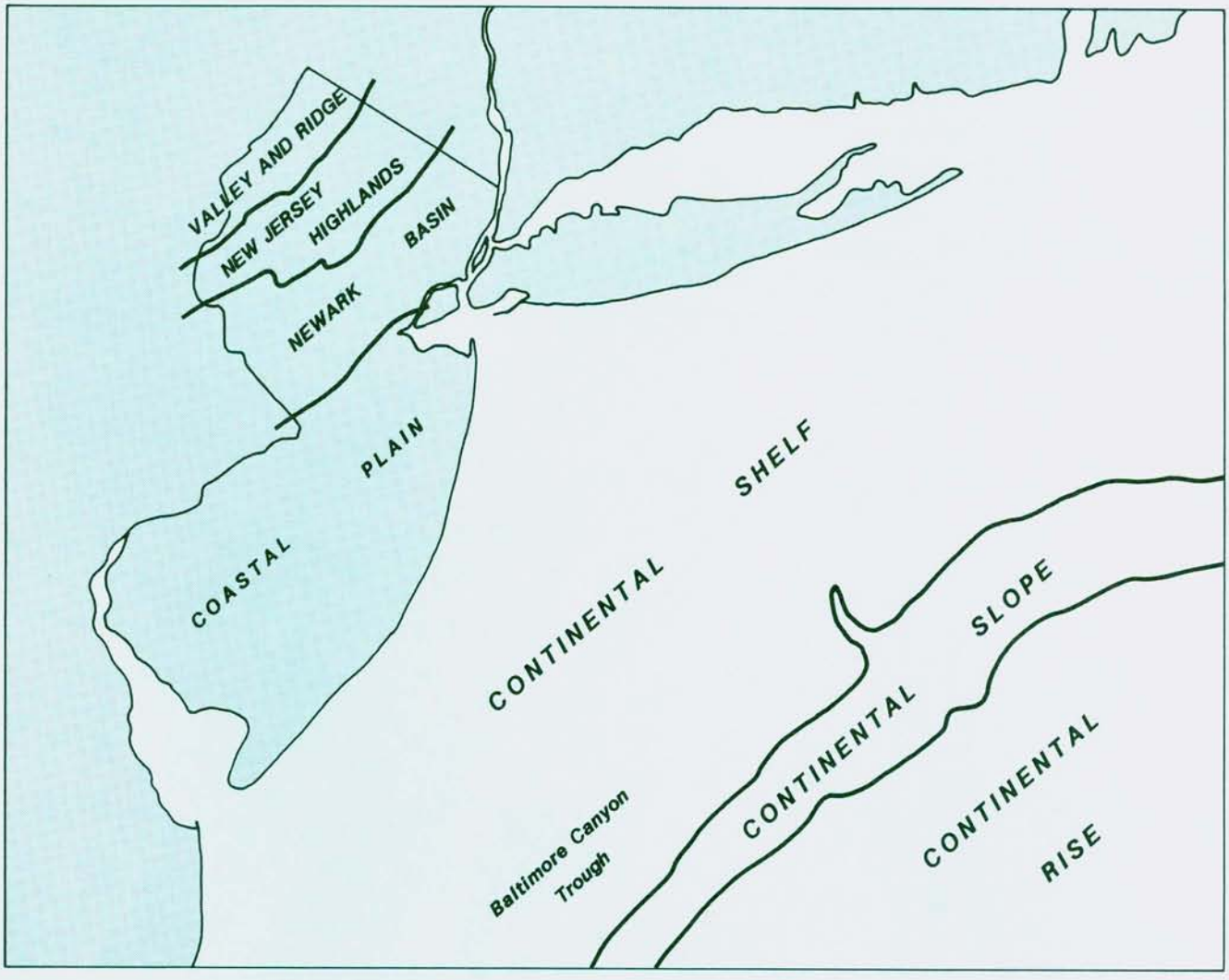
New Jersey Geological Survey
Geologic Report 16

Geologic Research in New Jersey
1987



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New Jersey Geological Survey
Geologic Report 16

GEOLOGIC RESEARCH IN NEW JERSEY—1987

edited by
David P. Harper

New Jersey Department of Environmental Protection
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Geological Survey
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INTRODUCTION

This report is the first of an annual series listing geological research projects in New Jersey. Its purpose is to inform the geologic and scientific community of relevant projects and theses in order to curtail duplication of effort, help with ongoing research, and foster new project ideas.

In the fall of 1986, questionnaires were sent to colleagues in New Jersey and adjacent states, state and federal agencies, and several large consulting firms. More than 150 responses were received. Ongoing research and manuscripts in review were grouped into nine categories to enable users to find projects of interest quickly. Publications, reports in press, and theses completed in 1986 and 1987 were grouped together at the end of the report.

It must be noted that project descriptions and completion dates are those of the researcher. In most instances, the New Jersey Geological Survey does not have additional public information on a project and will not be publishing the results. Reprint requests and inquiries concerning projects should be addressed directly to the researcher or sponsoring institution, not to the New Jersey Geological Survey.

Although we have attempted to contact those agencies and nearby institutions likely to be performing geologic research in New Jersey, there are undoubtedly some unintentional omissions, especially if the research is being done by individuals residing outside the State. If you are interested in having your research or publications included in future listings, please contact:

Editor
New Jersey Geological Survey
CN-029
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If you know of someone who should be listed, please send us his or her name.

Haig F. Kasabach
State Geologist

COASTAL AND OFFSHORE GEOLOGY

GAIL M. ASHLEY, BRENDA EKWURZEL, and CAROL VASSALLO, Rutgers Univ., New Brunswick, **Hydraulics and geomorphology of Townsend's and Hereford Inlets.** Area: coastal Cape May County.

A study of the present-day geomorphology and hydrology is being conducted for each inlet. This includes channel bathymetry, grain size, inlet velocity, tidal prism, and tidal surge. A historical analysis of each inlet is also being carried out by examining the cause-and-effect relationship between man-made (groins, dredging, and beach nourishment) and natural (waves, tides, and storms) events and responses (shoal migration, inlet "silting," and erosion of inlet beaches and barrier beaches adjacent to the inlet). Anticip. compl. date: July 1987.

GAIL ASHLEY and R. E. GRIZZLE, Rutgers Univ., New Brunswick, **Flow characteristics and sedimentation in a tide-dominated back-barrier lagoon:** article submitted to Marine Geology.

GAIL M. ASHLEY and ANDREW ROWAN, Rutgers Univ., New Brunswick, **Bank stability in a tidal channel-salt marsh system.** Area: Tuckerton salt marsh, Ocean County.

