a continuous variable on the basis of relative wave height (d_b/H_b. Plunging waves near Price Inlet occur at $d_b/H_b < 0.89$, whereas spilling waves generally break at $d_b/H_b > 1.10$. Mean concentration increases with decreasing d_b/H_b according to:

$$\text{Log}_{10}(\text{SS10}) = 17.4 - 1.7\ d_b/H_b,$$

where SS10 is suspended sediment concentration at 10 cm above the bed. This theorized model accounts for almost 60 percent of the variation in mean concentration by d_b/H_b.

Secondary controlling factors of concentration also include distance relative to the wave breakpoint, beach slope, and wave height. Mean suspended sediment in the breaker zone reaches a maximum several meters landward of the breaker line, peaking more sharply in plunging than in spilling waves. For the range of slopes in the present study (0.004-0.040), mean concentration increases according to the model:

$$\text{Log}_{10}(\text{SS10}) = 0.22 + 14.5\ m,$$

where m is dimensionless beach slope. (Author)
CP ST 30

260

KANA, T.W. 1981. Survey of the northern marginal flood channel of North Edisto Inlet, October 1981. RPI Tech. Memo. for Seabrook Island Company, Charleston, SC; RPI, Columbia, SC, 24 pp.

Provides an updated survey of northern margin flood channel of North Edisto Inlet as it affects the shoreline in the vicinity of Amberjack and Bonita Courts on Seabrook Island. A summary of results and conclusions is given.
ID 20

261

KANA, T.W. 1983. Soft-engineering alternatives for shore protection. In Proc. Coastal Zone '83, ASCE, New York, NY, pp. 912-929.

The only way to prevent a rash of (coastal) structural failures along erosional, armored shorelines is to (1) require that stronger structures be built or (2) preserve wave-absorbing beaches in front of the structures. The nonstructural alternative is recommended from an aesthetic, recreational, or cost standpoint. Any time a beach can be preserved in front of a structure, the chance of damage is lessened. There are a number of ways that beach can be preserved, including submerged breakwaters, underwater sand fences, beach nourishment, and movement of tidal inlets. The key to long-term beach maintenance is to retard the rate of sediment loss by reducing wave energy or increasing the sediment supply. (Author)
BN 00

262
KANA, T.W. 1988. USA — South Carolina. Chap. 62, *Artificial Structures and Shorelines* (H.J. Walker, ed.), Kluwer Academic Publ., Dordrecht, Netherlands, pp. 593-605.

Provides a simple inventory (maps and tables) of coastal structures along the ocean shoreline of South Carolina.
CS 01

263
KANA, T.W. 1988. Shoreline assessment and plan for interim beach restoration along Pawleys Island, S.C. Final Rept., Town of Pawleys Island, SC; CSE, Columbia, SC, 32 pp. + app.

BN 40

264
KANA, T.W. 1988. *Beach Erosion in South Carolina.* M. Goodwin and F. Rogers (eds.), South Carolina Sea Grant Consortium, Charleston, SC, SCSG-SP-88-1, 55 pp.

While controversy is bound to persist in the beach erosion debate, the degree of South Carolina's erosion problem and the existing patterns of development and preservation offer considerable cause for optimism. Stronger coastal zone management is needed to ensure the continued balance of preservation and public access with revenue-generating development. As we gain more experience, we may be able to extend our vision beyond 50 years and discover innovative ways to deal with erosion, working with nature, rather than against it. (Author)
BE 01

265
KANA, T.W. 1989. Beach nourishment through inlet relocation. In Proc. Beach Preservation Technology '89, Florida Shore and Beach Preservation Association, pp. 293-302.

Description of the Captain Sams Inlet relocation near Seabrook and Kiawah Islands, South Carolina. (S.J. Smith)
BN TI

266
KANA, T.W. 1989. Erosion and beach restoration at Seabrook Island, South Carolina. Shore & Beach, Vol. 57(3), pp. 3-18.

Discusses history of shoreline change at Seabrook Island and influence of North Edisto and Captain Sams Inlets. (P.A. Work)
BE BN SH TI 20

267

KANA, T.W. 1989. Beach nourishment through inlet relocation. In Proc. Beach Preservation Technology '89, Florida Shore & Beach Pres. Assoc., Tallahassee, pp. 293-302.

BN ID 20

268

KANA, T.W. 1990. *Conserving South Carolina Beaches Through the 1990s: A Case for Beach Nourishment.* South Carolina Coastal Council, Charleston, SC, 33 pp.

The estimates it will take 16 million cubic yards of sand (~100 football fields, each filled with a 100-ft high pile of sand) at a cost of about $65 million to restore and maintain a minimum dry-sand beach along the state's eroded coast over the next ten years. Areas such as Hunting Island and Folly Beach will require expenditures up to $500 per linear foot, while stable beaches such as Myrtle Beach will require less than $100 per foot. (Author)

BN 01

269

KANA, T.W. 1993. The profile volume approach to beach nourishment. In D.K. Stauble and N.C. Kraus (eds.), *Beach Nourishment Engineering and Management Considerations*, ASCE, New York, NY, pp. 176-190.

An ideal present profile (IDP) is developed for the reach in question and used as a basis for comparison of profiles, for delineation of the natural "shoreline" in the absence of structures, and for an estimate of sand deficits. Nourishment quantities are predicated on several factors, none of which relate directly to an equilibrium beach slope for the area, but in effect, account for the normal range of profile variations. (Author)

BN 01

270

KANA, T.W. 1993. South Carolina beach nourishment projects: successes and failures. In P. Bruun (ed.), Proc. Hilton Head Island Intl. Coastal Symposium; co-sponsors Jour. Coastal Research, South Carolina Coastal Council, and South Carolina Shore & Beach Pres. Assoc., 6-9 June 1993, Hilton Head Island, SC, pp. 255-260.

BN 01

271

KANA, T.W., and **ANDRASSY, C.J.** 1993. Performance evaluation of recent South Carolina nourishment projects. Final Rept., Contr. DACW39-92-C-0115, U.S. Army Eng. Waterways Expt. Sta., Vicksburg, MS; CSE, Columbia, SC, 314 pp. + app.

Detailed review of the planning, design, and construction of nourishment projects at Myrtle Beach, Seabrook Island, and Hunting Island, emphasizing which elements of the design analyses (erosion, geotechnical, coastal processes modeling, etc.) were most important for each case.

BN 10/20/50

272
KANA, T.W., and **ANDRASSY, C.J.** 1995. Beach profile spacing: practical guidance for monitoring nourishment projects. In Proc. 24th Coastal Eng. Conf., ICCE'94, ASCE, New York, NY, pp. 2100-2114.

273
KANA, T.W., and **DINNEL, S.** 1980. Bathymetry, shoreline changes, and remedial measures for shore protection on Isle of Palms adjacent to Dewees Inlet, S.C. Tech. Rept., Beach & Racquet Club Co., Inc., Isle of Palms, SC; RPI, Columbia, SC, 63 pp.

The study defines the extent of beach erosion, long-term and short-term erosion trends, identifies causes of erosion, and recommends remedial shore protection measures.
BA BE CP SH TI 30

274
KANA, T.W., and **HAYES, M.O.** 1979. Design options for breaching Kiawah Island Spit and stabilizing Captain Sams Inlet. Memo to Seabrook Island Company (R. Campbell) and Kiawah Island Company (A. Ball). RPI, Columbia SC.

Outlines several design options for cutting a new channel and stabilizing Captain Sams Inlet at the neck of Kiawah Spit. Advantages of a new channel are given:

1) Relief of erosive pressure.
2) Freeing of a large volume of sand from the ebb delta.
3) Stabilization of recurved spit.

ID BN 20

275
KANA, T.W., and **HAYES, M.O.** 1980. Hydraulics, of tidal delta sedimentation and surf zone sediment suspension. Final Rept., U.S. Army Res. Off.; Coastal Res. Div., Dept. Geol., USC, Columbia, SC, 32 pp.

A summary of results of research performed between December 1975 and July 1980 on the hydraulics of tidal delta sedimentation and surf zone suspensions. The goals of the study were:

1) Determination of rates and patterns of sediment transportation on the ebb-tidal delta of Price Inlet.
2) Determination of rate of longshore transport adjacent to natural tidal inlet (Price Inlet).
3) Determination of quantitative sediment budget for the inlet and associated shoals.
4) Determination of inlet stability and relate it to the controlling hydraulic parameters.
5) Derivation of a predictive model for ebb-tidal delta genesis and tidal channel migrations.
6) Determination of depositional history of Price Inlet during the Holocene.

GS TI 30

276
KANA, T.W., and **KNOTH, J.S.** 1977. Longshore sediment transport rates in South Carolina. In D. Nummedal (ed.), *Beaches and Barriers of the Central and South Carolina Coast* (guidebook for a field trip to Sullivans Island and the Isle of Palms), pp. 25-29.

Authors evaluate various methods used to calculate net transport rates of sand for northern islands in South Carolina. Previous methods used by the Coastal Research Division are based on longshore component of wave energy flux. Recent studies include seasonal wave process measurements, suspended sediment concentrations, longshore current velocities, and using dyed sand tracers. Despite the inclusion of these additional factors, new transport rate calculations are very similar to those in previous studies. (P. Donovan-Ealy)
CP ST 01

277
KANA, T.W., and **MASON, J.E.** 1988. Evolution of an ebb-tidal delta after an inlet relocation. In D.G. Aubrey (ed.), *Lecture Notes on Coastal and Estuarine Studies*, Springer-Verlag, New York, NY, Vol. 29, pp. 382-411.

Describes the relocation of Captain Sams Inlet and the evolution of the new inlet after relocation. (S.J. Smith)
ST TI 20

278
KANA, T.W., and **SEXTON, W.J.** 1982. Shoreline stability along Block 16 Seabrook Island: recent trends and alternatives for shore protection and beach improvement. Study for Block 16 Property Owners, Seabrook Island; Seabrook Island Company, Charleston, SC, and RPI, Columbia, SC, 37 pp.

Outlines problems of shoreline change due to beach erosion developing along Block 16 of Seabrook Island. Erosion of Deveaux Bank, migration of Captain Sams Inlet, and onshore movement of northern channel of North Edisto Inlet have been indicated as the principal factors that account for most of the changes.
BE 20

279
KANA, T.W., and **SEXTON, W.J.** 1988. Barrier beaches and tidal inlets of central South Carolina. In D.T. Secor, Jr. (ed.), *Southeastern Geological Excursions*. Geol. Soc. Amer., SE Sect., Columbia, SC, pp. 185-203.

Gives a description of sedimentary features at different stop locations during Field Trip 6. The following stop locations are described:

1) Sullivans Island — recurve spit.
2) Sullivans Island — regressive dune.
3) North end of Sullivans Island — beach spit — shallow migrating inlet.
4) Isle of Palms — regressive dune/beach sequence.
5) Northeast end of Palms — Wild Dunes development.

6) Dewees Inlet — sand-transport pathways at the margins of a stable tidal inlet.
7) Seabrook Island and Captain Sams Inlet.
8) North Edisto Inlet.
9) Renken Point.
10) Seabrook near golf course.
11) Captain Sams abandoned tidal Inlet.
12) New Captain Sams Inlet.

BE BN CS TI 20/30

280

KANA, T.W., and **SNYDER, H.S.** 1991. An estimate of South Carolina beach nourishment requirements through the 1990s. In Proc. 4th Annual National Beach Preservation Technology Conf., pp. 103-116.

Beach surveys and a consideration of nourishment experience over the past decade were used to estimate that 16 million cubic yards of sand (cost of $65 million) is required to restore and maintain a 50 ft dry sand beach in South Carolina for 10 years. Authors estimate that "one-half of South Carolina's 90 miles of developed beaches are eroding or lack a dry-sand beach because of development and shore-protection structures which have been placed too close to the ocean." Nourishment projects anticipated in the 1990s are outlined and basic cost estimates given. (P. Donovan-Ealy)

BE BN BS SB 01

281

KANA, T.W., and **STEVENS, F.D.** 1992. Coastal geomorphology and sand budgets applied to beach nourishment. In S.A. Hughes (ed.), Proc. Coastal Engineering Practice '92, ASCE, New York, NY, pp. 29-44.

When combined with traditional analytical techniques in nourishment design, conceptual models of coastal processes and morphologic trends offer an easily understandable framework for defining beach erosion problems. They can be used to test theories regarding causes of erosion, to guide the selection of survey sites and analytical techniques, and to explain the basic nature of coastal processes at a site. (Authors)

BN CP SB 01/10/40

282

KANA, T.W., and **SVETLICHNY, M.** 1983. Artificial manipulation of beach profiles. In Proc. 18th Coastal Engineering Conference, ASCE, New York, NY, pp. 903-922.

Discusses results of a study on response of natural beaches to artificial manipulation by sand scraping. Results show that scraping and fill had little adverse effect on the beach cycle in the northern zone of the project area, which is fronted by natural dune system. The study found significant differences in the response of shorelines in higher erosion settings and slower recovery of beach profiles backed by seawalls.

BS 50

283
KANA, T.W., BACA, B.J., and **SIAH, S.J.** 1985. Shoreline and environmental assessment of Debidue, Arcadia I, and Arcadia II tracts, Debidue Island, South Carolina. Rept. to North Inlet Corporation, Columbia, SC, 58 pp.

Elucidates various physical and environmental constraints on developing portions of the Island. Recommendations address preservation of sensitive or unstable areas.
CS EN 40

284
KANA, T.W., BACA, B.J., and **WILLIAMS, M.L.** 1986. *Potential Impacts of Sea-Level Rise on Wetlands Around Charleston, South Carolina.* Rept. No. EPA-230-10-85-014, U.S. Environmental Protection Agency, Wash., DC.

Presents background information concerning global warming and future sea level rise, the ecological balance of coastal wetlands, and potential transformation of the ecosystem as seal level rises. Also discusses potential, impact of future sea level rise on Charlestons wetlands, and suggests ways to improve the ability to predict the impact of sea level rise on other coastal wetlands, onshore beach conditions; and aerial photography.
CP EN 20

285
KANA, T.W., BACA, B.J., and **WILLIAMS, M.L.** 1986. Beach surveys and environmental monitoring along Seabrook Island, South Carolina: August 1985 — June 1986. Final Rept., Seabrook Island POA, SC; CSE, Columbia, SC, 58 pp. + app. [Note: Other reports in the series include Kana (1987) (period 1986-1987) and CSE (1988, 1989, and 1990-1993).]

A study of shoreline surveys carried out to determine the rates of erosion and deposition at different points along the beach. A sediment budget and identification of potential erosional problems are given.
BS EN 20

286
KANA, T.W., BACA, B.J., and **WILLIAMS, M.L.** 1988. Charleston case study. *Greenhouse Effect, Sea Level Rise, and Coastal Wetlands.* U.S. Environmental Protection Agency, Wash., DC., pp. 37-60.

CP EN 20

287
KANA, T.W., DINNEL, S.P., and **HAYES, M.O.** 1981. A development setback line for three beachfront parcels on Isle of Palms, South Carolina. Final Rept., The Beach & Racquet Club Co., Isle of Palms, SC; RPI, Columbia., SC, 35 pp.

Gives a summary of historical shorelines, aerial photographs, historical maps and sketches dating back to 1696, and erosion trends on Isle of Palms. The data are used for determining reasonable and prudent setback lines.
SH 20

288
KANA, T.W., DINNEL, S.P., and **SEXTON, W.J.** 1980. Erosion of Long Island, South Carolina, by tidal creek migration, and recommended shore protection. Feasibility Rept., Seabrook Island Company, SC; RPI, Columbia, SC, 31 pp.

A study of historical shoreline changes and bathymetry at the juncture of Captain Sams Creek and Long Island (Seabrook Island), South Carolina, summarizing shoreline changes associated with Captain Sams Creek along Long Island, a barrier beach ridge located on Seabrook Island. Structural improvements for shore protection are recommended.
BE SH TI 20

289
KANA, W.T., DINNEL, S.P., and **SEXTON, W.J.** 1981. Bathymetry of Kiawah River, Stono River, and historical changes in Stono Inlet, South Carolina. Tech. Rept., Kiawah Island Company, Charleston, SC; RPI, Columbia, SC, 71 pp.

Presents field survey results from Kiawah and Stono Rivers. Gives the historical analysis of Stono Inlet and inlet cross-sections.
BA SH TI 20

290
KANA, T.W., MASON, J.E., and **WILLIAMS, M.L.** 1987. A sediment budget for a relocated tidal inlet. In Proc. Coastal Sediments '87, ASCE, New York, NY, pp. 2094-2109.

A sediment budget has been developed for a new tidal delta (Captain Sams Inlet) and down drift zone of accretion, which evolved after a sand spit was breached by the new inlet. The results provide new insight into ebb-tidal delta evolution for a moderate-sized mesotidal inlet and an estimate of the rate and total quantity of sediments made available for accelerated by-passing.
SB 20

291
KANA, T.W., SEXTON, W.J., and **HAYES, M.O.** 1980. Dredging and realignment of the northern marginal flood channel of North Edisto Inlet. Feasibility Study for Seabrook Island Company, Charleston, SC; RPI, Columbia, SC, 44 pp.

"A study of the hydrography, bathymetry, and sediments of the northern marginal flood channel of North Edisto Inlet, South Carolina, was completed to determine the feasibility of moving the channel seaward of its present location."
BA GS ST TI 20

292
KANA, T.W., SEXTON, W.J., and **WILLIAMS, M.L.** 1983. Survey of offshore sand deposits for beach nourishment Myrtle Beach, South Carolina. Feasibility Study, City of Myrtle Beach, SC; RPI, Columbia, SC, 52 pp.

Side-scan sonar, bathymetry, and high-resolution seismic reflection profiling offshore Myrtle Beach, South Carolina provided the basis for shallow vibracoring and grab sampling to identify possible offshore beach renourishment resources. Although nearshore sediment sizes are quite variable (mud to coarse sand) and broad areas of the bottom contain only a thin layer of sand over hard-bottom, four potential borrow area are outlined. (P. Donovan-Ealy)
BN GP GT 50

293
KANA, T.W., SIAH, S.J., and **WILLIAMS, M.L.** 1983. Shoreline stability — Shipwatch at Wild Dunes, Isle of Palms, South Carolina. Final Rept., Drake Development Company, Columbia, SC; RPI, Columbia, SC, 31 pp.

Contains analysis of shoreline stability and historical trends for an area northeast of Isle of Palms. The review includes photogrammetric determination of shoreline, and estimated mean high water positions, projection of future shoreline trends; and, an assessment of the overall geomorphic trends at Isle of Palms, and their effects.
SH 20

294
KANA, T.W., SIAH, S.J., and **WILLIAMS, M.L.** 1984. Shoreline assessment of a tract known as Melrose Plantation, Daufuskie Island, South Carolina. Preliminary report prepared for The Melrose Company, Hilton Head, SC, by RPI, Columbia, SC, 23 pp.

Gives an analysis of historical shoreline changes, assessment of present beach conditions, and management alternatives for the area.
MP SH 10

295
KANA, T.W., SIAH, S.J., and **WILLIAMS, M.L.** 1984. Alternatives for beach restoration and future shoreline management; Seabrook Island, South Carolina. Feasibility Study for Seabrook Island Property Owners Association, Inc.; CSE, SC, 118 pp.

Reviews historical shoreline changes; gives an assessment of present beach conditions after relocation of Captain Sams Inlet; and gives general design criteria for beach nourishment.
BN MP 20

296
KANA, T.W., STEVENS, F.D., and **LENNON, G.** 1990. Beach and dune restoration following Hugo. Shore & Beach, Vol. 58(4), pp. 57-63.

BN 30/40/50

297
KANA, T.W., STEVENS, F.D., and **LENNON, G.** 1991. Post-*Hugo* beach restoration in South Carolina. In Proc. Coastal Sediments '91, N.C. Kraus, K.J. Gingerich, and D.L. Kriebel (eds.), A Specialty Conference on Quantitative Approaches to Coastal Sediment Processes, ASCE, New York, NY, pp. 1697-1711. [Note: Also published as Kana et al. (1991), Proc. 4th Beach Preserv. Tech. Conf., Florida Shore & Beach Preserv. Assoc., pp. 1-13.]

The three phases of a project to restore South Carolina beaches after Hurricane *Hugo* are discussed:

1) Dune restoration.
2) Beach nourishment (from external sources).
3) Dune revegetation and sand fencing.

Preliminary results indicated that emergency nourishment and natural recovery of the beach profile restored Myrtle Beach to near prestorm conditions by October 1990, one year after the hurricane.
BN 30/40/50

298
KANA, T.W., WARD, L.G., and **JOHNSON, H.M**. 1980. Suspended sediment and sand transport at Duck, North Carolina. Final Rept., USACE-CERC, Contr. No. DACE 72-78-M-0865; Univ. South Carolina, Columbia, 75 pp.

ST 00

299
KANA, T.W., WILLIAMS, M.L., and **EISER, W.C.** 1986. Erosion assessment study for Hilton Head Island. Executive Summary for Town of Hilton Head Island, SC; CSE, Columbia, SC, 47 pp. + technical data report (65 pp. + app.).

The scope of work covered:

· Beach erosion inventory.
· Establishment of 36 control points (monuments) behind the foredunes.
· Survey of the beach from the monuments to low-tide wading depth (-6 ft MSL).
· Development of a computerized database of comparative beach surveys.
· Preparation of sediment budgets, an accounting of gains and losses along the shoreline.
· Development of a conceptual model of erosion/deposition patterns, inference of causes to the extent possible, and an outline of nourishment requirements. (Authors)

BE CP SB 10

300
KANA, T.W., WILLIAMS, M.L., and **SHIBLES, B.N.** 1983. Shoreline changes at the northeast end of Isle of Palms, S.C., May 1982 through May 1983. Final Rept., Wild Dunes Beach & Racquet Club Company, Isle of Palms, SC; RPI, Columbia, SC, 44 pp.

Summarizes shoreline changes along the northeast end of Isle of Palms between May 1982 and June 1983 based on periodic beach surveys, aerial over flights, and detailed sediment budget analysis. Results indicate major shoreline changes have taken place primarily in response to natural build up of an offshore shoal opposite Beachwood East and Dune Crest Lane.
SH 30

301
KANA, T.W., WILLIAMS, M.L., and **SHIBLES, B.N.** 1983. Survey of beach changes (1981-1983) and recommendations for beach maintenance. Final Rept., City of Myrtle Beach, SC; RPI, Columbia, SC, 25 pp.

Contains results of a beach survey completed May 1983 along Myrtle Beach. Comparison of beach profile changes of Spring 1981, May 1982, and the most recent survey is made. Also contains an estimate of net sand losses on the active beach during the period of study.
BS 50

302
KANA, T.W., WILLIAMS, M.L., and **STEVENS, D.** 1985. Managing shoreline changes in the presence of nearshore shoal migration and attachment. In Proc. Coastal Zone '85, Vol. 1, ASCE, New York, NY, pp. 1277-1294.

