

POTENTIOMETRIC SURFACE OF THE KINGSHILL AQUIFER AND HYDROLOGIC CONDITIONS
ST. CROIX, U.S. VIRGIN ISLANDS,
JULY 1987

DEPARTMENT OF THE INTERIOR U.S. GEOLOGICAL SURVEY

CARIBBEAN ISLANDS REGIONAL AQUIFER SYSTEM ANALYSIS

GEOLOGICAL SURVEY WATER RESOURCES DIVISION
 WATER RESOURCES INVESTIGATION REPORT 89-4085

POTENTIOMETRIC SURFACE OF THE KINGSHILL AQUIFER AND HYDROLOGIC CONDITIONS IN SAINT CROIX, U.S. VIRGIN ISLANDS, JULY 1987

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A ground-water level survey and reconnaissance of the hydrologic conditions in central Saint Croix were performed during July 1987. This synoptic survey was accomplished as part of the Caribbean Island-Regional Aquifer System Analysis program (Gómez-Gómez, 1987). Information shown on this map will be used in calibration of a digital ground-water-flow model and complements other data obtained to define the hydrogeologic framework and hydrochemistry of St. Croix. This map covers the island's principal ground-water system, the Kingshill aquifer, and areas nearby. The potentiometric surface was delineated on the basis of measurements at existing wells and several test holes which were constructed at sites where lithologic and borehole geophysical data were obtained. The altitude of the potentiometric surface was referenced to mean sea level datum from the topographic map at 1:24,000 scale. The map illustrates existing conditions of the potentiometric surface altitude, the location of most major production wells and their estimated discharge, and sites where ground-water quality samples for common constituents and stable isotopes of water were collected. Instantaneous discharge at pumping wells was obtained from actual measurements, on-line flow meters, or from well owners. The discharge at public water supply well batteries was estimated only for daily withdrawal. These estimates are based on actual discharge measurements at various wells and from previous reports (Geraghty and Miller, 1983).

are: ground-water withdrawals in the south-central part of the aquifer area increased from less than 50,000 gallons per day to about 0.5 million gallons per day, and the dredging of Krause Lagoon for construction of port facilities. Both factors may explain the difference in the potentiometric surface which is as much as 5 feet lower within the south-central part of the aquifer.

Additional information is available at the U.S. Geological Survey, Water Resources Division, GPO Box 424, San Juan, Puerto Rico, 00936, telephone (809) 749-4346.

References

- Geraghty & Miller, Inc., 1983, Report on current ground-water conditions in the U.S. Virgin Islands: 80 p.
- Gómez-Gómez, Fernando, 1987, Planning report for the Caribbean Islands Regional Aquifer-System analysis project: U.S. Geological Survey Water-Resources Investigation Report 86-4074, 50 p.
- Jordan, D.G., 1975, A survey of the water resources of St. Croix, Virgin Islands: U.S. Geological Survey Open-File Report 73-137, 51 p.

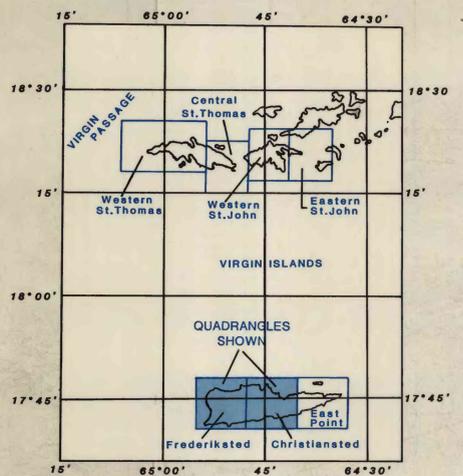
The map also shows two important hydrologic features: conservation ponds and areas served by the public water-supply system from the seawater desalination plant at Christiansted. Definition of the latter is locally important since, in general, urban areas outside of Christiansted and Frederiksted dispose of sewage through septic tanks. Areally this source of recharge could be of significance given the tropical dry climate.

Hydrologic conditions prevailing within the island have changed since they were last addressed in the mid 1960's (Jordan, 1975). Between 1963 and 1967 the average departure of the mean annual precipitation from the long term normal was -4.69 in (inches), indicative of relatively dry years. For the period of record, 1963 to 1987 this average departure was only -1.41 in, indicating that the annual average precipitation for the period was closer to the average long term normal of 42 in. Other significant changes

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EXPLANATION	
	MAJOR WELL FIELDS - Delineates areas where major well fields are located. The number represents the estimated total daily pumping in gallons per day.
	PUBLIC WATER SUPPLY SERVICE AREAS (approximate) - Represents urban areas that are connected to public water-supply systems and that receive water from desalination plants at Christiansted.
	POTENTIOMETRIC CONTOUR - Shows altitude at which the water level would have stood in tightly cased wells. Dashed where approximately located. Contour, in feet, is variable. Datum is mean sea level.
	AREA WHERE AQUIFER IS UNSATURATED - Approximate delineation of impermeable sub-surface lithologic unit which yields little or no water.
	BOUNDARY OF AQUIFER - Delineates geologic contact between the Kingshill aquifer, composed of unconsolidated sediments, and metamorphic rocks.
	WATER CONSERVATION POND - Pond containing water at time of hydrologic reconnaissance.
	AFFECTED AREA BY PUMPING WELL - Indicates area where potentiometric surface was affected by pumping from a nearby well(s).
	WATER LEVEL DATA CONTROL POINT - Number is altitude of water level, in feet above or below(-) mean sea level.
	Well used for public water supply
	Well used for industrial water supply
	Well used for domestic water supply
	Well battery
	Observation well
	Abandoned well
	Test hole
	Dry well (entire thickness of Kingshill Marl or related lithologic sequence is unsaturated at this location)
	Unused well
	P - Indicates well pumping at time of water level measurement.
	R - Indicates water level was recovering after pumping was discontinued, while water level was measured.
	E - Indicates value was estimated from water-level measurement made in mid-August, 1987.
	QW - Indicates water sample collected at well during survey. Data in files: upper number indicates instantaneous well discharge in gallons per minute; lower number is total daily pumping in thousand gallons per day; subscript "e" indicates pumping values are estimates.