Modern-process study of bank stability of tidal channels in salt marsh. A progrmm of in-situ monitoring of creep processes is in progress. Rates of calving and marsh block disintegration with respect to tidal channel hydraulics will be determined. Anticip. compl. date: June, 1988

GAIL M. ASHLEY and MARJORIE ZEFF, Rutgers Univ., New Brunswick, **Flow and sediment transport in the tidal channel system in the back-barrier salt marsh of Cape May, New Jersey.** Area: Great Sound area, Middle Twp., Cape May County, New Jersey.

A modern-process study of tidal hydraulics and sediment transport in a wide range of tidal channels. The study was conducted as part of a comprehensive study of the Great Sound tidal channel-salt marsh lagoon system. Supported by N.J. Sea Grant (NOAA). Anticip. compl. date: March, 1987.

GAIL M. ASHLEY and MARJORIE ZEFF, Rutgers Univ., New Brunswick, **Tidal channel hierarchy in a low-mesotidal salt marsh: flow and sediment characteristics.** Article submitted to Marine Geology.

DAVID G. AUBREY, W. D. GRANT (deceased), and A. J. WILLIAMS, III, Woods Hole Oceanographic Institution, **Atlantic shelf sand ridge study: physical oceanography and sediment dynamics.** Area: Peahala Ridge, Long Beach Island, Ocean County, New Jersey.

Extensive field measurements coupled with theoretical work are helping define the origins of the pervasive ridge-and-swale topography found on the N.J. Continental Shelf. Bottom stress, sediment transport, and wave data were acquired for one month off the N.J. coast in support of these experiments. Anticip. compl. date: late 1987.

STEWART C. FARRELL, Stockton State College, **Beach profiles network for New Jersey.** Area: Sandy Hook to Cape May.

Establish and monitor 90 beach profiles along the N.J. coastline, 3000-6000 feet apart. Use the data to calibrate the computer-generated beach-erosion rates from the N.J. coastline metric mapping program and provide baseline information to the Federal Emergency Management Administration for coastal storm damage. N.J.D.E.P. contract. Anticip. compl. date: 1987.

STEWART C. FARRELL, Stockton State College, and STEPHEN LEATHERMAN, Univ. of Maryland, **Metric mapping of the New Jersey coastline.** Area: Sandy Hook to Cape May.

Gather together and compile all existing maps and orthophotographic aerial photographs for the New Jersey coastal zone, reduce the data to digital format, and load it into a user-friendly IBM PC program to allow access to coastal data, shoreline erosion rates, etc. N.J.D.E.P. contract. Anticip. compl. date: Jan. 1988.

MARY JO HALL and JOSEPH E. NADEAU, Rider College, **Sediment source, flux, and fate based on trace metal distribution, Great Sound, New Jersey.** Area: Cape May County. Article submitted to Marine Geology.

MARY JO HALL and JOSEPH E. NADEAU, Rider College, **Tracing pollutants using trace metals associated with sediments in the lagoons of southern New Jersey.** Area: Stone Harbor/Great Sound, Middle Twp., Cape May County.

Trace metal distributions established the southern access route to Great Sound as the major transport route. Vertical profiles within core samples showed generally decreasing metal content with depth except for a "high" 20-40 cm below the surface. Anticip. compl. date: Jan. 1987.

JOHN C. HATHAWAY and others, U.S. Geological Survey, **Atlantic Outer Continental Shelf stratigraphy.**

Research on the stratigraphy of sedimentary bodies of the estuaries and Continental Shelf of the eastern U.S. will continue in 1987, as will development of improved techniques for analyzing individual particles and thin layers and crusts. Anticip. compl. date: 1987.

K. D. KLITGORD and others, U.S. Geological Survey, **Tectonics and structure of the Continental Margin.**

Depth-to-surface and paleoenvironment maps for selected stratigraphic units in the Baltimore Canyon Trough are being prepared. A digital seismic stratigraphic data base for the Baltimore Canyon region is being constructed. Anticip. compl. date: 1989.

H. J. KNEBEL and others, U.S. Geological Survey, **Acoustic and sidescan-sonar study, Delaware Bay.**

Analysis of acoustic profiles and sidescan-sonar from Delaware Bay will be underway, and a shallow coring program within Delaware Bay is planned. The coring program will attempt to recover samples (to depths of 20 feet) at strategic locations in order to provide stratigraphic and age control for the acoustic records. Anticip. compl. date: 1989.

B. A. McGREGOR, and others, U.S. Geological Survey, **Continental margin and submarine canyon dynamics.**

A 15-day ALVIN dive program focusing on the submarine canyons seaward of New Jersey is planned.

JOSEPH E. NADEAU and MARY JO HALL, Rider College, **Preliminary evaluation of the effects of dredging along the Intracoastal Waterway between Hereford and Townsend's Inlets, N.J.** Area: Great Sound, Middle Twp., Cape May County.

Eight vibracores of 25-30 feet will be recovered. Grain size, metal concentrations, and fecal coliform will be determined for each 5 cm core length. Anticip. compl. date: Sept. 1987.

JOSEPH E. NADEAU and MARY JO HALL, Rider College, **Tracing pollutants using trace metals associated with sediments in the lagoons of southern New Jersey.** Area: Great Sound, Middle Twp., Cape May County.

Sediment movement patterns into Great Sound and distribution of such sediments based on trace metals associated with sediment were determined. In prep. for publication. Anticip. compl. date: Jan. 1987.

J. M. ROBB and others, U.S. Geological Survey, **Seismic stratigraphy of the U.S. North Atlantic Continental Margin.**

Completion of image processing and mosaicking of previously-acquired Sea-MARC sidescan-sonar data from the N.J. Continental Slope is dependent on arrival and functioning of an image-processing system. A report on submarine features in the New Jersey area is being prepared. Anticip. compl. date: 1989.

ROBERT STALLARD, R. KEY, L. S. YAN, R. ROTTER, L. HERNANDEZ, D. CRERAR, and K. COSTELLO, Princeton Univ., **Study of trace elements in New Jersey estuaries and coastal waters.**

We are evaluating the nature of trace metal contamination in New Jersey estuarine and coastal waters. Field work involves running inshore and offshore transects along the New Jersey coast. One sampling cycle has been completed and analyses are under way.

P. C. VALENTINE and others, U.S. Geological Survey, **Biostratigraphic and depositional framework, U.S. Atlantic Continental Margin.**

Biostratigraphy (Cretaceous nannofossils) of a Coastal Plain core hole is being compiled. Reports will be prepared on the lower Eocene calcareous nannofossil biostratigraphy and zonation of the Continental Slope off New Jersey, based on DSDP Leg 95 core holes. Preparation of a stratigraphic cross section across the Baltimore Canyon trough will be underway.

JEFF WALDNER and DAVE HALL, N.J. Geological Survey, **Atlantic County marine seismic survey.**

A 72 km survey grid of high-resolution marine seismic line has been collected and is being used in conjunction with offshore drilling and onshore data to determine the seaward characteristics and extent of the Cohansey-Kirkwood aquifer system offshore of Atlantic City.