Describes a process of shoal build-up, detachment from the ebb-tidal delta, and subsequent migration and attachment to the shoreline. The process is said to be important for better understanding of erosion/deposition patterns around tidal inlets. The area of study is at the northern end of Isle of Palms.
SH TI 30

303
KANA, T.W., MICHEL, J., HAYES, M.O., and **JENSEN, J.R.** 1984. The physical impact of sea-level rise in the area of Charleston, S.C. In M.C. Barth and J.G. Titus (eds.), *Greenhouse Effect and Sea Level Rise*, Van Nostrand Reinhold Co., New York, NY, pp. 105-150.

Reports on a pilot study to determine the potential shoreline impact from accelerated rises in sea level due to anthropogenic (man-induced) factors.
CP SH 20

304
KANA, T.W., SEXTON, W.J., THEBEAU, L.C., and **HAYES, M.O.** 1981. Preliminary design and permit application for breaching Kiawah spit north of Captain Sams Inlet. Final Rept., Seabrook Island Company, SC; RPI, Columbia, SC, 43 pp.

Contains background historical information on shoreline changes, plan and elevation of proposed project (breaching Kiawah Spit), and a statement of environmental effects of the project on adjacent property and wildlife.
EN SH TI 20

305
KANA, T.W., SIAH, S.J., WILLIAMS, M.L., and **SEXTON, W.J.** 1984. Analysis of historical erosion rates and prediction of future shoreline positions, Myrtle Beach, South Carolina. Project Rept., City of Myrtle Beach, SC; RPI, Columbia, SC, 130 pp.

Gives historical beach erosion rates; determines the "ideal present shoreline," and projects historical erosion rates. The first technical report applying the ideal profile methodology for objective delineation of shorelines and setback lines in the presence of structures.
BE SH 50

306
KANA, T.W., VOGEL, M.J., SEXTON, W.J., and **HAYES, M.O.** 1983. Shoreline changes along Kiawah Island, May 1872 through May 1983. Final Rept., Kiawah Island Company, SC; RPI, Columbia, SC, 33 pp. + app. [Also Kana, Williams, and Siah (1984) covers the period May 1983 to May 1984. See also Williams and Kana (1985, 1986).]

Summarizes shoreline changes along Kiawah Island between May 1982 and May 1983, based on quarterly beach surveys. Also relates changes of 1982 to those of prior years. The purpose of the surveys was to assist Kiawah Island Company in planning development setbacks and land use along the shoreline, and to identify adverse erosional trends.
BS SH 20

307
KANA, T.W., VOGEL, M.J., SIAH, S.J., WILLIAMS, M.L., and **EISER, W.C.** 1984. Shoreline assessment of Dewees Island, South Carolina. Project Rept., Drake Development Corp.; CSE, Columbia, SC, 65 pp.

Gives a preliminary assessment of the shoreline along Dewees Island, South Carolina. Also gives analysis of historical shoreline changes, assessment of present beach conditions and management alternatives. Reviews the geomorphic setting and coastal processes along Dewees Island, historical photos, tables, and graphs delineating shoreline movement, as well as average annual accretion and erosion rates at 11 beach transects.
BS SH 30

308
KASSNER, J., and **BLACK, J.A.** 1982. Efforts to stabilize a coastal inlet: a case study of Moriches Inlet, New York. Shore & Beach, Vol. 50(2), pp. 21-29.

Presentation of the history of Moriches Inlet, and efforts to stabilize this unstable inlet. (S.J. Smith)
ID TI 00

309
KASSNER, J., and **BLACK, J.A.** 1983. Inlets and barrier beach dynamics: a case study of Shinnecock Inlet, New York. Shore & Beach, Vol. 51(2), pp. 22-26.

"This report describes the history of Shinnecock Inlet, its role in coastal processes and the consequences of efforts to stabilize it."
CD ID TI 00

310
KATUNA, M.P. 1991. The effects of Hurricane *Hugo* on the Isle of Palms, South Carolina: from destruction to recovery. Jour. Coastal Research, CERF, Spec. Issue No. 8 (Impacts of Hurricane *Hugo*: September 10-22, 1989), pp. 263-274.

This paper discusses the damage inflicted by Hurricane *Hugo* on the Isle of Plams. It compares pre- and post-hurricane beach monitoring data to determine the volume of sand that was eroded by the storm from the island's beach-dune system.
BS CP 30

311
KATUNA, M.P., REISS, T.E., and **WERTZ, R.R., JR.** 1990. Changes in sediment budget along the Isle of Palms, S.C., caused by Hurricane *Hugo*. SE Geol., Vol. 33(2), pp. 11-16.

Reports the changes in the sediment budget for the Isle of Plams as a result of Hurricane *Hugo*. Presents an overview of the destruction caused by storm generated waves and accompanying tidal surge on the island, as well as storm transport of sediment eroded from the beach.
BS CP SB 30

312
KATUNA, M.P., COLGAN, M.W., WEATHERFORD, S., and **MEISBURGER, J.** 1993. Investigations of the offshore bathymetry and sedimentology of Folly Island, S.C.: determination of potential offshore sand reserves for beach renourishment. In Beach Nourishment, Engineering and Management Considerations, *Coastlines of the World*, ASCE, New York, N.Y., pp. 212-225.

An investigation of the offshore bathymetry off Folly Beach using side-scan sonar. Attempt to locate offshore shoals (sand bodies) that could be used for beach renourishment purposes. Sediment analyses were also conducted to determine the feasibility and compatability of sand resources that could be used for beach fill purposes.
BA SB 20

313
KATUNA, M.P., RHODES, T.M., COLGAN, M.W., MOELLER, M.E., and **PARROTT, P.M.** 1993. Shoreline dynamics along Folly Beach, S.C. (U.S.A.): the past, the present, and the future. In Proc. Intl. Coastal Symp., Hilton Head Island, SC, Vol. 1, pp. 261-267.

Historical review of the erosion problems on Folly Island. Erosional trends were determined using beach survey data, and profile comparisons were used to determine the fate of the renourished coastline.
CP SH 20

314
KENNEY, N.T. 1962. Our changing Atlantic coastline. National Geographic Magazine, Vol. 122(6), pp. 860-867.

A well-illustrated, nontechnical, review of the severe damage caused by the March 1962 storm along the coast of Eastern United States is presented. Photos show before-and-after conditions of beaches and resorts from Long Island to Cape Hatteras. An excellent color oblique photo of the breakthrough(inlet) on Hatteras Island is shown. Many examples of storm damage to structures and natural coastal features are included.
RS SH 00

315
KIESLICH, J.M. 1981. Channel entrance response to jetty construction. USACE, CERC, GITI-19.

"Thirteen tidal inlets located on the Atlantic, Gulf, and Pacific coasts of the continental United States were selected for a study of the response of inlet ocean entrances to manmade improvements."
CS TI

316
KJERFVE, B., and **MAGIL, K.E.** 1989. Hydrological changes in Charleston Harbor. In Coastal Zone '89, Vol. 3, Proc. Sixth Symposium on the Coastal and Ocean Management, ASCE, New York, NY, pp. 2640-2649.

Reports that greater changes have taken place at Charleston Harbor than most estuarine systems as a result of major flow diversion into the estuary in 1942, increasing the discharge 50-fold, and subsequently rediverting 63 percent of discharge away from the estuary in 1985. Flow changes have direct bearing on both salinity and sediment characteristics of the estuary. Hydraulic changes in water discharge are reviewed.
CP ID ST 20

317
KLEMAS, V. 1987. Remote sensing of estuaries and tide-dominated coastal processes. ASCE, New York, NY, pp. 1-12.

Estuarine applications of remote sensing require a wide assortment of sensors, including aerial film cameras for beach erosion and vegetation mapping, multispectral scanners for wetlands biomass and estuarine water property studies, thermal and infrared scanners for mapping surface water temperatures and currents, microwave devices for salinity or wave measurements, and underwater cameras and acoustic systems for benthic observations. High-resolution thematic mapper and SPOT imagery is significantly improving our ability to discern coastal features and processes from satellite altitudes. (Authors)
BE CP EN RS 00

318
KNOTH, J. 1978. Analysis of longshore sediment transport on Bulls Island, South Carolina, using a fluorescent tracer. M.S. Thesis, Univ. South Carolina, Columbia.

See paper by Knoth and Nummedal (1977). (P.A. Work)
ST 30

319
KNOTH, J.S., and **NUMMEDAL, D.** 1977. Longshore sediment transport using fluorescent tracer. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 383-398.

A project to determine the annual rate of longshore sediment transport, using fluorescent dyed sand as a tracer, was initiated as an instructional design prior to the USACE's attempt to stabilize the eroding shoreline of north Bulls Island, South Carolina. Data collection involved simultaneous acquisition of beach face sediment samples and surf zone wave process measurements. Tracer concentrations over time and space were determined from samples obtained in a grid pattern and along a transect downdrift of injection. Wave-energy flux factors were calculated from bi-hourly measurements of wave energy and longshore current parameters. Theoretical estimates of longshore sediment transport rates based on these flux values and current velocities were calculated together with transport rates from the tracer study and compared to the standard rating curve for littoral transport. Results of the study tend to support the established relationship between longshore sediment transport and wave energy flux. (Author abstract)
ST 30

320
KOMAR, P.D. 1991. Littoral sediment transport. Chap. 11 in J.B. Herbich (ed.), *Handbook of Coastal Engineering*, Vol. 2, Gulf Publishing Co., Houston, TX.

Literature review and overview of longshore sediment transport problem. Includes discussion of cross-shore distribution of longshore sediment transport, and addresses laboratory and field studies. (P.A. Work)
ST 00

321
KOMAR, P.D., and **INMAN, D.L.** 1970. Longshore sand transport on beaches. Jour. Geophys. Res., Vol. 75, pp. 5914-5927.

Widely cited paper that discusses relationship between gross longshore sediment transport rate and wave parameters and presents results from two field sites. Waves and currents were measured in the field and transport rates inferred from the movement of tracer material. (P.A. Work)
ST 00

322
KONDO, H. 1990. Flow area prediction of tidal inlets after sea-level rise. In Proc. 22nd Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 3063-3073.

TI

323
KRAUS, N.C., ISOBE, M., IGARASHI, H., SASAKI, T, and **HORIKAWA, K.** 1982. Field experiments on longshore sand transport in the surf zone. In Proc. 18th Coastal Engineering Conf., Vol. 2, ASCE, New York, NY, pp. 969-988.

Describes eight fluorescent sand tracer experiments for measurement of short-term longshore sediment transport rates. Cores were taken to infer sediment transport rates and horizontal currents and breaking wave heights were also measured. Cross-shore distribution of the advected tracer sand was found to be nonuniform, with sand advected faster either near the shoreline or the breakpoint, or both. (P.A. Work)
ST 00

324
KRISHNAMOHAN, R., KANA, T.W., and **ANDRASSY, C.J.** 1993. Comparison of geotechnical properties of beach fill versus borrow area sediments for the fifth Hunting Island (SC) beach nourishment project. Tech. Rept., Contr. DACW39-92-C-0110, USACE, WES, Vicksburg, MS; CSE, Columbia, SC, 48 pp. + app.

Conceptual model predicts a trend of sediments in the upper beach becoming coarser by means of selective sorting at the discharge point (hydraulic nourishment) along the backshore, while those at the lower beach become finer after nourishment. Comparison with actual beach observations supports this prediction since the actual (observed) data showed the berm sediments becoming measurably coarser in both mean grain size and degree of grading (i.e., poor sorting). Comparative profiles and a detailed volume change analysis revealed that the dry beach retained 70 percent of its fill, whereas the underwater lenses retained only 27 percent of their fill after two years. This further supports the idea that use of coarser borrow material will improve longevity of the upper beach. (Authors)
BN GS 10

325
KRISHNAMURTHY, M. 1977. Tidal prism of equilibrium inlets. Jour. Waterway, Port, Coastal, and Ocean Div., ASCE, New York, NY, Vol. 103(4), pp. 423-432.

A method of tidal prism prediction using the tidal prism/cross-sectional area relationship is described. (S.J. Smith)
TI

326
LANGDON, C.H., and **EDGE, B.L.** 1977. Historical coastline changes in the vicinity of Charleston, S.C. In Proc. Coastal Sediments '77, ASCE, pp. 815-827.

The barrier islands and inlets in the vicinity of Charleston, South Carolina, provide exceptional examples of the dynamic coastal processes of erosion, accretion, and migration. A historical study of shoreline and nearshore hydrographic changes was conducted for a ten-mile reach of coast extending south from the entrance to Charleston Harbor. Dramatic erosional trends have been documented for this section of coast for a 120-year period. A significant increase in coastline encroachment is attributed to the construction of the Charleston Harbor jetties in 1895.
BE SH 20/30

327
LANGFELDER, L.J., STAFFORD, D.B., and **AMEIN, M.** 1968. A reconnaissance of coastal erosion in North Carolina. Rept., State of North Carolina; Dept. Civil Eng., NC State Univ., Raleigh.

Paper presents results of a coastal erosion survey along 330 miles of coast using photo and wave refraction methods. Advantages and limitations of the techniques are discussed. The photo procedure uses measurements on photos taken at different points along the dune line and high water line of the transient beach. Difference in ground distances computed by multiplying the measurements by the photo scale represents the change in the dune line and high water line. Total erosion is converted to annual rates. Results of the photo survey are presented and compared to the wave-refraction method.
BE RS 00

328
LANGFELDER, L.J., STAFFORD, D.B., and **AMEIN, M.** 1970. Coastal erosion in North Carolina. Jour. Waterways and Harbors Div., Vol. 96(WW2), Paper No. 7306, ASCE, New York, NY, pp. 531-545.

A description of a two-phase approach, using photos and wave refraction techniques, to, survey beach erosion along 330 miles of North Carolina coast. Advantages of the photo approach to beach erosion are discussed. The procedure is the measurements between stable reference points, the dune line and high water line on comparative photos in different years. Difference in ground distances obtained by multiplying photo measurements by the photo scale represents the change in location of the dune line and high water line. Annual rates of change are computed by dividing the total changes by the elapsed time interval. A summary of the erosion data is presented.
BE RS 00

329
LANKFORD, T.E., and **BACA, B.J.** 1989. Comparative environmental impacts of various forms of beach nourishment. In Proc. Coastal Zone '89, Vol. 3, ASCE, New York, NY, pp. 2046-2059.

Discussion of environmental monitoring studies on beach nourishment projects in the southeastern United States. Results show that negative impacts can occur at both nourished and borrow sites. Impacts at nourished sites which result from nearshore turbidity, direct burial of organisms, and extreme habitat alterations, are of short duration, while those (impacts) at borrow sites are more serious.
BN 01

330
LANKFORD, T.E., BACA, B.J., and **NATION, C.E.** 1988. Biological monitoring of beach scraping at Pawleys Island, South Carolina. Final Rept., Town of Pawleys Island, SC; CSE, Columbia, SC, 36 pp.

EN 40

331
LARSON, M., and **KRAUS, N.C.** 1989. SBEACH: numerical model for simulating storm-induced beach change. Report 1: Empirical foundation and model development. Tech. Rept. CERC-89-9, USACE, Coastal Eng. Res. Center, Vicksburg, MS.

Presents theory underlying development of numerical model for beach profile response. Describes assumptions and limitations. Model is presently being used by Corps of Engineers to predict beach profile changes and assist with design of coastal engineering projects. (P.A. Work)
ST 00

332
LARSON, M., KRAUS, N.C., and **BYRNES, M.R.** 1990. SBEACH: Numerical model for simulating storm-induced beach change. Report 2: Numerical formulation and model tests. Tech. Rept. CERC-89-9, USACE, Coastal Eng. Res. Center, Vicksburg, MS.

Companion report to that listed above. (P.A. Work)
ST 00

333
LENNON, G. 1985. Identification of a northwest-trending seismogenic graben near Charleston, South Carolina. M.S. Thesis, Univ. South Carolina, Columbia, 84 pp.

Identification of a northwest-trending graben is made using drill hole data and mapping of three Tertiary unconformities. The graben is bounded to the northwest by the Woodstock Fault, to the southwest by the Ashley River Fault, and to the northeast by the Charleston Fault. Precise location of the faults is not possible because of borehole locations; however, distortion is limited to an area between central Kiawah Island and Rantowles. (M.S. Harris)
CS 20/30

334
LENNON, G. 1989. The nature and causes of hurricane-induced ebb scour channels on a developed shoreline. Jour. Coastal Research, CERF, Spec. Issue No. 8 (Impacts of Hurricane *Hugo*: September 10-22), pp. 237-248.

Ebb-scour channels resulting from Hurricane *Hugo* are examined within a one-mile segment of Folly Island, South Carolina. Ebb-scour channels are incised into sands and loosely consolidated materials by super-elevated water loosing consolidated downhill to

the beach. They vary in length, width and depth as a function of the storm surge height, land elevation, area of drainage, wind speed, direction and duration, as well as natural and man-made barriers.
CP 20

335
LENNON, G., COLQUHOUN, D.J., and **TALWANI, P.** 1984. Identification of a northwest trending seismogenic graben near Charleston, S.C. EOS, Vol. 65(45), 989 pp.

Results of power auger drilling, geophysical logging and preliminary geoseismic data indicate the presence of two parallel faults near Charleston. Stratigraphic offsets indicate that long-term motion on the northeast, Charleston Fault is up on the northeast block and down on the southwest. On the southwest, Ashley River Fault the opposite sense of motion is apparent. These faults have been active throughout the Tertiary.
GP SM 20/30

336
LEVEN, D.R. 1993. Tidal inlet evolution in the Mississippi River delta plain. Jour. Coastal Research, CERF, Vol. 9(2), pp. 462-480.

"This study presents the argument that temporal changes in tidal prism and sediment supply results in a sequential change of inlet morphology."
TI

337
LONDON, J.B., and **VOLONTE, C.R.** 1991. Land use implications of sea-level rise: a case study at Myrtle Beach, South Carolina. Coastal Management, Vol. 19(2), pp. 205-218.

The prospect of global warming and consequent sea-level rise will have important implications for coastal communities. This article examines the land-use implications of alternate sea-level rise scenarios on the city of Myrtle Beach (SC). Current trends as well as high and low sea-level rise scenarios are superimposed on the city's beach profile and near shore contours to estimate the type and value of land development likely to be impacted. It is found that losses associated with accelerated sea-level rise would be particularly high in the city's hotel district and that overall property loss could range from 21 percent to 60 percent of the city's total property value. To lessen these potential losses, coastal communities such as Myrtle Beach must choose among one of three policy options including barricade the beach, raise the land, and implement a strategic retreat. (Authors)
BE 01

338
LONDON, J.B., FISHER, J.S., ZARILLO, G.A., MONTGOMERY, J.E., and **EDGE, J.E.** 1981. A study of shore erosion management issues and options in South Carolina. SC Sea Grant Consortium, Charleston, 246 pp.

The damage associated with shoreline erosion has increased significantly in recent years. Although these erosional trends have been long-term, related property loss has accelerated largely due to increased activity along the coast. In response to this problem, federal, state, and local entities are reevaluating existing policy and formulating new approaches to more effectively manage coastal resources. It is for this reason that the present study was undertaken with attention given to shoreline management options applicable to conditions in the State of South Carolina. (Authors)
BE 01

339
LOSADA, M.A., MEDINA, R., and **DISIRE, J.M.** 1989. Coastal use conflicts: the case of Hondarribia Inlet, Spain. Jour. Coastal Research, CERF, Vol. 5(2), pp. 345-352.

Presents a case study of a harmonic solution to use conflicts in the modification of a tidal inlet. (S.J. Smith)
TI 00

340
LOUTERS, T., MULDER, J.P.M., POSTMA, R., and **HALLIE, F.P.** 1991. Changes in coastal morphological processes, due to the closure of tidal inlets in the SW Netherlands. Jour. Coastal Research, CERF, Vol. 7(3), pp. 635-652.

Presents the hydraulic and geomorphologic changes due to the closure of two tidal inlets. (S.J. Smith)
CP TI 00

341
LUDIUM, R.L., and **VAN LOPIK, J.R.** 1966. A remote sensing survey of areas in central coastal Louisiana, Part 1, Discussion. NTIS Acquisition No. AD 808904, Sciences Services Div., Texas Instruments, Inc., Dallas, TX.

Report investigates the use of remote sensing in evaluating terrain along the central Louisiana coast. The study, conducted for the Office of Naval Research, was to determine the capability of remote sensors in detecting and delineating landforms, land-water contacts, and vegetation types in a deltaic region. Sensors evaluated include conventional panchromatic, black-and-white infrared, color, and color infrared photos and day-and-night infrared imagery in the 8-14 micron band. Description of the study areas and results of the remote sensor interpretation and evaluation are given. Useful information on photos and infrared sensors is included. Color infrared film was the most useful. Many example photos of features taken with different film types are also included.
CS RS 00

342
MACHEMEHL, L.L., HERBICH, J.B., and **JO, C.H.** 1991. Study of tidal-inlet stability. Jour. Waterway, Port, Coastal, and Ocean Eng., ASCE, New York, NY, Vol. 117(6), pp. 588-598.

"This research concentrated on developing relationships between selected inlet characteristics, inlet width and inlet length, and inlet stability for 51 U.S. tidal inlets."
TI 00

343
MAGOON, O.T. 1973. Use of earth resources technology satellite (ERTS-1) in coastal studies. Cited in *Bibliography of Publications Prior to July 1983 of the Coastal Engineering Research Center and the Beach Erosion Board*; U.S. Army Engineer Waterways Expt. Sta., Vicksburg, MS.

This paper summarizes some of the possibilities of the use of ERTS-1 imagery in coastal studies. The material presented is preliminary and is a result of the synergistic contributions of personnel of the NASA-Goddard Space Flight Center and CERC. (Authors)
CP RS 00

344
MAGOON, O.T., and **PIRIE, D.M.** 1973. Remote sensing in the study of coastal processes. Cited in *Bibliography of Publications Prior to July 1983 of the Coastal Engineering Research Center and the Beach Erosion Board*, U.S. Army Engineer Waterways Expt. Sta., Vicksburg, MS.

The quantifiable determination of important coastal parameters remotely rather than by in situ measurements combined with automatic data reduction and analysis will result in a greatly increased understanding of the parameters being studied. This paper gives a progress report on joint Corps of Engineers-National Aeronautics and Space Administration (NASA) efforts to apply remote sensing in coastal studies. The devices used were multiband photography, the infrared scanner, the Side-Looking Airborne Radar, and various image enhancement and processing devices.
CP RS 00

345
MAGOON, O.T., JARMAN, J.W., and **BERG, D.W.** 1972. Use of satellites in coastal engineering. Cited in *Bibliography of Publications Prior to July 1983 of the Coastal Engineering Research Center and the Beach Erosion Board*, U.S. Army Engineer Waterways Expt. Sta., Vicksburg, MS, 22 pp.

A new concept, using earth satellites in data gathering, has been generated. These satellites may observe areas of the coast and adjacent seas during times when other methods of sensing are very difficult or essentially impossible. This paper describes the unmanned Earth Resources Technology Satellite (ERTS) and the manned Skylab Satellite. (Authors)
CP RS 00

346
MAGOON, O.T., PIRIE, D.M., and **JARMAN, J.W.** 1973. Coastal applications of the ERTS-A satellite. Cited in Bibliography of Publications Prior to July 1983 of the Coastal Engineering Research Center and the Beach Erosion Board, U.S. Army Engineer Waterways Expt. Sta., Vicksburg, MS.

