

DIGITAL GROUND-WATER RECHARGE POTENTIAL MAP DATA FOR KENT AND SUSSEX COUNTIES, DELAWARE

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SUMMARY

Ground-water recharge potential maps show land areas characterized by their abilities to transmit water from land surface to a depth of 20 feet. The basic methods for mapping ground-water recharge potential are presented in Delaware Geological Survey Open File Report No. 34 (Andres, 1991) and were developed specifically for the geohydrologic conditions present in the Atlantic Coastal Plain of Delaware. Recharge maps are being used in state and county resource protection programs. The maps are also being used in digital ground-water flow modeling and geologic mapping research.

The only modification to the published method (Andres, 1991) is that flow-net analysis is not used to discriminate recharge areas from discharge areas. As a result, recharge potential has been mapped for almost all land areas not depicted as water, swamp, or marsh on U. S. Geological Survey 1:24,000-scale topographic maps. A systematic methodology for mapping areas that have undergone significant filling, excavation, or regrading could not be developed; therefore, recharge potentials are designated as “pit/fill” for these areas.

Approximately 10 years of field, laboratory, and geographic information systems (GIS) work were invested in producing recharge potential maps. Over 6900 well and test boring logs and more than 400 descriptions of outcrops and hand auger borings were used for mapping in Kent and Sussex counties. About 600 of these were test borings drilled and logged by staff of the Delaware Geological Survey for this project. Another 580 well and test boring logs were used for a complementary mapping project in New Castle County (Butoryak and Talley, 1993). Single-well aquifer tests were completed in nearly 200 wells to establish the relationships between earth materials and hydraulic properties that are the bases for recharge potential characterization. More than 400 grain-size distribution tests were run on outcrop and borehole samples to test the accuracy of field descriptions.

The GIS data are distributed in the North American Datum of 1983, Universal Transverse Mercator Zone 18-North map projection, in meters. The GIS data are in ESRI, Inc., interchange format (E00) and can be imported into ArcView or ArcMap as coverages. The attribute “recharge” contains the recharge potential rating. Users should consult their user guide for instructions on how to import the data. A metadata file in xml format is also included.

These maps, developed through the application of generally accepted geologic principles

and practices, represent our knowledge at the time of production. They were derived through interpretation of site-specific boring and outcrop exposure data located across the map area. Thus, the lines on the map must be considered on the basis of the scale at which they were mapped and the data from which they were derived. Because specific subsurface conditions between individual data points are not certain, precise location of any individual map feature requires investigation on a more detailed scale. Data used in constructing the map are available at the DGS offices.

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REFERENCE CITED

Andres, A. S., 1991, Methodology for mapping ground-water recharge areas in Delaware's Coastal Plain: Delaware Geological Survey Open File Report No. 34, 18 p.

Butoryak, K. R., and Talley, J. H., 1993, Delineation of Ground-Water Recharge Resource Protection Areas in the Coastal Plain of New Castle County, Delaware: unpublished report to Water Resources Agency for New Castle County, 26 p.