S. JEFFRESS WILLIAMS, U.S. Geological Survey, Office of Energy and Marine Geology, and E. P. MEISBURGER, USAE Coastal Engineering Research Center, **Quaternary history and sedimentary framework of the coast and Continental Shelf of southern New Jersey.** Area: southern New Jersey, entrance to Delaware River estuary.

A study of coastal landforms and continental shelf areas of southern N.J. in the vicinity of Cape May is underway to better understand the Quaternary stratigraphic framework of the region. A collection of 1400 line-kilometers of high-resolution seismic reflection profiles, 120 vibracores (less than or equal to 3.7 m in length), and 35 surface grab samples are the data

base for interpreting the shallow subbottom stratigraphy, eustatic sea level changes, location and morphology of paleochannels, and origins of sand bodies containing potentially economic deposits of heavy mineral placers and sand and gravel. Anticip. compl. date: 1989.

ENGINEERING AND ECONOMIC GEOLOGY

CHRISTY BELL, N.J. Geological Survey, **Mines, pits, and quarries: Sand and gravel.**

This is a literature survey to determine locations and extent of historic and recent sand and gravel operations. Production sites are described and located on 1:24,000 scale quadrangle maps. The final report will include a brief discussion of sand and gravel operations in New Jersey.

CHRISTY BELL and RAY SIMONDS, N.J. Geological Survey, **Bedrock mines of the Mesozoic Basin and Reading Prong.**

Mining sites within the Newark Basin and Reading Prong are being reviewed for entry in the U.S. Geological Survey Mineral Resource Data System, a data base of all mining operations in the country. Each site is field checked. Literature references and current ownership are included.

E. C. ESCOWITZ and others, U.S. Geological Survey, **Offshore placer heavy-mineral resources.**

Magnetic separation of heavy-mineral samples from offshore Long Island and N.J. has been completed. These will be analyzed this year. Anticip. compl. date: 1989.

A. E. GROSZ, and others, U.S. Geological Survey, **Heavy minerals of Atlantic Coastal Plain and adjacent provinces.**

A study of the distribution of heavy minerals in vibracore samples from offshore of Cape May will be completed in 1987. A report will be prepared on the heavy-mineral placer deposits of the study area. Anticip. compl. date: 1987.

ENVIRONMENTAL GEOLOGY

GAIL M. ASHLEY, MARK FEIGENSON, and FRANKLIN McLAUGHLIN, Rutgers Univ., New Brunswick, **Characteristics of heavy mineral transport in the Raritan River basin, New Jersey.**

Four sites in the Raritan River basin have been sampled bimonthly from Sept. 1985 to present and analyzed for concentrations of ten metals (Ag, As, Cd, Co, Cr, Cu, Hg, Ni, Pb, and Zn) in dissolved and particulate fractions. Findings indicate that the amounts and mechanism of transport for metals varies widely within the basin. Most important controlling factors are land use, geology, discharge, season, suspended sediment load, organic content, and individual nature of each metal. Anticip. compl. date: Aug. 1987.

CHRISTY BELL, KARL MUESSIG, and others, N.J. Geological Survey, **Natural occurrence of radon in New Jersey.**

As part of a Statewide study of indoor radon, the N.J.D.E.P. is evaluating indoor air, geology, soil, water, gamma signature, etc. for selected homes. Data will be used to test a radon distribution model and assess lung-cancer risk.

JULIA L. BERRINGER and GEORGE R. KISH, U.S. Geological Survey, Water Resources Division, Trenton, **Corrosiveness of ground water in the Coastal Plain of New Jersey.**

Corrosion indices have been calculated for 272 wells to determine the extent of corrosive ground water in the Kirkwood-Cohansey aquifer. Maps indicate most shallow water in the Coastal Plain is corrosive. Anticip. compl. date: Sept. 1988.

PETER BOWER, Rutgers Univ., Newark, **Trace metals in the sediments of the Hackensack River and estuary.**

Sediment cores with good chronologies will be analyzed for Cd, Ni, Pb, Zn, Cu, Mn, Fe, and Co. Project has just begun with first cores being analyzed for Be7 and Cs137. Anticip. compl. date: 1989.

ERIC VOWINKEL, U.S. Geological Survey, Water Resources Division, Trenton, **Water quality and land use.** Area: N.J. Coastal Plain.

The relation between water quality, hydrogeology, and land use is being statistically evaluated. New and existing data from wells screened in shallow aquifers in the Coastal Plain are being evaluated.

GEOPHYSICS

DAVID GOLDBERG, R. N. ANDERSON, Lamont-Doherty Geological Observatory, and DANIEL MOOS, Stanford Univ., **Geophysical logging in drill holes through the Triassic Border Fault.** Area: near Riegelsville, Pa.

Borehole televiewer (ultrasonic) and multichannel sonic logging through faults, aquifers, and impermeable bedrock enabled quantitative measurements of the elastic properties and physical extent of these zones. Completed: June 1986.

JOSEPH M. HULL and DEE-FEN SUN, Rutgers Univ., Newark, **Gravity studies of the Green Pond Outlier, New Jersey.** Area: northern Highlands, Morris and Passaic Counties.

Gravity studies will determine depth to basement in the Outlier, complementing structural work. Results from a first traverse match both seismic data and balanced cross sections. Thesis under way. Anticip. compl. date: Spring 1988.

J. T. KUO, Columbia Univ., ROBERT METZGER, New Jersey Zinc, and ROBERT STUHLER, Columbia Univ., **Integrated geological and geophysical studies of Franklin-Ogdensburg zinc deposit.** Area: Wallkill Valley, Sussex County.

We have carried out extensive geophysical surveys, particularly gravity surveys, in the valley within the Franklin-Ogdensburg zinc district in order to interpret the subsurface geology and to locate the zinc ore body displaced by a fault. Continuing field course project.

LLOYD MULLIKIN, JEFF WALDNER, WAYNE HUTCHINSON, KARI ANDRES, and STEWART SANDBERG, N.J. Geological Survey, **Atlantic County geophysical study.**

This study uses high-resolution seismic, high-powered resistivity surveys and well logs to interpret Tertiary stratigraphy of the Cohansey Sand and Kirkwood Formation in the Atlantic County area. At a later stage, test and monitoring wells will be installed to verify interpretations.

STEWART SANDBERG, LLOYD MULLIKIN, JEFF WALDNER, KARI ANDRES, SUHAS GHATGE, and DAVE PASICZNYK, N.J. Geological Survey, **South River geophysical study.**

This study is to investigate regional stratigraphy relevant to chloride migration in the Farrington and Old Bridge aquifers. Geophysical techniques will be used to determine the depth to the Palisades Sill and the continuity and extent of the Woodbridge Clay, Old Bridge aquifer, and Woodbury Clay in the South River area.