This paper describes the Earth Resources Technology Satellite (ERTS) placed in orbit in July 1972 and the ERTS simulation high-altitude aircraft flights which have been flown for approximately one year. The ERTS satellite and simulation programs conducted by NASA have been developed to demonstrate the techniques for efficient management of the earth's resources. Results of the ERTS-A simulation flights flown at an altitude of 65,000 ft as related to coastal studies are also described. Simulations of both the RBV and MSS in coastal areas are presented. (Authors)
CP RS 00

347
MARINO, J.N. 1986. Inlet ebb shoal volumes related to coastal physical parameters. Coastal & Oceanographic Eng. Dept., Univ. Florida, Gainesville, UFL/COEF-86/017.

A study was conducted to determine the influencing factors of shoal volume. Factors considered include tidal prism, inlet width/depth ratio, inlet cross-sectional area, and the tidal amplitude. (S.J. Smith)
CP ST TI 00

348
MARINO, J.N., and **MEHTA, A.J.** 1986. Sediment volumes around Florida's east coast tidal inlets. UFL/COEF-86/009, Coastal & Oceanographic Eng. Dept., Univ. Florida, Gainesville.

"Tidal inlets are known to trap littoral sediment. The objectives of this study were to determine sediment volumes associated with 19 inlets on Florida's east coast, and to evaluate changes in sediment volumes due to, both, inlet stabilization and new inlet construction. Significant areas examined were the ebb and flood tidal shoals, the adjacent shorelines, and the sources and disposal areas for dredged material. All calculations were based on available information. There is a general trend of decreasing ebb shoal volume from north to south. A total of 557 million cubic yards of sediment were found to reside in the ebb shoals. Out of this amount, 464 million cubic yards were found in the northernmost five inlets. 110 million cubic yards of the total amount were impounded as a result of jetty construction and dredging. 33 million cubic yards can be attributed to the opening of new inlets. The total volume of sediment trapped, at all inlets, as a result of construction works was 383 million cubic yards. Of this amount, 88 million cubic yards can be attributed to impoundment by jetties and 62 million cubic yards due to the opening of new inlets."
ST TI 00

349

MARINO, J.N., and **MEHTA, A.J.** 1987. Inlet ebb shoals related to coastal parameters. In Proc. Coastal Sediments '87, ASCE, New York, NY, Vol. II, pp. 1608-1623.

". . . the degree to which various coastal physical parameters influence the ebb shoal volume was investigated."
ST TI 00

350

MARINO, J.N., and **MEHTA, A.J.** 1988. Sediment trapping at Florida's east coast inlets. UFL/COEF-TR/89/001, Dept. Coastal and Ocean Eng., Univ. Florida, Gainesville.

"In response to the need to evaluate the coastal sedimentary budget, sediment volumes associated with nineteen tidal inlets along the east coast of Florida have been estimated. Significant regions examined were ebb and flood shoals, the adjacent beaches, and the sources and placement areas for dredged material. A total of $420x10^6$ m^3 of predominantly sandy sediment resides in the ebb shoals. Of this amount, $350x10^6$ m^3 or 83 percent occur in the five northernmost inlets. As a result of artificially opened inlets and training of inlets of natural origin, $282x10^6$ m^3 of sediment have been trapped mainly from the littoral drift over the years, a surprising large amount, $41x10^6$ m^3, from dredged inlet channels, has been placed at sea."
ST TI 00

351

MARPLE, R.T., and **TALWANI, P.** 1993. Evidence of possible tectonic upwarping along the South Carolina coastal plain from an examination of river morphology and elevation data. Geol., Vol. 21, pp. 651-654.

A 200-km-long, 15-km-wide, north-northeast trending zone extending north of Charleston is identified using Landsat imagery, aerial photography, and topographic maps. The zone includes subtle topographic highs and morphologic river changes that could be associated with ongoing tectonic uplift of a fault (Woodstock fault?) and possibly related to seismicity in Charleston. (P. Donovan-Ealy)
CS 30

352

MASON, C. 1973. Regime equations and tidal inlets. Jour. Waterways, Harbors, and Coastal Eng. Div., ASCE, New York, NY, Vol. 99(3), pp. 393-400.

"Observations of the apparent dependence of various geometric parameters on discharge for stable channels in alluvial material have resulted in the well-known regime concept. . . The intent of this paper is not to comment upon either the merits or shortcomings of the regime concept, but rather to investigate an analogous relationship for reversing tidal flow through inlets in a sandy beach."
ID TI 00

353
MASON, J.E. 1986. Morphologic evolution of a relocated mesotidal inlet, Captain Sams Inlet, South Carolina. Tech. Rept., Dept. Geol., Univ. South Carolina, Columbia, 149 pp.

"Captain Sams Inlet, South Carolina was relocated in March 1983. The relocation afforded the unique opportunity to study the evolution of a small tidal inlet immediately after breach." The author studied the rate of migration and compared it to historical trends, as well as documenting the evolution of the inlet towards the mesotidal inlet model of Hayes. (S.J. Smith)
ID TI 20

354
MAYOR-MORA, R. 1974. Hydraulics of tidal inlets on sandy coasts. In Proc. 14th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1524-1545.

"A series of laboratory experiments was carried out on an idealized ocean-inlet-bay system subjected to reversing flows caused by tidal and surface wave actions." Laboratory measurements were used to determine the hydraulic response of tidal inlets to variations in wave and tidal influences. The laboratory investigation is compared to available field data. Further investigation on the effects of surface waves, controlling jetties, and freshwater inflow is also presented. (S.J. Smith)
ID TI 00

355
McBRIDE, R.A. 1987. Tidal inlet history, morphology, and stability, eastern coast of Florida, USA. In Proc. Coastal Sediments '87, ASCE, New York, NY, Vol. II, pp. 1592-1607.

This paper presents the changes observed in tidal inlet morphology and stability corresponding to the varying wave and tidal climate along Florida's eastern coast. (S.J. Smith)
ID TI 00

356
McBRIDE, R.A., and **MOSLOW, T.F.** 1991. Origin evolution and distribution of shoreface sand ridges, Atlantic inner shelf, U.S.A. Marine Geol., Vol. 97, pp. 57-85.

GP SM 00/01

357
McCARTAN, L., LEMON, E.M., JR., and **WEEMS, R.E.** 1984. Geologic map of the area between Charleston and Orangeburg, South Carolina. USGS Misc. Investigations Series, Map I-1472, 1:250,000.

The first of two sheets contains a geologic map, geologic cross sections, a table of lithic characteristics (texture, mineralogy, weathering, clay fraction composition, colors, coral dates, magnetic polarity, altitude, important mollusks, and general remarks) of the sedi-

mentary units (three Tertiary and six Quaternary). The second sheet has lithologic logs used in the cross sections as well as other important logs within the study area. (M.S. Harris)
CS SM 20/30

358
McCARTAN, L., WEEMS, R.E., and **LEMON, E.M., JR.** 1979. The Wando Formation (Upper Pleistocene) in the Charleston, South Carolina, Area. U.S. Geol. Surv., Bull. 1502-A, pp. 110-117.

This paper formally names and describes the Wando Formation as a lithostratigraphic unit. Type reference sections and lithologies, depositional environments, ages, and contacts are described. (M.S. Harris)
CS SM 20/30

359
McCARTAN, L., OWENS, J.P., BLACKWELDER, B.W., SZABO, B.J., BELKNAP, D.F., KRUZUSAULKUL, N., MITTERER, R.M., and **WEHMILLER, J.F.** 1982. Comparison of amino acid racemization geochronometry with lithostratigraphy, bisotratigraphy, uranium-series coral dating, and magnetostratigraphy in the Atlantic Coastal Plain of the southeastern United States. Quaternary Research, Vol. 18, pp. 337-359.

The debate as to the number and age of depositional units in the Charleston to Myrtle Beach, South Carolina outer coastal plain is addressed with information obtained to date by several groups of researchers. The uranium series dating method is used as a measure of the age of the units. Younger units cannot be correlated between Charleston and Myrtle Beach because no good uranium series dates are available. Conflicts exist between uranium-series analyses and the amino acid racemization analyses, possibly due to inadequate sampling and number of analyses, "incorrect lithostratigraphic correlations, inaccuracy of the assumption regarding latitudinal gradient of effective temperature, incomplete understanding of the controls of amino acid racemization or epimerization, and inaccuracy of some U-series dates" (p. 357). (M.S. Harris)
SM 30/40/50

360
McCAULEY, C.K. 1960. Exploration for heavy minerals on Hilton Head Island, South Carolina. SC State Development Board, Bull. 26, 13 pp.

Heavy mineral surveys in 1954-55 of Hilton Head Island (SC) reveal that 17-20 percent of the samples contain at least 3 percent heavy minerals. Analyses indicate that the major components of the heavy mineral fraction include ilmenitite, zircon, rutile, and monazite, in order of abundance. The northern half of the beach contains the richest deposits and an estimate of the total heavy mineral tonnage is given. (P. Donovan-Ealy)
CP TH 10

361
McCREESH, C.A. 1982. A beach process-response study at Hunting Island, South Carolina. M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia, 72 pp.

Study of beach process response revealed a correlation between short-term erosional episodes with large, steep waves generated by high velocity winds from the northeast, especially during spring tides. Depositional trends have been found to be associated with longshore line swells from a southeasterly direction during neap tides.
CP 10

362
McNAIR, E.C., JR. 1976. Sand-bypassing system using a jet pump. In Proc. 15th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 1342-1360.

Presentation of a jet pump system that may provide economic benefits for the mechanical bypassing of sand at smaller tidal inlets. (S.J. Smith)
ST TI 00

363
MEHTA, A.J. 1987. Hydraulics and stability of a small inlet. Shore & Beach, Vol. 55(3-4), pp. 96-100.

A preliminary study of the physical processes of a small, sandy tidal inlet. (S.J. Smith)
ID TI 00

364
MEHTA, A.J., and **ZEH, T.A.** 1979. Investigation of the hydrodynamics of inlet plume. In Proc. Specialty Conf. on Conserv. and Util. of Water and Energy Resources, ASCE, New York, NY, pp. 478-485.

ID 00

365
MEHTA, A.J., BYRNE, R.J., and **DEALTERIS, J.T.** 1976. Measurement of bed friction in tidal inlets. In Proc. 15th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 1701-1720.

Two Florida inlets were used as case studies for this investigation. Characteristic values of Manning's n were determined for each inlet, which were then able to be used in the tidal prism-throat cross-sectional area formula. Velocity profile measurements were also made, and a relation between the bed shear stress at incipient motion and the corresponding grain size was reviewed and found to differ from the correlation made by Shields. (S.J. Smith)
ID ST TI 00

366
MEHTA, A.J., et al. 1991. Tidal inlet management at Jupiter Inlet, Florida. Prog. Rept. No. 4, Dept. Coastal and Ocean Engr., Univ. Florida; Gainesville, UFL/COEF-TR/91/008.

"In this progress report on the Jupiter Inlet Management Study, we have made observations and tentative conclusions with regard to the protocol for sand bypassing at the inlet, the problem of sand movement around the south jetty, influx of sediment in the interior region of the Loxahatchee River estuary, sedimentation in the area of marina docking facilities, mining of the ebb shoal, offshore rocky outcrops, mangroves and seagrasses."
ST TI 00

367
MEHTA, A.J., DELCHARCO, M.J., and **HAYTER, E.J.** 1991. Tidal inlet management at Jupiter Inlet. Prog. Rept. No. 5, Coastal and Ocean. Engr. Dept., Univ. Florida; Gainesville, UFL/COEF-91/012.

This report includes results from physical and numerical models and conclusions on possible improvements to the jetty system. The report also includes the effects of modifications on navigation, beach erosion, sand influx into the inlet; and an analysis of proposed sediment traps. (S.J. Smith)
CS ST TI 00

368
MEISBURGER, E.P. 1989. Shore normal distribution of heavy minerals on ocean beaches: southeast Atlantic coast. USACE, Coastal Eng. Res. Center, Misc. Paper CERC-89-8, 35 pp.

Sets of beach transect samples between Kitty Hawk (NC) and Palm Beach (FL) were analyzed for shore-perpendicular heavy mineral variations. The weight percent of heavy minerals is higher in the backshore than in the foreshore zone and is likely related to the relationship between backshore deposits and high energy storms. Process energy and changes in source appear to affect selective sorting of heavy minerals on the coast. (P. Donovan-Ealy)
CP TH 01

369
MEYER, R.P. 1955. Seismic studies of offshore geologic structure between Charleston, South Carolina, and Cape Fear, North Carolina. Geol. Soc. Amer. Bull., Abstracts with Programs, Vol. 66, p. 1597.

Three to five stratigraphic horizons were identified from 10 reverse seismic-refraction profiles run off North and South Carolina. Depths and relief on the crystalline basement are presented. (P. Donovan-Ealy)
CS GP OS 20/30/40/50

370
MILLIMAN, J.D., PILKEY, O.H., and **BLACKWELDER, B.W.** 1968. Carbonate sediments on the continental shelf, Cape Hatteras to Cape Romain. SE Geol., Vol. 9(4), pp. 245-267.

Authors discuss abundance, assemblages, relict fauna, and particle characteristics of the carbonate fraction of sediments off three cuspate embayments of North and South Carolina. The carbonate fraction increases markedly in shelf sediments from 5 percent to as much as 25 percent south of Cape Hatteras due to high temperatures and a more tropical marine life. Three types of carbonate components on the shelf include residual lithic fragments, oolites, and skeletal fragments. Carbon-14, mineralogic and petrologic data suggest that most of the carbonate was deposited during and after the last glaciation. A sequence of shelf carbonate sedimentation is presented and a comparison with other shelves follows. (P. Donovan-Ealy)
CS GS SM 40/50

371
MOELLER, M.E., and **KATUNA, M.P.** 1994. Folly Beach renourishment project: one year later. Bull. SC Acad. Sci., Aiken, Vol. 61, p. 94.

Folly Beach, South Carolina was the site of a large beach renourishment project shortly before the "storm of the century" hit the east coast on March 13, 1993. Biannual beach surveying by the South Carolina Coastal Council tracked changes in sediment volume before and after the storm. The beach lost a considerable amount of sand during the storm and addition sand was needed. The most stable stretches of the beach were those where groins were constructed or other hard stabilization structures were in place. (P. Donovan-Ealy)
BE BN SB SH 20

372
MOLINA, B.F., and **PILKEY, O.H.** 1972. Origin and distribution of calcareous fines on the Carolina continental shelf. Sedimentology, Vol. 18, pp. 293-310.

The fine carbonate fraction in shelf sediments of the Carolina shelf contains significantly higher percent carbonate (averages 43 percent) than the bulk sample (25 percent) in the inner shelf but reaches equality as distance offshore increases. The origin of calcareous fines on the Carolina shelf is attributed to biological and physical destruction of coarser particles and primary formation in the fine-size fraction. (P. Donovan-Ealy)
CP GS 01

373
MOORE, J.E., and **GORSLINE, D.S.** 1960. Physical and chemical data for bottom sediments: south Atlantic coast of the United States, *M/V Theodore N. Gill* cruises 1-9. U.S. Fish & Wild. Serv., Spec. Scien. Rept. No. 366, 69 pp.

Bottom sediments collected on nine cruises of the south Atlantic coast were analyzed for chemical content, textural parameters, carbonate content, and heavy minerals. (P. Donovan-Ealy)
GT TH 01

374
MORANG, A. 1992. Inlet migration and hydraulic processes at East Pass, Florida. Jour. Coastal Research, CERF, Vol. 8(2), pp. 457-481.

Use of Army Corps of Engineer data and historical records enabled a study of the processes that cause this tidal inlet to migrate eastward both before and after stabilization efforts. (S.J. Smith)
ID TI

375
MORGAN, T.T. 1977. Shoreline history of Sullivans Island and Isle of Palms. In D. Nummedal (ed.), *Beaches and Barrier Islands of the Central South Carolina Coast* (field trip guidebook, Sullivans Island and the Isle of Palms in conjunction with Coastal Sediments 77). Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, SC, pp. 70-73.

Describes erosional trends at Sullivans Island and Isle of Palms.
BE SH 30

376
MOSLOW, T.F. 1977. Internal stratification of tidal delta deposits, beaches and barrier islands of the central South Carolina coast. In D. Nummedal (ed.), *Beaches and Barrier Islands of the Central South Carolina Coast* (field trip guidebook, Sullivans Island and the Isle of Palms in conjunction with Coastal Sediments 77). Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, SC, pp. 45-51.

Reviews tidal-controlled patterns of sediment deposition in the inlets and estuaries of the mesotidal coast of South Carolina. Flood tidal delta studies from other shorelines, have been reviewed.
ST TI 20/30

377
MOSLOW, T.F. 1980. Stratigraphy of mesotidal barrier islands. Ph.D. Dissertation, Univ. South Carolina, Columbia.

Analysis of 63 core and auger holes on Kiawah and Seabrook Islands (SC) provides a stratigraphic model for prograding Holocene mesotidal barrier islands. Prograding barrier stratigraphy "is a regressive, coarsening upward sequence of fine-grained, cross bedded, beach ridge, backshore and foreshore sands overlying burrowed, laminated shoreface and transition zone silts and clays."
CS GT SM 20

378
MOSLOW, T.F., and **DAVIES, J.** 1979. Late Holocene depositional history of regressive barrier island — Kiawah Island, South Carolina. AAPG, Vol. 63, p. 499.

Unlike most barriers along the east coast, Kiawah Island, South Carolina, displays a history of seaward progradation. The Holocene stratigraphy of the island was studied using 35 cores and changes in the environment of deposition are identified. (P. Donovan-Ealy)
CP CS 20

379
MOSLOW, T.F., and **TYE, R.S.** 1985. Recognition and characterization of Holocene tidal inlet sequences. Marine Geol., Vol. 63, pp. 129-151.

"Analysis of Holocene sediments in over 80 vibracore, wash bore and auger drill holes from coastal North and South Carolina demonstrate sharply contrasting sedimentary sequences and processes of sedimentation between wave- and tide-dominated inlet-fill deposits. This variation in inlet sequences is primarily a function of the antipathetic relationship between wave height and tidal range in the study area. In addition to hydrographic regime, antecedent topography, sediment supply (i.e., sand versus mud) and lateral facies changes along dip are important factors in determining the sedimentologic nature of tidal inlet sequences. With a higher preservation potential for inlet deposits compared to other barrier island deposits, fining-upward sand- and/or mud-rich inlet sequences will dominate clastic shorelines.

Inlet channels rework the adjacent barrier island deposits, replacing characteristic coarsening-upward shoreface sequences with fining-upward tidal inlet sequences. Ephemeral, rapidly migrating wave-dominated inlets, filled by landward and longshore sediment transport, deposit a fining-upward sequence of: (1) inlet floor, a poorly-sorted, coarse shell and pebble basal lag; (2) active inlet-channel, planar and trough cross-bedded fine- to coarse-grained sand and shell; and (3) spit platform, planar cross-bedded and parallel laminated, well-sorted, fine-grained sand capping the sequence. Seawardmost wave-dominated inlet sequences are overlain by horizontally laminated overwash and/or cross-bedded and rooted eolian dune sands. Landward, inlet deposits are interbedded with fine-grained flood-tidal delta sands overlain by salt marsh.

Ebb delta bar-bypassing at tide-dominated inlets mouths concentrates inlet deposits in the updrift portion of a barrier island. Seawardmost tide-dominated inlet sequences fine upward from basal trough and planar cross-bedded active inlet-channel sand and shell into a trough cross-bedded and rippled ebb-tidal delta sand. Coarsening upward foreshore sand and shell overlie abandoned-inlet deposits. Landward, the overlying ebb-tidal delta and foreshore sands interfinger with wavy- to lenticular-bedded silts and clays of the abandoned inlet-fill and bioturbated salt marsh which form an impermeable updip seal over the inlet channel. Isolation of these wave- or tidally influenced inlets by paleotopography confines inlet deposition to a small area, resulting in vertical stacking of abandoned inlet channels."
SM TI 01/20

380
MYERS, V. 1975. *Storm-Tide Frequencies on the South Carolina Coast.* National Weather Service, Office of Hydrology, Silver Springs, Md., 79 pp.

CP 01

381

MYRTLE BEACH, CITY OF. 1992. Beach management plan, City of Myrtle Beach: City of Myrtle Beach. Myrtle Beach, SC, 70 pp., maps.

This beach management plan was prepared for two reasons. One was to put into a single, written document the city's longstanding recognition of the value and fragility of the beach. The other reason for this beach management plan, and the reason for a plan in this format at this time, was legislative mandate. South Carolina's Beach Management Act of 1990, as well as the original version of the act adopted in 1988, establishes a state policy to create a comprehensive, long-range beach management plan and to require local comprehensive beach management plans for the protection, preservation, restoration, and enhancement of the beach/dune system. (Authors)
BN 01

382

NOAA. 1983. Cooperative shoreline movement study: Cape Fear, N.C., to Tybee Island, GA. National Oceanic & Atmospheric Administration, National Ocean Survey, U.S. Dept. Commerce, Wash., DC, 32 map plates.

This is Volume 1 of a series (see Anders et al., 1990) and depicts historical shorelines from the mid 1800s to circa 1980 at 1:24,000 (quadrangle scale) based on comparison of government charts (T-sheets, etc.). Scale is impractical for detailed site planning but the maps are most interesting around inlets where shoreline changes are greater. (T.W. Kana)
SH 01

383

NOAA. 1989. Hurricane *Hugo*, effects on water levels and storm surge recorded at NOAA/ National Ocean Service water level stations. Data Rept., Off. Oceanography and Marine Assessment, National Oceanic & Atmospheric Administration, National Ocean Service, Rockville, MD.

CP 01

384

NTIS. 1982. Aerial photography: its use in the study of coastal erosion and pollution: 1974 — October 1982. Citations from Oceanic Abstracts, National Technical Information Services, Springfield, VA, 98 pp.

This bibliography contains citations concerning aerial photography and its use as a means to study coastal shoreline problems such as erosion and pollution, and to survey coastal and land areas. (This updated bibliography contains 98 citations, 16 of which are new entries to the previous edition.) (Authors)
BE RS 00

385
NTIS. 1986. Aerial photography: applications in the study of coastal erosion and pollution: 1974-May 1986. NTIS, Springfield, VA, 127 pp.

This bibliography contains citations concerning the applications of aerial photography in the study of coastal shoreline problems such as erosion and pollution. Topics include ocean wave direction and measurement, oil pollution detection and direction forecasting, shoreline change measurements, coastal mapping, and coastal topographic features. (This updated bibliography contains 350 citations, 49 of which are new entries to the previous edition.) [Prepared in cooperation with Cambridge Scientific Abstracts, Wash., DC.] (Authors)
BE RS 00

386
NTIS. 1989. Aerial photography: applications in the study of coastal erosion and pollution: June 1986 — June 1989. NTIS, Springfield, VA, 61 pp.

