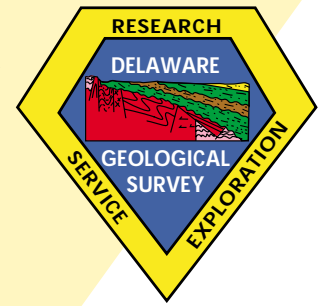


First State Geology

Current information about Delaware's geology, hydrology, and mineral resources

Published twice yearly by the Delaware Geological Survey
University of Delaware



Vol. 19, No. 2 • Summer 2001

DGS Celebrates 50 Years of Service

On June 4 the DGS will celebrate 50 years of science and service for the Diamond State. Senate Bill 129, creating the Delaware Geological Survey, was signed into law (Chapter 55, Part VI, Title 7 of the Delaware Code) by Governor Carvel on June 4, 1951.

The "modern" Delaware Geological Survey is actually the second geological survey to have been established in the state. In 1837 a Geological and Mineralogical Survey was created by the Legislature of the State of Delaware. James C. Booth served as the first state geologist. The survey focused primarily on the relationship between geology and agriculture. In 1841 Booth published his findings in "Memoir of the Geological Survey of the State of Delaware: Including the Application of the Geological Observations to Agriculture." Booth's work so advanced the science of geology in the state that it felt there was no reason to continue his work. As a result, the survey was discontinued.

It was not until the 1940s that the need to develop ground-water resources led to the creation of the modern Delaware Geological Survey. Since its reestablishment in 1951, Dr. Johan J. Groot and Dr. Robert R. Jordan have served as the second and third state geologists. The directed goal of the Delaware Geological Survey is to provide objective scientific geologic and hydrologic information, advice, and service to our stakeholders. This goal is accomplished by conducting geologic, hydrologic, and geologic hazard investigations and services and by continuing development of basic data collection and computer-based data management and dissemination programs. The scientific information is used to advise, inform, and educate our stakeholders about the important roles that the earth sciences play in issues regarding water resources, public health, agriculture, economic development, land-use planning, environmental protection, geologic hazards, energy and mineral resources, and recreation.

Special Publication 8, "James C. Booth and the First Delaware Geological Survey: A Facsimile of 1841 Memoir by James Booth" and Special Publication 17, "The Delaware Geological Survey: The Formative Years – 1951-1969" may be obtained by contacting the DGS at 302-831-2833 or by ordering online at <http://www.udel.edu/dgs/pubform.html>.

finding of note is that swamps and marshes covered a much larger area than the existing Burnt and Cypress swamps. The report contains detailed descriptions of the sediments that make up the Cypress Swamp Formation as well as the field, laboratory, and computer methods used to identify, describe, and map the unit.

This report, by A. Scott Andres and C. Scott Howard, is a product of a more com-



Map of southeastern Delaware and adjacent Maryland showing where the Cypress Swamp Formation is likely to be found (thick red line). Other lines denote elevation contours (in ft); The green line represents the 20 ft elevation contour; the pink line represents the 40 ft elevation contour, with higher elevations indicated by shading: pink 40-50; magenta 50-60; yellow >60.

New DGS Report on Cypress Swamp

By A. S. Andres

A new publication on the Cypress Swamp Formation describes the occurrence and characteristics of a newly named geologic unit found in and around the Cypress and Burnt swamps in Sussex County, Delaware. The Cypress Swamp Formation is a sedimentary deposit that formed over the past 22,000 years in marsh, bog, dune, swamp, and floodplain environments. One

prehensive investigation of the Cypress Swamp area done in cooperation with the Delaware Natural Heritage Program of the Department of Natural Resources and Environmental Control, the Delaware Department of Transportation, and Delaware Wildlands, Inc. The results of the work are part of a natural resource characterization report and are being used to assist planning and design of a wetlands mitigation site on a portion of the property.

To obtain a copy of Report of Investigations No. 62 call (302) 831-2833. The report is accessible through the DGS web site at www.udel.edu/dgs/webpubl.html.

Delaware's Spatial Data Framework Takes Shape

By *W. S. Schenck*

In late 2000 and early 2001, the State Mapping Advisory Committee (SMAC) and the Delaware Geographic Data Committee (DGDC) laid out and formalized the Delaware Spatial Data Framework. The Framework consists of nine main digital layers that provide the basic data "skeleton" needed by users of geographic information systems (GIS) in Delaware. The Delaware Spatial Data Framework also supports the Federal Geographic Data Committee goal of establishing the National Spatial Data Infrastructure (NSDI) providing seamless data "skeletons" being developed in other states across the United States. Delaware's framework layers include transportation, hydrology, hypsography, orthoimagery, governmental units (boundaries), land use and land cover, cadastral (tax parcel), geographic names, and geodetic control. The layers exist at a scale of 1:24,000.