LEONARDO SEEBER, LYNN SYKES, JOAN ARMBRUSTER, KLAUS JACOB, MARTITIA TUTTLE, and KIM LOCKE, Lamont-Doherty Geological Observatory, Columbia Univ., **Earthquake hazard and neotectonics.** Several interlinked projects.

In this ongoing research program we hope to improve constraints on earthquake hazard by improving our understanding of the fundamental processes responsible for intraplate neotectonics in the eastern U.S. and along the northeastern Atlantic Seaboard (greater New York City area in particular). Progress has been very encouraging.

ROBERT E. SHERIDAN and RICHARD K. OLSSON, Rutgers Univ., New Brunswick, **Seismic reflection profiling in southern New Jersey Coastal Plain.** Area: along Route 557, Atlantic, Gloucester, and Salem Counties.

Seismic reflection profiles are planned that will reveal the structure and stratigraphy of the Coastal Plain and pre-Coastal Plain rocks. Ties to Coastal Plain wells will be made to establish geologic correlations. Anticip. compl. date: Dec. 1988.

JOHN VN THIRUVATHUKAL, Montclair State College, **Total intensity magnetic map of southern New Jersey.**

A total intensity magnetic map of southern N.J. has been prepared using about 300 magnetic measurements. The contour interval is 100 gammas. The Geometrics G-826 proton precession magnetometer was used. Study completed.

JEFF WALDNER, STEWART SANDBERG, and JOHN GROENEWOLD, N.J. Geological Survey, **Camden, New Jersey, area geophysical study.**

This study is to identify major stratigraphic units and to determine the regional significance of interaction between the Delaware River and the Potomac-Magothy-Raritan aquifer system. Geophysical methods will be used to determine the extent of stratigraphic units. Transient electromagnetic methods will be used to evaluate the distribution of potable water in these units.

HYDROGEOLOGY

JOHN M. ASH, N.J. Geological Survey, **Preliminary report on the hydrogeologic effects of ground-water heat pumps in New Jersey.**

Project to investigate the use of ground-water heat pumps in New Jersey, the effects of hydrogeologic conditions on heat pumps, and the effect of heat pumps on hydrogeologic conditions. Funded by a U.S.E.P.A. Underground Injection Control grant. Anticip. compl. date: Apr. 1987.

CYNTHIA BARTON, JANE KOZINSKI, and ART BAEHR, U.S. Geological Survey, Water Resources Division, Trenton, **An assessment of ground-water resources in the Greenwich Township region, Gloucester County, New Jersey.**

Defined the geohydrology of the Potomac-Raritan-Magothy aquifer system, collected data to assess ground-water quality, and began to evaluate the ground-water resources using the McDonald-Harbaugh 3-D ground-water flow model. Anticip. compl. date: Sept. 1988.

GEORGE BLYSKUN, N.J. Geological Survey, **Ambient ground-water quality network.**

This project is to revise the Ambient Ground-Water Monitoring Network so as to allow statewide characterization of water quality within 5-10 years. The current network consists of 20 wells, mostly in the Coastal Plain, to provide regional coverage, and 26 wells in one glacial valley, to provide intensive local assessment. These are sampled yearly for chemical parameters. The observation well network in northern New Jersey will be expanded during the next two years.

JAMES BOYLE, HUGH HOUGHTON, and PATRICIA GOMES, N.J. Geological Survey, **Northwest Mercer County water-resources study.**

This project is an evaluation of ground-water resources in the Stony Brook and Jacobs Creek watersheds. Sedimentary, stratigraphic, and structural geologic conditions in the Brunswick and Lockatong Formations are being integrated with pump-test results and ground-water-level and discharge measurements in an overall assessment.

ROBERT CANACE and RICHARD DALTON, N.J. Geological Survey, **Hamburg Quadrangle, Sussex County, aquifer-delineation demonstration map.**

The project is to map geology of the Hamburg quadrangle, then use this mapping in a detailed description of local hydrogeology, environmental geology, and engineering geology. The work is intended to serve as a model for the use of geology in establishing rational land-use-planning criteria.

ROBERT CANACE, WAYNE HUTCHINSON and LLOYD MULLIKIN, N.J. Geological Survey, **Seismic investigation of the Ramapo River valley aquifer between Suffern, N.Y., and Oakland, N.J.**

This is a cooperative effort with the U.S. Geological Survey to develop a model of the glacial valley-fill aquifer between Suffern, New York and Oakland, New Jersey. The N.J. Geological Survey is to map depth to bedrock and generally characterize sediment using well and seismic data. In review.

ROBERT CANACE, LLOYD MULLIKIN, and JAMES BOYLE, N.J. Geological Survey, **Statewide aquifer map.**

This project is to map characteristics of the principal aquifers of New Jersey. This is being done in conjunction with geologic map revision under the COGEOMAP program.

ROBERT CANACE, SCOTT STANFORD, and DAVID HALL, N.J. Geological Survey, **Lower Rockaway Valley aquifer delineation.**

The hydrogeology of the lower Rockaway River valley fill is being studied using surface mapping, well records, seismic reflection and refraction, test drilling, distribution of volatile organic compounds and isotopes.

GAIL CARTER, N.J. Geological Survey, **Aquifer classification under Section 106, N.J. Clean Water Act.**

The Section 106 Ground-Water Committee is to develop an aquifer classification procedure and revise the N.J. Ground-Water Quality Standards. Current standards use four classes based on natural dissolved solids (TDS). The goal is to devise a more appropriate, flexible, and comprehensive scheme. Additionally, a Statewide Ground-Water Management Strategy will be developed as part of this project.

PHILIP T. HARTE, U.S. Geological Survey, Water Resources Division, Trenton, **Geohydrology of the Rockaway buried valley.** Area: Northern Morris County, New Jersey.

The objectives of the study are to determine the occurrence and movement of ground water within the Rockaway River basin glacial valley-fill aquifer system. A computer model is being developed to simu-

late hydrologic conditions. Anticip. compl. date: Sept. 1989.

MARY C. HILL, U.S. Geological Survey, Water Resources Division, Trenton, **Saltwater intrusion in the upper aquifer system of Cape May County, New Jersey: analysis of past and present conditions and evaluation of optimal aquifer management.** Area: Southern Cape May County.

The project is in its initial stage. A base map has been prepared and relevant wells in the U.S. Geological Survey data base have been identified. An inventory of other data is in preparation. Anticip. compl. date: Oct. 1989.

JOSEPH HOCHREITER, Jr., and JEAN C. LEWIS, U.S. Geological Survey, Water Resources Division, Trenton, **Geohydrology of Logan Township, Gloucester County, New Jersey.**

The project is investigating the occurrence of aquifers and confining units, and water quality of aquifers underlying Logan Township. Emphasis has been placed on uninvestigated areas of the Township east of Raccoon Creek. Anticip. compl. date: June 1987.