This bibliography contains citations concerning the applications of aerial photography in the study of coastal shoreline problems such as erosion and pollution. Topics include ocean wave direction and measurement, oil pollution detection and direction forecasting, shoreline change measurements, coastal mapping, and coastal topographic features. (This updated bibliography contains 122 citations, 45 of which are new entries to the previous edition.) [Prepared in cooperation with Cambridge Scientific Abstracts, Wash., DC.] (Authors)
BE RS 00

387
NEAL, W.J., BLAKENEY, W.C., JR., PILKEY, JR., O.H., and **PILKEY, SR., O.H.,** 1984. *Living with the South Carolina Shore*. Duke Univ. Press, Durham, NC, 205 pp.

The dilemma of the South Carolina coastal property owner is growing, and the purpose of this book is to address the underlying causes and suggest some solutions. The intent is not to discourage development but rather to encourage proper limited development. The goal is to increase the reader's awareness of how barrier islands and beaches operate, how shorelines and entire barrier islands may retreat, what kinds of hazards are faced by coastal dwellers and property owners, and how to reduce the impacts of those hazards if you are already in such a zone. (Authors)
BE CP 01

388
NELLIGAN, D.F. 1982. Ebb-tidal delta stratigraphy, Breach Inlet, South Carolina. M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia, 221 pp.

A depositional model based on vibracore transects is developed for the area. Findings include rapid rates of erosion by channel cutting, and deposition by abandoned channel filling due to the highly dynamic nature of the setting. A typical stratigraphic sequence of the area is suggested.
GT ID TI 30

389

NELSON, D. 1989. *Hurricane* ***Hugo*** *Beach Erosion, Grand Strand Area, South Carolina: A Preliminary Report.* South Carolina Coastal Council (Charleston); Coastal Carolina College, Conway, SC, 13 pp.

Gives an assessment of erosion impacted by Hurricane *Hugo* by comparing pre-Hugo and post-Hugo erosional features.
BE 40/50

390

NELSON, D. 1991. Factors affecting beach morphology changes caused by Hurricane Hugo, northern South Carolina. Jour. Coastal Research, CERF, Spec. Issue No. 8, pp. 163-179.

Hurricane-induced beach erosion occurred in two distinctly different styles within the study area. Variation in beach sand size contributed to the difference. Fine sand beaches of North Myrtle Beach did not change slope but eroded downward uniformly along the entire profile. Coarser sand beaches showed a decrease in beach slope and greater washover deposition of sand. During the hurricane, littoral transport energy apparently overpowered the deleterious effects of seawalls and positive effects of local sand sources. Erosion moved the high tide line an average of 10.4 meters landward. However, localized accretion also occurred near the inlets. The storm tide height varied along the beach by 88 cm within a kilometer. However, the average storm tide level was nearly the same across the study area. Prehurricane beach surveys revealed that long wave-length waves generated by the approaching hurricane facilitated berm sedimentation and beach accretion throughout the study area for several days before making landfall. (Author)
CS SH

391

NIELSEN, A.F., and **GORDON, A.D.** 1980. Tidal inlet behavioral analysis. In Proc. 17th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 2461-2480.

"This paper highlights some of the limitations of existing stability theories, presents a new method of dynamic behavioral analysis, outlines the case study of an estuary to which existing stability theories could not be effectively applied but to which the behavioral analysis produced interesting results, and recommends the direction in which further research could yield beneficial results."
ID TI 00

392

NUMMEDAL, D. 1977. Potential for hurricane damage to the Isle of Palms. Beaches and Barrier Islands of the Central South Carolina Coast. In D. Nummedal (ed.), *Beaches and Barrier Islands of the Central South Carolina Coast* (field trip guidebook, Sullivans Island and the Isle of Palms in conjunction with Coastal Sediments 77). Coastal Res. Div., Dept. Geol. Univ. South Carolina, Columbia, SC, pp. 63-68.

Discusses the impact of destruction of barrier island dunes, on the Isle of Palms.
CP SH 30

393
NUMMEDAL, D., and **HUMPHRIES, S.M.** 1978. Hydraulics and dynamics of North Inlet, South Carolina, 1975-1976. GITI Rept. No. 16, CERC, USACE, Ft. Belvoir, VA, 214 pp.

"The analysis presented in this report focuses on three attributes of the inlet environment: (a) the inlet hydraulics, (b) the longshore currents adjacent to the inlet, and (c) the seasonal morphologic change of the North Inlet tidal deltas and adjacent beaches."
ID TI 30

394
NUMMEDAL, D., OERTEL, G.F., HUBBARD, D.K., and **HINE, A.C.** 1977. Tidal inlet variability--Cape Hatteras to Cape Canaveral. In Proc. Coastal Sediments '77, 5th Symp. of the Waterway, Port, Coastal and Ocean Div., ASCE, New York, NY, pp. 543-562.

"This paper identifies the major mechanisms which control sediment dispersal and deposition at tidal inlets. These are found to favor landward-directed transport through the throat in wave-dominated microtidal environments and seaward transport through the throat in tide-dominated environments."
ST TI 01

395
OA. 1986. Hilton Head Island beach monitoring study, September. Survey Rept., Town of Hilton Head Island, SC; Olsen Associates, Inc., Jacksonville, FL, 33 pp.

Presents results from September 1986 wading-depth beach surveys as well as previous surveys, maps, and charts. Assesses long-term and short-term shoreline migration rates, associated volumetric changes, and identifies areas of chronic erosion or accretion. (W.C. Eiser)
BE BS SH 10

396
OA. 1987. Hilton Head Island beach monitoring study survey: 1986-1987. Final Rept., Town of Hilton Head Island, SC; Olsen Associates, Inc., Jacksonville, FL, 36 pp + app.

Study assesses both long- and short-term rates of shoreline migration and associated volumetric changes along the island coastline; also, identifies particular areas of chronic erosion or accretion; and highlights ongoing shoreline change phenomena. The results of the study are for determination of various beach nourishment alternatives.
BS 10

397
OA. 1987. Engineering evaluation of a beach restoration strategy for Hilton Head Island, S.C. Submitted to City of Hilton Head Island, SC; Olsen Associates, Inc., Tallahassee, FL, 66 pp.

Contains preliminary engineering evaluation of a preferred beach restoration alternative for Hilton Head. The evaluation is intended to assist in future implementation of a long-term and comprehensive beach preservation and enhancement program for the ocean front shoreline of the Island.
BN 10

398
OA. 1987. Wave-refraction analysis of the existing bathymetry and potential impact of offshore borrowing at Hilton Head Island, S.C. Final Rept., Town of Hilton Head Island, SC; Olsen Associates Inc., Tallahassee, FL, 66 pp.

Presents a wave-refraction study in order to assess the potential effects of removing sediment from "candidate" borrow sites. The study involved the existing bathymetric conditions around Hilton Head Island, as well as for an altered bathymetry which reflects the highest probable dredging scenario at each borrow site.
BA CP 10

399
OA. 1992, 1993, 1994. Hilton Head Island beach restoration project, Years 1-3. Monitoring Rept., Town of Hilton Head Island, SC; Olsen Associates, Inc., Jacksonville, FL.

Series of three reports documenting performance of 2 million cubic yard beach renourishment project constructed at Hilton Head Island in 1990. Also examines long-term and short-term erosion trends outside the project boundaries. (W.C. Eiser)
BE BN BS 10

400
O'BRIEN, M.P. 1931. Estuary tidal prisms related to entrance areas. Civil Engineering, Vol. 1(8), pp. 738-739.

TI 00

401
O'BRIEN, M.P. 1969. Equilibrium flow areas of inlets on sandy coasts. Jour. Waterways and Harbors Div., ASCE, New York, NY, Vol. 95, pp. 43-52.

ID 00

402
O'BRIEN, M.P. 1971. Notes on tidal inlets on sandy shores. Univ. Calif. Hydraulic Engineering Lab., Rept. HEL 24-5, Berkeley.

TI 00

403
O'BRIEN, M.P. 1976. Notes on tidal inlets on sandy shores. GITI Rept. No. 5, CERC, USACE, Ft. Belvoir, VA, 26 pp.

TI 00

404
O'BRIEN, M.P. 1980. Comments on tidal entrances on sandy coasts. In Proc. 17th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 2504-2516.

The author makes an argument for the use of maximum tidal inlet discharge rather than tidal prism for the equilibrium inlet cross-sectional area relationship. (S.J. Smith)
ID TI 00

405
O'BRIEN, M.P., and **CLARK, R.R.** 1974. Hydraulic constants of tidal entrances. In Proc. 14th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1546-1565.

"Data contained in the tide tables, current tables and navigation charts of National Ocean Survey pertaining to tidal entrances along the coasts of the continental United States are analyzed to obtain flow coefficients defined by a simple hydraulic equation."
ID TI 00

406
O'BRIEN, M.P., and **DEAN, R.G.** 1972. Hydraulics and sedimentary stability of coastal inlets. In Proc. 13th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 761-780.

"A method is presented for investigating the stability of coastal inlets against closure due to transport and deposition of sand in the inlet cross-section. . . To apply the method, geometric and hydraulic data representing the inlet are necessary; the minimum data required include a survey of the inlet throat cross-section and the lag between high (or low) water in the ocean and the following slack water in the inlet. In addition, it is necessary to conduct measurements or make assumptions concerning the minor and gradual hydraulic loss coefficients. Based on assumed depositional patterns in the inlet, the method is applied to five real inlets, and the stability indices are presented."
ID ST TI 00

407
OLSEN, E.J. 1993. Port Royal Sound channel maintenance project. Section 933 Preliminary Evaluation Rept., Town of Hilton Head Island, SC; Olsen Associates, Inc., Jacksonville, FL, 24 pp.

Assesses the "physical and fiscal propriety" of requesting that beach-compatible material from the Port Royal Sound navigation project be placed along the Hilton Head shoreline during maintenance dredging by the Charleston District, USACE. (W. C. Eiser)
BE BN GT 10

408

O'REILLY, W.C., and **GUZA, R.T.** 1993. A comparison of two spectral wave models in the Southern California Bight. Coastal Eng., Vol. 19, pp. 263-282.

Compares two numerical models for wave transformation. Both assume linear wave theory; one includes refraction only, while the second includes refraction and diffraction. (P.A. Work)
CP 00

409

OZSOY, E. 1977. Suspended sediment transport near tidal inlets. In Proc. Coastal Sediments '77, 5th Symp. of the Waterway, Port, Coastal and Ocean Div., ASCE, New York, NY, pp. 914-926.

"Jet diffusion and settling of suspended sediments in the vicinity of tidal inlets are analyzed. Bottom friction retards the jet and, therefore, causes an increase in the deposition rate; however, an offshore sloping bottom opposes this effect. Bottom sediments are sorted with respect to grain size. Large depositions occur where marginal shoals are usually found. For high inlet velocities, erosion near the mouth generates deep troughs due to scouring. These results and their implications on the geomorphology of the inlet vicinity are discussed qualitatively."
ID ST TI 00

410

PARTHENIADES, E., and **PURPURA, J.A.** 1972. Coastal changes near a tidal inlet. In Proc. 13th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 843-864.

Concludes that for a stability analysis of a tidal inlet along a shoreline where the direction of littoral drift changes seasonally, the net littoral drift is not sufficient. The total volumes of sand transported in either direction should be used in the design criteria. (S.J. Smith)
ST TI 00

411

PEREGRINE, D.H., and **JONSSON, I.G.** 1983. Interaction of waves and currents. Misc. Rept. No. 83-6, USACE, Coastal Eng. Res. Center, Fort Belvoir, VA, 88 pp.

Reviews wave-current interaction problem, including effects of nonuniform currents (nonuniform either in vertical or horizontal), dissipation, and breaking. Discusses CREDIZ model for wave transformation developed by Dutch Rijkswaterstaat. (P.A. Work)
CP TI 00

412

PEREGRINE, D.H., JONSSON, I.G., and **GALVIN, C.** 1983. *Annotated Bibliography on Wave-Current Interaction.*

Self-explanatory title. (P.A. Work)
CP 00

413
PILKEY, O.H., and **FIELD, M.E.** 1973. Onshore transportation of continental shelf sediment: Atlantic Southeastern United States. USACE, Coastal Eng. Res. Center, Reprint 24-73, pp. 429-446.

Abundances of phosphorite grains, total gold content, ooids, and various heavy minerals in beach and nearshore zones may indicate derivation from an offshore (shelf) source. The two environments may share a common source, experienced similar environments of deposition during the Pleistocene sea-level fluctuations, or indicate evidence of onshore transportation. Examples of past and present-day onshore transportation are presented. Mechanisms suggested for onshore sand movement include asymmetry of shoaling waves, and tidal and storm-induced currents. (P. Donovan-Ealy)
CP GS ST 01

414
PILLAY, S. 1988. An analysis and simulation of correlation errors in wet flux determination in salt marsh tidal channel systems, Msc. Thesis, Univ. South Carolina, Columbia, 95 pp.

Studies were made on (1) the mean cross correlation of sediment concentration and current velocity, (2) product of individual means of concentration and velocity, at Town Creek (North Inlet) and Bass Creek (Kiawah Island) on the South Carolina Coast. The differences found are attributed to the physical characteristics of the system.
CP ST 20/30

415
POSAMENTIER, H.W., JERVEY, M.T., and **VAIL, P.R.** 1988. Eustatic controls on clastic deposition I — Conceptual Framework. In C.K. Wilgus, B.S. Hastings, C.G. Kendall, H.W. Posamentier, C.R. Ross, and J.C. Van Wagoner (eds.), *Sea-Level Changes—An Integrated Approach*, SEPM Spec. Publ. 42, Tulsa, Oklahoma, pp. 109-124.

This paper states a conceptual approach to the framework of the effects of sea-level changes on depositional patterns. Terminology for Type 1 and Type 2 sequences and sequence boundaries is discussed, as well as those terms related to sequence stratigraphy. (M.S. Harris)
CP CS 00

416
POWELL, M.D., and **BLACK, P.G.** 1990. Meteorological aspects of Hurricane *Hugo's* landfall in the Carolinas. Shore & Beach, Vol. 58(4), pp. 3-14.

417
RPI. 1982. Environmental parameters and preliminary design of a detached breakwater for shore protection at Mariners Walk. Rept., Wild Dunes Beach & Racquet Club, Isle of Palms, SC; RPI, Columbia, SC.

A design memorandum containing recommendations for shore protection at Mariners Walk. Information on the physical environment to support a preliminary design of a breakwater, is provided
BE CS 20

418
RANKIN, D.W., POPENOE, P., and **KLITGORD, K.D.** 1978. The tectonic setting of Charleston, South Carolina. Geol. Soc. Amer., Abstracts with Programs, Vol. 10(4), p. 195.

Geophysical data and borehole information suggest that the meizoseismal area of the 1886 Charleston earthquake is within a major late Triassic/early Jurassic rift that connected the ancestral Gulf of Mexico with rifts that paralleled Appalachian structural trends but were located on the Atlantic continental shelf. Description of the rift deposits and its structure follows. (P. Donovan-Ealy)
CS GP GT 20/30

419
REEL, C.L. 1982. The origin and geologic significance of bubble sand, Bull Island, South Carolina, M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia, 134 pp.

Distribution of bubble sand sub-environment was found to be controlled by beach morphology and topography which control exposure to wave and tidal action. The variability in surficial beach sand firmness was found to be directly related to areal and vertical distribution of air bubbles in the upper half-meter of substrate. Laminar disruption in bubble sands, accompanied by bubble collapse, develops convolute lamination, total disorganization of primary bedding, resulting in massive sands. Determination of bubble sand deposits in the rock record can be utilized as indicators of low energy, intertidal depositional environments.

420
REISS, T.E., WERTZ, R.R., JR., and **KATUNA, M.P.** 1991. Beach profile measurements after Hurricane *Hugo*: Sullivans Island and Isle of Palms, South Carolina. U.S. Geol. Surv., Open File Rept. 91-0110, 116 pp.

On September 22, 1989, Hurricane *Hugo* struck the U.S. mainland near Charleston (SC). Landfall was at Sullivans Island, a barrier island east of Charleston. A reconnaissance flight just before landfall measured 140-knot winds at 12,000 ft, yielding an estimate of the highest one-minute wind speed of 120 knots at landfall. Storm-surge measurements after the storm's passage showed an average value of 14.3 ft above mean sea level across Sullivans Island. The combination of high winds and high water created drastic changes in the beach morphology along the seaward margins of Sullivans Island and Isle of Palms. The purpose of this investigation is to document these changes. In total, 25 locations on the two islands were surveyed.
BS CP 30

421
RENGER, E., and **PARTENSCKY, H.W.** 1974. Stability criteria for tidal basins. In Proc. 14th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1605-1618.

Examines the possible effects of a harbor construction project on the nearby tidal inlets related to the tidal prism/inlet cross-sectional area relationship. (S.J. Smith)
ID TI

422
RHODES, P.E. 1990. Federal emergency work on South Carolina beaches following Hurricane *Hugo*. In Proc. Third Beach Preservation Tech. Conf., Florida Shore & Beach Assoc., Tallahassee, FL, pp. 26-35.

BE 01

423
RIB, H.T. 1959. The application of aerial photography to beach erosion studies. M.S. Thesis, Dept. Civil Eng., Cornell Univ., Ithaca, NY.

Essay discusses applications of photos to beach erosion studies, and indicates how photos can be used more in this field. Use of photos in determining the source and rate of accumulation or loss of beach materials, investigating wave refraction, and evaluating the performance of shore protection structures is discussed. Photogrammetry and interpretation are reviewed and suggested specifications for photos are given. A scale of 200 ft per inch or larger was recommended. Several photos illustrate beach features and phenomena. (Authors)
BE CS RS 00

424
RICKETTS, P.J. 1992. Current approaches in geographic information systems for coastal management. Mar. Pollut. Bull., Vol. 25(1-4), pp. 82-87.

Geographic Information Systems (GIS) are being widely applied in coastal resource management. Critical coastal management issues such as sensitivity analysis, habitat modeling, and pollution monitoring require the ability for resource managers to make rapid and appropriate decisions. With the capability to incorporate a wide variety of alphanumeric and graphic data, including remotely sensed imagery, GIS provide an increasingly sophisticated tool for decisionmakers. Furthermore, current technological developments in artificial intelligence and expert systems are opening up new avenues for advanced GIS applications. However, such developments have the effect of making GIS more and more remote as far as resource managers and scientists are concerned, due to the high level of technical expertise required to operate these advanced systems, not to mention the high costs of the required hardware and software. This paper addresses the need to provide simpler and relatively inexpensive GIS for coastal resource management, especially for developing countries. (Authors)
BE GI RS SH 00

425
RIGGS, S.R., and **BELKNAP, D.F.** 1988. Upper Cenozoic processes and environments of continental margin sedimentation: eastern United States. In R.E. Sheridan and J.A. Grow (eds.), *The Geology of North America*, Vol. I-2, The Atlantic Continental Margin, U.S., Geol. Soc. Amer., Boulder, CO, pp. 131-175.

This report is an extensive presentation of data describing the Cenozoic geologic history of the coastal plain of the eastern United States. Sea-level changes, Neogene geology (lithostratigraphic, biostratigraphic, paleoecological, sedimentation patterns, phosphogenesis), Quaternary geology (Pleistocene systems, depositional environments, Holocene geology), fluvial, estuarine, shelf environments, and carbonate systems are covered. (M.S. Harris)
CP CS SM 01

426
RUBY, C.H. 1981. Clastic facies and stratigraphy of a rapidly retreating cuspate foreland, Cape Romain, South Carolina. Ph.D. Dissertation, Univ. South Carolina, Columbia.

A rapidly transgressing cuspate foreland, Cape Romain (SC), is described based on 57 core holes. This foreland fronts 12 km of marsh and tidal flats and is retreating at approximately 10-15 m/yr, with up to twice this amount associated with any large storm. Two primary sequences are revealed: (1) a 15-m-thick late Pleistocene regressive sandy estuarine unit, (2) overlain by a 12 m thick Holocene transgressive barrier-lagoon system. These sequences comprise 12 separate facies of which eight depositional environments are Holocene and four are late Pleistocene.

Pleistocene and Holocene stratigraphy and sedimentology are defined and discussed including an "antecedent barrier" which migrated landward across the Cape Romain area about 4000 years BP and the ancestor of Cape Romain which formed seaward of today's position and is migrating landward.
SH SM 30/40

427
S&ME, INC. 1993. Geotechnical exploration, Folly Beach fishing pier, Folly Beach, South Carolina. Tech. Rept., Davis & Floyd, Inc., 9 pp.

Report describes site and subsurface conditions on proposed Folly Beach fishing pier location. Logs from five water and seven land borings, each averaging 55-70 ft are included. (P. Donovan-Ealy)
GS GT 20

428
SCCC. 1979. State of South Carolina coastal management program and final environmental impact statement. South Carolina Coastal Council and Office of Coastal Zone Management (NOAA), Charleston, SC.

MP 01

429
SCCC. 1990. Calculation of South Carolina Coastal Council jurisdictional baselines and setback lines. South Carolina Coastal Council, Charleston, SC.

A series of reports that documents the data and procedures used to establish the SCCC lines of beachfront jurisdiction for 25 islands and beaches in the state. Each report provides a brief physical description of the locality, classifies it by jurisdictional zone, and lists the data used to establish the baseline and setback line positions, including historical aerial photography, beach profile data, and previous studies. (W. C. Eiser)

· Long-term shoreline change rates for *Waites Island* range from accretional, with no quantitative rate, to -9.5 ft/yr (8 pp.).
· The long-term erosion rate for *North Myrtle Beach* is -0.4 ft/yr (9 pp.).
· The long-term erosion rate for *Myrtle Beach* is -0.68 ft/yr (9 pp.).
· Long-term erosion rates for *Garden City/Surfside Beach* range from -0.9 ft/yr to -1.5 ft/yr (12 pp.)
· The long-term erosion rate for northern, *unincorporated Horry County* is -0.6 ft/yr, while the rate for southern, unincorporated Horry County is -0.9 ft/yr (12 pp.)
BE BS SH 50

· *Litchfield Beach/Huntington Beach State Park* are stable, with the exception of the southern spit at Litchfield Beach where the erosion rate is -1.7 ft/yr (12 pp.)
· Long-term accretion rates for *Pawleys Island* range from +0.7 ft/yr to +1.2 ft/yr (18 pp.).
· Long-term shoreline change rates for *Debidue Beach* range from +3.8 ft/yr of accretion at the northern end, to -11.5 ft/yr or erosion at the southern end (13 pp.).
BE BS SH 40

· Long-term erosion rates for *Dewees Island* range from -5.2 ft/yr to -10.3 ft/yr (5 pp.).
· Long-term shoreline change rates for the Isle of Palms range from stable to +2 ft/yr of accretion (11 pp.).
· The long-term shoreline trend *Sullivans Island* is stable to accretional, with no quantitative rate given, except for the *Breach Inlet* shoreline, where the long-term erosion rate is -2.6 ft/yr (10 pp.).
BE BS SH 30

· Long-term erosion rates for *Morris Island* range from 0 to -19.5 ft/yr (5 pp.).
· The long-term erosion rate for most of *Kiawah Island* is -0.5 ft/yr, although individual rates range from 0 to -1.45 ft/yr (8 pp.).
· Long-term erosion rates for *Seabrook Island* range from 0 to -2.6 ft/yr (11 pp.).
· Long-term erosion rates for *Eddingsville Beach* range from -1.3 ft/yr to -9 ft/yr (7 pp.).
· Long-term shoreline trend rates for *Edisto Beach* range from +0.4 ft/yr to +3 ft/yr of accretion (13 pp.)
BE BS SH 20

· Long-term shoreline change rates for *Bay Point Island* range from +27 ft/yr of accretion to -25 ft/yr of erosion (8 pp.).
· Long-term erosion rates for St. *Phillips Island* range from -4 ft/yr to -8 ft/yr (3 pp.).
· The long-term erosion rate for *Little Capers Island* is -25 ft/yr (5 pp.).
· Long-term erosion rates for *Pritchard Island* range from -7.65 ft/yr to -11.54 ft/yr (4 pp.).

