

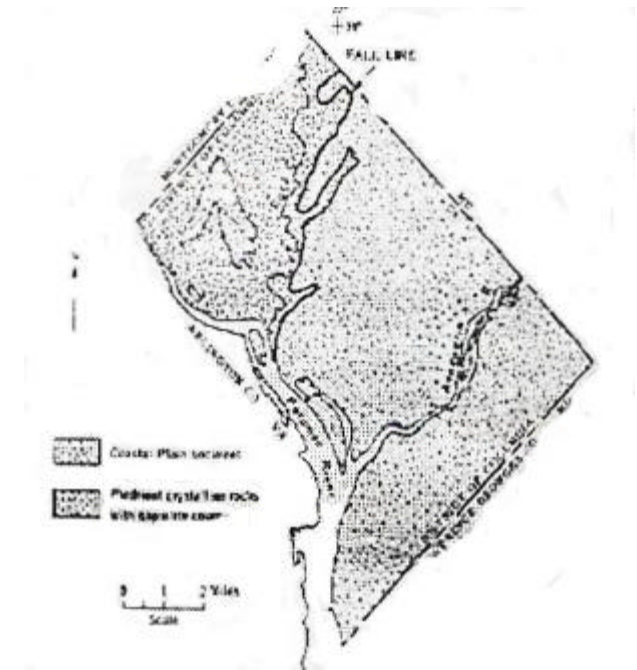
DISTRICT OF COLUMBIA GROUND WATER CONDITONS

Background on D. C Ground Water: Ground water is a precious natural resource. It occurs under all of D.C. The city has three different major types of aquifers: perched, unconfined and confined. Most neighborhoods have at least two of these aquifer types present. The supply is nourished by 10" (250mm) of the 40" (1000mm) of precipitation. Most of the infiltrated and percolated 10" (250mm) of precipitation becomes base flow from the surficial or unconfined aquifers that feed the local streams. Thus all 75+ tributary-surface watersheds of the District of Columbia are also ground water basins. While the stream valleys still exist, many of these streams are sewered or partially filled. The ground water still flows to the buried or piped channel. This is a major pathway for contaminants that is not currently well recognized.

The deepest and most productive aquifer in DC is the interstate confined aquifer called the lower Potomac group. This regional aquifer has supplied water to the District of Columbia's industry, agriculture and public supply for two centuries. The confined aquifers feed both city and interstate wells for various uses including drinking, heat pumps, aquaria, and irrigation. The recharge areas for this regional water supply is in the northern central section of D.C. Smaller confined aquifer zones appear in seven perched tables of the Cenozoic terraces, in the fracture systems of the Piedmont bedrock of NW and in selected layers covered by compacted fill or river sediment such as under the Anacostia Estuary or Oxon Creek.

Top 4 Users: Sump pumps for ground water control after construction is the largest single user of city ground water. Construction dewatering is the second heaviest user of ground water. Clean up of polluted sites with monitoring and recovery wells are third. Water supply for aquariums, irrigation, heat pumps, landscape ponds and swimming pools as well as emergencies is fourth. Industrial and air conditioning-cooling wells from the early part of the twentieth century are no longer used or available. While the public drinking water supply was totally from ground water until the 1850s, human consumption of local ground water stopped with the advent of piped city

water to all residents by the 1950s. The quality of the shallow wells became highly contaminated especially related to horse manure and auto residues.



Quantity: The normal temperature for city ground water should be 50F/IOC all year long. Water tables vary across the city both with seasonality and local pre/post construction activity. The nature of the sedimentary geology, filled stream valleys and fractured bedrock provide many avenues for abundant ground water resource. The intensive dewatering downtown has changed the importance of the resource in these developed areas. Millions of gallons of ground water are pumped out each day to keep the urban infrastructure stable and this volume is discharged into the storm and sanitary sewer systems. Rarely are the true economic benefits in utilizing this resource factored in.

Quality: Chemistry of our ground water varies by location across the city. The natural quality of Coastal Plain underground waters is generally naturally high in iron and sulfur which may exceed EPA drinking water standards. Waters are slightly acidic because all soils and geology are silica rich. Piedmont ground water

in the northwest portion of the city has a different chemistry with more Ca, K, and comes from the breakdown of metamorphic rocks from an ancient oceanic environment. D.C. maintains both shallow and deep ambient water quality monitoring wells across the city in all the major geologies.

Protection: D.C. has some of the strongest ground water quality standards in the country. Research profiles of ground water quantity, quality as well as flow models are being gathered and used for management. Site specific clean-up issues are looked at by the city in a larger neighborhood context and related to contamination and pumping in the adjoining properties. Ecological risk related to ground water surface water interconnections is another area of concern. Recently two major state wetlands failed and the cause was tracked to dewatering.

Drilling into the prime sole source regional aquifer under DC is also carefully monitored and steps to protect the recharge are underway.

Urban Issues: Coastal zones along the tidal portion of the Anacostia require special care in

dealing with contaminated ground water because of the tidal flux and sensitive artesian system.

Land use history and strong characterization of each urban fill are required for ground water work plans to be approved up front. The ground water section encourages conferences and data sharing with all participants before any project gets well along in the planning stages.

D.C. has many pathways for ground water to migrate. A compiled list of over 21 different pathways that water or polluted ground water may take in this small city-state is available.

Ref Background Study of the GROUND Water in the District of Columbia: DC VVMRC Report 103 (1992)

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