JOSEPH HULL, PATRICIA GOMES, and JOSEPH DiBENEDETTO, Rutgers Univ., Newark, **Structural control of ground-water flow and resources, Newark Basin, New Jersey.** Area: Hunterdon and Mercer Counties.

The two graduate students are both studying the relationship between minor structures (particularly faults and fractures) and ground water in bedrock of the Newark Basin. Theses in preparation. Anticip. compl. date: Spring 1987.

JEAN C. LEWIS and FREDERICK J. SPITZ, U.S. Geological Survey, Water Resources Division, Trenton, **Hydrogeology, ground-water quality, and the possible effects of a hypothetical radioactive-water spill, Plainsboro Township, Middlesex County, New Jersey.**

A small area underlain by jointed sedimentary rocks of the Stockton Formation was studied. Infiltration rates, evapotranspiration rates, ground-water velocity, transmissivity, storativity, hydraulic gradients, and stream discharge were determined. No ground-water-quality problems were found. In review. Anticip. publication date: July 1987.

ANTHONY S. NAVOY, ELIZABETH M. ERVIN, ERIC P. DeCLERCQ, LOIS M. VORONIN, and ROBERT ROSMAN, U.S. Geological Survey, Water Resources Division, Trenton, **Ground-water resources of Camden, New Jersey, and vicinity.** Area: Camden metropolitan area.

The project is a regional investigation of the Potomac-Raritan-Magothy aquifer flow system in the Camden, N.J., area. Includes regional water-quality trends, aquifer-Delaware River interaction, and movement of downdip saline water. Anticip. compl. date: Oct. 1988.

GARY N. PAULACHOK, S. D. McAULEY, G. R. KISH, G. J. BARTON, D. A. STORCK, and J. S. CLARK, U.S. Geological Survey, Water Resources Division, Trenton, **Atlantic City and vicinity bond issue ground-water supply investigation.** Area: Atlantic and parts of Ocean, Burlington, Cumberland, and Cape May Counties.

Project objectives are to define geohydrologic framework and hydraulic properties of the principal aquifers and confining layers, to assess regional ground-water quality, and to develop a detailed model of regional ground-water flow. Anticip. compl. date: Sept. 1988.

AMLETO A. PUCCI, Jr., D. A. HARRIMAN, J. E. MURASHIGE, D. A. POPE, L. BRATTON, and E. P. DeCLERCQ, U.S. Geological Survey, Water Resources Division, Trenton, **South River area ground-water resources investigations.** Area: Coastal Plain, Middlesex and Monmouth Counties.

The project is a regional investigation of the ground-water resources of the Potomac-Raritan-Magothy aquifer system. An assessment of the hydrogeology is finished; water-quality assessment and flow-and-transport modeling is beginning. Anticip. compl. date: Nov. 1988.

PETER SUGARMAN, and LLOYD MULLIKIN, N.J. Geological Survey, **Stratigraphy of the outcropping and subsurface Vincentown Formation, Monmouth County, New Jersey.**

This project is to map aquifers within the Vincentown Formation so as to better understand its regional hydrogeology. The Vincentown is a medium- to coarse-grained, glauconitic quartz sand in outcrop, but becomes a massive, silty unit downdip. Outcrop mapping, geophysical well logs, cuttings, and a continuous core from Allair State Park will be used.

OTTO S. ZAPECZA and ZOLTAN SZABO, U.S. Geological Survey, Water Resources Division, Trenton, **Natural radioactivity in ground water of the Triassic-Jurassic Newark Basin in New Jersey.**

Objectives of the study include defining the occurrence and distribution of radionuclides in ground water of the Newark Basin and identifying geologic and geochemical factors controlling radionuclide distribution, migration, and concentration in ground water. Anticip. compl. date: Oct. 1987.

PHANEROZOIC GEOLOGY

ALICE M. BLOUNT, The Newark Museum, and T. ELETHERIOU, Rutgers Univ., Newark, **Clay mineralogy and crystallinity of Mesozoic shales and siltstones of the Newark Basin.**

Clay minerals, most importantly illite, are being analyzed for polytype and crystallinity to deduce information about diagenesis, burial conditions, metamorphism (near basalt flows), and other conditions of origin of Mesozoic siltstones and shales. Anticip. compl. date: June 1987.

W. E. DEAN and others, U.S. Geological Survey, **Inorganic and organic geochemistry in the Newark and Hartford Basins.**

Statistical analyses of the inorganic and organic geochemistry of samples from the Newark and Hartford Basins are in progress. Results of these analyses will be used to integrate the inorganic and organic geochemistry, sedimentology, and stratigraphy of carbon-rich strata in offshore and onshore Mesozoic basins. Anticip. compl. date: 1987.

AVERY A. DRAKE, U.S. Geological Survey, and DON MONTEVERDE, N.J. Geological Survey, **Geologic and structural mapping of the Paleozoic rocks of New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Mapping of these rocks is on the basis of surface exposures supplemented by paleontologic, geophysical, and well-record information. It is begun by compilation, at a scale of 1:24,000, of previous work. Where all information is in agreement, mapping is field checked by reconnaissance. Where difficulties are apparent or foreseen, the area is mapped in detail. Mapping of the Kittatinny Valley will be completed in 1987. Mapping of the Paleozoic rocks of central and northwestern N.J. is under way. Anticip. compl. date: 1990.

N. O. FREDERICKSON and others, U.S. Geological Survey, **Mesozoic palynology.**

Samples from the Newark Basin and Mesozoic basins in Virginia are being examined in order to work out sporomorph biostratigraphy of these rocks. Anticip. compl. date: 1989.

ALBERT J. FROELICH and others, U.S. Geological Survey, **Early Mesozoic evolution of the eastern United States.**

In order to complete a coherent regional stratigraphic synthesis for the exposed early Mesozoic basins, compilation in the Newark Basin will continue at a scale of 1:125,000, along with the collection of stratigraphic and sedimentologic data. Igneous rocks are being characterized by geochemistry, sedimentary rocks by lithologic sequence and sedimentologic packaging. Analog aeromagnetic data has been converted to digital and truck magnetometer surveying has been completed. Anticip. compl. date: Oct. 1989.

WILLIAM B. GALLAGHER, N.J. State Museum, and FRANK ASARO, Lawrence Laboratories, Univ. of California at Berkeley, **Geochemistry and paleoecology of the Cretaceous-Tertiary extinction in New Jersey.**

Biostratigraphic evidence indicates that the Cretaceous-Tertiary boundary is present in the lower part of the Hornerstown Formation. Microstratigraphic sampling generated a set of samples that are being neutron-bombarded at Lawrence Laboratory for neutron-activation analysis. Any iridium anomalies will be stratigraphically placed with respect to faunal changes. Anticip. compl. date: June 1987.