· Long-term shoreline trends for *Harbor Island* are described as accretional, with no quantitative rates given (9 pp.).
· Long-term erosion rates for most of *Hunting Island* range from -7 ft/yr to -16 ft/yr (17 pp.).
· Long-term shoreline trends for *Fripp Island* are described as stable to accretional, with no quantitative rates given (12 pp.)
· Long-term shoreline change rates for *Hilton Head Island* range from +4.3 ft/yr to -6 ft/yr (16 pp.).
· Long-term erosion rates for *Daufuskie Island* range from -0.7 ft/yr to -11.1 ft/yr (10 pp.).

BE BS SH 10

430

SCCC. *Annual State of the Beaches Report.* South Carolina Coastal Council, Charleston, SC.

A series of annual reports summarizing the results from a beach monitoring program of semiannual wading depth surveys at approximately 400 monuments state-wide. (W.C. Eiser)

September 1991. This report concludes that beaches in the Charleston area and along the Grand Strand have essentially returned to pre-*Hugo* conditions. Edisto Beach and Folly Beach, as well as Daufuskie, Fripp, and Seabrook Islands, are identified as lacking a dry-sand beach. (24 pp.)
May 1993. Daufuskie Island, Hunting Island, and southern Debidue Beach are described as having undergone the most erosion during the monitoring period. (60 pp.)
May 1994. Daufuskie Island, Fripp Island, Seabrook Island, Edisto Beach, Garden City, and portions of North Myrtle Beach are listed as experiencing moderate to severe sand deficits. (62 pp.)
BE BS SH 01

431

SCCC. 1992. *South Carolina's Beachfront Management Plan.* South Carolina Coastal Council, Charleston, SC, 136 pp.

MP 01

432

SCDHPT. ca. 1970s. Unpublished miscellaneous surveys along Fripp Island and in conjunction with construction of groins. South Carolina Department of Highways and Public Transportation, Columbia, SC.

BS CS 10

433

SCSGC. 1981. A Study of Shore Erosion Management Options in South Carolina. South Carolina Sea Grant Consortium, Charleston, Rept. SC-SG-81-1, 246 pp.

BE 01

434

SCWMR. 1979. Benthic and sedimentologic studies on the Charleston Harbor ocean disposal area, Charleston Harbor deepening project. USACE, Charleston Dist.; SC Wild. & Marine Res., 50 pp.

Temperature, salinity, benthic communities and sediment were studied to assess affects of disposal of dredged materials over the Charleston Harbor Ocean Disposal area. Significant differences in the quantity or variety of species within and without the disposal area did not exist possibly due to the similar sediment size between the native and dredged material. (P. Donovan-Ealy)
CP EN GS 20/30

435

SANDIFER, P.A., MIGLARESE, J.V., CALDER, D.R., MANZI, J.J., BARCLAY, L.A., JOSEPH, E.B., and **McKENZIE, M.C. (eds).** 1980. *Ecological Characterization of the Sea Island Coastal Region of South Carolina and Georgia. Vol. III. Biological Features of the Characterization Area.* U.S. Fish & Wild. Serv., FWS-OBX-79/42, Wash., DC, 620 pp.

EN 01

436

SAYAO, O.F.S.J., and **KAMPHIUS, J.W.** 1983. Littoral sand transport: review of the state of the art (1982). C.E. Research Rept. No. 78, Dept. Civil Eng., Queens Univ., Kingston, Ontario, Canada.

Extensive literature review of papers available at the time of publication on longshore sediment transport. Reviews the energy flux approach, the "steady flow modification" approach, and numerous laboratory studies on the problem. Includes a directory of reports published by the Queens University, Department of Civil Engineering. (P.A. Work)
MS ST 00

437

SCHILT, F.S., BROWN, L.D., OLIVER, J.E., and **KAUFMAN, S.** 1983. Subsurface structure near Charleston, South Carolina, results of COCORP reflection profiling in the Atlantic coastal plain. In G.S. Gohn (ed.), *Studies Related to the Charleston, South Carolina, Earthquake of 1886 — Tectonics and Seismicity.* U.S. Geol. Surv., Prof. Paper 1313, pp. H1-H19.

The Consortium for Continental Reflection Profiling (COCORP) surveyed 72 km of seismic reflection tracklines near Summerville, South Carolina. Authors present an interpretation of the regional Mesozoic stratigraphy including several normal and reverse faults which have been active in the late Cretaceous and possibly Tertiary. Profiles showed a strong reflector at 750 m to 1 km depth which corresponds to the lower Mesozoic basalt layer identified in various cores. The crust-mantle transition identified at 32-34 km agrees with the depth presented in a previous study in the Piedmont. (P. Donovan-Ealy)
CS GP SM 20/30

438
SCHMELTZ, E.J., SORENSEN, R.M., McCARTHY, M.J., and **NERSESIAN, G.** 1982. Breach/inlet interaction at Moriches Inlet. In Proc. 18th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1062-1077.

"The formation of a significant breach immediately adjacent to the existing inlet and the artificial closure of the opening afforded a unique opportunity to study the dynamics of a tidal inlet under the influence of relatively rapid changes in tidal prism and cross-sectional area. The purpose of this paper is to present the results of a field measurement program and subsequent analyses of the dynamics of the inlet/breach system. The analyses were based on data obtained before, during, and after closure of the breach."
ID TI 00

439
SCHMITTER, R.D. 1986. Sediment transport characteristics of the nearshore zone between Hilton Head Island and Ossabaw Islands, Georgia, as determined by heavy mineral analysis. M.S. Thesis, Univ. Georgia, Athens, 82 pp.

A study of hornblende concentrations on the South Carolina and Georgia inner continental shelf indicates that high hornblende concentrations exist in the landward and most seaward sections of the transects. High hornblende concentrations in the landward section indicate transport from the Piedmont province via northern river drainages and deposition in the study area by southerly longshore drift. The high concentrations of hornblende in the offshore cores indicates onshore transport of material through bathymetric lows on the shelf. The source of the hornblende in the latter case is believed to be ancient Piedmont river deltas or estuaries which extended farther offshore in times of sea-level low-stands. (P. Donovan-Ealy)
CP ST TH 10

440
SCHMITTER, R.D., and **FREEMAN-LYNDE, R.P.** 1988. Hornblende content of Georgia-South Carolina, U.S.A., nearshore sands: support for shoreward sediment transport in the nearshore zone. Sed. Geol., Vol. 57, pp. 153-169.

Heavy mineral content for 51 box cores taken in transects off Hilton Head Island (SC) and Tybee, Wassaw and Ossabaw Islands (GA were calculated from the acid-insoluble 3-2 phi fraction. High hornblende content in the offshore section suggests shoreward transport of hornblende-rich sediment from the adjacent inner continental shelf. Low hornblende content in the mid-transect section indicates dilution of hornblende-rich sands by hornblende-poor sands from the coastal plain. High hornblende contents in the nearshore zone suggests the contribution of hornblende-rich sediments from the Piedmont Province transported to this area by southerly longshore drift. (P. Donovan-Ealy)
GS ST TH 10

441
SCHOONEES, J.S., and **THERON, A.K.** 1993. Review of the field-data base for longshore sediment transport. Coastal Eng., Vol. 19, pp. 1-25.

Data points for net longshore sediment transport rate. Seven studies were investigated which included assessment of local longshore sediment transport rates. Studies were ranked by apparent accuracy. (P.A. Work)
ST 00

442
SCOTT, G., THEBEAU, L.C., and **KANA, T.W.** 1981. Ashley River marsh survey, phase I. Draft Rept., Olde Charleston Partners, Charleston, SC; RPI, Columbia, SC 43 pp.

Study identifies and quantifies the existing amounts and types of marsh vegetation on the Ashley River. The marsh vegetation survey is expected to assist the developer for future land-use planning.
BS 20

443
SCHWING, F.B., KJERFVE, B., and **SNEED, J.E.** 1983. Nearshore coastal currents on the South Carolina continental shelf. Jour. Geophysical Res., Vol. 88(C8), pp. 4719-4729.

Summer measurements of currents, sea level, wind, and atmospheric pressure were made at climatological time scales (2-12 days) and tidal time scales (12-25 hours) at a shelf depth of approximately 10 m. The tide gauge was at North Inlet; the current meter was located offshore of North Inlet; and the wind measurements were made at Charleston. It is hypothesized that "the alongshore wind rapidly sets up a nearshore current with a mass flux onshore or offshore depending upon the wind direction" (p. 4728). (M.S. Harris)
CP 01

444
SEABERGH, W.C. 1977. Jetty design for Little River Inlet, South Carolina. In Proc. Coastal Sediments '77, ASCE, New York, NY, pp. 966-985.

Describes fixed-bed modeling study (1:60 vertical, 1:300 horizontal) to examine tidal flows through Little River Inlet under various jetty configurations. Light weight plastic tracer was used to simulate depositional patterns. See also paper by Ward and Knowles (1987). (P.A. Work)
CS ID MS TI 50

445
SEABERGH, W.C., and **ASCE, A. M.** 1977. Jetty design for Little River Inlet, South Carolina. In Proc. Coastal Sediments '77, Fifth Symposium of the Waterway, Port, Coastal and Ocean Div.; ASCE, New York, NY, pp. 966-985.

A fixed bed model of the inlet was built to develop an optional plan which would minimize construction costs and provide a stable non silting entrance channel. An understanding of tidal elevations, tidal currents and salinities enabled development of a workable model. Sediment movement in the vicinity of the jetty system was tested by using a lightweight plastic sediment as a tracer.
MS 50

446
SEELIG, W.N. 1977. A simple computer model for evaluating coastal inlet hydraulics. CERC, CETA 77-1.

"This report describes a method for estimating coastal inlet velocities, discharge, and bay levels using the simple numerical model of Seelig, Harris, and Herchenroder. The model can be used for sea-level fluctuations caused by astronomical tides, storm surges, seiches, or tsunamis."
ID TI 00

447
SEELIG, W.N., and **SORENSEN, R.M.** 1979. Numerical model investigation of selected tidal inlet-bay system characteristics. CERC, R 79-10.

448
SEELIG, W.N., HARRIS, D.L., and **HERCHENRODER, B.E.** 1977. A spatially integrated numerical model of inlet hydraulics. CERC, GITI 14.

See Seelig, W.N. (1977). (S.J. Smith)

449
SEMINAR ON PLANNING and **ENGINEERING IN THE COASTAL ZONE.** 1972. Proceedings of Seminar on Planning and Engineering in the Coastal Zone. Coastal Plains Center For Marine Development Services, Wilmington, NC, No. 2, 141 pp.

The purpose of this seminar was to provide a means by which existing knowledge and recent developments in the fields of planning and engineering in the marine environment could be imparted to and/or exchanged among both technical and nontechnical personnel concerned with these fields in the coastal plains region. Consistent with the mission of the center, this regional seminar highlighted problems and solutions applicable to the coasts of the Carolinas and Georgia. As is usually the case in proceedings of meetings of this type, the comments and conclusions expressed herein do not in all cases necessarily represent the official views of the center or any of the cosponsoring organizations. (Authors)
CP SH 01

450
SEXTON, W.J. 1981. Natural bar bypassing of sand at Captain Sams Inlet, South Carolina. Unpubl. M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia, 148 pp.

Study of how sediment bypassing takes place in the area. It is done by studying the geomorphology and hydraulic characteristics of the inlet.
ST 20

451
SEXTON, W.J. 1989. Proposed baseline and 40-year setback line for the central portion of Sullivans Island. Rept. to George Malanos, Sullivans Island, SC, 16 pp.

452
SEXTON, W.J. 1993. The recovery of undeveloped beaches along the South Carolina coast, post *Hugo*. In Proc. Hilton Head Island Intl. Coastal Symposium; co-sponsors Jour. Coastal Research, South Carolina Coastal Council, and South Carolina Shore & Beach Pres. Assoc., 6-9 June 1993, Hilton Head Island, SC, pp. 71-91.

453
SEXTON, W.J. 1995. The poststorm Hurricane *Hugo* recovery of the undeveloped beaches along the South Carolina coast, "Capers Island to the Santee Delta." Jour. Coastal Geol., *in press*.

454
SEXTON, W.J., and **HAYES, M.O.** 1980. Assessment of changes at Captain Sams Inlet, Seabrook Island, South Carolina. Final Rept., Seabrook Island Company, Charleston, SC; RPI, Columbia, SC, 20 pp.

455
SEXTON, W.J., and **HAYES, M.O.** 1980. Erosional and depositional trends of Block 16. Memo, Seabrook Island Company (Bob Cowan); RPI, Columbia, SC.

Provides additional information pertaining to erosion problem at Block 16. Migration and depositional rates are given.
BE 20

456
SEXTON, W.J., and **HAYES, M.O.** 1980. Beach stability at Seabrook Island, South Carolina, December 1979 through October 1980. Final Rept., Seabrook Island Company, Charleston, SC; RPI, Columbia, SC, 22 pp. [Other reports in the series include Sexton and Hayes (1981) for the period March through July 1981 (20 pp.).]

Reports on beach stability trends of the entire barrier island. Beach stability trends on Seabrook Island are found to be directly affected by changes in offshore shoals affiliated with North Edisto Inlet and Captain Sams Inlet. Changes in offshore shoal orientation and size affect short term variations.
BE SH 20

457
SEXTON, W.J., and **HAYES, M.O.** 1981. Shoreline stability of Seabrook Island, South Carolina, March through July 1981. Interim Rept., Seabrook Island Company, Charleston, SC; RPI, Columbia, SC 20 pp.

Contains changes in beach morphology monitored along the shoreline of Seabrook Island.
SH 20

458
SEXTON, W.J., and **HAYES, M.O.** 1982. Natural bar bypassing of sand at a tidal inlet. In Proc. 18th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1479-1495.

Documentation of the natural sand bypassing process at Captain Sams Inlet (SC). (S.J. Smith) Discusses sediment accumulation due to periodical migration of Captain Sams Inlet. The sediment accumulates at the seaward terminus of the tidal inlet to form a wave-modified ebb-tidal delta that trends downdrift. Continued sediment accumulation on the tidal delta shoal and lengthening of the tidal channel in a downdrift direction results in an unstable channel configuration, resulting in ebb-delta breaching on its updrift side, releasing a sediment package for inlet bypassing.
SB ST TI 20

459
SEXTON, W.J., and **HAYES, M.O.** 1983. Prognosis of future shoreline changes on Botany Bay Island, South Carolina. Final Rept., Cubit Engineering Ltd., Clemson, SC; RPI, Columbia, SC, 15 pp.

Gives an outline of findings and conclusions regarding the causes of past and present shoreline trends on the Island. The findings include:

1) Unstable shoreline
2) Appearance and disappearance of Deveaux Bank and its influence on shaping the shoreline.
3) Formation and northward migration of tidal delta south of Botany Island that initiated a depositional trend.

BE SH 20

460
SEXTON, W.J., and **HAYES, M.O.** 1991. The geologic impact of Hurricane *Hugo* and poststorm shoreline recovery along the undeveloped coastline of South Carolina, Dewees Island to the Santee Delta. Jour. Coastal Research, CERF, Spec. Issue 8, pp. 275-290.

461
SEXTON, W.J., and **MOSLOW, T.F.** 1981. Effects of Hurricane *David* on the beaches of Seabrook Island, South Carolina. NE Section, Vol. 3(3 & 4), Geol. Soc. Amer., Philadelphia, PA, pp. 297-305.

462
SEXTON, W.J., DINNEL, S.P., and **KANA, T.W.** 1981. Effects of the continued migration of the northern marginal flood channel of North Edisto Inlet, (June 1980 through May 1981). Tech. Rept., Seabrook Island Company, Charleston, SC; RPI, Columbia, SC, 17 pp.

A comparison of the changes of bathymetry of North Edisto Inlet during an 11-month period (June 1980-May 1981). The report documents changes in surface elevations for the purpose of gaining a better understanding of the migration pattern of a marginal flood channel which causes significant erosion to the beach of Seabrook.
BA ID TI 20

463
SEXTON, W.J., HAYES, M.O., and **DINNEL, S.P.** 1981. Shoreline stability of Kiawah Island, S.C., October 1975 through July 1981. Project Rept., Kiawah Island Company, SC; RPI, Columbia, SC, 22 pp. [Other reports in the series include Sexton, Hayes, Kana, and Muthig (1982) for the period March 1981 through January 1982 (30 pp.).]

Reports short-term variations in beach morphology of Kiawah Island. Also gives a summary of the beach morphology changes between October 1975 and March 1981. The results of the research are intended to give an understanding of the dynamic nature of beaches on Kiawah Island.
SH 20

464
SEYMOUR, R.J. Undated. Measuring the nearshore wave climate: California experience. Unpublished, 7 pp.

Describes the California, nearshore wave data collection program run by Scripps Institution of Oceanography since 1975. (P.A. Work)
CP 00

465
SHA, L.P., and **VAN DEN BERG, J.H.** 1993. Variation in ebb-tidal delta geometry along the coast of the Netherlands and the German Bight. Jour. Coastal Research, CERF, Vol. 9(3), pp. 730-746.

"A descriptive model of ebb-tidal delta geometry is proposed, which considers the relative influence of waves as compared to tidal currents, wave direction, and the interaction of offshore and inshore tidal currents."
ID ST

466
SHEPARD, F.P. 1950. Photography related to investigation of shore processes. Photogrammetric Eng., Vol. 16(5), pp. 756-769.

Paper discusses the uses of ground and aerial photos to study waves, rip currents, beach features, and cycles of erosion. Photos are noted to be particularly useful in studying wave patterns along coastlines. Rip currents are illustrated by ground and aerial photos. Seasonal cycles of beach erosion and accretion can be investigated with periodic ground or aerial photos. Importance of accurate dating of historical photos is emphasized. (Authors)
CP RS 00

467
SHEPARD, F.P., and **WANLESS, H.R.** 1971. Straight barrier coasts: Cape Romain to Florida Keys. In F.P. Shepard and H.R. Wanless (eds.), *Our Changing Coastlines*, McGraw-Hill, New York, pp. 132-161.

Provides a detailed physical description for the islands and beach areas in South Carolina, Georgia, and Florida. In South Carolina, they include Price, Capers, Dewees Inlets, Charleston Harbor, Fort Sumter, north Edisto River estuary, Pritchards Island, and St. Phillips Island.
BS 01

468
SHOSHANY, M., and **DEGANI, A.** 1992. Shoreline detection by digital image processing of aerial photography. Jour. Coastal Research, CERF, Vol. 8(1), pp. 29-34.

Digital image processing techniques applied to digitized (scanned) aerial photography allow significant improvements in the process of shoreline detection. Those improvements can be achieved in two areas: first, the area of objective and consistent shoreline recognition and then in the area of accurate georeferencing of the detected line. From the possible lines, the high water line (HWL) is most clearly represented in the photographs by a line of high brightness gradient. Three different enhancement and filtering techniques were utilized for the detection of the HWL. A combination of two of the methods provided an optimal detection methodology. The improvement in the area of georeferencing was achieved by mainly the increase in the number and accuracy of the control points relative to manual methods. (Authors)
RS SH 00

469
SIAH, S.J., OLSEN, E.J., and **KANA, T.W.** 1985. Myrtle Beach nourishment project. Engineering Rept., City of Myrtle Beach; CSE (Columbia, SC), and Olsen Associates, Inc. (Jacksonville, FL), 160 pp. + app.

Develops engineering analyses for design of a beach nourishment project along the city of Myrtle Beach. It includes geotechnical investigation and identification of suitable borrow sites, compatibility analysis of borrow sand, analysis of meteorologic and oceanographic processes, longshore currents and littoral transport, erosion trends and sediment budgets, beach nourishment design and construction planning, cost estimate, recommended plan, conceptual layout, and construction details.
BE BN GT MS SB 50

470
SILL, B.L., FISHER, J.S., and EDGE, B.L. 1981. Hunting Island, South Carolina, hydraulic model studies. Dept. Civil Eng., Clemson Univ., South Carolina, 27 pp.

471
SILL, B.L., FISHER, J.S., and **WHITESIDE, S.D.** 1981. Laboratory investigation of ebb-tidal shoals. Jour. Waterway, Port, Coastal, and Ocean Div., ASCE, New York, NY, pp. 233-244.

Laboratory investigation of the formation of ebb-tidal shoals by a steady ebb jet. (S.J. Smith)
ST TI

472
SMITH, J.B., and **FITZGERALD, D.M.** 1994. Sediment transport patterns at the Essex River Inlet ebb-tidal delta, Massachusetts, U.S.A. Jour. Coastal Research, CERF, Vol. 10(3), pp. 752-774.

"Essex River Inlet is located along the Northern Massachusetts barrier chain between Castle Neck to the north and Coffins Beach to the south. The position of the inlet as well as the geometry of the back barrier system are controlled by a preexisting drainage system which, in turn, is strongly influenced by the bedrock topography. The inlet is fronted by a well developed ebb-tidal delta. The hydraulics, sediment transport patterns and morphological changes of the ebb-tidal delta have been investigated through the documentation and analysis of tidal- and wave-generated currents, grain size distributions, bedform migrational trends, swash bar development, and historical shoreline changes.

The inlet throat is increasingly dominated by ebb-tidal currents and seaward sediment transport as tidal range increases from mean towards spring tides. A similar trend exists in the marginal flood channels with increasingly stronger flood than ebb-tidal currents with increasing tidal range. These flow asymmetries explain the seaward- and inlet- oriented bedforms (sand waves and megaripples) that floor these channels, respectively. The swash platform is dominated by landward currents and the onshore migration and coalescence of swash bars. The period of time between swash bar formation in the terminal lobe region and their eventual attachment to the landward beaches is approximately 5 to 7 years.

The channels and swash platform are parts of clockwise (updrift half of ebb-tidal delta) and counterclockwise (downdrift half of ebb-tidal delta) sediment gyres that circulate sand within the ebb-tidal delta and account for the sand that bypasses the inlet. Sediment transport rates determined using a variety of means (i.e., Maddock's (1969) equation, swash bar migration data, morphological changes) indicate that the main ebb channel can easily remove the sand supplied from the marginal flood channels and across the channel margin linear bars. Moreover, calculated sand transport rates in the main ebb channel infer an order-of-magnitude, more sand is moved across the swash platform than is indicated by the migration of the swash bars. This suggests that far more sand is circulated within the sediment gyres than bypasses the inlet."
ST TI 00

473
SNYDER, S.W., HINE, A.C., and **RIGGS, S.R.** 1982. Miocene seismic stratigraphy, structural framework, and sea-level cyclicity: North Carolina continental shelf. SE Geol., Vol. 23(4), pp. 247-266.