Currently, the DGDC and SMAC committees are working with the U. S. Geological Survey (USGS) toward the creation of a pilot program involving Delaware's Spatial Data Framework and 1:24,000-scale USGS data. The program will allow both sets of data to be displayed, providing users with the most up-to-date information available for Delaware. The DGDC and SMAC are also working with the USGS on ways to incorporate Delaware's data into the national mapping process. This will ensure that the USGS 1:24,000-scale topographic maps (U.S. primary map series) are the same for both the USGS and the state users of these data products.

Delaware and New Jersey Reaffirm the 1934 Mean Low Water Line Boundary

By *W. S. Schenck*

Since the mid-1980s, the Delaware Boundary Commission has been working to restore and sign agreements on the state's boundaries with Maryland, Pennsylvania, and New Jersey. Most of the work done to restore these boundaries has been in the form of repairs and protection of the existing 179 monuments marking these boundaries. The Commission signed agreements with Maryland and Pennsylvania in 1994 and set in motion the work needed to repair and reaffirm the 1934 Mean Low Water Line, Delaware Bay Line, and the Delaware Bay

Line Offshore Extension boundary. New Jersey recently signed the 1934 Mean Low Water Line agreement and returned that agreement to the Commission. The Commission plans to hold a joint meeting in June between Delaware, Maryland, Pennsylvania, and New Jersey to formally recognize this occasion. The Delaware commissioners and associates hope to sign the document at that time, completing the work of replacing and repairing all 179 boundary monuments. Negotiations continue with New Jersey to reaffirm the Delaware Bay Line and to agree on the Offshore Extension of that line to the 200-mile federal limit.

Map Conversion Project

By *T. E. McKenna*

Data and samples from wells and outcrops in Delaware provide the essential infrastructure for geologic, hydrologic, and geologic hazard investigations in the state and support interpretations that are needed for critical decision-making. Collection, compilation, and management of these data and samples along with their provision to other agencies and the public are primary functions of the DGS. The DGS organizes and catalogs well and outcrop data and enters them in paper archives and computer databases. Samples are cataloged and placed in a sample repository. Well and outcrop maps that incorporate a grid-numbering system for assigning well and outcrop numbers are the key indices for a significant portion of these DGS data holdings. The objective of the Map Conversion Project is to convert the existing well and outcrop maps from paper to a digital geographic information system (GIS) format and to extend the basemap boundaries to include offshore areas in the Delaware Bay and Atlantic Ocean where the DGS has significant data holdings.

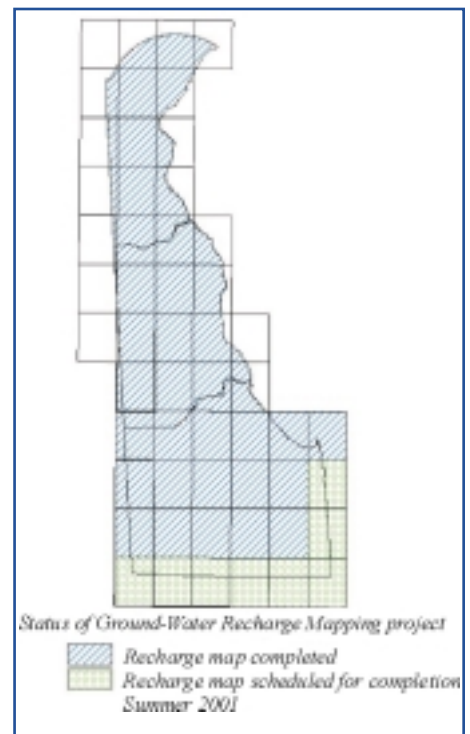
The project reached a major milestone in November 2000 with the award of a contract to Mapping Technologies International, Inc. (MTI) of Moorestown, N. J. MTI is creating 64 digital maps with well and outcrop locations using the ArcGIS suite of software from Environmental Systems Research Institute, Inc (ESRI) and algorithms to enable updating of the maps by the DGS. A rigorous quality-assurance/quality-control procedure, developed jointly by DGS and MTI, was designed to maximize the quality of the digital product.

The project is on track to be completed in 2001. The product will provide DGS researchers, agencies, and the public with more efficient, accurate, and standardized well and outcrop data that are consistent with data from other state agencies, modern computer-mapping techniques, and digital product distribution.

Todd Keyser Joins DGS on Ground-Water Recharge Mapping Project

Todd Keyser, Project Geologist, is no stranger to Delaware having completed his BS in Geology at the University of Delaware. Todd is currently working on his MS degree at the University of Delaware with an emphasis on structural geology in the Piedmont.