GREGORY HERMAN, N.J. Geological Survey, **Green Pond structure** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Geologic information for the Green Pond Outlier is being compiled at a scale of 1:24,000 and field checked. Uncertainties as to structure are being resolved by detailed mapping and cross-section analysis. Serial cross sections of the Paleozoic sequence are to be constructed with the aid of aeromagnetic and gravity data. Anticip. compl. date: 1990.

GREGORY HERMAN, N.J. Geological Survey, **Thicknesses of Paleozoic units, northwestern New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

This project is to compile published and unpublished measured sections and thickness estimates of Paleozoic units of northwestern New Jersey. These will allow more accurate construction of cross sections.

HUGH F. HOUGHTON, N.J. Geological Survey, RON PARKER and ROBERT McDOWELL, U.S. Geological Survey, **Newark Basin mapping revisions** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Mapping within the Newark Basin, especially the northern portion, is to delineate lithofacies rather than formations and to show major and minor folds, faults, and joint systems. Data will be made available

at a scale of 1:24,000, at least in blue-line format. Anticip. compl. date: 1990.

JOSEPH M. HULL and RICHARD BIZUB, Rutgers Univ., Newark, **Shortening of cover and basement in the Green Pond Outlier, New Jersey.**

Alleghenian shortening of the ductile cover in the Outlier by buckle folds and cleavage is matched by shortening of the stiff basement on a high angle fault network. The deformation style is similar to thick-skinned Laramide uplifts of the Rockies. Thesis and manuscript in preparation. Anticip. compl. date: Spring 1987.

JOSEPH M. HULL and RALPH COSTA, Rutgers Univ., Newark, **Vugs as strain markers and kinematic indicators.** Area: Newark Basin, Essex-Bergen Counties.

We have quantified the internal microstructures and shape fabric of undeformed vugs in Newark basalts, and have compared this material to deformed amygdules in Catoctin greenstones and Archean amphibolites. Manuscript in preparation. Anticip. compl. date: Spring 1987.

JOHNATHAN M. HUSCH, DOUGLAS STURGIS, THOMAS BAMBRICK, CHARLES TRIONE, JULIAN MASTER, and W. MARK ELIASON, Rider College, **Geochemistry of Mesozoic diabases of west-central New Jersey and eastern Pennsylvania.**

A study of major and trace element concentrations and Sr isotopic values in a number of Mesozoic diabase dikes and sills. Results are used to test various models for the origin and evolution of the diabase.

RAMA KATNA and others, U.S. Geological Survey, **Metal-organic interactions, Newark Basin.**

Phytoclasts and shales rich in organic matter were collected from the Newark Basin. Where hydrothermal activity is indicated, X-ray spectroscopy and scanning electron microscopy will be done on clay minerals and size separates of the clay minerals and pyrolysis study will be done on phytoclast samples.

WARREN MANSPEIZER, Rutgers Univ., Newark, **En-echelon folds: Newark Basin.** Area: Newark Basin, N.J., N.Y., and Pa.

This study involves field mapping of en-echelon folds along the border fault. Anticip. compl. date: 1988.

WARREN MANSPEIZER, Rutgers Univ., Newark, **Tectonic history and paleogeography of the Newark Basins and Atlantic passive margin.** Area: Newark Basins, offshore and onshore.

This study integrates both onshore and offshore stratigraphic, structural, and seismic data, focusing on determining the tectonic evolution and paleogeographic setting of the Newark Basins and subsequent formation of the Atlantic passive margin. Anticip. compl. date: 1990.

WARREN MANSPEIZER, Rutgers Univ., Newark (editor), **Triassic-Jurassic rifting.**

Special volume to be published in 1987 by Elsevier. The volume includes 37 papers on Triassic-Jurassic rifting of the proto-Atlantic Basin. The following deal directly with N.J. data:

- Petrology of New Jersey sandstones: M. Oshudlak and J. Hubert
- Foreland-type folds in Newark Basin: M. Lucas and W. Manspeizer
- Basalt geochemistry: J. Puffer and A. Phillpotts
- Stratiform Cu, Zn, Ni, Cr, Ag, and Pt mineralization: R. Robinson and G. P. Wilkes
- Coals of the Newark Basins: N. Robbins and D. A. Textoris
- Thermal maturation: B. Katz
- Marine mudstones: J. Smoot and P. E. Olsen
- Proto-Atlantic Basin, offshore and onshore: Warren Manspeizer
- Mesozoic rift basins, Middle Atlantic Continental Margin: R. Benson

KENNETH G. MILLER, DENNIS V. KENT, Lamont-Doherty Geological Observatory, MARK FEIGENSON, RICHARD K. OLSSON, Rutgers Univ., New Brunswick, R. Z. POORE, and LAUREL BYBELL, U.S. Geological Survey, **Paleogene chronostratigraphy of ACGS #4 borehole: Sr-isotope, magnetostratigraphic, and benthic foraminiferal studies.** Area: Mays Landing, Atlantic County.

We are using Sr-isotope, magnetostratigraphic, and biostratigraphic studies to improve chronostratigraphic control of the Paleogene strata of the N.J. Coastal Plain. Anticip. compl. date: preliminary, Apr. 1988; final, Apr. 1989.

RICHARD K. OLSSON, Rutgers Univ., New Brunswick, **Geologic framework study of New Jersey margin and offshore area.** Area: N.J. Coastal Plain and Baltimore Canyon Trough.

The Cretaceous depositional sequences of the N.J. Coastal Plain have been identified and correlated with sequence stratigraphy of the Exxon Group (Haq and others, in press). Completed Dec. 1986. Submitted to N.J. Geological Survey and U.S. Minerals Managemnent Service.

RICHARD K. OLSSON, Rutgers Univ., New Brunswick, and SHERWOOD W. WISE, Florida State Univ., **Paleocene-Eocene depositional sequences in New Jersey Atlantic Margin.**

Paleocene to Middle Eocene depositional sequences in New Jersey Coastal Plain and offshore margin are identified using biostratigraphic and baleobathymetric analysis. Anticip. compl. date: 1987.

RICHARD K. OLSSON and PAUL SIKORA, Rutgers Univ., New Brunswick, **Paleoslope study of Albian to Cenomanian benthic foraminifera in western Atlantic Margin and Basin.**

Paleoslope models of the distribution of Albian to Cenomanian benthic foraminifera are being constructed for nearshore to deep sea paleoenvironments. Anticip. compl. date: 1987.

JAMES P. OWENS, U.S. Geological Survey, and PETER SUGARMAN, N.J. Geological Survey, **Pre-Quaternary geology of the Farmingdale Quadrangle, New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Mapping of the Farmingdale quadrangle is under way to allow completion of a detailed cross section of the north-central Coastal Plain. Excellent Paleocene through Miocene exposures exist along the Manasquan River and in sand and clay quarries throughout the quadrangle. Surface data will be supplemented with auger holes and well logs.