The shallow stratigraphic and structural framework for several Miocene depositional sequences overlying the Carolina Platform in Onslow Bay, North Carolina was determined using over 1000 km of high-resolution seismic-reflection trackline and over 100 9-m vibracores. The distribution, thickness, and depositional pattern suggests that the strata have been controlled by the regional tectonic framework, local structural features, and numerous, relative sea-level fluctuations. The authors' model for the Miocene of the upper North Carolina continental shelf consists of a series of basins bounded by several local structures which may be surficial expressions of recurrent movement along older, rift-originated or pre-rift basement faults. (P. Donovan-Ealy)
CS GP OS 00

474
SNYDER, S.W., RIGGS, S.T., and **HINE, A.C.** 1991. Sequence stratigraphy of Miocene deposits, North Carolina continental margin. In W.C. Horton and V.A. Zullo (eds.), *Geology of the Carolinas* (50th anniversary volume), pp. 263-273.

The authors present a chronostratigraphic interpretation of the Miocene section of the North Carolina continental shelf. Stratigraphic framework was established using high-resolution seismic reflection data and previous biostratigraphic analyses. (P. Donovan-Ealy)
GP OS 00

475
SORENSEN, R.M. 1977. Procedures for preliminary analysis of tidal inlet hydraulics and stability. CERC, CETA 77-8.

"This report summarizes procedures for calculations of the maximum tidal inlet channel velocity during a tidal cycle as well as the bay tidal range and phase lag (published by King, 1974)." The report also offers guidance in the use of the above procedures in design of jettied inlets as well as calculations of tidal prism/inlet area stability calculations. (S.J. Smith)
ID TI 00

476
SORENSEN, R.M. 1980. The Corps of Engineers' general investigation of tidal inlets. In Proc. 17th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 2565-2580.

The General Investigation of Tidal Inlets (GITI) is presented in summary and a listing of GITI reports is given in the appendix. "The various GITI research efforts can be divided into five categories: (1) filed studies of the hydraulics and sedimentary dynamics of selected inlets, (2) analysis of historic field data, (3) numerical models of inlet hydraulics, (4) movable and fixed-bed physical inlet models, and (5) other miscellaneous inlet studies."
TI 00

477
STAFFORD, D.B. 1968. Development and evaluation of a procedure for using aerial photographs to conduct a survey of coastal erosion. Rept., State of North Carolina; Dept. Civil Eng., North Carolina State Univ., Raleigh, NC.

Report describes the use of photos for a beach erosion survey along the North Carolina coast. Onslow and Carteret counties were used as a study area in developing and evaluating the procedure. Advantages and disadvantages of using photos for beach erosion surveys are discussed and a review of pertinent literature is included. An effort was made to develop procedures to minimize photo errors. Changes in two locations along the beach, the dune line, and the high water line were determined. The use of photos for beach erosion surveys was concluded to be applicable to coastal development and has important advantages over other collection methods.
BE RS 00

478
STAFFORD, D.B., and **LANGFELDER, L.J.** 1971. Air photo survey of coastal erosion. Photogrammetric Eng., Vol. 37(6), pp. 565-575.

Article describes and evaluates a procedure for using photos in a survey of beach erosion in North Carolina. Reference points are selected on photos taken in different years and the distance measured between these points and points located along the dune line and high water line on the transient beach. The measurements are multiplied by the photo scale for ground distances. Difference in the ground distances is the change in beach location over the elapsed time interval. Changes are converted to rates of change by dividing by the time interval. Advantages and limitations of this approach are discussed; illustrations of data obtained in North Carolina are presented.
BE RS SH 00

479
STAFFORD, D.B., BRUNO, R.O., and **GOLDSTEIN, H.M.** 1973. An annotated bibliography of aerial remote sensing in coastal engineering. Misc. Paper No. 2-73, USACE, Coastal Eng. Res. Center.

Self-explanatory title; source of commentary on several other papers found in this annotated bibliography. (P.A. Work)
SH 00

480
STAPOR, F.W. 1978. Sand transport at Edisto Beach, Colleton County, South Carolina. Final Rept., Marine Resources Res. Inst., SC Wild. & Mar. Res. Div., Charleston.

ST 20

481
STAPOR, F.W. 1982. Coastal erosion and deposition in the Dewees Island region, Charleston County, South Carolina. SC Wild. and Marine Res. Dept., Charleston, SC, 12 pp., maps.

This study is an attempt to identify, quantify and rank in importance the processes responsible for coastal erosion and deposition in the Dewees Island region. (Authors)
BE 01

482
STAPOR, F.W., and **MATTHEWS, T.D.** 1976. Mollusc C-14 ages in the interpretation of South Carolina barrier island deposits and depositional histories. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments*, AAPG Field Course, USC, Columbia, Tech. Rept. No.11-CRD, Part II, pp. 101-114.

The synchroniety of an organism's death and subsequent deposition cannot be assumed but rather must be tested using a suite of samples from a given locality. The character, age and duration of sources contributing material for deposition at a given locality can be assumed from such an assemblage. Mollusk shells suitable for C-14 dating were collected from the barriers of Bay Point, Botany Bay, Seabrook and Kiawah, South Carolina. Earliest times of deposition are given as 1600 BP for Bay Point, 1200 BP for Botany Bay, and 1200 BP for Seabrook. Holocene deposition of Kiawah Island began no later than 2500 BP; however, the majority of this island may be younger than 1200 years BP.
MS SM 10/20/30

483
STAPOR, JR., F.W., and **MAY, J.P.** 1981. Sediment transport at Hunting Island, South Carolina: Appendix II. In *Hunting Island State Park: Beach Erosion Study*, SC Dept. Parks, Recreation & Tourism, SC Wildlife & Marine Resources, and The Citadel, Charleston, SC, 48 pp.

ST 10

484
STAPOR, F.W., and **MAY, J.P.** 1987. Sediment transport and ebb-tidal delta development at Charleston harbor entrance, South Carolina. In Proc. Coastal Sediments '87, Vol. II, pp. 1640-1655.

Charleston Harbor Entrance, a tide-dominant (ebb-directed) inlet has a lunate ebb-delta pierced by twin jetties constructed between 1884 and 1896. Computer simulation, using pre- and post-jetty bathymetries, indicates that littoral drift is presently and was historically inlet-directed, south along islands to the north and north along islands to the south. Sediment budgets determined from map differencing of prejetty and postjetty bathymetries indicate that net erosion of the ebb-delta has systematically decreased since jetty construction as has also net erosion of Morris Island, the adjacent barrier island to the south. Jetty construction has not adversely affected this area and should not be blamed for coastal erosion occurring on more southerly islands. (Author abstract)
BE GT SH SM ST TI 20/30

485

STAUBLE, D.K. 1991. Coastal impacts of Hurricane *Hugo*. In Coastal Sediments '91, A Specialty Conference on Quantitative Approaches to Coastal Sediment Process, Vol. II, ASCE, New York, NY, pp. 1666-1680.

Examination of sediment transport patterns and morphodynamics of an extreme event by evaluation of aerial photography and ground measurements has been given. The author recommends that impact variability of Hurricane *Hugo* can provide valuable lessons on the process/response of coastal sediments and morphologies.
ST 01

486

STAUBLE, D.K. 1993. An overview of southeast Florida inlet morphodynamics. Jour. Coastal Research, CERF, Spec. Issue No. 18, pp. 1-27.

"The southeast coast of Florida from Palm Beach County to Dade County presently contains ten active inlets. Of these inlets, five have formed by natural processes and five by man-made dredging. Historically, eight other inlets have occurred along this coast, four by natural processes and four by man-made processes. These inlets had all closed by the late 1920s by natural shoaling at the inlet throat. Natural shoaling and inlet closure was also a problem for the five active natural inlets. There are only two natural inlets (Norris and Bear Cuts) remaining. Since the 1920s, all of the other active inlets north of these two have been highly engineered to maintain a stable navigation channel. Variability in inlet morphology is related to (1) bay or lagoon configuration; (2) structures constructed along the throat-adjacent shorelines, fixing throat width and length; (3) updrift and downdrift jetty configuration and length; (4) seaward length of dredged channel; and (5) proximity to shore-normal rock and reef hard bottoms. Using hindcast calculations, dominant wave approach directions were found to be from north of shore normal. Physical factors of mean wave height, mean tidal range, tidal prism and net southerly longshore drift are related to inlet and ebb shoal morphology in this mixed-energy, wave-dominated system. A complex relationship exists between inlet morphology and physical forcing functions and is complicated by the heavily engineered nature of these inlets, as well as the role of underlying and exposed hard bottom geology on controlling inlet evolution."
ID TI 00

487

STAUBLE, D.K., EISER, W.C., BIRKEMEIER, W.A., HALES, L.Z., and **SEABERGH, W.C.** 1990. Erosion characteristics of Hurricane *Hugo* on the beaches of South Carolina. Shore & Beach, Vol. 58(4), pp. 23-36.

Discusses the effects of Hurricane *Hugo* (September 1989) on the beaches of South Carolina. Includes photographs and beach profiles before and after landfall. (P.A. Work)
CP 30

488

STEELE, K.E., MICHELENA, E.D., and **HALL, J.M.** 1974. NDBO wave data — current and planned. In Proc. Intl. Symp. on Ocean Wave Meas and Anal (WAVES'74), ASCE, New York, NY, pp. 417-432.

The Data Buoy Office of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) deployed a 40-ft (12-m) discus buoy in the Atlantic Ocean 300 miles east of Charleston (SC) on December 10, 1973. This buoy had installed on it an experimental wave measurement system designed to produce significant wave height, wave period, and spectral width. These data have been acquired regularly and relayed to shore since deployment of the buoy. The engineering structure of the wave measurement system on the buoy is discussed and some of the data produced by the system since deployment are presented. Some of the measurement difficulties associated with the system design are examined, and plans for overcoming these difficulties are discussed. The formats and plots of wave data available to users, and plans for the future acquisition of them are presented. (Author abstract)
CP 20 30

489

STEPHEN, M.F. 1981. Effects of seawall construction on beach and inlet morphology and dynamics at Caxambas Pass, Florida. Ph.D. Dissertation, Univ. South Carolina, Columbia.

Reduced incoming wave energy due to shoreline orientation, local wave refraction, and shoals on the wide continental shelf cause a dominance of tidal energy and thus a mesotidal morphology at the Caxambas Pass inlet-barrier island complex. However, seawall construction near Caxambas Pass Inlet has increased local wave amplification due to wall-generated reflection, resulting in an unnaturally large wave field near the inlet. This has resulted in spit formation, unnatural growth of flood tidal shoals and channel redistribution. This has prevented the inlet's ability to provide sediment back-passing, causing the loss of sediment storage areas, reduction of beneficial sheltering and the modification of wave refraction effects on the beaches north of the inlet. Alteration of inlet morphology and beach erosion in excess of 100 meters on naturally stable Marco Island has resulted.
BE CS TI 00

490

STEPHEN, M.F., BROWN, B.J., FITZGERALD, D.M., HUBBARD, D.K., and **HAYES, M.O.** 1975. Beach erosion inventory of Charleston County, South Carolina. A preliminary report. SC Sea Grant, Tech. Rept. No. 4; Univ. South Carolina, Columbia, 79 pp.

A preliminary summary of beach erosional-depositional trends for Charleston County, measured from sequential vertical aerial photographs covering the period 1939-1973. Deals with rates of shoreline change, 1939-1973, which allow classification of the Charleston County coastline into four categories:

1) Areas of long-term erosion.
2) Areas of long-term accretion
3) Unstable areas.
4) Stable areas.

BE SH 20/30

491

STEPHENS, D.G., VAN NIEUWENHUISE, D.S., MULLIN, P., LEE, C., and **KANES, W.H.** 1976. Destructive phase of deltaic development: North Santee River delta. Jour. Sed. Petrol., Vol. 46(1), pp. 132-144.

Bottom samples collected along profiles across the North Santee River, South Carolina were analyzed for grain size, sedimentary structures, biota, color, composition, and petrology. Subsequent coring shows stratigraphic relationships and vertical extent of five facies. Since the construction of a dam in 1942, reduced discharge and sediment load has caused a change from fluvial to marine deposition. The present Santee delta represents an abandoned deltaic lobe undergoing seaward destruction and modification. (P. Donovan-Ealy)

CP CS GS 40

492

STONE, I.C., JR., and **SIEGEL, F.R.** 1968. Geochemistry and distribution of heavy minerals of continental shelf sediments off the South Carolina coast. Geol. Soc. Amer., Spec. Paper 115, 215 pp.

Heavy mineral suites of continental shelf sediments off South Carolina indicate a source in the Piedmont province but at least part has resided for some time in the Coastal plain. Distinct geochemical trends are detected and source materials identified. (P. Donovan-Ealy)

CP TH 01

493

SVETLICHNY, M. 1982. Short-term impact of beach scraping and backshore restoration, Myrtle Beach, South Carolina. Unpubl. M.S. Thesis, Dept. Geol., Univ. South Carolina, Columbia, 214 pp.

Discusses a study undertaken on beach and backshore scraping to evaluate the short term impact and potential benefits from a manipulated beach. The findings indicate that the design life of beach restoration is less dependent on gross quantities of sediment moved from shore to backshore, but dependent on the nature of the pre-existing beach topography.

BN 50

494

SWIFT, D.J.P. 1968. Coastal erosion and transgressive stratigraphy. Jour. Geol., Vol. 76, pp. 444-456.

The process of ravinement is discussed in great detail, both general marine ravinement, as well as ravinements associated with lateral migration of tidal channels. The factors involved in ravinement include "the depth to which reworking occurs . . . tide range . . . intensity and direction of wave attack . . . rate of sediment supply, nature of material supplied, and relative sea-level rise" (p. 455). (M.S. Harris)
CP 00

495
SWIFT, D.J.P. 1976. Coastal sedimentation. In D.J. Stanley and D.J.P. Swift (eds.), Marine *Sediment Transport and Environmental Management.* Wiley & Sons, New York, NY, pp. 255-310.

GS SM ST 00

496
SWIFT, D.J.P., and **THORNE, J.A.** 1991. Sedimentation on continental margins, I: a general model for shelf sedimentation. Spec. Publ. Intl. Assoc. Sedimentol., Vol. 14, pp. 3-31.

A general model of shelf sedimentation is presented. Swift and Thorne apply an accommodation/supply ratio (RxD:QxM; R=rate of sea-level rise, D=rate of sediment transport, Q=rate of sediment input, and M=character of sediment input) to sedimentation on the shelf. Ratios which are greater than one are in accommodation-dominated regimes; ratios which are less than 1 describe supply-dominated regimes. (M.S. Harris)
CP MS 00

497
SWIFT, D.J.P., SANFORD, R.B., DILL, JR., C.E., and **AVIGNONE, N.F.** 1971. Textural differentiation on the shoreface during erosional retreat of an unconsolidated coast, Cape Henry to Cape Hatteras, Western North Atlantic Shelf. Sedimentology, Vol. 16, pp. 221-250.

BE 00

498
SZABO, B.J. 1985. Uranium-series dating of fossil corals from marine sediments of Southeastern United States Atlantic Coastal Plain. Geol. Soc. Amer. Bull., Vol. 96, pp. 398-406.

Coral samples from South Carolina, North Carolina, and Virginia are used to obtain dates for coastal Quaternary deposits. Comparisons made between amino acid data and the U-series data trends exhibit some similarities; however, the amino acid data are discounted in Virginia. Th-230 ages for the Norfolk, late and early Wando Formations are 71+/-5 ka, 87+/-4 ka, and 129+/-10 ka. Correlations are made with the deep sea oxygen isotope record. (M.S. Harris)
CP 01

499
TANNER, W.F. 1961. Mainland beach changes due to Hurricane *Donna*. Jour. Geophysical Research, Vol. 66(7), pp. 2265-2266.

Report presents changes caused by Hurricane *Donna* along the lower west coast of Florida using before-and-after photos. Photos taken in 1953, 1957, and 1958 (before the hurricane in September 1960) were compared with those taken in October and November of 1960. The assumption that the more obvious differences between the coastline on the prestorm and the 1960 photos were due primarily to storm effects was used to detect coastal changes and to compute sand movement by the storm. An average depth of 5 ft for eroded and accreted areas was also assumed to convert area changes to volume changes. The author concluded that the storm only accelerated already active processes and that there was about 100 years of sand movement during the storm period.
RS SH 00

500
THIELER, E.R., and **YOUNG, R.S.** 1992. Quantitative evaluation of coastal geomorphological changes in South Carolina after Hurricane *Hugo*. Jour. Coastal Research, CERF, Spec. Issue No. 8, pp. 187-200.

Prestorm and poststorm aerial videotape surveys were made along 51 km of the barrier island coast of South Carolina from Garden City to Folly Beach. Before *Hugo*, the shoreline from the beach landward to, and including the first row of development, was classified as dune field (45 percent), bulldozed dune ridge (25 percent), revetment (14 percent), bulkhead (12 percent), vegetated washover terrace (3 percent), and beach only (1 percent). After the storm, 80 percent of the shoreline was classified as washover sheet, and 5 percent as washover fan. The only areas that were not overwashed were sections of very high dune field (13 percent) and large bulldozed dune ridge (2 percent). The most important observations can be summarized as follows:

1) Provided the dune field was not submerged, the minimum width of dune field required to survive Hurricane *Hugo* was 30 m.
2) Two types of dunes survived the storm--those high enough to prevent being overwashed and wide enough to prevent being completely eroded.
3) All bulkheads and revetments were overtopped, and wave activity was carried inland to the first and succeeding rows of development.
4) Fifty percent of all buildings completely destroyed or removed from their foundations were fronted by a combination of dry beaches less than 3 m wide and dune fields less than 15 m wide. (Authors)

BE CS SH 01

501
THOMPSON, E.F. 1977. Wave climate at selected locations along U.S. coasts. Tech. Rept. No. TR-77-1, USACE, Coastal Eng. Res. Center, Fort Belvoir, VA.

Not available in time to review for this bibliography.
CP

502
TISDALE, M.G. 1978. Sedimentology and paleoecology of a buried, Pleistocene, carbonaceous sand from Myrtle Beach State Park, Horry County, South Carolina. M.S. Thesis, Univ. South Carolina, Columbia, 76 pp.

Author describes the stratigraphy of a late Pleistocene carbonaceous sand deposit below the beach face at Myrtle Beach State Park. Fourier grain-shape analysis indicates grains from three sources or transport histories including fluvial, wind blown and reworked Pleistocene sand. (P. Donovan-Ealy)
CS GS SM 50

503
TITUS, J.G., and **BARTH, M.C.** 1984. An overview of the causes and effects of sea level rise. In M.C. Barth and J.G. Titus (eds.), *Greenhouse Effect and Sea Level Rise.* Van Nostrand Reinhold, New York, NY, pp. 1-56.

The overview chapter in a book which includes Chapter 4 — Case Study of Charleston, South Carolina, by Kana et al. (1984) (cited herein).
00

504
TYE, R.S. 1981. Geomorphic evolution and stratigraphic framework of Price and Capers Inlets, South Carolina. Msc. Thesis, Univ. South Carolina, Columbia.

Tidal inlet-barrier island depositional system is studied in a three-dimensional framework. Results show that migrating tidal inlets influence barrier island stratigraphy.
TI 30

505
TYE, R.S., and **MOSLOW, T.F.** 1993. Tidal inlet reservoirs: insights from modern examples. Chapter 4 in E.G. Rhodes and T.F. Moslow (eds.), *Marine Clastic Reservoirs*, Springer-Verlag, New York, NY, pp. 77-99.

"An inverse relation between wave regime and tidal range results in the deposition of variable yet distinct tidal-inlet sequences and channel geometries. Two additional factors controlling tidal-inlet stratigraphy are antecedent topography and sediment supply (i.e., lithology and quantity).

Inlet migration and abandonment produce subtle and dramatic variations in shore-parallel and shore-perpendicular sedimentary sequences. Wave-dominated inlet channels range in strike-oriented geometries from shallow (3 to 5 m), laterally continuous lenticular wedges to deep (15-18 m), V-shaped deposits. Tide-dominated inlets continuously migrate within a restricted zone and form U-shaped (along strike) and crescentic, concave-upward (along dip) channel geometries.

The association of barrier islands with fine-grained back-barrier and marine sediments creates excellent conditions for the formation of stratigraphic traps. An awareness of the

intricate differences between wave- and tide-dominated inlet deposits is a valuable tool for predicting shoreline sand geometry, facies association, and controls on fluid migration and entrapment."
TI 00/20/30

506
TYE, R.S., RHODES, E.G., and **MOSLOW, T.F.** 1993. Tidal inlet reservoirs: insights from modern examples. In E.G. Rhodes and T.F. Moslow (eds.), *Marine Clastic Reservoirs: Examples and Analogues*, Springer-Verlag, New York, NY, pp. 77-79.

The main objectives of the paper were to identify physical factors involved in tidal inlet stratigraphy, location of tidal-inlet sand bodies, geometry of the sand bodies, and the preservation potential of those sand bodies. Comparison and analysis of modern tidal inlets along the East and Gulf Coasts of the United States is made. The primary influence on tidal-inlet sequences and geometries is regarded to be "wave regime and tidal range, with additional factors being antecedent topography and sediment supply" (p. 96). (M.S. Harris)
CP TI 00/20/30

507
USACE. (various dates) General design memorandum. Beach nourishment and maintenance projects at Hunting Island, South Carolina: 1968, 1971, 1975, 1980. U.S. Army Corps of Engineers, Charleston Dist..

BN 10

USACE. 1949. Cooperative beach erosion study: State of South Carolina. Interim Rept., U.S. Army Corps of Engineers, Charleston Dist., 23 pp. + app.

BE 01

508
USACE. 1962. Myrtle Beach, South Carolina, interim hurricane survey report. Cherry Grove, Tilghman, Ocean Drive, Crescent, Atlantic, and Windy Hill Beaches, South Carolina. Letter from the Secretary of the Army transmitting a letter from the Acting Chief of Engineers, Dept. of the Army, dated November 8, 1961, submitting a report, together with accompanying papers and illustrations, on an interim hurricane survey of Cherry Grove, Tilghman, Ocean Drive, Crescent, Atlantic, and Windy Hill Beaches, South Carolina, authorized by Public Law 71, 84th Congress, approved June 15, 1955; House Document 336, 87th Congress. USACE, U.S. Gov. Print. Off., Wash., DC, 28 pp., maps.

The purpose of this report is to present the effects of hurricanes on the area in the vicinity of Myrtle Beach (Cherry Grove, Tilghman, Ocean Drive, Crescent, Atlantic and Windy Hill Beaches), South Carolina, and if advisable, to recommend means of preventing loss of human lives and damage to property. (Authors)
BE BS 01/50

509
USACE. 1963. Report on Operation Five High disaster recovery operations from 6-8 March 1962 storm. U.S. Army Corps of Engineers, North Atlantic Div., Civil Works Branch.

BS 01

510
USACE. 1964. Hunting Island Beach, South Carolina. U.S. Army Corps of Engineers, Letter to U.S. Congress, House Document No. 323, U.S. Govt. Printing Off., Wash., DC, 64 pp.