Todd was hired to work on the Ground-Water Recharge Mapping project as it wraps up its statewide classification of ground-water recharge potential of the shallow Columbia aquifer. This project is being done in cooperation with the Water Supply Section of the Department of Natural Resources and Environmental Control. Maps generated during this project will show an area's potential to transmit water into the water table aquifer system. Completion of this project is scheduled for the end of the summer with a comprehensive state map as a final product.



Evaluation of Sand Resources

By *K. W. Ramsey*

As part of an ongoing cooperative effort between the DGS and the Minerals Management Service of the U.S. Department of the Interior, the DGS analyzed offshore sediment for potential use as beach nourishment. Report of Investigations No. 63, "An Evaluation of Sand Resources, Atlantic

Offshore Delaware” by Kimberly K. McKenna and Kelvin W. Ramsey, is in press. The publication is a compilation of all sediment coring offshore Delaware in state waters between the shoreline and three miles offshore and federal waters from three miles to approximately 10 miles offshore. Sediment from each core was analyzed for its potential for use for beach nourishment.



Crew member from Alpine Ocean Seismic Drilling Norwood, N.J. labeling a core on deck of RV Atlantic Twin. Funding for collection of the cores came from the Minerals Management Service.

Each core site was classified as excellent, good, fair, or poor for yielding beach nourishment sand based on grain size and thickness of the sand body. An excellent resource would be one with a thickness of ten or more feet of the same size or slightly coarser than that found on the natural beach. A poor resource would be one in which only mud was found at the core site or one in which the sand size was very fine with an admixture of silt and clay. The distribution of excellent and good sand resource sites was mapped to indicate larger areas of potential sand resources. A total of 268 core sites was included in this investigation. The publication will be available in mid-2001 both as paper copies and on the DGS Web Site.

As a continuation of this project, an additional 20 cores were collected during May from Rehoboth Beach to the Indian River Inlet three to five miles offshore. Core sites were selected in areas that had potential for sand resources but had not previously been cored.

Ground-Water Discharge to Estuaries (Call for Papers)

By T. E. McKenna

Direct ground-water discharge to an estuary can represent a significant volumetric component of the water budget for an estuary's watershed but is typically poorly quantified in both time and space relative to other components of the water budget. The chemistry of these discharging ground-waters can have a direct effect on the ecology in an estuary by either sustaining habitat for organisms that require a low-salinity-water regime or by degrading habitat due to overexposure to certain chemicals (e.g. nutrient over-enrichment and toxic exposure). Research on submarine ground-water discharge is currently being done worldwide across the fields of hydrogeology, oceanography, limnology, ecology, and geophysics. A symposium on "Ground-Water Discharge to Estuaries" is being organized for the Geological Society of America's (GSA) National Meeting to bring together researchers from these fields to facilitate an interdisciplinary exchange of ideas and methods. Determining the locations, quantity, and quality of submarine ground-water discharge through the bottom of the Inland Bays is one component of the EPA-funded CISNet Project (see Winter and Summer 1999 and Winter 2000 issues of *First State Geology*). The symposium will provide an opportunity for the CISNet team to present their results and learn about other studies and techniques that may be applicable in Delaware's Inland Bays.

The symposium, co-sponsored by the National Ground Water Association and the Hydrogeology Division of GSA, is being organized by Tom McKenna of the DGS and Jonathon Martin of the University of Florida for the GSA meeting in Boston, Massachusetts on November 5-8, 2001. It is the first symposium to be cosponsored by these two organizations at the National GSA meeting. The deadline for electronic abstracts is July 17, 2001. More information is available by contacting Tom McKenna at the DGS or from www.geosociety.org/meetings/2001 and www.udel.edu/dgs/tmck/sgd.

State Energy Workshop

In March the DGS cooperated with the Delaware Coastal Zone Management Program to develop a state energy workshop, "Energy for the Next Decade." Reports from federal units indicate a particular concern for the availability of natural gas as an environmentally acceptable fuel to meet demands for electrical power generation. We advised that, from a geologic perspective, the presence of

gas offshore in the mid-Atlantic could create debate about the moratoria currently prohibiting further environmental and exploration studies in the area. An elaborate process involving several layers of permits and environmental studies will give opportunities for Delaware's participation if there should be interest.

The Outer Continental Shelf Policy Committee (OCSPEC) is a formal federal advisory body for the Department of the Interior that includes representatives from the coastal states. State Geologist Robert R. Jordan has served on OCSPEC for many years and has been appointed to its Natural Gas Subcommittee. The subcommittee will submit its report to OCSPEC at a meeting to be held in late May. That meeting may also consider aspects of the new federal energy policy expected as this newsletter goes to press, and further steps in the development of a 5-Year Leasing Plan for the period 2002-2007 as required by Congress.