JAMES P. OWENS, NORMAN SOHL, U.S. Geological Survey, and PETER SUGARMAN, N.J. Geological Survey, **Geologic mapping, Cenozoic-Mesozoic formations of the New Jersey Coastal Plain** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Field work is completed for about 60% of the area. Anticip. compl. date: 1990.

DAVID C. PARRIS, SHIRLEY ALBRIGHT, WILLIAM B. GALLAGHER, CRAIG DeTAMPLE, N.J. State Museum, BARBARA GRANDSTAFF, EARLE SPAMER, Philadelphia Academy of Natural Sciences, and ROBERT DENTON, Johnson and Johnson, Inc., **Taphonomy and paleoecology of the Marshalltown Formation (Campanian) site at Ellisdale, N.J.** Area: Monmouth County.

Streambed collecting and careful excavation using taphonomic methodology has yielded a mixed, nearshore scarp assemblage of lignitic and silicified wood, large terrestrial vertebrates (dinosaurs), aquatic vertebrates, marine vertebrates, and invertebrates. Studies are proceeding to determine the nature of the depositional environment. Anticip. compl. date: July 1987.

DAVID C. PARRIS, N.J. State Museum, and KENNETH M. CRUIKSHANK, Univ. of Cincinnati, **Biostratigraphy of the Martinsburg Formation in New Jersey and adjacent areas.** Area: Northampton Co., Pa., Warren and Sussex Counties, N.J., Orange Co., N.Y.

Fossils collected from approximately 20 sites within the area are giving new information on the ages of the members of the Martinsburg Formation; field work and identification are nearing completion, text is in preparation. Anticip. compl. date: Dec. 1987.

J. D. PHILLIPS and others, U.S. Geological Survey, **Geophysical mapping of early Mesozoic basins.**

As part of a geophysical mapping effort for the early Mesozoic basins of the eastern U.S., an aeromagnetic map and interpretive cross sections will be prepared for the Newark Basin in 1987. Gravity data will be collected and a report on truck magnetometer data is being prepared. Landsat images will be used to define structures and lithology between the Newark and Gettysburg Basins. Anticip. compl. date: 1988.

ROBERT C. RAMSDELL, Montclair State College, **Additional biostratigraphic investigations into a fossiliferous site in the Navesink Formation (Late Cretaceous) at Atlantic Highlands, Monmouth County, New Jersey.**

This is an ongoing project (since 1977) involving paleoenvironmental and biostratigraphic study of Late Cretaceous and early Tertiary Coastal Plain formations of New Jersey. Two preliminary publications have been released as Special Publications of the N.J. Marine Sciences Consortium. Anticip. compl. date: 1990.

NORMAN F. SOHL, L. M. BYBELL, T. A. AGER, R. LITWIN, W. C. POAG, P. C. VALENTINE, G. W. ANDREWS, and R. Z. POORE, U.S. Geological Survey, **Biostratigraphic support for the New Jersey State Geologic Map (COGEOMAP).** Area: N.J. Coastal Plain.

Current activities center upon biostratigraphic studies of the Tertiary sequence in the ACGS #4 core, the Cretaceous section of the Freehold core, and re-examination of critical parts of older wells. A conodont CAI index map has been prepared. Anticip. compl. date: Oct. 1989.

PETER SUGARMAN, N.J. Geological Survey, JAMES OWENS, LAUREL BYBELL, and THOMAS GIBSON, U.S. Geological Survey, **Paleogene core investigation, northern New Jersey**

Coastal Plain (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

The lithology, paleontology, contacts, and thicknesses of the Vincentown, Manasquan, and Shark River Formations are revealed in a continuous core taken in Allair State Park. This is to be used together with outcrop mapping and a core from Freehold in determining the pre-Quaternary stratigraphy of the northern Coastal Plain. Core from Mays Landing will be analyzed with special attention to the Kirkwood, Mays Landing, and Chickahominy Formations. A corehole in the Camden area is planned if funds and time permit.

PETER SUGARMAN, RICHARD VOLKERT, N.J. Geological Survey, and LOU JACOBI, N.J. Department of Environmental Protection, **New Jersey Coastal Plain basement map.**

This project is to map bedrock elevation beneath the Coastal Plain sediments and to provide an index of wells which have penetrated the bedrock surface. Selected wells from New York and Delaware will be incorporated to give regional perspective. Structural and lithologic characteristics of the basement will be shown to the extent possible.

PRECAMBRIAN GEOLOGY

JOSEPH M. HULL, Rutgers Univ., Newark, **Origin of gneissic banding in the Reading Prong, New Jersey.** Area: N.J. Highlands, Warren, Morris and Passaic Counties.

Gneissosity in Grenville metamorphic rocks has many origins: deformation zones, rotation of dikes, elongate xenoliths, metamorphic segregation, lit-par-lit intrusion, and relict bedding. Examples of each are described. Manuscript in preparation.

RICHARD VOLKERT, N.J. Geological Survey, and AVERY A. DRAKE, U.S. Geological Survey, **Mapping of the Precambrian rocks of New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Precambrian units are being mapped in detail at a scale of 1:24,000. Chemistry is being used to determine protoliths and as a stratigraphic aid. Engineering and hydrogeologic characteristics, and asbestos and uranium mineral concentrations are being investigated. Anticip. compl. date: 1990.

EDWARD J. ZOFCHAK, JOHN H. PUFFER, and JOSEPH M. HULL, Rutgers Univ., Newark, **Petrography and geochemistry of the Losee (quartz-oligoclase) Gneiss, Franklin and Hamburg quadrangles, Sussex County, New Jersey.**

Over 200 outcrops of Losee quartz-oligoclase Gneiss were sampled for this M.S. research project. Field and petrographic studies show that the unit has been thoroughly recrystallized and metamorphosed to at least upper amphibolite facies during the 1.1 B. Y. Grenville event. REE (Rare Earth Element) analysis this year will determine the nature of the protolith (orthogneiss vs. paragneiss). Anticip. compl. date: 1987.

REGIONAL AND GENERAL GEOLOGY

JOHN M. ASH, N.J. Geological Survey, **Generalized stratigraphic column for New Jersey.**

An 8½ by 11 inch sheet showing the formally recognized geologic formations and members for New Jersey is in preparation. Anticip. compl. date: April, 1987.

RICHARD DALTON, N.J. Geological Survey, and AVERY A. DRAKE, U.S. Geological Survey (coordinators), **COGEOMAP: A new state geologic map for New Jersey.**

The N.J. Geological Survey, in cooperation with the U.S. Geological Survey, is preparing completely revised geologic maps of New Jersey. 12 geologists from the N.J. and U.S. Geological Surveys are directly involved in mapping. Numerous others are involved in paleontological or geochemical work. Separate maps of surficial and older units will be published at a scale of 1:100,000. Completion of field work and compilation are scheduled for 1990. Projects within this Cooperative Geologic Mapping (COGEOMAP) effort are listed in the appropriate sections of this compilation.