The purpose of this report is to present the results of investigations to determine the engineering and economic feasibility of plans directed toward development of the best method of arresting erosion and stabilizing the beach at Hunting Island State Park, South Carolina. (Authors)
BE BN BS 01/10

511
USACE. 1965. Hurricane survey: Edisto and Hunting Island beaches, South Carolina. Interim Rept., U.S. Army Corps of Engineers, Charleston Dist., 13 pp. + app.

BS 10/20

512
USACE. 1968. Folly Beach, Charleston County, South Carolina: detailed project report on beach erosion control. U.S. Army Corps of Engineers, Charleston, SC, 168 pp., illus. and maps.

This report presents the results of investigations made to determine the engineering and economic feasibility providing beach erosion control measures for the east Folly Shores reach of Folly Beach, South Carolina. The investigations include topographic surveys of the area and material sampling from the beach and prospective nourishment sources, evaluations of historical changes in the shoreline and in offshore depths, estimates of erosion rates, evaluations of patronage records and projections of population, and estimates and comparisons of cost of various improvements for the selection and apportionment of the best project plan. (Authors)
BE BN 01

513
USACE. 1971. *National Shoreline Study.* U.S. Army Corps of Engineers, Multiple Volumes, Wash., DC.

BS 01

514
USACE. 1972. Reconnaissance report on beach erosion, Pawleys Island beach. U.S. Army Corps of Engineers, Charleston Dist., SC.

BE 40

515
USACE. 1974. Survey report, Hilton Head Island, South Carolina. U.S. Army Corps of Engineers, Charleston Dist., SC, 20 pp. + app.

BS 10

516
USACE. 1975. Hilton Head Island, Beaufort County, South Carolina: survey report on beach erosion control & hurricane protection. U.S. Army Corps of Engineers, Charleston, SC, 20 pp., illus. and maps.

The purpose of this study is to evaluate the problems with respect to beach erosion and its vulnerability to storm damage, to evaluate various alternative measures to protect against these effects, to determine cost sharing between the federal government and local interest, and to select and recommend the best course of action to remedy the problems. The study area with which this report is concerned is Hilton Head Island and all adjacent shores. (Authors)
BE BN 01

Shoreline assessment for Hilton Head Island. Includes beach profiling and sediment sampling, analysis of aerial photographs, historical maps, coastal processes and sediment transport patterns, inventory of shore-protection measures, and feasibility study of erosion control plans involving beach renourishment and shore protection structures. (W.C. Eiser)
BE BS CP SH 10

517
USACE. 1975. Hunting Island beach, South Carolina, final environmental statement. U.S. Army Corps of Engineers, Charleston, SC, 27 pp., illus.

Hunting Island Beach, a part of Hunting Island State Park, is located along the southeastern shore of South Carolina in Beaufort County, 16 miles east of the City of Beaufort, 9 miles southwest of Edisto Beach, and 35 miles northeast of Tybee Roads at the mouth of the Savannah River. The beach has experienced severe shoreline recession, with loss of usable beach area, and damage to park roads and facilities. Remedial measures were proposed in a survey report in 1964, and a shore protection project was authorized by the Rivers and Harbors Act of 1965. This authorization provided for the construction and periodic renourishment of a 10,000-ft feeder beach, and a terminal groin located about 1,900 ft north of the north end of the feeder beach. The groin is a prestressed concrete sheet pile structure about 840 ft long and appears to be functioning well. (Authors)
BE BN EN CS 01

518
USACE. 1977. Hunting Island Beach, South Carolina: project evaluation and proposals for FY 1977 construction. U.S. Army Corps of Engineers, Charleston Dist., 37 pp.

BS 10

519
USACE. 1978. Bulls Island, Charleston County, S.C., shoreline demonstration project. Preliminary Preconstruction Rept., U.S. Army Corps of Engineers, Charleston, SC, 32 pp., illus. and maps.

Because of the importance and increasing interest in the coastal and estuarine zone, the undesirable effects of erosion within these zones, and the inability to obtain satisfactory financial and technical assistance to combat such erosion, Congress considered it essential to develop, demonstrate, and disseminate information about low-cost means of preventing and controlling shoreline erosion. Congress authorized Section 54, of the Water Resources Development Act of 1974, Public Law 93-251, referred to as the "Shoreline Erosion Control Act of 1974." This act directs the Secretary of the Army, acting through the Chief of Engineers, USACE, to "establish and conduct for a period of five fiscal years a national shoreline erosion control development and demonstration program." It further directed the Chief of Engineers to appoint a Shoreline Erosion Advisory Panel (SEAP). Among the functions delegated to the panel is to recommend "development and demonstration sites." The Chief of Engineers selected the Bulls Island, South Carolina site as recommended by SEAP. (Authors)
BE BN EN 01

520
USACE. 1979. Folly Beach, South Carolina, survey report on beach erosion control and hurricane protection. U.S. Army Corps of Engineers, Charleston Dist., SC, 39 pp., illus. and maps.

The purpose of this study is to evaluate the problems with respect to beach erosion at Folly Beach and its vulnerability to storm damage, to investigate the various structural and nonstructural alternatives, to determine cost sharing between the federal government and local interests, and to select and recommend the best course of action to remedy the problems. (Authors)
BE CS 01

521
USACE. 1982. Atlantic Coast hindcast, Phase II, wave information. U.S. Army Corps of Engineers, Waterways Expt. Sta., Vicksburg, MS.

CP 01

522

USACE. 1983. Myrtle Beach, Horry and Georgetown Counties, South Carolina — reconnaissance report on beach erosion control and hurricane protection. U.S. Army Corps of Engineers, Charleston Dist., 114 pp.

Report includes grain size, wave hindcast, erosion rate, socioeconomic, beach demand, and land-use data. Considers renourishment and offshore breakwaters as possible solutions. Calculates storm damage mitigation and recreational beach-use benefits.
BE CP 30/40/50

523

USACE. 1985. Folly Beach, South Carolina: beach erosion control and hurricane protection. U.S. Army Corps of Engineers, Charleston Dist., SC, 69 pp.

The recommended plan provides for beach restoration, erosion control and improvement of recreational beach along the ocean shoreline of Folly Beach, South Carolina. The plan improvement provides for restoration and periodic renourishment of a continuous reach of beach in the center section of the Folly Island ocean shoreline for a total project length of 16,860 ft. The plan would require 684,000 cubic yards of sandy fill material. Borrow areas selected as a source of fill sand are shoal areas in Lighthouse and Stono Inlets. Beach nourishment and restoration would create and maintain a total of 23 acres of beach which would bring about an increase in recreational activity and reduce beach erosion which currently endangers oceanfront development. Minor and temporary impacts include the disruption of benthic populations, increase in water turbidity, reduction in aesthetic values during construction, possible improvement of the navigability of inlets due to the removal of shoal material and increase in auto emissions and noise levels during peak activity periods. (Authors)
BE BN 01

524

USACE. 1987. Evaluation of the impact of Charleston Harbor jetties on Folly Island, South Carolina. Tech. Rept., U.S. Army Corps of Engineers, CERC, Vicksburg, MS, 65 pp. + app.

BE BS 20

525

USACE. 1987. Feasibility report on storm damage reduction: Myrtle Beach and vicinity. U.S. Army Corps of Engineers, Charleston Dist., 175 pp. + app.

Reports on problems and needs associated with shoreline changes along the northeastern coast of South Carolina. It includes results of engineering, environmental, economic, institutional, and shoreline erosion. Various feasible alternatives are given.
BE SH 50

526
USACE. 1990. *Edisto Beach, South Carolina. Reconnaissance Report for Storm Damage Reduction,* April 1990. U.S. Army Corps of Engineers, Charleston Dist., South Atlantic Div., 25 pp. + app.

BS 20

527
USACE. 1991. Folly Beach, South Carolina, shore protection project. Volume I — General Design Memorandum. U.S. Army Corps of Engineers, Charleston Dist., SC.

Describes beach nourishment/groin rehabilitation plan that was undertaken in 1993. Includes aerial photographs and engineering drawings of project site and features. (P.A. Work)
BN CS 20

528
USACE. 1993. Myrtle Beach, South Carolina, shore protection project. Draft General Design Memorandum, U.S. Army Corps of Engineers, Charleston Dist., SC, 46 pp. + app.

BN 20

529
USDOC. 1993. NDBC data availability summary. U.S. Department of Commerce, 1801-24-02, Rev. H. National Data Buoy Center, Stennis Space Center, MS.

Describes type of data, data collection equipment, and duration of record for each NDBC data collection station. Includes moored buoys throughout the Atlantic and Pacific Oceans and Gulf of Mexico, and Coastal-Marine Automated Network (CMAN) Stations. (P.A. Work)
CP 01

530
USDOC/NOAA. 1977. NDBO wave measurements. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Off. Ocean Eng., NOAA Data Buoy Off., July 1977, 22 pp.

Discusses equipment and products of NDBO group, circa 1977. (P.A. Work)
CP 01

531
USNWSC. 1975. *Summary of Synoptic Meteorological Observations, North American Coastal Marine Areas — Revised, Atlantic and Gulf Coasts.* Vol. 4, U.S. Naval Weather Service Command, National Climatic Center, Asheville, NC.

Provides records of ship observations by geographical location. Note that many observations (such as wave height) are visual; ships are typically moving, and tend to avoid locations where conditions are predicted to be worst. (P.A. Work)
CP 01

532
VALLIANOS, L. 1980. Barden Inlet, N.C.: a case study of inlet migration. In Proc. 17th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-4, pp. 2640-2654.

Factors affecting migration of a tidal inlet are studied. A "flow conveyance index" (ratio of planform area of the tidal inlet to planform area of shoals found within the tidal inlet) was computed and compared to rates of inlet migration. (S.J. Smith)
ID TI 00

533
VAN DE KREEKE, J. 1992. Stability of tidal inlets: Escoffier's analysis. Shore & Beach, Vol. 60(1), pp. 9-12.

A restatement and clarification of Escoffier's theory on cross-sectional stability of tidal inlets. (S.J. Smith)
ID TI 00

534
VAN DE KREEKE, J. 1993. Inlet-beach interaction: time scales and modeling approaches. Jour. Coastal Research, CERF, Spec. Issue No. 18, pp. 285-289.

"Beach erosion at barrier islands is closely related to the sediment flux in and out of the inlets. Two examples of conceptual Large Scale Coastal Behavior Models are presented that estimate the sediment flux in and out of an inlet-basin system."
MS TI 00

535
VAN DOLAH, R., GAYES, P.T., KATUNA, M.P., and **DEVOE, R.** 1993. Five-year program to evaluate sand, mineral and hard bottom resources of the continental shelf off South Carolina. In Proc. Coastal Zone '93, 8th Symp. Coast and Ocean Mgmt., Vol. 1, pp. 1188-1196.

In July 1992, the State of South Carolina entered into a cooperative arrangement with the Minerals Management Service (MMS) to establish a technical working group to identify and evaluate sand resources off the coast of South Carolina. The general objectives of the state are to undertake a five-year program to evaluate the sand, mineral, and hard bottom resources that exist on the shelf. During the first year, a task force was formed to conduct a detailed compilation and review of existing data pertinent to the assessment of South Carolina's offshore resources as they relate to beach nourishment activities. Future work by the task force will be to conduct a phased mapping effort to identify potential sand sources and critical resource areas in the nearshore zone (0-10 miles). All data gathered will be incorporated into the GIS database for use by various federal and state regulatory and resource management agencies.
BA EN GP GT 01

536
VAN DOLAH, R.F., KNOTT, D.M., WENNER, T.D., MATHEWS, T.D., and **KATUNA, M.P.** 1984. Benthic and sedimentological studies of the Georgetown ocean-dredged material disposal site. Tech. Rept. No. 59, SC Marine Resources Center, 96 pp.

Sample sites located within and near the Georgetown ocean-dredged material disposal site were used to identify mineralogical, textural, and chemical characteristics of bottom sediments; species composition and density of benthic communities; determine the degree of accumulation of pollutants; describe temperature-depth, salinity-depth, and dissolved oxygen-depth profiles in the water column; and assess the effects of the present dredged material disposal practices on benthic communities in the disposal area. Sediments collected in the channel, disposal site, downcurrent of the disposal site and in a control site show that sediments to the south are consistently finer grained which may be attributed to differing influence of wave action on the sites. (P. Donovan-Ealy)
CP EN GS GT 40

537
VAN DOLAH, R.F., WENDT, P.H., MARTORE, R.M., LEVISEN, M.V., and **ROUMILLAT, W.A.** 1992. A physical and biological monitoring study of the Hilton Head beach nourishment project. Final Rept., Town of Hilton Head Island and SCCC, 159 pp.

After dredging 2.5 million cubic yards of sand from two offshore shoals for the 1990 Hilton Head beach renourishment, a monitoring program was established to document changes in bottom-dwelling invertebrate communities and sediment characteristics. Two beach sites and several offshore sites were sampled. Major findings of the project include the alteration of the intertidal beach profile and a significant change in the bottom character of the Joiner Bank borrow site. The site filled with unconsolidated muddy sediments, a condition which persisted throughout the study period. (P. Donovan-Ealy)
BE BN BS CP EN 10

358
VAN DOLAH, R.F., COLGAN, M.W., DEVOE, M.R., DONOVAN-EALY, P., GAYES, P.T., KATUNA, M.P., and **PADGETT, S.** 1994. An evaluation of sand, mineral and hard-bottom resources on the coastal ocean shelf off South Carolina. Final Rept., Minerals Management Service, Office of International Activities and Mineral Resources, 235 pp.

The South Carolina Task Force on Offshore Resources and Critical Habitats evaluated South Carolina's sand, mineral, and hard-bottom resources in a zone extending from the coast to 16 km offshore. The 2465 geological and biological records will help facilitate the efficient use of the state's resources while ensuring such use will incorporate environmentally sound planning. The geological portion of the database includes sediment analyses, high-resolution seismic-reflection data, side scan sonar data and heavy mineral analyses. An evaluation of historical shoreline movement in the state is also included. (P. Donovan-Ealy)
BA GP GS GT SH TH 01

539
VELLINGA, P. 1983. Predictive computational model for beach and dune erosion during storm surges. In Proc. Coastal Structures '83, ASCE, New York, NY, pp. 806-819.

Model was used as a primary basis for the planned (circa 1996-1997) USACE Grand Strand nourishment project.
MS 00

540
VEMULAKONDA, S.R. et al. 1985. Coastal and inlet processes numerical modeling system for Oregon Inlet, N.C. CERC, CERC-85-6, 110 p.

A system of numerical models called Coastal and Inlet Processes (CIP) was developed to evaluate the coastal processes at Oregon Inlet, N.C. Models for wave propagation, wave-induced currents and setup, sediment transport within and beyond the surf zone, and profile response were included. The model was used to evaluate the effects of jetty construction at the inlet, as well as other alternatives to inlet management and stabilization. (S.J. Smith)
CP MS TI

541
VINCENT, C.L., and **CORSON, W.D.** 1981. Geometry of tidal inlets: empirical equations. Jour. Waterway, Port, Coastal, and Ocean Div., ASCE, Vol. 107(1), pp. 1-10.

Empirical equations are presented to relate the physiographic parameters of a tidal inlet such as length and depth. (S.J. Smith)
TI

542
VINCENT, L.C., CORSON, W.D., and **GINGERICH, K.J.** 1991. Stability of selected United States tidal inlets. GITI Rept. 21, CERC, U.S. Army Eng. Waterways Expt. Sta., Vicksburg, MS.

"The study developed methods for describing stability characteristics to be used later in relating the characteristics to the morphology and hydraulics of inlet systems. The methods were applied to analyze the stability of a wide range of inlets in order to develop a database on natural variations in inlet stability, and a possible classification of inlets based on their stability was examined for interrelationships. Regional variation in stability was analyzed. It should be noted that this report does not attempt to relate inlet stability to the morphology or hydraulics of inlet systems. Rather, this report is restricted to analysis of the stability characteristics of inlets."
ID TI

543
WADDELL, E. 1973. Dynamics of swash and its implications to beach response. Louisiana State Univ., Coastal Studies Inst., Tech. Rept. 139, 49 pp.

CP ST 00

544

WAGENER, H.D. 1970. Beach erosion in the Charleston Harbor area. Environmental Geology Series 1, Div. Geol., SC State Development Board, Columbia.

Report describes a study of beach erosion at Isle of Palms, Sullivans Island, and Folly Beach, South Carolina, from photos and field observations. Periodic photo mosaics or photo index sheets were used in the investigation. Mosaics of photos taken in 1941, 1949, 1954, 1958, and 1964 were compared to determine changes in the location and configuration of the beaches. Changes interpreted from the mosaics are described. Current erosional conditions and the performance of erosion control structures are described from field observations in 1969. The author states periodic photos can be used to monitor coastal changes and recommends a study group for the South Carolina coast; incipient erosion problems can then be detected and preventive measures taken before any severe damage. (Stafford et al., 1973)
BE RS SH 20/30

545

WALTHER, M.P., and **DOUGLAS, B.D.** 1993. Ebb shoal borrow area recovery. Jour. Coastal Research, CERF, Spec. Issue No. 18, pp. 211-223.

"The use of an inlet's ebb shoal as a borrow area for beach nourishment can significantly alter the sediment processes surrounding the inlet. The borrow area can become a sediment sink reducing natural bypassing and increasing erosion along the downdrift shoreline. To quantify the trapping and sediment transport rates over such a borrow area, a transport ratio methodology is presented. Transport ratio and trapping rates have been calculated and compared with measured data for ebb shoal borrow areas at Boca Raton Inlet, Redfish Pass, and Johns Pass in Florida. The predicted values are reasonably close to those measured. The methodology indicates that for the same dredged volume a shallow cut will initially reduce the natural bypassing rate less than a deeper cut. However, over a comparatively long period a deeper cut will be nearly the same."
ST TI 00

546

WALTON, T.L. 1973. Littoral drift computations along the coast of Florida by means of ship wave observations. Coastal and Oceanographic Eng. Dept., Tech. Rept. TR-15, Univ. Florida, Gainesville.

Presents method for prediction of longshore sediment transport rates utilizing offshore wave data available from ship observations. Littoral drift roses are polar graphs giving annual net longshore sediment transport rate as a function local shoreline orientation. (P.A. Work)
CP ST 00

547
WALTON, T.L. 1977. Beach nourishments in Florida and on the lower Atlantic and Gulf coasts. Florida Sea Grant Tech. Paper No. 2, Coastal and Oceanographic Eng. Dept., Univ. Florida, Gainesville.

Discusses nourishment projects throughout the region described in the title. Report not available in time to re-review for this bibliography. (P.A. Work)
BN 00

548
WALTON, T.L., JR. 1977. A relationship between inlet cross-section and outer bar storage. Shore & Beach, Vol. 45(2), pp. 9-14.

"This paper discusses a correlation between the amount of sand stored in the outer bar of an inlet and the inlet channel cross-section. Assuming one can properly estimate the inlet hydraulics and equilibrium cross-sectional area which an inlet will take, this correlation should allow a coastal engineer to obtain a rough approximation of the final consequences which the opening of an inlet will have on adjacent shorelines."
ST TI 00

549
WALTON, T.L., and **ADAMS, W.D.** 1976. Capacity of inlet outer bars to store sand. 14th Coastal Engineering Conf., ASCE, New York.

TI 00

550
WALTON, T.L., and **ESCOFFIER, F.F.** 1981. Linearized solution to inlet equation with inertia. Jour. Waterway, Port, Coastal, and Ocean Div., ASCE, Vol. 107(3), pp. 191-194.

"The present note describes a solution technique using a linearization technique of equating friction-work over the tidal cycle in a nonlinear approach to friction-work in a linear approach, and thus avoids apriori assumptions of the form of the bay tide."
ID TI 00

551
WARD, L.G. 1977. Barrier-island sedimentary environments. In D. Nummedal (ed.), *Beaches and Barrier Islands of the Central South Carolina Coast* (field trip guidebook, Sullivans Island and the Isle of Palms in conjunction with Coastal Sediments 77). Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, pp. 52-53.

Describes a typical traverse from the low-tide terrace to the back-barrier marshes along the South Carolina coast.
CS 30

552
WARD, L.G. 1978. Physical and sedimentological processes in a salt marsh tidal channel: Kiawah Island, South Carolina. Ph.D. Dissertation, Univ. South Carolina, Columbia.

Monitoring of current velocity, discharge and suspended material of a tidal channel at Kiawah Island (SC) shows that the system is ebb-dominated. Mass budgets of suspended material show a net export of organic material during winter and of both organic and inorganic material during summer. Ebb dominance is attributed to time-velocity asymmetry of the tidal currents, settling lag and scouring lag effects. "Maximum current velocity for both flood and ebb tide occurs near high slack water. Peak ebb velocity is approximately 20-30 percent stronger than peak flood velocity. The occurrence of maximum current velocity near high slack water causes a net displacement of suspended material in an ebb or seaward direction under normal conditions."

Short-term and seasonal variations in suspended load transport are explained. Highest suspended material concentrations occur during spring tides. Material eroded during strong winds and heavy rains increase sediment load transport. Also due to higher temperatures and increased biological activity during summer, suspended material concentrations increase by approximately an order of magnitude.
CP TI 20

553
WARD, D.L., and **KNOWLES, S.C.** 1987. Coastal response to weir jetty construction at Little River Inlet, North and South Carolina. In Proc. Coastal Sediments '87, A Specialty Conference on Advances in Understanding of Coastal Sediment Processes, ASCE, New York, NY, pp. 1078-1093.

"This study evaluates effects of a two weir jetty system on an inlet and adjacent beaches. . . Data from beach profile surveys, aerial photography, wave hindcast analysis, and a nearshore observation program were analyzed." Describes construction and configuration of dual weir jetty system and monitoring program to document effects of jetties on geomorphology. Beach profile surveys, aerial photography, wave hindcast data, and visual wave observations were included in the monitoring program. (P.A. Work)
BE CP CS ID ST TI 50

554
WATSON, C.C., JR. 1992. GIS aids in hurricane planning. GIS World, Spec. Issue, pp. 46-48, 50, 52.

This article describes how the Hilton Head Island (SC) GIS is involved in hurricane planning and response. Four aspects of this involvement are described, starting with the development of a hurricane response plan. Next, the major role GIS plays in public awareness is outlined, followed by the role in the recovery plan should a hurricane actually strike. Finally, the importance of protecting GIS assets is noted, along with the town's data protection scheme. (Authors)
CP GI 01

555
WAUGH, J.E. 1962. Storm damage survey. Photogrammetric Eng., Vol. 28(3), pp. 516-517.

Article describes a program initiated by the USCGS after the March 1962 East Coast storm to update coastal charts. Immediately after the storm, about 900 miles of coastline from Long Island to North Carolina was photographed with panchromatic film, and all major inlets harbor entrances, and major breakthroughs were photographed with color film. The photos showed that many of the coastal charts were made obsolete by the storm. Photos were used to produce chartlets to show mariners the major changes caused by the storm. Chartlets were to be used until all regular charts could be revised. Color photos were concluded to be very useful in investigating storm damage and changes along coastlines.
RS SH 00

556
WEBER, J.D. 1970. Photographic monitoring of shoreline movement. Shore & Beach, Vol. 38(1), pp. 36-83.

Capabilities and limitations of photos in measuring beach erosion is presented. Characteristics of the dune line, high water line, and the water line for measuring beach erosion on photos are described and problems associated with each line are discussed. Techniques used by the Wilmington District Office to compare periodic photos to monitor beach erosion of the North Carolina coast are described. Plans for comparing the photo survey with field survey measurements are described. Discussed are the common problems in measuring coastal change on photos. The best conditions for taking photos for erosion surveys are noted. Potentials of black-and-white infrared film to delineate the water line are discussed. Precautions to be observed if the photo survey is to produce accurate short-term beach erosion data are given.
BE RS 00

557
WEEMS, R.E., and **LEMON, E.M., JR.** 1984. Geologic map of the Mount Holly quadrangle, Berkeley and Charleston Counties, South Carolina. USGS Geol. Quad. Map GQ-1579, 1:24,000.