Second Time - Safety Committee of the Month

By K. W. Ramsey

In April, for the second time this year, the University of Delaware Department of Occupational Health and Safety (DOHS) has recognized the DGS as the Safety Department of the Month. Specifically, the DGS was recognized for the proactive approach used in handling hydrofluoric acid (HF).

HF is a highly reactive acid used in the preparation of pollen and spores for research. It is used to dissolve all mineral matter, leaving behind only the organic material. Skin contact with HF can be fatal if untreated so the material must be handled very carefully. All staff members of the DGS were trained about the use of the material and how to handle a spill or contamination problem. The lab where the acid is used is clearly marked and a spill kit is kept in the lab. In over 10 years of regular HF use at the DGS there has never been a spill or an accident. The DOHS citation may be viewed online at <http://www.udel.edu/OHS/>.

Mailing List Update

Dorothy Windish is in the process of updating the First State Geology mailing list. If you no longer wish to receive this publication or if you know of someone who currently does not receive First State Geology but would like to receive it, please contact Dorothy by phone at 302-831-2834, by email 22004@udel.edu, or by writing to Dorothy's attention at Delaware Geological Survey, University of Delaware, Newark, DE 19716-7501.

Publications

Recent DGS Publications

Reports of Investigations

No. 62, The Cypress Swamp Formation, Delaware: **A. Scott Andres** and C. Scott Howard, 2000, 13 p.

Other Publications by DGS Staff

Daria L. Nikitina, James E. Pizutto, Reed A. Schwimmer, and **Kelvin W. Ramsey**, 2000, An updated Holocene sea-level curve for the Delaware coast: *Marine Geology*, v. 171, p. 7-20.

Staff Notes

Presentations

At 2001 Environmental Careers Conference, Abbotts Mill Nature Center, March 6, **Kelvin W. Ramsey**, "Career Opportunities in Geology," March 6.

"The '62 Storm: Revisiting Delaware's Storm of the Century," **Kelvin W. Ramsey** and **William S. Schenck** at Storm of the Century Symposium, Rehoboth Beach, Delaware, March 7.

Meetings

Robert R. Jordan and **John H. Talley** represented the state at the Delaware River

Master's Advisory Committee meeting held on April 25th. It is through this body that Delaware, New Jersey, Pennsylvania, New York, and New York City decide questions related to the allocation of Delaware River water under the 1954 Decree of the U. S. Supreme Court. The River Master is a federal officer (from the U. S. Geological Survey) who directs reservoir releases to assure flows specified by the decree. William J. Carswell, Jr. has been reappointed River Master.

The Parties to the Decree approved a one-year extension of experimental thermal releases to support trout habitat in New York. Approval of the complex "excess release" quantities for the next operating year will be withheld until June when the latest water conditions are known. The high water use period began in the upper Delaware River basin with "good" hydrologic conditions and New York City's reservoirs were spilling in April.

A. Scott Andres, "The Cypress Swamp Formation, a New Lithostratigraphic Unit in Delaware," and **Kelvin W. Ramsey**, "Distribution of Late Pliocene and Quaternary Deposits in the Middle Atlantic Coastal Plain: Delaware, Maryland, and Virginia," at the SE Section of the Geological Society of America, Raleigh, North Carolina, April 3-6.

Thomas E. McKenna, "Ground-Water Discharge to the Inland Bays," to the Delaware Department of Natural Resources and Environmental Control, April 5.

Thomas E. McKenna participated in a

meeting as a technical advisor at the Great Marsh Site Conservation Planning Meeting of the Nature Conservancy, May 3 .

William S. Schenck, Satellite Imagery Workshop, Memphis Tennessee, February 2-8. NASA sponsored the meeting as an outreach to states, local governments, and tribes.

Scott A. Strohmeier, National Earthquake Risk Management Conference, Seattle, Washington, September 17-22, 2000.

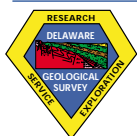
John H. Talley, with representatives of the Delaware Emergency Management Agency and the City of Wilmington, Hurricane Preparedness Workshop, National Hurricane Center, January 26 – February 2, Miami, Florida.

Service and Awards

Congratulations to **Thomas E. McKenna** who was promoted May 1 to Associate Scientist.

Robert R. Jordan has been reappointed by the American Association of Petroleum Geologists to a three-year term as Commissioner of the North American Commission on Stratigraphic Nomenclature. The Commission develops recommendations for the identification and classification of geologic units throughout North America.

John H. Talley was appointed chairperson of the National Affairs Committee of the American Institute of Professional Geologists.



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First State Geology is published by the Delaware Geological Survey, a State agency established by an Act of the Delaware General Assembly in 1951 and organized as a unit of the University of Delaware.

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