GREGORY HERMAN, N.J. Geological Survey, **Cross sections—northwestern New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Five detailed cross sections are being constructed from the Delaware River to the Ramapo-Canopus border fault. Geology along each traverse will be com-

piled, field checked, and amended. Sections will then be constructed to a depth corresponding to "undisturbed basement" or to a maximum depth resolvable through seismic, gravity, and aeromagnetic data. Anticip. compl. date: 1990.

JOSEPH M. HULL, Rutgers Univ., Newark, **Width-displacement relationships for deformation zones.** Area: N.J. Highlands, Morris and Sussex Counties.

The ratio of displacement to width is fixed for cataclasites (65:1) and mylonites (2:1), but varies for superplastic tectonites. This behavior is related to deformation-zone propagation and growth. Manuscript in review.

JOSEPH M. HULL and ROBERT KOTO, Rutgers Univ., Newark, **Deformation zones in the Highlands of New Jersey.** Area: Highlands, Allamuchy Mtn., Jenny Jump Mtn.

Populations of deformation zones of Grenville, Taconic (?), Alleghenian and Mesozoic age have been identified, and their associated tectonites and geometries described. Thesis and manuscript in preparation. Anticip. compl. date: Spring 1987.

PETER LYTTLE and JACK EPSTEIN, U.S. Geological Survey, **Chronology of deformation along the Taconic unconformity.** Area: Pa., N.J., and N.Y.

Mapping the Silurian/Devonian contact demonstrates major Alleghenian deformation overprinting milder, more northerly trending Taconic folds. Newly discovered materials at the contact, including colluvium and exotic pebbles, suggest a complex geologic history during the Taconic hiatus. Anticip. compl. date: early 1988.

ROBERT METZ, Kean College, **Recent traces from nonmarine ephemeral puddles.** Area: central Middlesex County.

Field investigation of specific trace-making organisms. Over 30 different insects and their exogenic traces have been documented, most for the first time. A number of traces compare favorably to trace fossil forms. Anticip. compl. date: May 1987.

N. M. RATCLIFFE, W. C. BURTON, MARK GEDDINGS, U.S. Geological Survey, **Northeastern seismicity and tectonics.**

This project, started in 1979, was completed in 1985, after extensive field work in and along the Newark Basin margin in N.J., N.Y., and Pa. Results of these studies will be published over the next five years and will include regional geologic maps and results of coring of faults, analyses of structures in Mesozoic rocks and integration of these results with Vibroseis, gravity, and ground magnetometer surveys.

SURFICIAL GEOLOGY

GAIL M. ASHLEY, AMY Von SCHONDORF, Rutgers Univ., New Brunswick, and BYRON STONE, U.S. Geological Survey, **Spatial variation in sedimentary facies in glacial outwash gravels, northern New Jersey.** Area: Kittatinny Valley, northwestern N.J.

An analysis of the sedimentology and paleohydraulics of an ice-contact glacio-fluvial deposit (Germany Flats) which formed during deglaciation of northern N.J. (about 18,000 BP). Anticip. compl. date: April 1987.

CORNELIA C. CAMERON and others, U.S. Geological Survey, **Peat resources of New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

A study of peat deposits of New Jersey, under the State-wide surficial geologic mapping effort. Anticip. compl. date: 1987.

ED EVENSON, Lehigh Univ., RON WITTE, N.J. Geol. Survey, and JACK RIDGE, Tufts Univ., **Wisconsinan history of the Great Valley and adjacent areas.** Area: Great Valley, N.J., and Pa.

Investigation of the style and timing of the deglaciation. Detailed morphosequence mapping of the ice retreat and glacial sedimentology. Anticip. compl. date: June 1987.

JOHN FARNSWORTH, N.J. Geological Survey, and WAYNE NEWELL, U.S. Geological Survey, **Tertiary and Quaternary geology of the New Jersey Coastal Plain** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

The Quaternary and Tertiary Bridgeton, Cohansey, and Cape May Formations are being mapped from surface exposures and drilling to depths of approximately 100 feet. The distribution of surficial deposits, marine Quaternary sequences, weathering, soils, and geomorphic features was compiled on a preliminary 1:250,000 scale base. From detailed field examination, data will be gathered on the petrology and vectorial properties of these formations. The history of weathering, erosion, and sediment protection on uplands will be integrated with that of glacio-eustatic cycles along estuarine margins. Anticip. compl. date: 1990.

STEWART C. FARRELL, Stockton State College, **Late glacial sedimentation in southern New Jersey.** Area: Columbia, Atsion, Franklinville area.

The Pleistocene climate altered sedimentation patterns in the Delaware basin and throughout southern N.J. Evidence points to either large-scale drainage across the southern counties or enhanced runoff and sedimentation as a result of frost inhibited infiltration of heavy rains. Anticip. compl. date: 1988.

EMILY W. B. RUSSELL, Rutgers Univ., Newark, BYRON STONE, U.S. Geological Survey, and SCOTT STANFORD, N.J. Geological Survey, **Pollen analysis of the lower half of core CC84, Wallkill Valley, Sussex County, New Jersey.** Area: Hamburg Quadrangle.

Pollen analysis of U.S. Geological Survey core CC48 is consistent with regional vegetational change in the early Holocene, and also reflects local conditions associated with development of the local drainage system. First part of the project completed April 1986. Further work is planned for spring 1987.

SCOTT STANFORD, N.J. Geological Survey, and BYRON STONE, U.S. Geological Survey, **Geologic mapping of Late Wisconsinan and Holocene deposits of northeastern and north-central New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

Surficial deposits are being mapped in detail at a scale of 1:24,000 from field work, aerial photography, well records, and test drilling. Maps show contacts, surface texture of stratified units, bedrock-elevation contours, and cross sections. Anticip. compl. date: 1990.

WAYNE NEWELL, BYRON STONE, U.S. Geological Survey, SCOTT STANFORD and RON WITTE, N.J. Geological Survey, **Pre-Wisconsinan Pleistocene deposits of north-central New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

The objectives of the study are to determine the number and extent of glaciations older than Late Wisconsinan, map these deposits for compilation at a scale of 1:100,000, and produce a few surficial maps at a scale of 1:24,000 to convey the most information on the older glaciations. Anticip. compl. date: 1990.

DAVID SOLLER and BYRON STONE, U.S. Geological Survey, RON WITTE, N.J. Geological Survey, **Pleistocene and Holocene Geology of Northwestern New Jersey** (for COGEOMAP 1:100,000 scale geologic maps of N.J.).

This study is to delineate the Late Wisconsinan terminal position and establish deglaciation history for northwestern N.J. Mapping will be at a scale of 1:24,000 for compilation at 1:100,000 and be based on the morphosequence concept. Subsurface data, pollen analysis and radiocarbon dating will be incorporated. Bedrock elevation contours will be shown and Pleistocene aquifers identified. Anticip. compl. date: 1990.

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