The geologic map is accompanied on the one sheet by text, geologic cross sections, geologic logs, and an isopach of poorly consolidated Quaternary units. (M.S. Harris)
CS 20/30

558
WEEMS, R.E., and **LEMON, E.M., JR.** 1985. Detailed sections from auger holes and outcrops in the Cainhoy, Charleston, and Fort Moultrie quadrangles, South Carolina. USGS Open-File Rept. 85-378, 65 pp.

Auger holes and natural exposures of strata in the vicinity of Charleston, South Carolina, are presented. The descriptions, location, elevation, and geologic column are presented for the data used to compile geologic maps in this area. (M.S. Harris)
CS 20/30

559
WEEMS, R.E., and **LEMON, E.M., JR.** 1987. Geologic map of the Moncks Corner quadrangle, Berkeley County, South Carolina. USGS Geol. Quad. Map GQ-1641, 1:24,000.

The geologic map is accompanied on the one sheet by text, geologic cross sections, geologic logs, and an isopach of poorly consolidated Quaternary units. (M.S. Harris)
CS 20/30

560
WEEMS, R.E., and **LEMON, E.M., JR.** 1993. Geology of the Cainhoy, Charleston, Fort Moultrie, and North Charleston quadrangles, Charleston and Berkeley Counties, South Carolina. USGS Misc. Invest. Series, Map I-1935, 1:24,000, 2 sheets.

The first of two sheets contains the geologic map of the four quadrangles and the second has text, geologic cross sections, detailed geologic columns, and an isopach map of unconsolidated Quaternary deposits. Deposits from Tertiary and Quaternary systems and periods are discussed with relation to depositional history, geomorphology, tectonics, and economic importance. (M.S. Harris)
CS SM 20/30

561
WEEMS, R.E., GOHN, G.S., and **HOUSER, B.B.** 1987. Additions and revisions to the auger hole records for the Cainhoy and Charleston Quadrangles, South Carolina. USGS Open File Rept. 87-362, 22 pp.

Revisions to previously published geologic sections (see Weems and Lemon, 1985; USGS OF-Rept. 85-378) are made because of needed corrections, both typographical and interpretative. Thirteen new and nine revised logs are included. (M.S. Harris)
CS GT 20/30

562
WEGGEL, J.R. 1981. Weir sand-bypassing systems. Spec. Rept., CERC, CERC-SR-8, 66 pp.

"Methods of data analysis and interpretation for weir-system design are presented along with guidance on proportioning the various components of a weir bypassing system."
CS TI 00

563
WEHMILLER, J.F., BELKNAP, D.F., BOUTIN, B.S., MIRECKI, J.E., RAHAIM, S.D., and **YORK, L.L.** 1988. A review of the aminostratigraphy of Quaternary mollusks from United States Atlantic Coastal Plain sites. Geol. Soc. Amer., Spec. Paper, Vol. 227, pp. 69-110.

A review of the aminostratigraphy of mollusks from the 150 sites along the East coast of North America and the Bahamas Islands is given. The broad study has allowed for an analysis of aminostratigraphy in a large framework with other methods, providing insight into geochemical problems encountered elsewhere in the literature. (M.S. Harris)
CP CS 00

564

WEISMAN, R.N., COLLINS, A.G., and **PARKS, J.M.** 1982. Maintaining tidal inlet channels by fluidization. Jour. Waterway, Port, Coastal and Ocean Div., ASCE, New York, NY, Vol. 108(4), pp. 526-538.

Describes the development of a fluidizing pipe system for the removal of sand from tidal inlets. (S.J. Smith)
CS TI 00

565

WILKINSON, D.L. 1978. Periodic flows from tidal inlets. In Proc. 16th Coastal Engineering Conf., ASCE, New York, NY, Vol. 1-3, pp. 1336-1346.

Presents the flow patterns found seaward of a tidal inlet during ebb tidal conditions. (S.J. Smith)
ID TI 00

566

WILLIAMS, M.L., and **KANA, T.W.** 1985. Shoreline changes along Kiawah Island, June 1984 — June 1985. Final Rept., Kiawah Island Company, SC; CSE, Columbia, SC, 76 pp.

Periodic documentation of monitored changes along the beaches of Kiawah Island and includes summary statistics, sediment budgets, comparative profile plots, along with ground and aerial photos.
BE SB 20/30

567

WILLIAMS, M.L., and **KANA, T.W.** 1986. Shoreline changes along Kiawah Island, June 1985 to September 1986. Final Rept., Kiawah Island Company, SC; CSE, Columbia, SC, 48 pp. + app.

Periodic documentation of monitored changes along the beaches of Kiawah Island and includes summary statistics, sediment budgets, comparative profile plots, along with ground and aerial photos.
BE SB 20/30

568

WILLIAMS, M.L., and **KANA, T.W.** 1987. Inlet shoal attachment and erosion at Isle of Palms, South Carolina: a replay. In Proc. Coastal Sediments '87, ASCE, New York, NY, pp. 1174-1187.

Examines the similarities and differences between the 1983-1984 and 1986/1987 shoal-attachment episodes. The investigation enables examination of the processes which triggered more frequent bypassing from the updrift inlet, and offers insight into appropriate remedial actions which are effective in protecting existing shorefront development until such time as shoal sand redistributes from the attachment point.
BE ID ST TI 30

569
WILLIAMS, M.L., and **KANA, T.W.** 1987. Beach nourishment at Myrtle Beach, South Carolina: an overview. In Proc. Coastal Sediments '87, ASCE, New York, NY, pp. 1106-1120.

Contains a preliminary analysis of the 1986-1987 Myrtle Beach nourishment project.
BE BN SB 50

570
WILSON, H.S. 1983. South Carolina's migrating beaches. In Proc. of a Conf., SC Sea Grant Consortium, Charleston, 91 pp., illus.

South Carolina's beaches are moving. Communities built on the edge of those beaches are threatened by erosion. The South Carolina Sea Grant Consortium designed this conference on "South Carolina's Migrating Beaches" to address considerations that result from living with eroding and accreting beaches. To ensure the future of South Carolina's beaches, the public must begin to understand not only the natural coastal processes at work, but the complex legal and engineering issues that have evolved in recent years. This conference was designed to increase public understanding of coastal processes and issues engendered by South Carolina's migrating beaches. (Author)
BE CP 01

571
WINN, R.N., VAN DOLAH, R.F., FRANKENBURG, A., and **KANA, T.W.** 1989. Benthic and sedimentological studies of the ocean-dredged material disposal site (ODMDS) for Charleston, South Carolina, Volumes 1 & 2. USACE, Charleston Dist., SC, 166 pp.

Analysis of benthic and sedimentologic data collected within the Charleston Ocean Dredged Material Disposal Site shows a significant change in sediment sorting and movement after deposition of the dredged material. Using Fourier grain-size analysis of 38 bottom samples in and around the disposal site, a decrease in sediment sorting after placement of the dredged material was documented and changes in bottom bathymetry were noted. These changes may represent a landward migration (northwesterly) of bottom sediments. Levels of metals in the disposal area were elevated but not above ranges measured in previous Charleston or Georgetown studies. (P. Donovan-Ealy)
EN GS GT TH 20/30

572
WOJTAL, A.M. 1977. Ebb-tidal delta of Breach Inlet, South Carolina: morphology, bedforms, and recent changes. In D. Nummedal (ed.), *Beaches and Barrier Islands of the Central South Carolina Coast* (field trip guidebook, Sullivans Island and the Isle of Palms in conjunction with Coastal Sediments '77). Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, pp. 33-38.

Reports on fieldwork carried out at Breach Inlet to study morphology, bedforms, and recent changes of beach tidal delta.
TI 30

573
WOOLLEN, I.D. 1976. Three-dimensional facies distribution of the Holocene Santee Delta. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments* (AAPG-sponsored field course). Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, pp. II-52 — II-63.

A sequence of post-Pleistocene stages of delta development is proposed based on three-dimensional faces distribution description based on fence diagram, cross-section and isopach structural maps.

574
WORK, P.A., and **DEAN, R.G.** 1991. Effect of varying sediment size on equilibrium beach profiles. In Proc. Coastal Sediments '91, ASCE, New York, NY, pp. 890-904.

BS GS 00

575
WORLD DREDGING. 1993. Folly Island beach restoration project. World Dredg. Min. Constr., Vol. 29(4), p. 9.

After years of erosion, the 5.7 miles stretch of beachfront along Folly Island (offshore of Charleston) is currently undergoing a $15 million face lift. When completed, the renourishment project being executed by the T.L. James Marine Group of Kenner (LA) will restore some 2.5 million cubic yards of sand and rebuild nine groins with sheetpiles and stone. The project is being overseen by the U.S. Army Corps of Engineers, Charleston District. (Authors)
BN 01

576
YUAN, A., BEHRENDT, J.C., and **UNGER, J.D.** 1983. High-resolution multichannel seismic profiles in connection with the 1886 Charleston earthquake. Geol. Soc. Amer., Abstracts with Programs, Vol. 64(45), p. 763.

The Helena Banks fault offshore Charleston, South Carolina has been active from late Cretaceous to at least Miocene/Pliocene time. Results from high-resolution multichannel seismic tracklines are presented which identify the J-reflector, overlying reflectors, and establish the displacement history of the fault. (P. Donovan-Ealy)
CS GP OS 20/30

577
ZABAWA, C.F. 1976. Estuarine sediments and sedimentation processes in Winyah Bay, South Carolina. In M.O. Hayes and T.W. Kana (eds.), *Terrigenous Clastic Depositional Environments* (AAPG-sponsored field course). Coastal Res. Div., Dept. Geol., Univ. South Carolina, Columbia, pp. II-64 — II-78.

Describes the sediments and sedimentation process on the coastal estuary of Winyah Bay, resulting from sediment deposition by Pee Dee, Black, Waccamaw, and Sampit Rivers.
ST 40

578
ZARILLO, G.A., JONES, W.E., and **McCREESH, C.M.** 1981. Beach erosion and shoreline processes: Hunting Island, South Carolina. Tech. Rept., Dept. Geol., Univ. South Carolina, Columbia, 88 pp.

BE 10

579
ZARILLO, G.A., WARD, L.G., and **HAYES, M.O.** 1985. *An Illustrated History of Tidal Inlet Changes in South Carolina.* S.C. Sea Grant Consortium, Charleston, SC.

Large-format color atlas indicating historical shoreline positions for each inlet on the South Carolina coast. Brief verbal description included on each inlet. (P.A. Work)
ID SH TI 01

580
ZEIGLER, J.M., and **RONNE, F.C.** 1957. Time lapse photography aid to studies of the shorelines. Naval Research Reviews, No. 4, Off. Naval Res., Wash., DC, pp. 1-6.

Report describes a program to obtain photos of the eastern United States coastline by scientists at the Woods Hole Oceanographic Institute. Vertical photos were taken of parts of the coast for making mosaics of coastal features, and oblique color photos of the entire East Coast were taken at a rate of two frames per second with a movie camera. This article is primarily concerned with oblique photos and discusses the equipment and procedures used. Changes in coastal features over about a six-month period are illustrated for Fire Island Inlet (NY) and Capes Hatteras and Fear (NC). Coastal changes are described in qualitative terms because of the difficulty of extracting quantitative data from the oblique photos. Users and uses of such photos are discussed. The group planned to continue the flights, at least annually.
CP RS 00

581
ZEIGLER, J.M., and **RONNE, F.C.** 1958. Coastline photography. Industrial Photography, Vol. 7(1), pp. 40-41.

Article describes a program by scientists at Woods Hole Oceanographic Institute to produce periodic color photos of the eastern United States coast. Photos were taken with a 16-mm movie camera at two frames per second. The coast from Maine to Texas was covered. Oblique color photos were taken from 2,500 ft to 5,000 ft. The camera and the film viewing system are described. Significant short-term changes in dynamic coastal features are discussed. Tidal inlets are rapidly changing coastal features. Several color photos are presented. Practical applications of time-lapse photos in coastal studies are described.
CS RS 01

Index Codes

BA	Bathymetry
BE	Beach Erosion
BN	Beach Nourishment
BS	Beach Surveys
CP	Coastal Processes (incl. winds/waves/tides/currents
CS	Coastal Structures
EN	Environmental (EIA/EIS/wetlands)
GI	Geographic Information System (GIS)
GP	Geophusics (incl. seismic/side-scan, etc.)
GS	Grain Size (sedimentology)
GT	Geotechnical (incl. vibtacores/broings/grab/samples/etc.)
ID	Inlet Dynamics
MP	Management Program
MS	Modeling Studies
OS	Offshore Stratigraphy
RS	Remote Sensing
SB	Sediment Budget
SH	Shoreline Chane (linear)
SM	Stratigraphic Modles
ST	Sediment Transport
TH	Trace and Heavy Minerals
TI	Tidal Inlets
00	not related to SC coast
01	entire SC coast
10	OCRM monuments 1000-1999
20	OCRM monuments 2000-2999
30	OCRM monuments 3000-3999
40	OCRM monuments 4000-4999
50	OCRM monuments 5000-5999

All 3-digit numbers on the following pages (001 to 581) refer to the numbered reference citation.

BA	BE	BN	BS	CP	CS	EN	GI	GP	GS	GT	ID	MP	MS	OS	RS	SB	SH	SM	ST	TH	TI	00	01	10	20	30	40	50
035	001	004	024	014	013	005	005	004	004	004	006	002	006	020	005	056	001	014	011	029	006	006	004	033	009	002	002	001
057	007	038	025	018	019	009	094	019	035	054	017	003	024	112	093	060	007	015	027	032	008	008	005	034	013	019	003	002
058	022	040	026	022	020	010	424	020	056	056	021	038	035	140	136	061	037	016	030	164	011	011	007	038	014	020	024	003
076	036	042	036	023	031	063	554	117	057	057	045	050	057	146	137	280	056	022	044	177	012	017	012	040	015	033	025	004
145	037	043	055	028	035	125		171	060	060	049	070	059	171	138	281	060	028	046	182	015	018	035	043	016	082	026	010
189	040	055	057	029	076	166		181	061	061	051	100	082	181	139	290	065	033	057	360	016	021	080	059	019	084	053	024
217	043	056	058	032	077	252		186	079	076	052	294	084	182	142	299	078	034	077	368	017	022	083	060	020	087	054	025
273	055	057	059	034	078	253		189	105	091	077	295	087	235	188	311	082	035	078	373	018	023	085	061	033	091	055	026
289	056	058	062	035	083	283		235	109	096	078	428	089	369	218	312	087	079	081	439	021	027	086	062	034	122	064	050
291	059	060	064	053	085	284		292	117	115	092	431	090	473	314	371	089	082	092	440	027	028	088	063	056	137	065	066
312	060	061	066	057	086	285		335	140	117	107		091	474	317	458	094	083	103	492	030	029	089	082	057	138	076	067
398	061	066	067	080	088	286		356	156	123	108		096	576	327	496	097	084	105	538	039	030	090	087	058	145	079	068
462	093	067	068	102	093	295		369	166	127	110		097		328	566	100	085	106	571	041	031	093	105	073	148	082	069
535	094	069	069	104	095	304		418	177	163	118		111		341	567	101	086	107		044	032	094	122	075	150	087	070
538	097	071	071	105	104	317		437	183	165	120		143		343	569	105	087	108		045	036	095	137	082	151	098	071
	098	072	073	106	109	330		473	195	171	141		145		344		130	088	111		046	037	096	167	087	152	099	072
	100	074	075	118	112	434		474	207	180	143		174		345		135	089	114		047	039	101	228	100	153	100	074
	101	075	100	126	115	435		535	219	182	148		178		346		136	090	116		048	041	112	234	104	155	114	077
	105	099	113	144	118	517		538	224	183	151		180		384		137	091	118		049	042	117	235	109	156	115	078
	124	113	129	145	119	519		576	238	214	152		184		385		138	095	121		051	044	121	245	122	158	116	079
	129	124	130	147	123	535			275	236	153		195		386		139	096	143		052	045	126	271	123	162	118	113
	135	133	131	148	127	536			291	238	154		254		423		142	115	147		053	046	129	281	124	163	119	133
	156	147	132	149	129	537			324	292	159		436		424		152	122	148		077	047	131	294	125	164	122	135
	161	184	134	151	139	571			370	373	170		444		466		176	123	149		078	048	132	299	130	171	127	165
	179	192	203	152	146				372	377	173		445		468		188	127	151		081	049	134	324	156	180	148	171
	184	210	210	156	156				413	388	178		469		477		211	172	158		084	051	137	360	162	186	149	182

BA	BE	BN	BS	CP	CS	EN	GI	GP	GS	GT	ID	MP	MS	OS	RS	SB	SH	SM	ST	TH	TI	00	01	10	20	30	40	50
	185	234	234	166	160				427	407	208		482		478		213	195	166		092	052	138	361	163	219	152	183
	188	241	245	176	162				434	418	213		496		499		217	202	168		106	096	140	359	164	220	165	228
	206	248	246	183	163				440	427	220		534		544		218	214	169		107	097	142	396	166	228	171	244
	207	261	251	184	171				491	496	260		539		555		226	335	173		108	102	144	397	171	233	192	248
	212	263	280	195	172				495	484	267		540		556		239	356	184		110	103	146	398	180	235	228	252
	213	265	282	196	175				502	535	274				580		266	357	187		111	120	154	399	184	256	232	253
	217	266	285	198	179				536	536	308				581		273	358	190		118	126	157	407	186	257	238	271
	226	267	301	204	185				538	538	309						287	359	191		119	136	161	429	189	258	244	282
	228	268	306	211	186				571	561	316						288	370	194		120	139	172	432	196	259	252	292
	230	269	307	212	189				574	571	352						289	377	197		141	141	174	439	205	273	253	296
	241	270	310	214	192						353						293	379	224		143	143	175	440	209	275	257	297
	247	271	311	215	193						354						294	425	225		147	147	177	482	210	279	263	301
	257	274	395	216	196						355						300	426	249		148	159	179	483	213	296	281	305
	264	279	396	217	214						363						302	437	250		150	168	181	507	214	297	283	359
	266	280	399	221	215						364						303	482	254		151	169	185	510	217	300	296	369
	273	281	420	223	216						365						304	484	255		152	170	194	511	235	302	297	370
	278	292	429	227	217						374						305	495	256		153	173	195	515	236	307	330	389
	279	295	430	229	222						388						306	502	258		154	176	198	516	246	310	359	429
	280	296	432	231	230						391						307	560	259		155	178	202	518	247	311	369	444
	288	297	442	242	238						393						313		276		157	187	203	537	260	318	370	445
	299	324	467	259	240						401						314		277		158	188	206	578	266	319	389	469
	305	329	508	273	244						404						326		291		159	190	207		267	326	426	493
	317	371	509	276	262						405						371		298		160	191	211		271	333	429	502
	326	381	510	281	279						406						375		316		167	193	212		274	335	491	508
	327	397	511	284	283						409						382		318		168	195	216		277	351	514	522
	328	399	513	286	309						421						390		319		170	197	223		278	357	522	525

BA	BE	BN	BS	CP	CS	EN	GI	GP	GS	GT	ID	MP	MS	OS	RS	SB	SH	SM	ST	TH	TI	00	01	10	20	30	40	50
	337	407	515	299	315						438						392		320		173	204	224		279	358	536	553
	338	469	516	303	333						444						395		321		176	208	225		284	359	577	569
	371	493	518	310	341						446						424		323		178	215	226		285	369		
	375	507	524	311	351						462						426		331		190	218	227		286	375		
	384	510	526	313	357						465						429		332		191	221	229		287	376		
	385	512	537	316	358						475						430		347		192	222	230		288	388		
	386	516	574	317	367						486						449		348		193	223	241		289	392		
	387	517		334	369						532						456		349		196	239	251		290	393		
	389	519		340	370						533						457		350		199	240	255		291	414		
	395	523		343	377						542						459		362		202	242	262		293	418		
	399	527		344	378						550						463		365		203	243	264		295	420		
	407	528		345	390						553						468		366		208	254	268		303	426		
	417	537		346	415						565						478		367		209	261	269		304	429		
	422	547		347	417						568						479		376		213	298	270		306	434		
	423	569		360	418						579						484		394		217	308	276		312	437		
	424	575		361	423												490		406		220	309	280		313	482		
	429			368	425												499		409		222	314	281		316	484		
	430			372	432												500		410		223	317	329		326	487		
	433			378	437												516		413		224	320	337		333	488		
	455			380	444												525		414		225	321	338		334	490		
	456			383	473												538		436		231	323	356		335	504		
	459			387	489												544		439		232	327	368		353	505		
	469			392	491												555		440		233	328	372		357	506		
	477			398	500												579		441		236	331	373		358	522		
	478			408	502														450		242	332	379		369	544		
	481			411	517														458		243	339	380		371	551		

BA	BE	BN	BS	CP	CS	EN	GI	GP	GS	GT	ID	MP	MS	OS	RS	SB	SH	SM	ST	TH	TI	00	01	10	20	30	40	50
	484			412	520														465		249	340	381		376	557		
	489			413	527														471		250	341	382		377	558		
	490			414	551														472		265	342	383		378	559		
	497			415	553														480		266	343	387		379	560		
	500			420	557														483		273	344	394		414	561		
	507			425	558														484		275	345	413		417	566		
	508			434	559														485		277	346	422		418	567		
	510			439	560														495		279	347	425		427	568		
	512			443	561														543		288	348	428		429	571		
	514			449	562														545		289	349	430		434	572		
	516			464	563														546		291	350	431		437	576		
	517			466	564														548		302	352	433		442			
	519			487	576														553		304	354	435		450			
	520			488	581														568		308	355	443		455			
	522			489															577		309	356	449		456			
	523			491															402		315	362	467		457			
	524			492															403		322	363	481		458			
	525			494															404		325	364	485		459			
	537			496															405		336	365	492		462			
	544			498															406		339	366	498		463			
	553			501															409		340	367	500		480			
	556			506															410		342	384	507		482			
	566			516															411		347	385	508		484			
	567			521															421		348	386	509		488			
	568			522															438		349	391	510		490			
	569			529															444		350	400	512		505			

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00	401	402	403	404	405	406	408	409	410	411	412	415	423	424	436	438	441									
TI	352	353	354	355	362	363	365	366	367	374	376	379	388	391	393	394	400	446	464	466	468	472	473	474	475	476
TH																										
ST	446	458	462	471	472	475	476	484	486	489	504	505	506	532	533	534	540	541	542	545	548	549	550	552	553	553
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